

Ignition 8.1 User Manual — Platform: Gateway, Projects and Databases

Generated 2026-10-12 from
<https://www.docs.inductiveautomation.com/docs/8.1/>

Ignition Platform

Overview

The Ignition platform refers to the core installation of Ignition. It provides all the basic functionalities such as connecting to devices and databases, licensing, launching clients and sessions, and managing all Ignition modules.

From that, additional modules or projects can be built to suit any customer's needs. Being cross-platform means that a piece of software like Ignition can be installed on multiple types of operating system such as Windows, Linux, and OSX. With its modular architecture, the Ignition platform enables you to build a customized system using modules as the building blocks. Modules are discussed in detail in the [Ignition Modules](#) section of the User Manual.

The following are key elements to the Ignition Platform. Follow the links for more detailed information on each area.

Feature	Description
Gateway	The Ignition Gateway is a web server, and when it is running, you access it from a web browser. In your web browser, type http://localhost:8088 to display the Gateway homepage. The Gateway Webpage is the hub for accessing all the functions of the Gateway server.
Database Connections	Connecting Ignition with an SQL database dramatically increases functionality. With a database, you can implement logging of data for historical analysis, tap into your data to discover trends and performance, create charts and reports, store Tag data, and store alarm logs.
Security	Security options in Ignition provide many ways to safeguard your data and applications. You control not only who accesses your systems, but when and where they can access them.
Designer	In Ignition Designer, your user interface design work is done. You create user interfaces with Vision components or Perspective components . Tags associated with components can instantly bind data to tables, charts, graphs, and graphs.
Tags	Tags are points of data and may have static values or dynamic values that come from an OPC address, an expression, or a SQL query. Tags offer a great amount of power in system design and configuration.
Alarming	Alarming enables you to easily create alarms, store alarm history, and design and manage your alarm notifications.
Localization and Languages	With Localization you can translate text into multiple languages in a project for display on client screens. The localization feature allows users located in different countries to set their default language so client screens can be displayed in their native language.
Expression Language and Syntax	The expression language is used to define dynamic values for component properties and expression Tags. Expressions often involve one or more other values that are used to calculate a final value. In most cases, expressions only return a value.
SQL in Ignition	Ignition's ability to connect to databases greatly increases the functionality available to you. You can use databases to store history, create easy to

Feature	Description
	search lists and configurations, and retrieve data from ERP or other systems.
Scripting	Most of the time when we talk about "scripting" in Ignition we are talking about Python scripting, or writing code in the Python language. Python is a general purpose programming language that was developed in the early 90s and has gained significant popularity in the 2000s. We like it because it is extremely readable, elegant, powerful, and easy to learn. As an added bonus, it gracefully interacts with Java, giving programmers an extremely powerful tool when paired with Ignition, which is written in Java.

Modular Architecture and Software Stack

Ignition platform has a modular architecture. Modules are software applications that are built and integrated into the platform to offer additional functionality. The modules are similar to applications for a smartphone in how they are seamlessly integrated and provide additional capabilities.

Most of the main features of Ignition are actually provided by different modules such as the **Perspective**, **Vision**, and **SQL Bridge** modules.

The Ignition software stack is shown in the illustration below. You can see that the HMI/SCADA/MES module layers are built on the Ignition platform. Here are the different software layers in Ignition's modular architecture:

- **Operating System (OS) Layer:** Provides basic computing resources such as the file system and access to the network.
- **Platform Layer:** Provides all the basic functionalities such as connecting to devices and databases, licensing, launching clients, and managing all Ignition modules over the web.
- **HMI/SCADA Module Layer:** Provides the core modules that enable real-time and historical data access, trends, and control.
- **Third Party Module Layer:** Additional modules provided by other developers to further extend Ignition's capabilities.
- **User Created Application Layer:** The resulting project created for your organization. Developed internally, or by a third party.

One Universal Platform

USER-CREATED APPLICATION LAYER

SCADA, HMI, MES, IIoT

THIRD-PARTY MODULE LAYER

MES

- OEE Downtime
- Recipe/Changeover
- SPC
- Track & Trace
- Web Services
- Instrument Interface

MQTT

- Engine
- Distributor
- Injectors
- Remote Manager
- Injectors
- Remote Manager

CORE MODULE LAYER



OPC UA



SQL Bridge



Tag Historian



Vision



Ignition Perspective



Reporting



Alarm Notification



Enterprise Administration

PLATFORM LAYER



- OPC UA Client
- Database
- Web Server

- Auditing
- Authentication
- Store & Forward

- Alarming Core Functionality
- Database Connectivity
- Real-Time Tag Database

- System Logging
- Licensing
- Module API

- Redundancy
- Unified Development Environment

OS LAYER



Windows
(Any Newer Version)



Linux



OS X

Gateway

The Ignition Gateway is the primary software service that drives everything in Ignition. It is a single application that runs as a web server and is accessed through a web browser. Its capabilities include connecting to data and PLCs, executing modules, and communicating with clients. You can customize the Homepage to fit your needs using the Gateway settings. From the Gateway, you activate Ignition, transfer licenses, backup and restore the Ignition Gateway, and set up redundancy. You can even set up a Gateway Network that allows two or more Gateways to connect to one another and share data.

Accessing the Gateway

The Gateway is accessed through a web browser (via the Gateway Web Interface). The web browser, running on any machine, must have network access to the host that is running the Gateway.

By default, Ignition installs by using the `8088` port. For example, if the host's IP address is `10.0.28.30`, you access the Gateway via the URL: `http://10.0.28.30:8088`. When Ignition is installed on the computer that you are logged into, you can access it by typing `http://localhost:8088` to display the Gateway Homepage. Any other computer on the same network can access the Gateway by using the IP Address or Host Name of the computer where Ignition is installed: i.e., `http://192.#.#.#:8088`, and it will launch the Gateway and bring up the Gateway Homepage.

Gateway Web Interface (Gateway Webpage)



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The Gateway Webpage

[Watch the video](#)

The Gateway Webpage performs a variety of functions and is the hub for accessing all the functions of the Gateway server. It drives everything in Ignition. The Gateway Webpage is where you set up your licensing and activation and configure your Gateway settings, databases, devices, projects, modules, security, and alarming. When the Gateway server is running, you can connect to a device, connect to a database, launch the Designer, and launch a Vision client or Perspective session. You can also check the status of your system, network, agents, sessions, tasks, reports, and alarms.

The Gateway Webpage has three tabs on the left side of the page that lead you to the key sections of the server: **Home**, **Status**, and **Config**. The top of the page shows you the path of where you are on the Gateway Webpage. You can perform a host of Gateway functions from configuring your system and modules, checking the status of all your Gateway connections, to launching clients and sessions, and many tasks in between. You can even redirect the Gateway Homepage to display another URL.

Home

The first time you go to the Gateway Homepage, it shows you several steps to help you get started. Once you're up and running, the **Home** tab lets you open Vision clients, Perspective sessions, and download the Designer Launcher. There are some resource links to help you get started with Ignition quickly: **Inductive University**, **Production Documentation** where you can learn about Ignition modules, and the Appendix which contains a complete reference for **components**, **expressions** and **scripting functions**.

When you're first introduced to Ignition, the Homepage is the landing page. It's where you'll find the **Designer Launcher**, **Vision Client Launcher**, and **Perspective Session Launcher**.

- The **Designer Launcher** locates all Gateways that are available on your local network. Once you open the Designer, you can access existing projects or create new projects on the Gateway.
- The **Vision Client Launcher** opens Vision Clients from any Ignition Gateway. It browses all Gateways for Vision projects that are available on your local network and remote locations. Once your Vision projects are added to the Vision Client Launcher, they will be displayed and all you have to do is click the link to launch a Vision Client.
- The **Perspective Session Launcher** opens a session directly in your browser or you can download the native application.

Home

Status

Config

Home > Get Started

WELCOME

Meet Ignition



Build It

Get the Designer

The Designer brings all your data, systems, and developers together into one beautifully simple, integrated development environment specifically designed to help you build industrial applications more quickly.



Download Designer Launcher

Run It

Vision Client Launcher

Download the Native Client Launcher to open Vision clients from any Ignition Gateway.



Download Vision Client Launcher

Perspective Workstation

Download Perspective Workstation to open sessions from any Ignition Gateway.



Download Perspective Workstation

Perspective Session Launcher

Launch a Perspective session directly in your browser or download the native application.



View Projects

NOTE

If you need to access your projects remotely, refer to the [Accessing Projects Remotely](#) section.

Status

The **Status** page provides in-depth information about the status of the different parts of the Ignition system. The list of options on the left menu in the Status page changes based on what modules are installed. You can select any of the available options to get more detailed information.

[Home](#)
[Status](#)
[Config](#)

SYSTEMS

[Overview](#)
[Performance](#)
[Alarm Pipelines](#)
[Gateway Scripts](#)
[Modules](#)
[Redundancy](#)
[Reports](#)
[SFCs](#)
[Voice Alarming](#)
[Tags](#)
[Transaction Groups](#)

CONNECTIONS

[Databases](#)
[Designers](#)
[Devices](#)
[Gateway Network](#)
[Store & Forward](#)
[OPC Connections](#)
[Perspective Sessions](#)
[Vision Clients](#)

DIAGNOSTICS

[Execution](#)
[Logs](#)
[Metrics Dashboard](#)
[Running Scripts](#)
[Threads](#)

Status > Systems > Overview

Architecture

Gateway | Ignition-77de4f48c8a5

0% cpu
207 mb

No Redundancy

Add a redundant backup gateway to protect your system from downtime caused by failures.

No Gateway Network

Multiply the power of your Ignition Gateways by combining them into an enterprise network. Streamline the administration, monitoring, deployment, and commissioning process into one central location.

Connections

Databases

1 / 1 connected

Designer Sessions

0 open

Devices

1 enabled

Gateway Network Connections

0 / 0 connections

OPC Connections

1 / 1 connected

Perspective Sessions

0 open

Store & Forward

0 stores quarantined

Vision Clients

0 open

Environment

Process Id	28
Operating System	Linux amd64
Java Version	11.0.16.1+1-LTS
Local Time	5:40:43 PM
Available Disk Space	219gb / 288gb
Detected NICs	

Systems

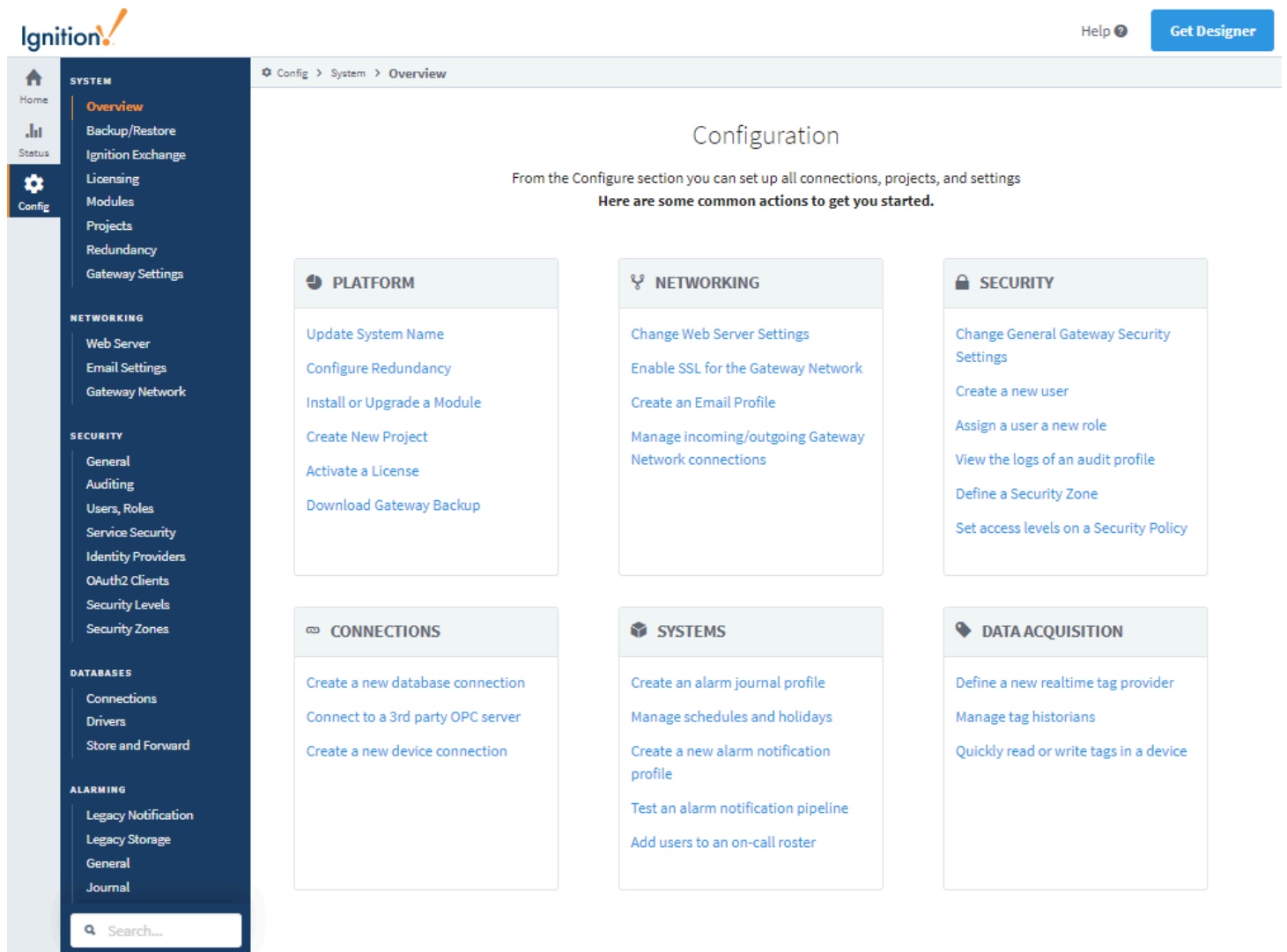
Alarm Pipelines	0 active
EAM Role	Unknown
Modules	24 installed
Performance	0% CPU 206mb
Redundancy	Not configured
Reports	0 scheduled
SFCs	0 running
Tags	196 tags

Diagnostics

Generate Diagnostic Bundle

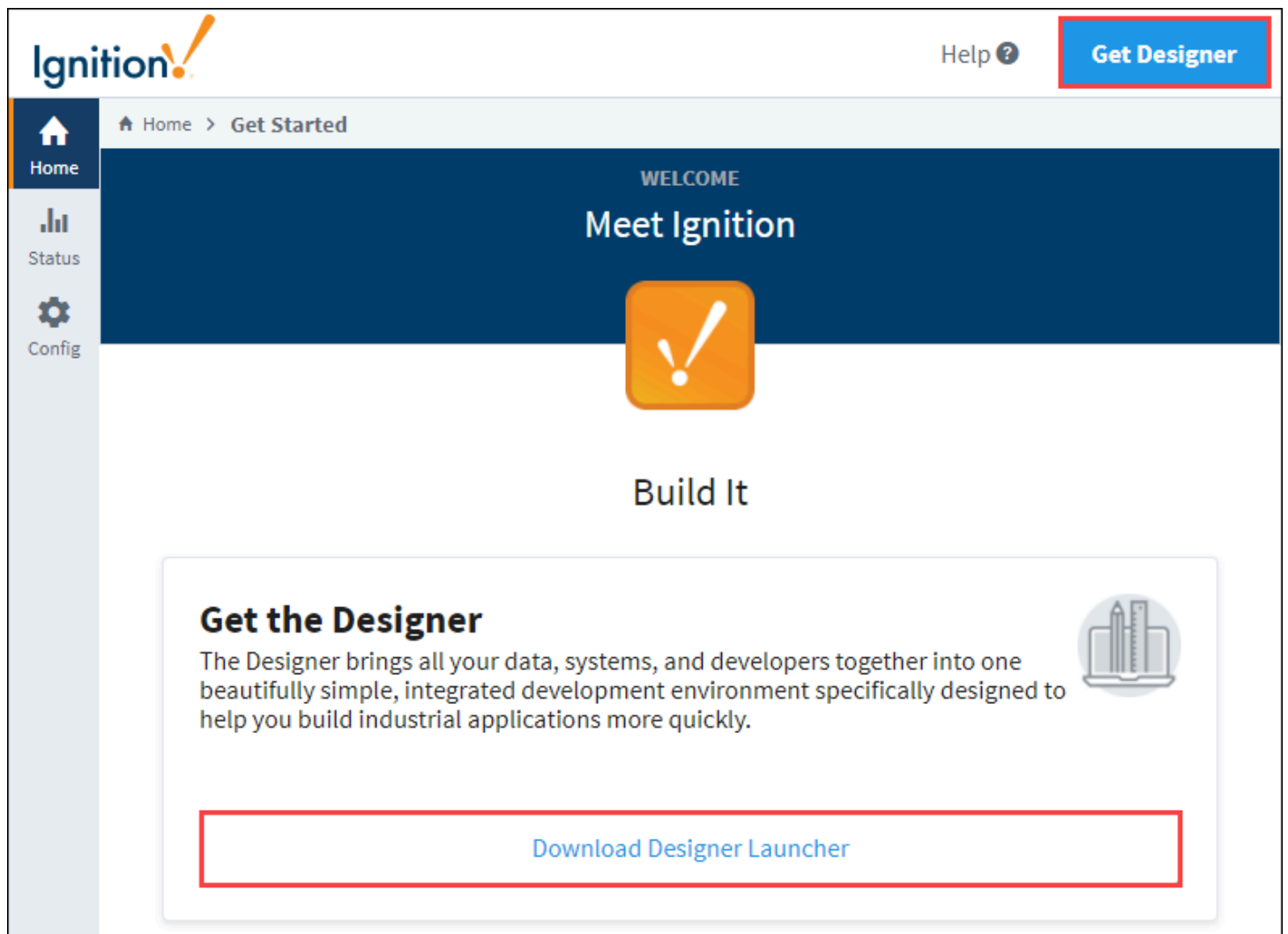
Config

If you are not already logged into your Gateway, **Config** tab presents you with a login screen. Enter the **username** and **password** for the Ignition administrator. This was the first account created during installation. From the Config page, you can set up all connections, projects, and perform all the Gateway and platform operations. The list of options on the left menu changes based on what modules are installed. You can select any of the available options to get more detailed information. This page also provides some links to common actions to help get you get started.



Designer Launcher

The **Designer Launcher** locates all the Gateways that are available on your local network. Once the Designer is open, you can access existing projects or create new projects on the Gateway. The **Designer Launcher** button on the top right side of the page and the **Download** button opens the Designer Launcher Download page. Here you can find all the Designer Launchers for each operating system: Windows, Mac and Linux. Ignition automatically detects your operating system so all you have to do is download the launcher and follow the steps to install the Designer Launcher. To learn about what the Designer can do, go to the **Designer** section of this manual.



Starting and Stopping the Gateway

After installation, the Gateway starts automatically. The Gateway runs as a service, so you can use your operating system's normal mechanisms to start or stop the service. You can also start or stop the Gateway from command line.

Windows

Ignition's installation directory contains `start-ignition.bat` and `stop-ignition.bat`, which can start or stop the service. For example:

```
C:\Program Files\Inductive Automation\Ignition> start-ignition.bat
```

However, you can also use Windows native service commands to control the running state of the Gateway:

```
net start ignition
```

```
net stop ignition
```

Linux

You can control the service using the `ignition.sh` script. It can be called with the `start` and `stop` parameters to perform the relevant operations. For example:

```
/usr/local/bin/ignition/ignition.sh start
```

Additionally, you can use native terminal commands to start or stop the service:

```
service Ignition-Gateway start
```

```
service Ignition-Gateway stop
```

Max OS X

You can access the service from the install directory using the "ignition.sh" script. On a typical Mac install using the dmg installer, the full command (without a custom location specified) is the following:

```
/usr/local/ignition/ignition.sh start
```

Gateway Command-line Utility

The **Gateway Command-line Utility - gwcmd** (GCU) is a lightweight standalone application that provides information about the Gateway. It performs high-level tasks that aren't available inside the Gateway webpage such as stopping and restarting the Gateway server, and setting ports used between the Gateway and clients. It shows the status of the Tomcat web server and the Ignition Gateway application. You can reset the Gateway password, and even launch the web browser to the Gateway webpage.

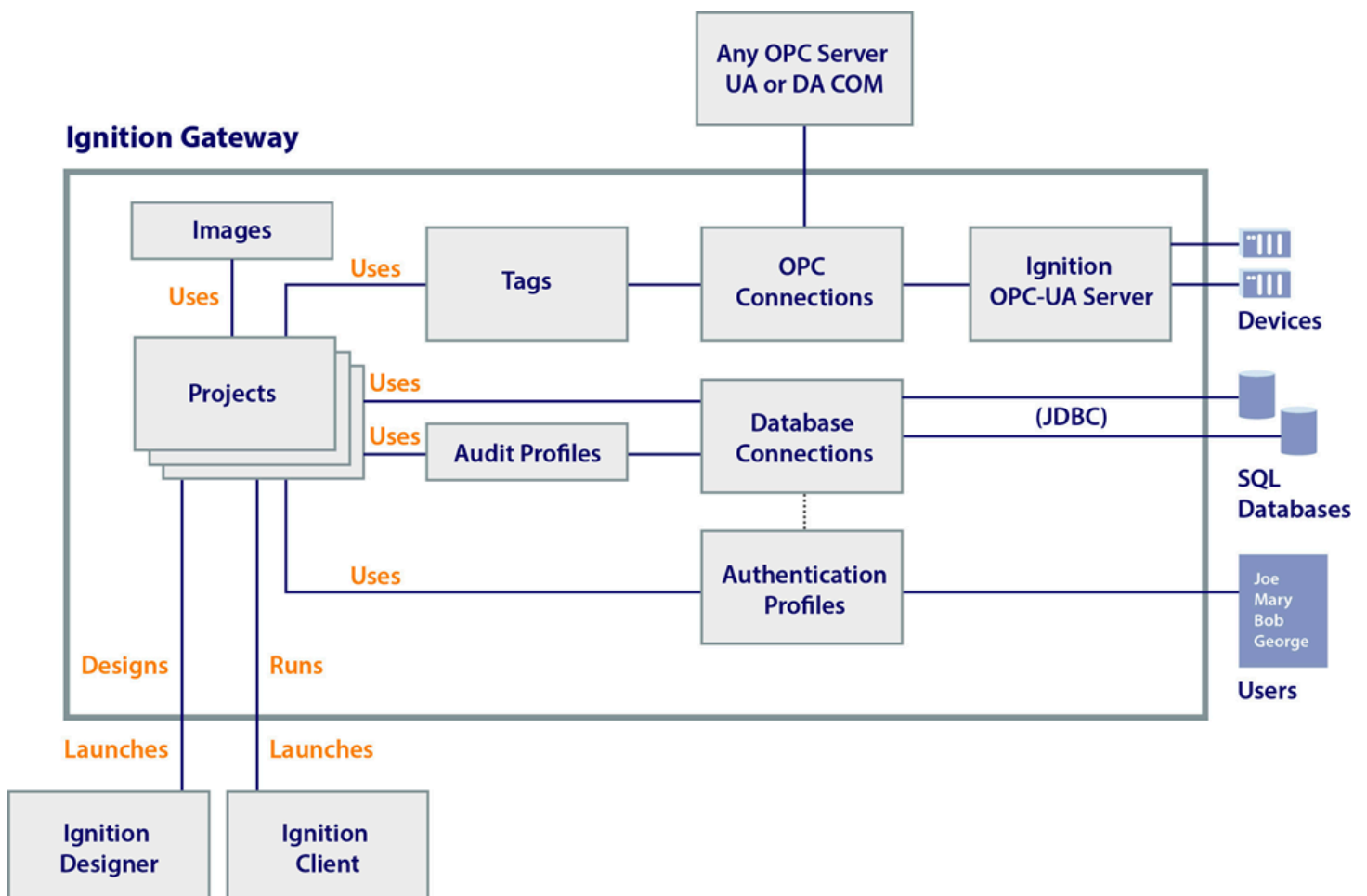
For more information, refer to the page on the **Gateway Command-line Utility - gwcmd**.

Gateway Architecture

The Gateway's architecture contains many parts, each one letting you perform a specific task. The Gateway parts are as follows:

- System Management
- Project and Module Management
- Security and Auditing Settings
- Database Connectivity
- Alarming and Modification Settings
- Tags Provider Settings
- OPC Connectivity
- Enterprise Administration Settings
- Projects

The following image shows the different parts of the Gateway and how projects work within the Gateway. Note the parts that are outside the Ignition Gateway box, non-Ignition OPC servers, databases, devices, etc., are all separate from Ignition but can be connected.



Home

The Home tab provides you with all of the tools you need to get started designing projects and launching Perspective Sessions and Vision Clients. There are four launchers on the Homepage that will quickly get you started:

- The **Designer Launcher** allows you to create or modify a project. Download the launcher and create a shortcut so it's always on your desktop when you need it.
- The **Vision Client Launcher** browses all Gateways for Vision projects that are available on your local network. Once your projects are added to the Vision Client Launcher, they will be displayed and available to open in a Vision Client. Simply download the launcher and create a shortcut on your desktop so it's always at your fingertips when you want to launch a Vision Client.
- The **Perspective Session Launcher** allows you to easily launch a session directly in your browser. Simply click the link and Ignition will display all your Perspective projects.
- **New in 8.1.0** The **Perspective Workstation** is a single application that acts as both a launcher, and desktop “wrapper” for Perspective Sessions.

While the top navigation bar is present no matter what tab you are in, the Get Designer button in the upper right corner does not require that a user login to the Gateway. This allows a user to launch the Designer right away, only logging in once the Designer has fully launched. See the **Designer** section for more information on launching and using the Designer.

On the Homepage, we also provide quick links to several resources: **Inductive University**, Product Documentation, and the Appendix which contains a complete reference for **components**, **expressions** and **scripting functions** in Ignition.

WELCOME

Meet Ignition



Build It

Get the Designer

The Designer brings all your data, systems, and developers together into one beautifully simple, integrated development environment specifically designed to help you build industrial applications more quickly.


[Download Designer Launcher](#)

Run It

Vision Client Launcher

Download the Native Client Launcher to open Vision clients from any Ignition Gateway.


[Download Vision Client Launcher](#)

Perspective Workstation

Download Perspective Workstation to open sessions from any Ignition Gateway.


[Download Perspective Workstation](#)

Perspective Session Launcher

Launch a Perspective session directly in your browser or download the native application.


[View Projects](#)

Status

Your Gateway at a Glance



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**Gateway Status Page
Troubleshooting**

[Watch the video](#)

The Status tab provides both an 'at a glance' overview of all of the systems in your Gateway, while also giving you the ability to drill down into specific systems and get a more in depth view of what is currently happening in your system. The Systems and Connections sections that are displayed on the left side of the Status page are based on what modules are currently installed. Some 3rd party modules could potentially add sections that are not discussed in this manual.

When first opening the Status tab, you will be taken to the Overview page. This page provides an overview of all Ignition systems, while also acting as a launchpad to all other sections in the Status tab. The pages in the Status tab are built around the idea of quickly drawing attention to problem areas by highlighting them. As you can see, this Gateway has a faulted database. The pages in the Status tab also allow you to 'drill down' into sections to see more information. Most objects can be clicked on, like the faulted database. Clicking either of these will take you to the appropriate section, allowing you to quickly find out what is wrong with a particular system.

Home

Status

Config

SYSTEMS

Overview

Performance

Alarm Pipelines

Gateway Scripts

Modules

Redundancy

Reports

SFCs

Voice Alarming

Tags

EAM Tasks

Transaction Groups

CONNECTIONS

EAM Agents

Databases

Designers

Devices

Gateway Network

Store & Forward

MongoDB

OPC Connections

Perspective Sessions

Vision Clients

DIAGNOSTICS

Execution

Logs

Metrics Dashboard

Running Scripts

Threads

Search...

Status > Systems > Overview

License Incomplete 1:55:28

View Modules

Architecture

Gateway | Gateway A

Version: (Dev Version)

License: partial

Uptime: a day

2% cpu

760 mb

No Redundancy

Add a redundant backup gateway to protect your system from downtime caused by failures.

Gateway Network

Active Connections	Remote Gateways	Bytes Sent /sec	Bytes Received /sec
1 / 1	1	663 B	1 KB

Connections

Databases

1 / 2 connected

Designer Sessions

0 open

Devices

2 enabled

EAM Agents

0 / 2 agents

Gateway Network Connections

1 / 1 connections

OPC Connections

1 / 1 connected

Perspective Sessions

0 open

Store & Forward

1 stores quarantined

▲ 1 total quarantined items

Vision Clients

0 open

Environment

Process Id	5776
Operating System	Windows 10 amd64
Java Version	11.0.17+8-LTS
Local Time	7:04:34 AM
Available Disk Space	219gb / 476gb
Detected NICs	

Systems

Alarm Pipelines	0 / 1 active
EAM Role	Controller
EAM Tasks	0 running
Modules	26 installed
Performance	1% CPU 761mb
Redundancy	Not configured
Reports	0 scheduled
SFCs	0 running
Tags	420 tags

Diagnostics

Generate Diagnostic Bundle

The Status section of the Gateway Webpage provides detailed information relating to the following parts:

Systems

Section	Description
Overview	Provides a top-down view of many of the components of your Gateway. This view is also useful for determining what step might be next when setting up your Ignition Gateway for the first time. You can view the status of your database connections, device connections, OPC connections, the number of open Clients and the number of open Designers. The Status > Overview page displays the number of Perspective Sessions currently running.
Performance	Displays the performance status for the Ignition system such as CPU, Memory and Threads.
Alarm Pipelines	Shows the status details about the alarm notification pipelines. You can see the status of an alarm and where the alarm is in the pipeline.
Gateway Scripts	Shows status details about all the Gateway event scripts running in Gateway. You can see information such as their execution status, whether the scripts are running or not, and so on.
Modules	A list of installed modules, their status, as well information about their version and current license state.
Redundancy	Lists information about the current state of Redundancy in Ignition. This information is only helpful when connected to another redundant Ignition server.
Reports	Displays information about the current and scheduled reports on the Gateway if you are using the Reporting module.
SFCs	Displays information about Sequential Function Chart (SFC) instances.
Tags	Lists information and statistics about all configured Tag Providers as well as a view into the Tag subscription model, scan classes, and what tags it is currently subscribed to.
Transaction Groups	Displays information about the current Transaction Groups.

Connections

Section	Description
EAM Agents	Displays a list of information from configured EAM agents.
Databases	Displays a list of configured databases, and if they have a valid connection or not. Shows active queries, long running queries, the number of queries a second that are running, as well as a trend showing the percentage of queries that completed in that time.
Designers	Displays information on currently running Designer sessions along with some information about each session.
Devices	Displays a list of currently configured OPC UA devices and which are connected and which have a faulty connection. It also shows how many Tags Ignition is requesting from the device along with how often it is requesting them. This information is used to determine if the device is overloaded with too many requests too quickly, or if the device is being under utilized.
Gateway Network	Shows an overview of the status of all Gateways within the Gateway Network. It also provides some metrics for each Gateway, giving an idea of the rate of data transfer between two Gateways, as well as a list of connection events. New in 8.1.25 The Live Diagram tab will take you to the Gateway Network Diagram. This tool is a visual representation of your Gateway Network and contains relevant information from the local Gateway's perspective.
Store & Forward	Displays a list of Store and Forward engines, including status, as well as the number of records currently in each Store and Forward system.
MongoDB	Displays metrics from a list of created MongoDB connections.
OPC Connections	Displays a list of all current OPC connections and their status.
Perspective Sessions	Shows a list of current Perspective sessions and details about each session.

Section	Description
Vision Clients	Shows a list of current Vision Clients and details about each client.

Diagnostics

Section	Description
Execution	Displays a status of all tasks that your Gateway runs on a schedule, such as duration and execution time of an alarm journal update or the average time it takes a Gateway to execute a Tag Group.
Logs	Displays errors caused by Gateway events like database or device connections, authentication profiles, alarm journals, and pipelines. Logs include a wealth of information about the running state of the Gateway.
Metrics Dashboard	New in 8.1.13 Displays user-configurable dashboards featuring gauges, counters, meters, and other metrics visualizations. Available metrics include information about performance, tags, alarming, projects, and databases.
Running Scripts	Shows all actively running Gateway scripts, as well as providing a way to terminate any running script. In addition, Vision client and Designer consoles have a Running Scripts tab, which also lists running scripts and provides a way to terminate them.
Threads	Shows what each thread is doing in the Gateway, including their state and CPU usages.

Search

The Status tab also displays a search bar at the bottom left of each page. This search bar allows you to type in a word or phrase, and it will list all appropriate pages in both the Status and Config tabs to easily find all pages related to a specific system.

Controller admin | Sign Out →

Ignition! Help ? [Get Designer](#)

SYSTEMS

- Overview
- Performance
- Alarm Pipelines
- Gateway Scripts
- Modules
- Redundancy
- Reports
- SEC...

Status **Config**

Status > Connections > Databases

Configuration

Valid Connections: 1 / 2

Total Throughput: 2.9 queries/sec

Search results for 'database'...

- Databases in > Connections
- Store & Forward in > Connections
- Transaction Groups in > Systems
- Connections in > Databases
- Drivers in > Databases
- Store and Forward in > Databases

database

Driver	Status	Connections	Throughput	Actions
MySQL ConnectorJ	Valid	0 / 8	2.9 queries/sec	Details
Oracle	ERROR	0 / 8	0.0 queries/sec	Details

Diagnostic Bundle Export

New in 8.1.21

The Status tab's Overview page contains an option to generate and download different sets of diagnostic information at once. This information includes:

- Gateway Information
- Thread dump
- Wrapper log file(s)
- System log IDB
- Metrics IDB
- Memory dump

NOTE

The memory dump will only be generated if the `-Dignition.diagnostic-bundle.enable-memory-dump` parameter is set to true (`wrapper.java.additional.X=-Dignition.diagnostic-bundle.enable-memory-dump=true`), and available disk space is **greater than or equal to** twice

the max heap size. For more information on adding system properties, see the [Gateway Configuration File Reference](#) page.

- **New in 8.1.27** Jetty server dump
- **New in 8.1.38** Gateway Network Diagram JSON

CAUTION

Exporting the Diagnostics Bundle with an increased number of wrapper logs and/or larger-sized wrapper logs may impact Gateway performance or cause the Gateway to restart.

Environment

Process Id	28
Operating System	Linux amd64
Java Version	11.0.15+10-LTS
Local Time	2:53:58 PM
Available Disk Space	239gb / 288gb
Detected NICs	172.17.0.5

Systems

Alarm Pipelines	0 active
EAM Role	Unknown
Modules	24 installed
Performance	0% CPU 182mb
Redundancy	Not configured
Reports	0 scheduled
SFCs	0 running
Tags	196 tags

Diagnostics

Generate Diagnostic Bundle 

Systems

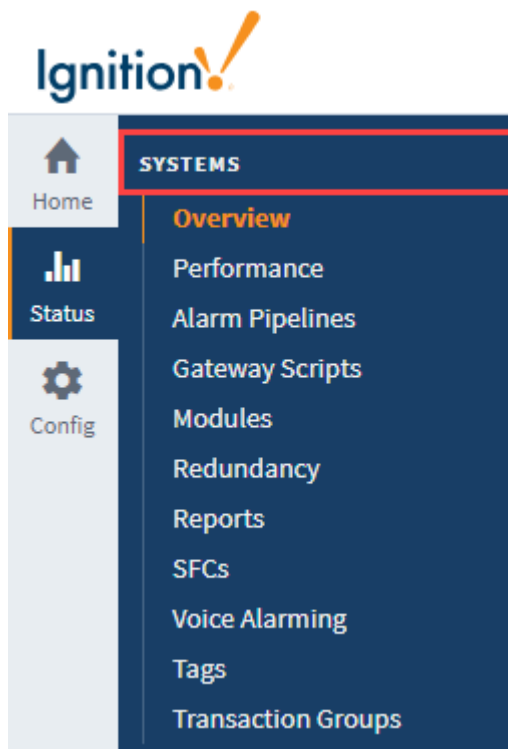


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Gateway Status Page Troubleshooting

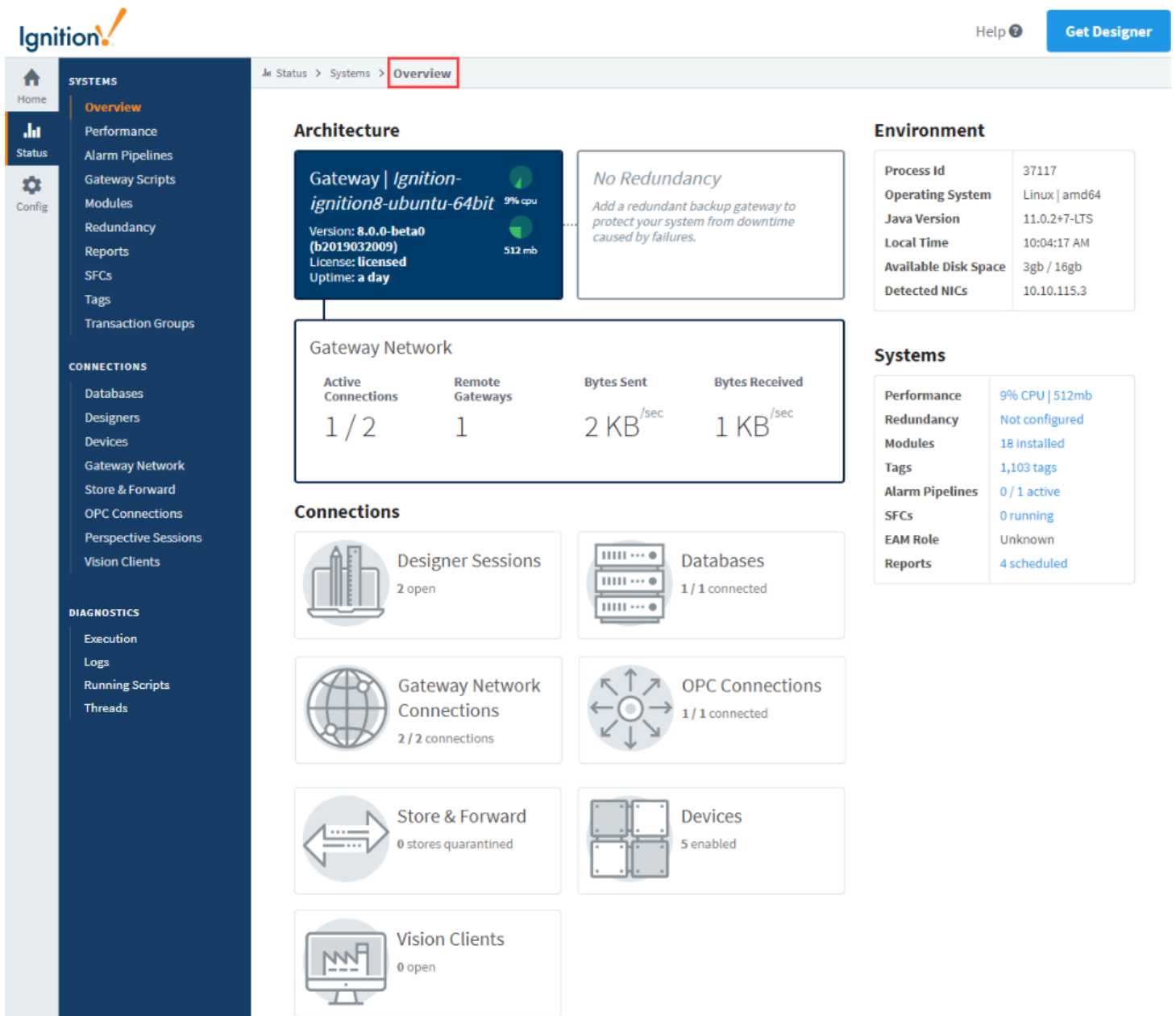
[Watch the video](#)

The Systems section of the Status tab displays information regarding the internal Gateway systems. This includes systems such as the currently running Transaction Groups as well as active Alarm Pipelines. These sections are not necessarily concerned with any connections to external systems.



Overview Section

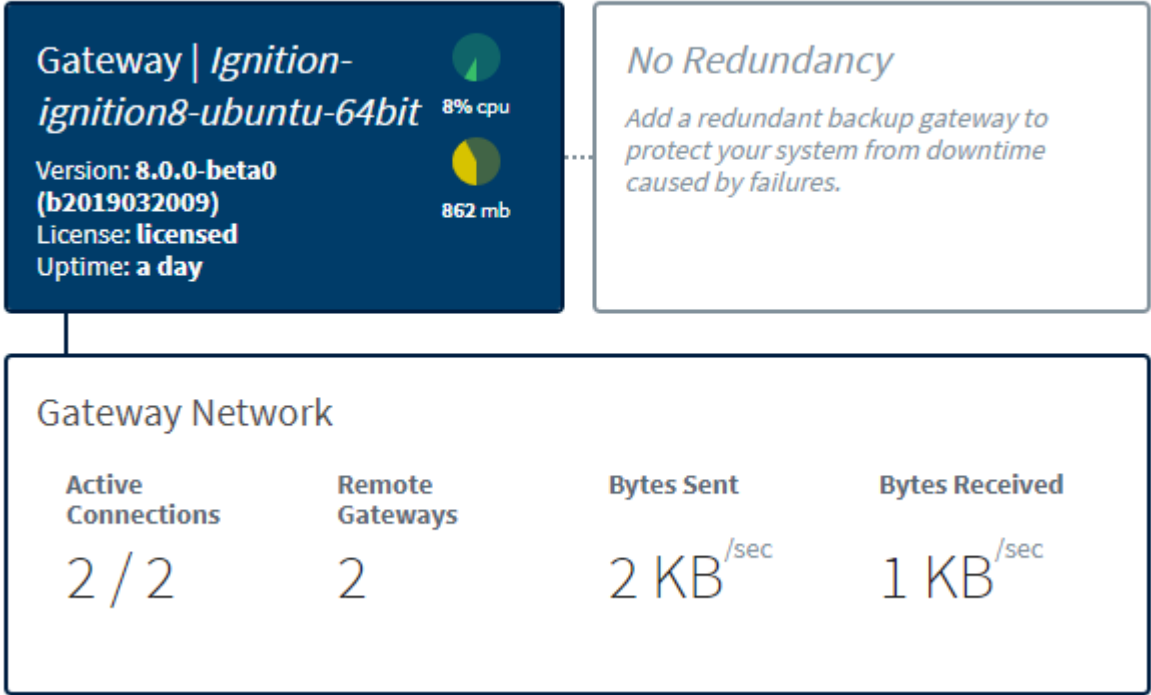
The Overview page is the first page that you see when navigating to the Status tab. It provides a visual synopsis of everything in the Gateway, as well as some basic information about the server Ignition is installed on. There are four sections on the page: **Architecture**, **Environment**, **Systems**, and **Connections**.



Architecture

The Architecture segment provides a top down view of your Gateway. You can see your Ignition version and resource usage, as well as similar information with a redundant Gateway, if one is connected. You also get an overview of the Gateway Network including how many active connections there are, and what is the amount of data being transferred between them.

Architecture



Environment

The Environment segment provides some basic information about your server such as the Operating System (OS), Java version, available disk space, and IP address of detected network interface cards (NIC).

Environment

Process Id	37117
Operating System	Linux amd64
Java Version	11.0.2+7-LTS
Local Time	11:18:31 AM
Available Disk Space	3gb / 16gb
Detected NICs	10.10.115.3

Systems

The Systems segment summarizes each of Ignition's systems. Here, you can see how many modules you have installed as well as how many Tags are configured in your Gateway, along with a handful of other information. Click on any of the linked system descriptions to find out more information about a particular system.

Systems

Performance	6% CPU 504mb
Redundancy	Not configured
Modules	18 installed
Tags	1,103 tags
Alarm Pipelines	0 / 1 active
SFCs	0 running
EAM Role	Unknown
Reports	4 scheduled

Connections

The Connections segment shows all of the systems that Ignition is connected to. If any of these have issues, they will be outlined in red. Clicked on the connection to be taken to the relevant page within the Status tab.

Connections



Designer Sessions
3 open



Databases
1 / 1 connected



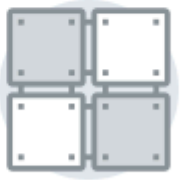
Gateway Network Connections
2 / 2 connections



OPC Connections
1 / 1 connected



Store & Forward
0 stores quarantined



Devices
5 enabled

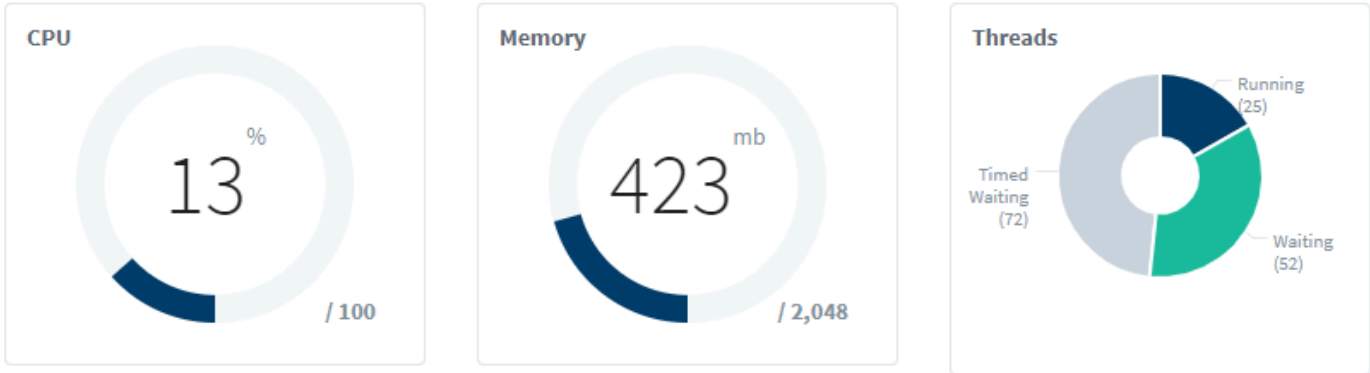


Vision Clients
0 open

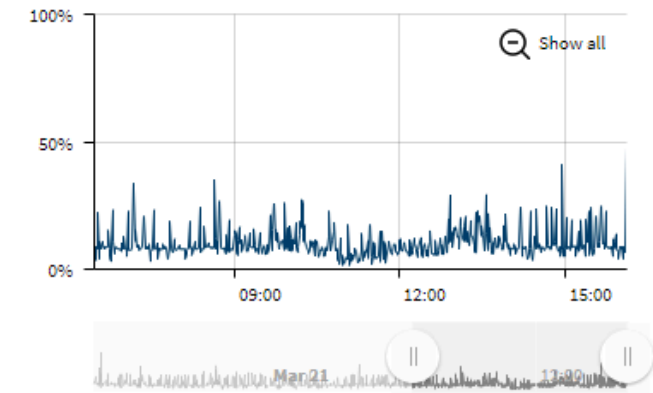
Performance

The Performance page displays information on the resource usage of the Gateway. This page enables you to quickly assess your Gateway's overall health and determine if the Gateway is being taxed too heavily for the server it's running on. You can see the current CPU usage, the current memory usage (in megabytes) out of the total allocated for the Gateway, and how CPU threads are performing. In the CPU Trend and Memory Trend sections there are sliders you can move to set the time range anywhere within the previous 24 hours. The lower portion of the page shows the current system response time as well as a log of any recent slow response events.

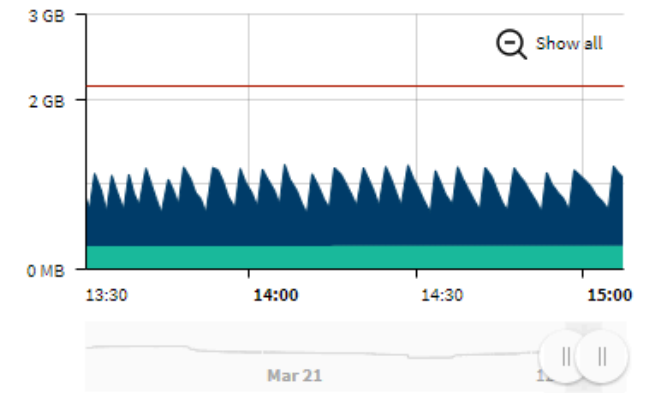
Status > Systems > Overview



CPU Trend

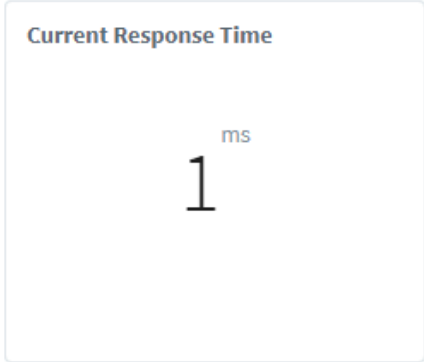


Memory Trend



Garbage Collectors: G1 Young Generation, G1 Old Generation

System Response



Recent Slow Response Events

Severity	Time	Event
No events to display.		

Alarm Pipelines

The Alarm Pipelines page lists the currently configured alarm pipelines in the Gateway. Each pipeline displays the number of alarm items currently running through it. Click on the Details button to the right to open up a new page that will show the alarm pipeline status and logs. There will also be a set of tabs at the top of the page. One for the Pipeline Status that is already open, the other for Pipeline Logs. This [log viewer](#) will act as a miniature log viewer that will only show logs that pertain to this particular pipeline.

[Status](#) > [Systems](#) > **Alarm Pipelines**

Configuration

Active

0/2

« < 1 of 1 > »

Filter

View 20 ▼

Name ▼	Active?	Items	Actions
project:alarm-pipelines:/pipeline:Loop Pipeline	false	0	Details
project:NewProject_SJP:/pipeline:Test Pipeline	false	0	Details

Gateway Scripts

The Gateway Scripts page displays a list of all currently configured Gateway scripts. These are scripts that are configured in the [Gateway Event Scripts](#) section of the project. The tabs at the top of the page will swap between the different types of Gateway Event Scripts: Timer, Tag Change, Message Handler, Startup, and Shutdown. They provide useful information such as the name of the project that it is running in as well as the last time it ran, the duration and status (if it was successful or not).

With this page you can quickly verify that your scripts are running properly. If a script has an error, click on the error for more details about what went wrong with the script. All of the logs for that section are also contained in the log viewer at the bottom of the page, to make it easy to see a list of all of the logged errors for that set of Gateway Event Scripts.

Timer

Tag Change

Message Handler

Startup

Shutdown

« < 1 of 1 > »

Filter

View 20 ▼

Project ▼	Name	Rate	Last Execution	Duration	Status
-----------	------	------	----------------	----------	--------

No scripts found.

« < 1 of 1 > »

Log Activity

⏮ ⏪ ⏩ ⏭

Min level INFO ▼



Live Values

ON

Merge to Logs



Logger	Time	Message
--------	------	---------

No log entries found

Modules

The Modules page shows a list of the currently installed modules, their current version, and if they are running properly with a license. The top of the page shows a quick count of the running and licensed modules, so you can easily tell if anything is not working. It is then easy to scroll down through the list to see which modules are having issues.

[Licensing Configuration](#)

Running Modules

18 / 18

Licensed Modules

18 / 18

License Details

License Key	LRN-IGN
Version	8
edition	standard

Inductive Automation, LLC

Name	Version	License	Status
Alarm Notification	5.0.0-beta0 (b2019032010)	Activated Q	✓ RUNNING
Allen-Bradley Driver	5.0.0-beta0 (b2019032010)	Activated Q	✓ RUNNING
DNP3 Driver	3.0.0-beta0 (b2019032010)	Activated Q	✓ RUNNING
Enterprise Administration	3.0.0-beta0 (b2019032010)	Activated Q	✓ RUNNING
Logix Driver	4.0.0-beta0 (b2019032010)	Activated Q	✓ RUNNING
Modbus Driver	6.0.0-beta0 (b2019032010)	Activated Q	✓ RUNNING

Redundancy

The Redundancy section displays information regarding the redundant system, if one is configured. It easily shows the Role of the Gateway you are viewing, the status of the connected Gateway, and their IP addresses. The trends on this page give a snapshot of the last few minutes of communication between the two Gateways. The first trend shows the data that is being sent and received between the two Gateways, the second shows the state updates that have recently occurred. The bottom of the page contains a log of the last system events, to easily track major events between the Gateways.

Force Re-Sync

The **Force Re-Sync** button forces a full synchronization of the redundant configuration state. The backup node will be forced to restart.

Request Failover

The **Request Failover** button switches the active node in a redundant pair.

New in 8.1.17 Failover to the other redundant node is now allowed if the nodes have different platform versions, which will allow attached clients to remain connected to at least one node during a redundant pair upgrade.

Status > Systems > **Redundancy**

Configuration

Role
Backup

Peer Connected
Yes

Redundancy Properties

Activity Level	Cold
Synchronization Status	Out of Date
Local Address	10.10.115.7
Peer Address	Ignition-ignition8-ubuntu-64bit-Master

Force Re-SyncRequest Failover

System Events

Severity	Time	Event
🔴	22Mar2019 16:43:04	Initiating a forced configuration re-sync
🔴	22Mar2019 16:43:04	Forced configuration sync initiated.
🔴	22Mar2019 16:42:28	Redundancy state changed: Role=Backup, Activity level=Cold, Project state=OutOfDate, History level=Full

Reports

The Reports page shows information on any Reports that have at least one scheduled action set up. The top of the page gives a quick count of reports that are executing an action, have executed an action, or are going to execute an action. Below you can also find a list of Reports in those states as well, to quickly see what project they are located in, or what their last execution time was. As with most other pages, there is also a log of all events related to reports at the bottom of the page.

Report Stats

Currently Executing

0

Completed Scheduled Executions

1

Upcoming Scheduled Executions

1

Currently Executing Reports

Project	Report Path	Status	Execution Start	Elapsed Time
No items to display				

Completed Scheduled Executions

Project	Report Path	Status	Execution Start	Elapsed Time
TestProject	Report	Finished	30Sep2016 00:00:00	283 milliseconds

Upcoming Scheduled Executions

Project	Report Path	Scheduled Start	Actions
TestProject	Report	01Oct2016 00:00:00	Save File

Log Activity



Min level
INFO
Live Values
ON
Merge to Logs

Logger	Time	Message
No log entries found		

SFCs

The **Sequential Function Charts** (SFCs) section displays a list of all of the currently configured SFCs along with a count of the currently running charts at the top of the page. Click the **Details** button next to any SFC for details about that particular Chart.

Status > Systems > Sequential Function Charts

Chart Stats

Running Charts

0 / 1

Defined Charts

« < 1 of 1 > »

Filter type to filter

View 20

Chart ^	Project	Run Mode	Running Instances	Actions
New Chart	test	✓ Callable	0	Details

« < 1 of 1 > »

On the Details for an individual SFC, there are two tabs: Chart Instances and Chart Logs. It contains a list of all currently running Chart instances, and allows you to swap tabs to look at any logged events for that particular chart.

Status > Systems > Sequential Function Charts

Chart Instances

Chart Logs

Chart Instances

Status	Execution Start ^	Current Step	Parent	Started By	Actions
No items to display.					

Voice Alarming

The Voice Alarming page provides details about the currently configured **Voice Notification Profiles** on the Gateway. This status can be used to quickly see which Notification Profiles are not working. Clicking the details button enables you to see the current calls with that Voice Notification profile and the current queue of calls waiting to be completed.

Voice Alarming

Available Voices

Name	Locale
No voice modules installed.	

Profiles

Name	Status	Pending Calls	
Skype	▲ unknown [-1]	0	Details
voiceProfile1	✓ Registered with VOIP Host	0	Details

Tags



INDUCTIVE
UNIVERSITY

Tag Diagnostics

[Watch the video](#)

The Tags page contains a lot of information about the Gateway's configured Tags and Tag Providers. The first page will show a list of all realtime and historical Tag Providers that make it easy to see if any of them are having issues. Clicking on an errored provider will show an error message that may help fix the problem. Clicking on the **Details** button to the left will open up a page with more information about the Tags in that particular provider.

Realtime Providers

« < 1 of 1 > »

Filter	type to filter	View	20	
Name ▲	State	Tag Count	Actions	
default	Running	299	Browse	
ExportTags	Running	11	Browse	
System	Running	104	Browse	
ubuntu-64bit_default-tags	Unknown	Not Available	Browse	

« < 1 of 1 > »

Historical Providers

« < 1 of 1 > »

Filter	type to filter	View	20	
Name ▲	State	Actions		
MySQL	Good	Details		
vm_db	Good	Details		

The details of the Tag Provider will show a list of all currently configured Tags in that Tag Provider, and show some basic information about them. You can browse through the Tag structure to get more information about each Tag. When clicking the Details button for an individual Tag, you will be brought to a Tag Diagnostics screen that will provide more detailed information about that particular Tag, such as if it has a script written in its Tag event scripts and what its last value was, among other information.

Tags

Groups

Provider Logs

2 items << < 2 of 1 > >>

Filter type to filter

View 50 ▼

Name ▲	Value	Type	Quality	Actions
Fan 1 HOA	0	AtomicTag	✓ Good	Details
Fan 2 HOA	0	AtomicTag	✓ Good	Details

Fan 1 HOA

Tag Diagnostics

Path	[default]AU 1
Last Value	n/a
Last Quality	Good
Last Execution	n/a
Value Timestamp	09Jul2019 15:41:26
Last Error	n/a
Last Error Cause	n/a
Alarmed?	false
Bound?	false
Historical?	false
Secure?	false
Scaled?	false
Scripted?	false

The Groups tab allows you to see the Tag Groups configured. It also shows the number of executions for each Tag Group, the last time the Group was executed and the average duration in milliseconds. Provider Logs display any events that relate to that particular provider.

Tags

Groups

Provider Logs

Name	Mode	Rate	Leased Rate	Is Leased	Executions	Last Duration	Avg Duration
Direct	Direct	1000	1000	false	73787	0	0
Direct 5 Seconds	Direct	5000	1000	false	14769	0	0
Driven	Driven	10000	1000	false	81172	0	0
Driven Machine State	Driven	10000	1000	false	81172	0	0
Driven Manual	Driven	4000	500	false	165852	0	0
Driven One Shot	Driven	120000	1000	true	1	0	0
Leased	Leased	10000	1000	false	81172	0	0
Time Driven	Driven	60000	1000	false	75018	0	0
default	Direct	1000	1000	false	73787	0	0

EAM Tasks

The EAM Tasks section will only show up once the **EAM module** is configured. This page shows information regarding the currently running and scheduled tasks, as well as tasks that were recently executed and whether they were successful or not. From here you can pause a scheduled task, or see the error that caused a previous execution to fail.

Status > Systems > **EAM Tasks**

Configuration

Executing Agent Tasks

0

Scheduled Agent Tasks

0

Executing Agent Tasks

Task Name	Task Type	Task State	Execution Start	Progress	Message
No items to display.					

Scheduled Agent Tasks

Task Name	Task Type	Repeats	Next Execution Start	Status
No items to display				

Recently Completed Tasks

Task Name	Task Type	Task Start	Agent	Task Result
Collect Backup (forced)	backup	25Mar2019 12:39:32	Ignition-2	✓ Success

Transaction Groups

The Transaction Groups page makes it easy to get a quick count of the currently running **Transaction Groups** as well as the currently errored groups. Below the counts is a list of Projects that contain Transaction Groups and some basic information like how many are running and how many database queries is it generating. Clicking the details button to the right for one of the Projects brings up more information about that Project's Groups. There are some counts on the number of Groups in various states, as well as a list of the groups. Any Groups that have problems can be clicked on to see what the error is to get a better idea of why the Group is unable to run.

Gateway Stats

Running Groups

0 / 5

Errored Groups

0 / 5

« < 1 of 1 > »

Filter

View 20 ▼

<u>Project</u> ▼	<u>Total</u>	<u>Running</u>	<u>Errored</u>	<u>Tag Writes</u>	<u>DB Queries</u>	<u>Actions</u>
Tank_Control	1	0	0	0 / sec	0 / sec	Details
NewProject_SJP	4	0	0	0 / sec	0 / sec	Details

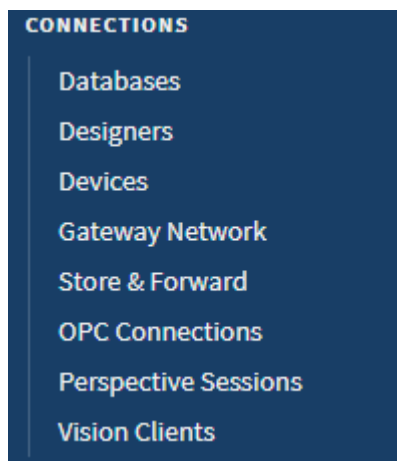
« < 1 of 1 > »

Connections

Status of Gateway Connections

The Connections section of the Status tab on the Gateway Webpage contains information regarding the status of Gateway connections to external systems. The list of systems displayed under the Connections section is based on what modules are installed. It can include EAM Agents, Databases, Devices, Store and Forward, the Gateway Network including other Gateways within the Gateway Network. The Connections section allows you to drill down and open up more specific information to easily find problems with anything connected to the Gateway, and even find crucial information about a faulty connection.

On the left side of the Status section of the Gateway Webpage, you'll see a list of all your connections. Click on any system to open a detailed page to see all the available options, and to get more detailed information. Some third party modules could potentially add sections that are not discussed in this manual.



Log Activity

Most of the systems in the Connection section have a Log Activity area somewhere within the details of the connection. This Log Activity area functions much like the [Logs in the Diagnostics](#) section of the Status page in that you see a list of all log messages depending on the logging level you are looking at as well as the filters you have set up. However, what makes the Log Activity areas in each Connections page unique is that they are filtered to only show loggers for that particular system. This helps you narrow down any potential problems by showing you only the information that pertains to the section you are looking at.

Log Activity



Min level

INFO

Live Values ☒

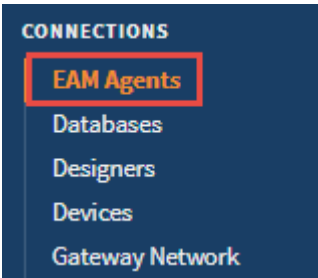
Merge to Logs

Logger	Time	Message
No log entries found		

Connections - EAM Agents

EAM Agents

The EAM Agents page shows a list of all the currently configured Agents, including information on the connection status. Agents can be organized into groups allowing you to group agents by location or agent function. If no groups exist, all Agents will be in the Default Group.



EAM Agents Page

The EAM Agents page contains some useful information about all of your Agent connections.

EAM Agent Connections

Attribute	Description
EAM Agents	Number of connected agents out of the number of configured agents.

Default Group and all Groups

Attribute	Description
Gateway	Name of the Agent.
Edition	Identifies a Standard vs Edge Gateway. Edge edition shows "edge," and if it's a Standard Gateway, this field is left blank.
Status	Current status of the Agent connection.
Last Comm	Date and time recorded for the last communication with the Agent.
Last Event	Name of the event last recorded with the Agent.
Event Date	Date and time recorded for the last occurring event with the Agent.
Log Activity	Shows any EAM Agent activity along with the Time the log was created and a brief message. You can find more of these same type of messages in the Gateway Logger which is found in the Status section under Diagnostics > Logs , and the Wrapper Logger file under Program Files > Inductive Automation > Ignition > logs > wrapper.log .

Configuration

Connected Agents

1 / 1

Default Group

Gateway ▾	Edition	Status	Last Comm	Last Event	Event Date
Ignition-2		✓ Connected	25Mar2019 14:26:30	cpu [NORMAL]	25Mar2019 12:39:20

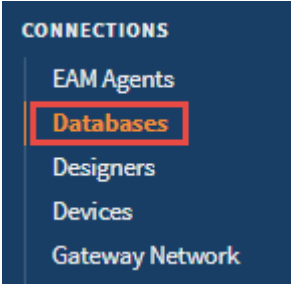
Log Activity



Min level	INFO ▾	i	Live Values	ON	Merge to Logs 🔍
Logger	Time	Message			
E AgentLicenseDetailPage	25Mar2019 12:41:53	license.ipl cannot be loaded from the archive!			
I AgentEventRecorder	25Mar2019 12:37:43	EAM event record table successfully verified.			
I Agent	25Mar2019 12:37:43	[Ignition-2] Agent state has transitioned to Running			
I AgentModel	25Mar2019 12:36:59	New agent 'Ignition-2' has connected to this controller. It needs to be approved.			🔍

Connections - Databases

The Databases page shows a list of configured databases, and if they have a valid connection or not. Clicking on the **Details** button to the right of a connection will either show the full error if the connection is faulted, or it will bring you to a Details page for that database connection. On the Details page, you can easily see any active queries, long running queries, the number of queries a second that are running, as well as a trend showing the percentage of queries that completed in that time.



Databases Page

The main database page contains some useful information about all of your database connections.

Attributes	Description
Valid Connections	Number of valid connections.
Total Throughput	Number of queries and their statuses.
Name	Name of the query.
Driver	Name of the driver.
Status	Current status of the database connection.

Status > Connections > **Databases**

Configuration

Valid Connections

1 / 1

Total Throughput

8.1^{queries/sec}

« < 1 of 1 > »

Filter type to filter

View 20 ▼

Name ▲	Driver	Status	Connections	Throughput	Actions
MySQL	MySQL ConnectorJ	✓ Valid	0 / 8	8.1 queries/sec	Details

« < 1 of 1 > »

Database Connection Details

The **Details** page for an individual connection provides more in depth information for that particular database connection.

Database Stats - Stats About the Database Connection

Attribute	Description
Connections	Number of database connections out of configured databases.
Queries/Sec	Number of queries running per second along with a trend showing the percentage of queries that completed in that time.

Active Queries - A List of Currently Active Queries

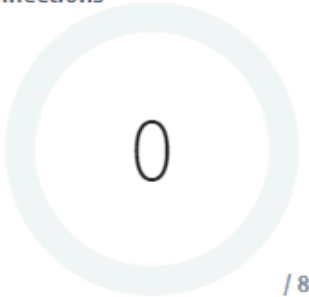
Attribute	Description
Query	Currently running queries.
Started	When the query was started.
Actions	The ability to cancel a query.

Longest Recent Queries - A List of the Longest Running Queries

Attribute	Description
Query	Displays the actual query.
Duration	Amount of time the query ran.
Started	When the query started running.

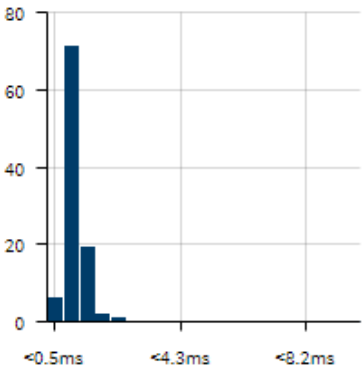
Database Stats

Connections



Queries / Sec

8



Active Queries

Query [▲]	Started	Actions
No items to display.		

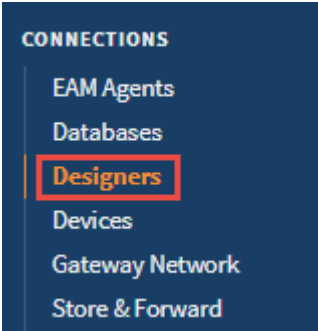
Longest Recent Queries

Query [▼]	Duration	Started
SELECT a.`id`,a.`tagpath`,a.`datatype`,a.`scid`,a.`querymode`,a.`created`, b.`drvid` FROM sqlth_te a left join sqlth_scinfo b on a.`scid`=b.`id` WHERE b.`drvid` in (?, ?, ?) and a.`retired` is null or a.`retired`=0	30 ms	7 minutes ago
SELECT `id` FROM sqlth_scinfo WHERE `scname`=? AND `drvid`=?	8 ms	7 minutes ago

Connections - Designers

Designers

The Designers page displays information on currently running Designer sessions. Each session shows basic details such as the user logged in and the project they are working on. Clicking the **Details** button next to a session opens a view with additional information about that Designer, including session stats and a log of recent activity or errors.



Designers Page

The main page shows all active Designer sessions along with basic details for each one.

Designer Stats

Attribute	Description
Active Designers	Number of active Designer connections.
Requests/Sec	Number of requests running per second along with a trend showing the percentage of requests that completed in that time.

Designer Sessions

Attribute	Description
Filter	Search criteria to filter for specific Designer sessions.
View	The number of Designer sessions to preview.
Id	Designer session id number.
User	Name of the user logged into the Designer.
Project	Name of project the user is currently working on.
Uptime	Amount of time the user is logged into the Designer session.
Status	If the Designer is actively connected or not.
Address	The IP Address and name of the computer running the Designer.
Memory	Current memory usage for the session.

Designer Stats



Designer Sessions

« < 1 of 1 > »

Filter	View						
type to filter	20 ▾						
<u>Id</u> ▾	<u>User</u>	<u>Project</u>	<u>Uptime</u>	<u>Status</u>	<u>Address</u>	<u>Memory</u>	<u>Actions</u>
697B7559	admin	alarm-pipelines	11 minutes	✓ Active	TR-89MC8R2-WS (10.10.110.54)	128mb	<button>Details</button>

« < 1 of 1 > »

Designer Details

The Designer Details page provides more in-depth information about a specific session. This includes user and project details, network and memory usage, and logging activity. The log at the bottom of the page displays any relevant errors or events related to that Designer session.

Session Details

Attribute	Description
User	Name of the user logged into the Designer.
Project	Name of project the user is currently working on.
Address	The IP Address and name of the computer running the Designer.
Uptime	Amount of time the user is logged into the Designer session.
Memory	Current memory usage for the session.
Timezone	Local time of the user.

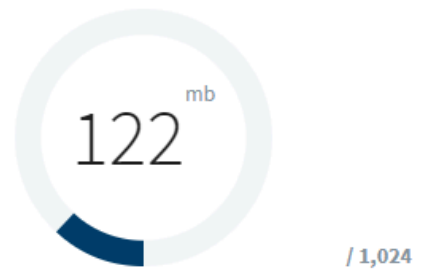
Log Activity

Attribute	Description
Min Level	Dropdown menu with options, Info, Debug, and Trace.
Live Values	Toggle to enable or disable live log updates.
Logger	Name of the logger that describes the context of the message.
Time	Time of log.
Message	Message for the log.

Session Details

User	admin
Project	alarm-pipelines
Address	TR-89MC8R2-WS (10.10.110.54)
Uptime	22 minutes
Timezone	America/Los_Angeles [GMT-8:00]

Memory



Log Activity



Min level INFO



Live Values



Merge to Logs



Logger	Time	Message
T Gateway	26Mar2019 14:42:27	Writing push notifications
T Gateway	26Mar2019 14:42:27	Writing push notifications
T Gateway	26Mar2019 14:42:27	Writing push notifications
T Gateway	26Mar2019 14:42:27	Writing push notifications

Connections - Devices

Devices

The Devices page lists the currently configured OPC UA devices, and lets you know which are connected and which have a faulty connection. From here, you can drill into a device connection to see how many tags Ignition is requesting from the device, along with how often it is requesting them. This information can be used to determine if we are overloading the device with too many requests too quickly, or if we can request more from our device.



Devices Page

The main Devices page lists out all OPC UA devices, as well as how many currently have a valid connection. Note: this will only show the devices connected through an Ignition device connection. For information about devices connected through other OPC Servers, see those programs.

Attribute	Description
Connected Devices	Number of devices connected out of configured devices.
Name	Name of the device.
Driver	Name of the device driver.
Status	Current device status.

Connected Devices

1 / 1

«

<

1

of 1

>

»

Filter

type to filter

View

20

▼

<u>Name</u> ▲	<u>Driver</u>	<u>Status</u>	<u>Actions</u>
Micro_1	MicroLogix	Connected: Protocol: EIP	Details

«

<

1

of 1

>

»

Device Details

Clicking the **Details** button to the right will display a diagnostics page for that device which provides metrics for the device configuration. The page contains an Aggregate Statistics table and lists additional statistics to help determine if the device is overloaded with requests. There are values for each subscription (such as those created by Tag Groups or Transaction Groups using OPC items) from the specified device, as well as aggregate statistics which pull from all subscriptions to get an average for the device.

Device Statistics

The table below summarizes the statistics available on the Device Details page.

Attribute	Description
Request Count	Tracks the number of requests that are coming in from the device. A request is a group of tags/items that the driver has grouped together to be read at the same time. Each driver forms these groups based on the protocol being used and occasionally configuration settings in the driver.
Throughput (Mean)	Represents the average amount of requests that come through per second since the device was last started. If the device connection is edited and saved, this will cause the device connection to reinitialize and this value will be reset.
Mean Response Time	The average time it takes for Ignition to get a response from the device. This number is an average based of the graph on the right of the page.
Monitored Item Count	Represents the total number of items that are subscribed to. Note that this count includes device diagnostic tags. However, other statistics on the device status page do not account for diagnostic tags.
Mean Queue Duration	New in 8.1.6 Represents the average amount of time a request has spent in the request queue. Not available under aggregate statistics.
Actual Sampling Interval	New in 8.1.6 Represents the actual rate the driver is sampling the device at. Used to determine Overload. Not available under aggregate statistics.

CAUTION

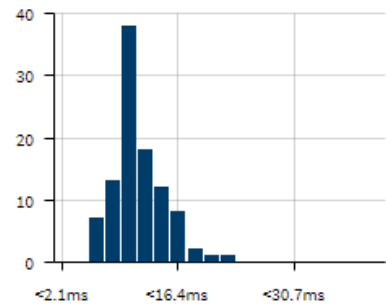
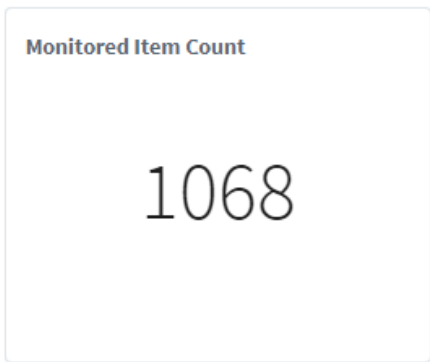
Note that the metrics above have corresponding [diagnostics tags](#) available, allowing other areas of Ignition to access these values

In the image below, we see there are a total of 1068 items being monitored, which are optimized into 38 different requests.

Of those requests, five are being sampled at a 250ms rate. At this same rate, requests sit in a request queue for an average of 4.24ms before being processed. Thus the actual sampling interval for this sampling rate is 254.24ms.

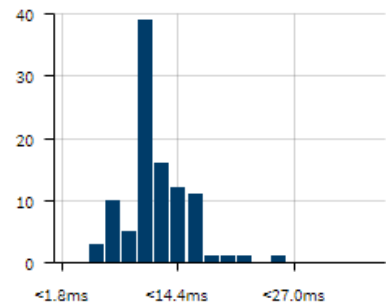
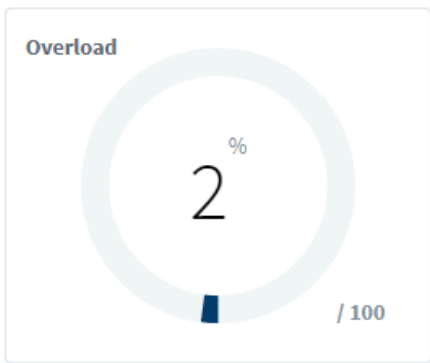
Aggregate Statistics

Details	
Request Count	38
Throughput (Mean)	52.33/sec
Throughput (1 min)	52.49/sec
Mean Response Time	10.64ms



Sampled at 250ms

Details	
Request Count	5
Throughput (Mean)	19.85/sec
Throughput (1 min)	20.00/sec
Mean Response Time	10.91ms
Mean Queue Duration	4.24ms
Actual Sampling Interval	254.24ms



Overload

New in 8.1.6 The overload metric was introduced in 8.1.6, replacing the prior Load Factor metric. Overload represents how well the device is able to keep up with the requests at the sample rate. It is calculated using the formula:

$$100 * (\text{Mean Queue Duration} / \text{Sampling Interval}) = \text{Overload}$$

If overload exceeds 100% then the requests are sampling at a slower than ideal rate.

Based on the image above, overload for our 250ms sample group is determined by:

$$100 * (4.24 / 250) = 1.696$$

Our value of 1.696 can then be rounded up to 2%. In this case, it doesn't seem as if the device is having much trouble keeping up with our requests.

Connections - Gateway Network

The Gateway Network Status page is designed to give a quick overview of the status of all Gateways within the Gateway Network. If a Gateway connection is faulted, the status message in red can be selected to see the error that pertains to why it is faulted. Any Gateway connections with a status of 'Connected' can be drilled into by clicking the **Details** button to the right. On the Details page, metrics for the selected Gateway connection are displayed, giving an idea of the rate of data transfer between the two Gateways, as well as a list of recent connection events.

This page gives a general overview of the Connections - Gateway Network webpage. See the [Gateway Network Connection Details](#) page for more in-depth information.

New in 8.1.25

The Gateway Network Status page also has a tab which visualizes data about your Gateway Network. See the [Gateway Network Diagram](#) page for more information.



Gateway Network Page

The main Gateway Network page displays a list of all current Gateway Network connections both incoming and outgoing, as well a list of all Remote Gateways that the Local Gateway can see both from its Gateway Network connections and through proxy connections. Each list has some basic information along with the ability to see more details on a specific Gateway Network connection or a Remote Gateway.

Gateway Network Connections

Attribute	Description
Remote Gateway	Name of the Remote Gateway connection.
Direction	The direction of the Gateway Network connection. Can either be Incoming or Outgoing.
Redundancy Role	The redundancy role of the Gateway. Can either be Independent, Backup, or Master.
Last Comm	The time of the last communication with the Gateway.
Ping Time	Reaction time of Gateway connection. How fast you get a response after you've sent out a request.
Status	Current state of the Gateway Network Connection.
Fault Count	Number of times the connection has faulted since the Gateway has been started.

Remote Gateways

Attribute	Description
Gateway Name	Name of the Remote Gateway.
Outgoing Msg/Sec	The number of outgoing messages per second.
Incoming Msg/Sec	The number of incoming messages per second.
Pending	Number of messages pending in a queue that are waiting to be dispatched to the Gateway Network connection.
Connected Through	How the Gateway is connected to the Remote Gateway.
Status	Current state of the Remote Gateway Connection.
Version	New in 8.1.40 The version of the connected Remote Gateway. If your 8.1 Gateway is connected to a 7.9 legacy Gateway, a banner will display at the top of both the Gateway Network and Gateway Live Diagram pages, which warns that your 7.9 Gateway will not be able to communicate with your current Gateway, should it be upgraded from 8.1 to 8.3.

Network

Live Diagram



Legacy Gateway Connections(s) Detected

This Gateway has remote connections to Gateways with versions 7.x. If this Gateway is updated to 8.3 in the future, these 7.x connections will no longer be able to communicate over the Gateway Network.

Connections

« < 1 of 1 > »

Filter type to filter

View 20 ▾

Remote Gateway ▲	Direction	Redundancy Role	Last Comm	Ping Time	Status	Fault Count	Actions
gateway+c	Outgoing	Independent	a few seconds ago	20 ms	Running	10	Details

« < 1 of 1 > »

Remote Gateways

« < 1 of 1 > »

Filter Gateway c

View 20 ▾

Gateway Name ▲	Outgoing Msg/Sec	Incoming Msg/Sec	Pending	Active	Routed Through	Status	Version	Actions
Gateway C	0.0	0.0	0	0	gateway+c	Connected	7.9.x	Details

« < 1 of 1 > »

Gateway Network Connection Details

Gateway Network Connection Details

Ignition's Gateway Network system shares information across Gateways using threads to send and receive information. For example, if you have a Remote Tag Provider configured between Gateway A and Gateway B, messages containing live tag information will be sent between these two Gateways using threads to send and receive live tag data. Similarly, a Remote Historical Tag Provider will send/receive messages with historical tag data between Gateway A and Gateway B using this same set of threads. Each Ignition sub system that uses the Gateway Network will utilize these threads in some way.

Ignition's Gateway Network also has a queue associated with each Ignition subsystem. These queues allow for Ignition to have a way to prioritize which sub system should have access to a send or receive thread. Prioritization here is especially important because if all send threads are in use, messages cannot be sent between two Gateways. The Gateway Network page includes additional information that will help better monitor Gateway interactions.

Network

Live Diagram

Connections

« < 1 of 1 > »

Filter type to filter

View 20 ▾

Remote Gateway ▲	Direction	Redundancy Role	Last Comm	Ping Time	Status	Fault Count	Actions
gateway+b	Outgoing	Independent	a few seconds ago	25 ms	🟢 Running	0	Details

« < 1 of 1 > »

Remote Gateways

« < 1 of 1 > »

Filter type to filter

View 20 ▾

Gateway Name ▲	Outgoing Msg/Sec	Incoming Msg/Sec	Pending	Active	Routed Through	Status	Actions
Gateway B	0.2	0.4	0	0	gateway+b	🟢 Connected	Details
	0.0	0.0	0	0		⚠️ Defined_NeverConnected	Details
	0.0	0.0	0	0		⚠️ Defined_NeverConnected	Details

« < 1 of 1 > »

The image above shows the basic Gateway Network Connection Status page where we can see there is an outgoing Gateway Network connection from Gateway A to Gateway B. Pressing the Details button will bring up detailed information about this connection as below:

Status

Running

Average Outgoing Bytes

1 KB /sec

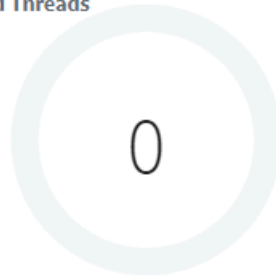
Average Incoming Bytes

2 KB /sec

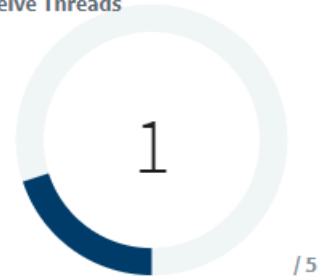
Ping Time

1 ms

Send Threads



Receive Threads



Active Outgoing Tasks

<u>Task Name</u> ▼	<u>Source Queue</u>	<u>Duration Secs</u>
CallResult:Services/Get Service State	Call Results Queue	30354
CallResult:Services/Get Service State	Call Results Queue	401254
CallResult:Services/Get Service State	Call Results Queue	554102

Active Incoming Tasks

<u>Task Name</u> ▼	<u>Duration Secs</u>
No items to display.	

Attribute	Description
Status	Current state of the Gateway Network Connection.
Average Outgoing Bytes	Average bytes of data going from the Local Gateway to the Remote Gateway per second.
Average Incoming Bytes	Average bytes of data going from the Remote Gateway to the Local Gateway per second.
Ping Time	Reaction time of Gateway connection. How fast you get a response after you've sent out a request.
Active	Number of messages being actively processed by the Gateway network connection.
Send Threads	A thread that is used by the Gateway Network to upload messages from one Gateway to another.
Receive Threads	A thread that is used by the Gateway Network to download messages from one Gateway to another.
Local Id	Id of the local Gateway.
Remote Id	Id of the remote Gateway.
Remote Gateway	Name of the Gateway on the Gateway network.
Network Address	Physical address used to communicate with all devices on the Gateway network.
Redundant Role	The redundancy role of the Gateway. Can either be Independent, Backup, or Master.
Direction	The direction of the Gateway Network connection. Can either be Incoming or Outgoing.
Session Id	Gateway connection session Id number. Connected Gateways use the same session Id on both Gateways.

Attribute	Description
Last Comm	The time of the last communication with the Gateway.
Fault Count	Number of times the connection has faulted since the Gateway has been started.
Connection Events	Displays a list of recent connection events.

Active Outgoing and Incoming Tasks List

Attribute	Description
Task Name	Name of the task that is using a thread.
Source Queue	The Ignition sub system queue that dispatched this task.
Duration Secs	This is how long in seconds it takes for a task to be performed.

Gateway Network Statistics

In addition to showing live thread and task information, users can also keep track of Gateway Network Statistics. By clicking on the Details button below, the Gateway Network Statistics Page appears for Gateway B:

Network

Live Diagram

Connections

« < 1 of 1 > »

Filter type to filter

View 20

Remote Gateway ▲	Direction	Redundancy Role	Last Comm	Ping Time	Status	Fault Count	Actions
gateway+b	Outgoing	Independent	a few seconds ago	25 ms	Running	0	Details

« < 1 of 1 > »

Remote Gateways

« < 1 of 1 > »

Filter type to filter

View 20

Gateway Name ▲	Outgoing Msg/Sec	Incoming Msg/Sec	Pending	Active	Routed Through	Status	Actions
Gateway B	0.2	0.4	0	0	gateway+b	Connected	Details
	0.0	0.0	0	0		Defined_NeverConnected	Details
	0.0	0.0	0	0		Defined_NeverConnected	Details

« < 1 of 1 > »

Outgoing Queues

The Gateway Network Statistics page has three sections associated with it. First, the Outgoing Queues section. The Outgoing Queues section shows tasks that are both in a pending and active state. A pending task is a task that has not yet been dispatched to the Gateway Network thread pool. An active task is a task that is being processed by the Gateway Network thread pool and should show up under the Gateway Network Connection Status page as either an outgoing or incoming task.

Outgoing Queues							
Name ▲	Priority	Inserts/Sec	Pending	Active	Avg Pending Secs	Total	Actions
Call Results Queue	Highest	0.5	0	0	0.0	333,299	<button>More ▼</button> <button>Clear</button>
Default Queue	Normal	0.0	0	0	0.0	2	<button>More ▼</button> <button>Clear</button>
Long Wait Queue	Low	0.0	0	0	0.0	0	<button>More ▼</button> <button>Clear</button>
Proxy Queue	AboveNormal	0.0	0	0	0.0	0	<button>More ▼</button> <button>Clear</button>
Tag Value Publishing	Normal	0.0	0	0	0.0	0	<button>More ▼</button> <button>Clear</button>

Attribute	Description
Name	Name of the queue.
Priority	Level of priority for a queue.
Inserts/Sec	Rate of task inserts per second for a queue
Pending	Number of pending tasks in a queue that have not yet been dispatched to a Send/Receive thread.
Active	Number of messages being actively processed by the Gateway Network connection.
Avg Pending Secs	Average number of seconds that a task has been pending in a queue.
Total	Total number of tasks executed from this queue.
Actions	Set of actions associated with a queue. Users can both Pause and Clear a queue.

Temporary Queue Actions

The Gateway Network Statistics page has controls for pausing and clearing a queue. To **pause** a queue means no new tasks will be allowed to be inserted into the paused queue. To **clear** a queue means that all pending tasks will be purged. These actions are designed to help the user deal with a possibly overloaded Gateway Network connection due to a specific sub system flooding the queue with more tasks than the connection can handle. Note that neither of these actions will have any effect on active tasks, as they have already been dispatched to the Gateway Network connection and cannot be cancelled.

Outgoing Queues

Name ▲	Priority	Inserts/Sec	Pending	Active	Avg Pending Secs	Total	Actions
Call Results Queue	Highest	0.5	0	0	0.0	333,313	More ▼Clear
Default Queue	Normal	0.0	0	0	0.0	2	Pause
Long Wait Queue	Low	0.0	0	0	0.0	0	More ▼Clear

Outgoing and Incoming Tasks Statistics

The Outgoing and Incoming Task Statistics section shows individual tasks that have been processed by the Gateway Network Connection.

Outgoing Task Statistics

Name ▲	Description	Queue	Invocations/Sec	Avg Duration Secs	Total
Remote Tags (v7)/getProviders	Returns a list of tag providers	Remote Tags (v7)	0.0	0.3	1
Remote Tags/cancelSubscription	Cancel a remote tag subscription	Remote Tags	0.0	0.4	1
Remote Tags/getProperties	Return a list of tag provider properties for a specified provider	Remote Tags	0.0	0.4	2
Remote Tags/modifySubscription	Modify a remote tag subscription	Remote Tags	0.0	0.4	1
Remote Tags/validateSubscription	Validates that tag subscriptions between gateways is synchronized	Remote Tags	0.1	0.6	39
Services/Enumerate Services	Returns a list of available services on a remote machine	Default Queue	0.0	0.7	12
Tag History Storage Service/canAcceptData	Indicates whether the local historian can store new data	Tag History Storage Service	0.0	0.4	1
Tag History/getHistoricalProviders	Returns a list of historical providers	Tag History	0.0	0.3	1

Incoming Task Statistics

Name ▲	Description	Invocations/Sec	Avg Duration Secs	Total
CallResult:Remote Tags (v7)/getProviders	Returns a list of tag providers	0.0	0.0	1
CallResult:Remote Tags/cancelSubscription	Cancel a remote tag subscription	0.0	0.0	1
CallResult:Remote Tags/getProperties	Return a list of tag provider properties for a specified provider	0.0	0.0	2
CallResult:Remote Tags/modifySubscription	Modify a remote tag subscription	0.0	0.0	1
CallResult:Remote Tags/validateSubscription	Validates that tag subscriptions between gateways is synchronized	0.1	0.0	39
CallResult:Services/Enumerate Services	Returns a list of available services on a remote machine	0.0	0.0	10
CallResult:Tag History Storage Service/canAcceptData	Indicates whether the local historian can store new data	0.0	0.0	1
CallResult:Tag History/getHistoricalProviders	Returns a list of historical providers	0.0	0.0	1

Outgoing and Incoming Tasks Attributes	Description
Name	Name of a task.
Description	Description for a task.
Queue	Queue invoking a task (For Outgoing Tasks only)
Invocation/Sec	Rate at which a task is invoked per second.
Avg Duration Secs	Average duration in seconds of the time it takes for this task to execute.
Total	Number of times the task has been executed in total.

Gateway Network Diagram

New in 8.1.25

Gateway Network Diagram Overview

The **Gateway Network Diagram** is a visual representation of your Gateway Network. You can access the **Live Diagram** tab by going to your Gateway webpage's Status tab > Connections > Gateway Network > Live Diagram.



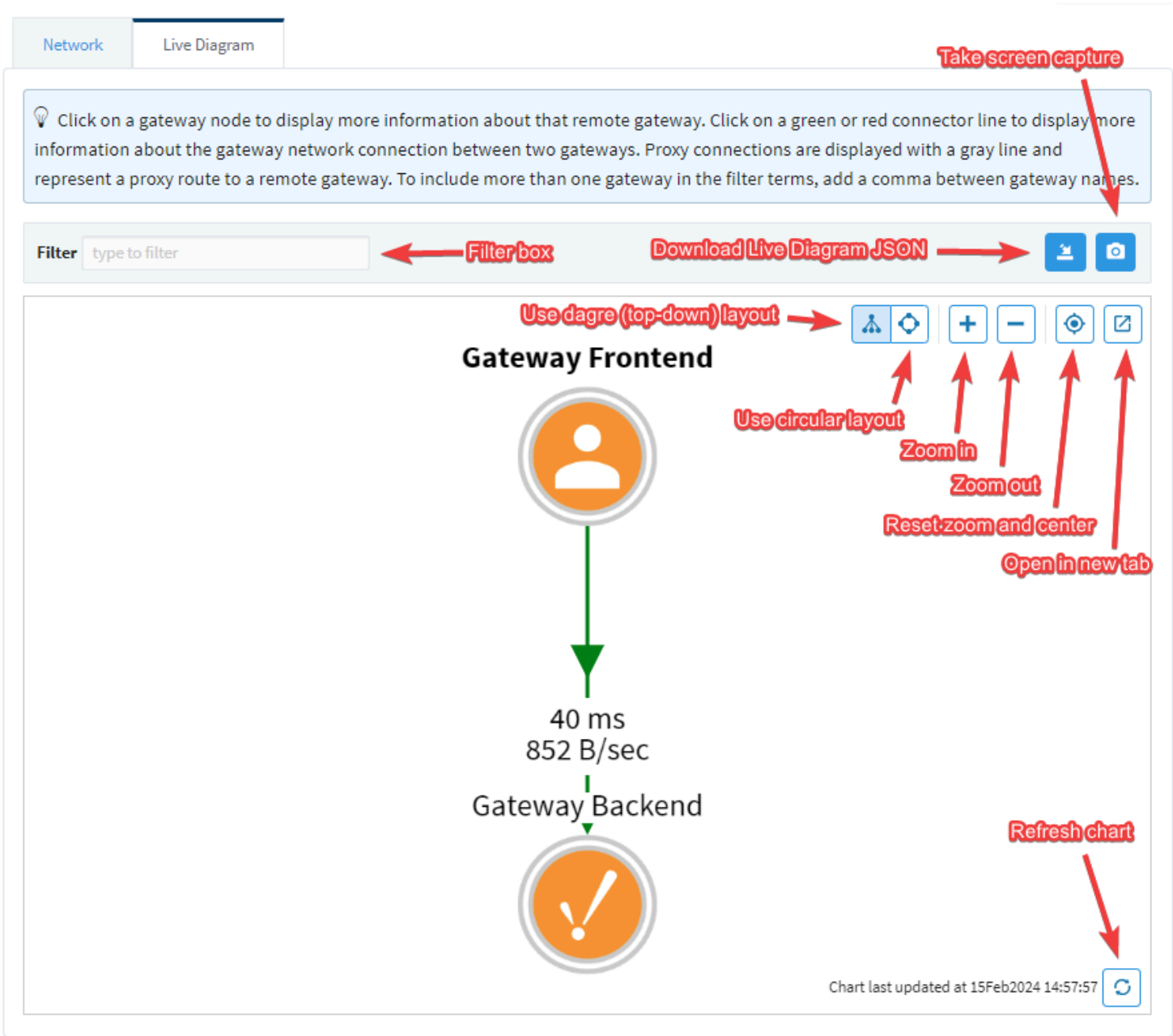
New in 8.1.40

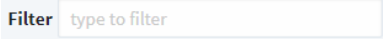
If your 8.1 Gateway is connected to a 7.9 legacy Gateway, a banner will be displayed at the top of both the **Gateway Network** and Gateway Live Diagram pages, which warns that your 7.9 Gateway

will not be able to communicate with your current Gateway, should it be upgraded from 8.1 to 8.3.

Gateway Network Diagram User Interface

To navigate the Diagram, you can use your mouse's left-click to pan around and your mouse's scroll wheel to zoom in or out. Additionally, you can drag and rearrange different nodes as you like. There are also different buttons on the Diagram interface that may be helpful:



Icon	Element	Description
	Filter box	Filters by Gateway name. You can use comma-delimited Gateway names so that multiple Gateways show through the filter.
	Download Live Diagram JSON	New in 8.1.38 Downloads the Gateway Network Diagram as a JSON file.
	Take screen capture	Takes a screenshot of the currently displayed Gateway Network Diagram.
	Use dagre layout	Displays the Gateway Network Diagram in a dagre, or top-down layout from the Perspective of the local Gateway.
	Use circular layout	Displays the Gateway Network Diagram in a circular layout, with the center being the local Gateway.
	Zoom in	Zooms into the Gateway Network Diagram.
	Zoom out	Zooms out of the Gateway Network Diagram.
	Reset zoom and center	Resets the camera panning and zoom and centers the Gateway Network Diagram.
	Open in new tab	Opens the Gateway Network Diagram in a new, separate tab.
	Refresh chart	Refreshes the Gateway Network Diagram so that the most recent Gateway Network configuration is shown.

Gateway Network Diagram Details

Live Diagram Icons

The following table shows each Gateway Network Diagram icon and its description.

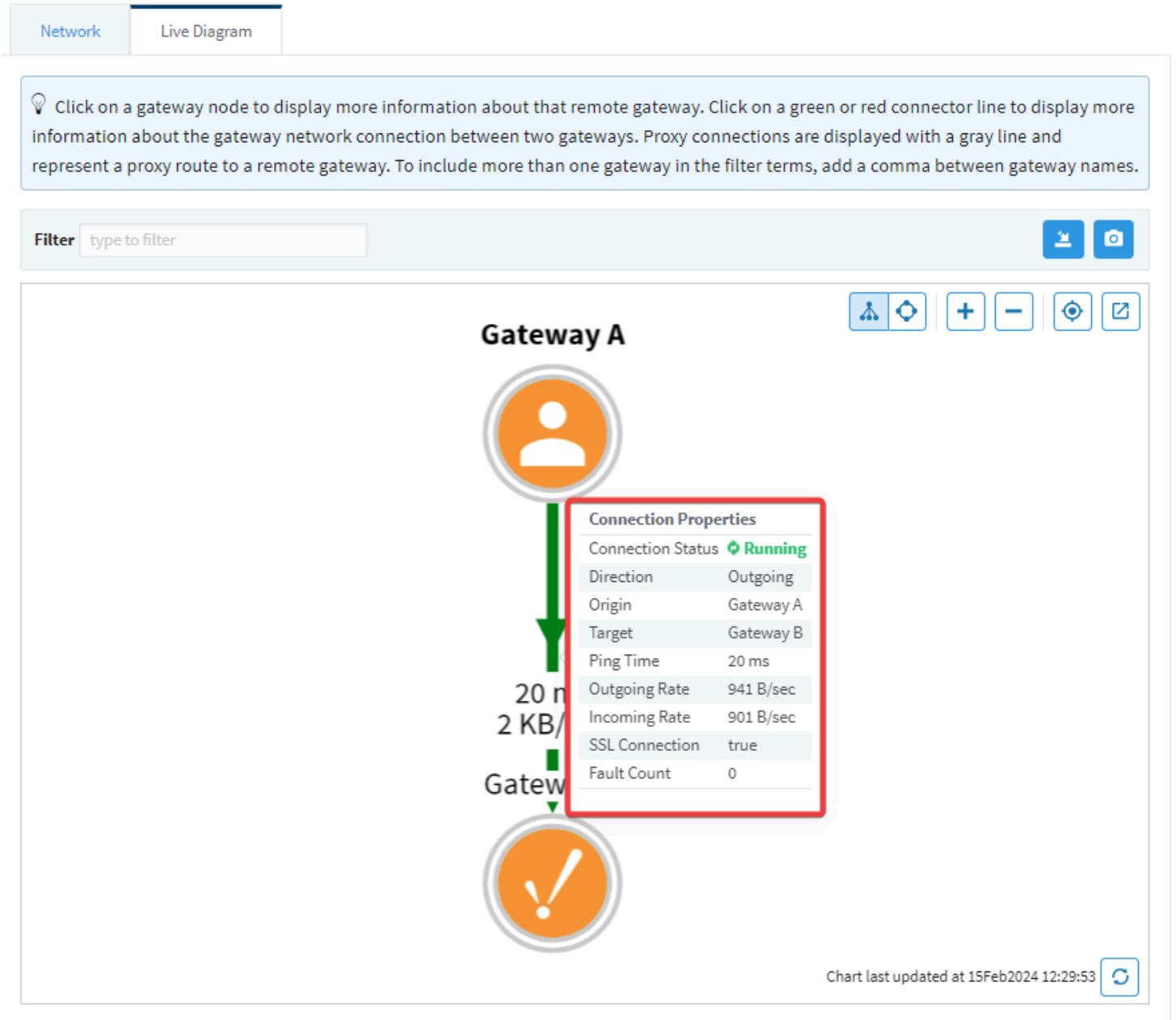
Icon	Description
	The local node from which you are viewing the Gateway Network Diagram. This icon's orange color also indicates that the node is running Standard Edition.
	The Gateway node that the local Gateway is connected to. This icon's orange color also indicates that the connected node is running Standard Edition.
	The local node from which you are viewing the Gateway Network Diagram. This icon's green color also indicates that the node is running Edge Edition.
	The Gateway node that the local Gateway is connected to. This icon's green color also indicates that the connected node is running Edge Edition.
	The local node from which you are viewing the Gateway Network Diagram. The icon's multicolor also indicates that the node is running Maker Edition.
	The Gateway node that the local Gateway is connected to. The icon's multicolor also indicates that the connected node is running Maker Edition.
	The local node from which you are viewing the Gateway Network Diagram. The icon's blue color also indicates that the node is running Cloud Edition.
	The Gateway node that the local Gateway is connected to. The icon's blue color also indicates that the connected node is running Cloud Edition.

Connection Details

You can find out more information about each node and connection by clicking on them in the diagram. For example, clicking on the connection itself will display information such as:

- Connection Status

- Direction (Outgoing versus Incoming)
- Origin Gateway and Target Gateway
- Ping time in milliseconds
- Rates (Outgoing and Incoming bytes per second)
- Whether the connection is using SSL
- How many times the connection has faulted



If the connection is in another state besides **Running**, the Diagram will update accordingly:

Click on a gateway node to display more information about that remote gateway. Click on a green or red connector line to display more information about the gateway network connection between two gateways. Proxy connections are displayed with a gray line and represent a proxy route to a remote gateway. To include more than one gateway in the filter terms, add a comma between gateway names.

Filter 

Gateway A



Connection Properties	
Connection Status	▲ Faulted
Direction	Outgoing
Origin	Gateway A
Target	Gateway B
Ping Time	N/A
Outgoing Rate	N/A
Incoming Rate	N/A
SSL Connection	true
Fault Count	0



Chart last updated at 15Feb2024 12:41:49



Gateway Nodes

On the other hand, clicking on the Gateway node itself will display information such as:

- Gateway Name
- Network Address
- Version
- Edition

Click on a gateway node to display more information about that remote gateway. Click on a green or red connector line to display more information about the gateway network connection between two gateways. Proxy connections are displayed with a gray line and represent a proxy route to a remote gateway. To include more than one gateway in the filter terms, add a comma between gateway names.

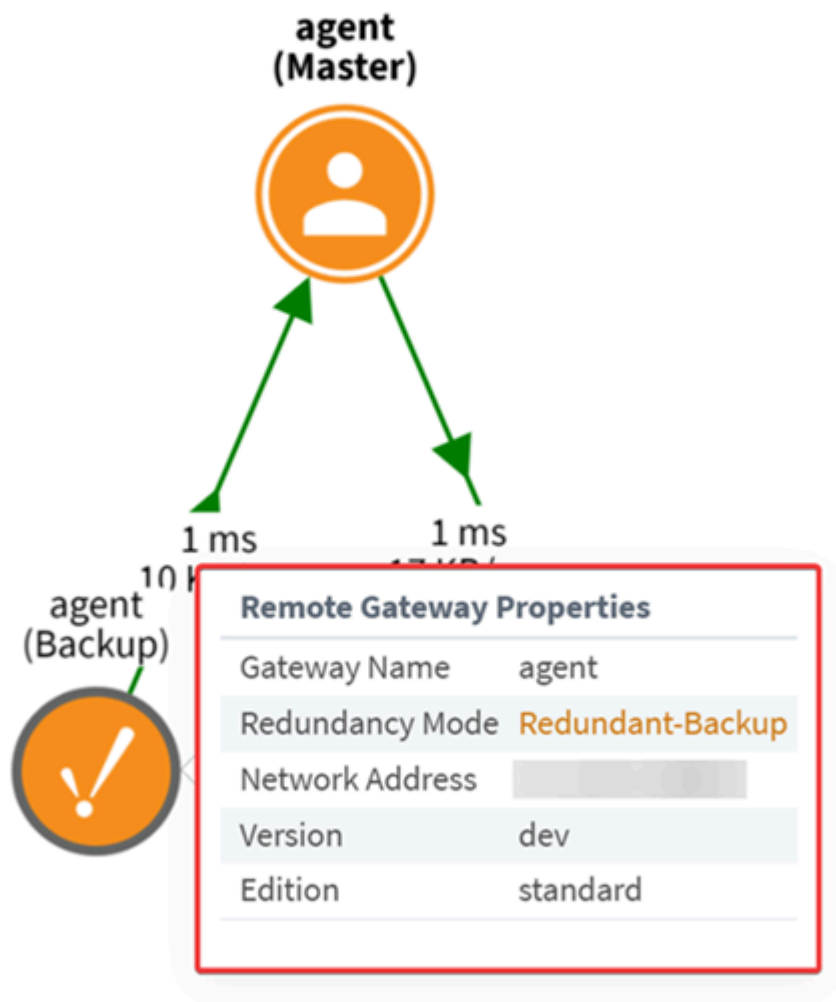
Filter 

i NOTE

If a Gateway in your Gateway Network is running Ignition version 8.1.24 or below, the Version and Edition fields will be N/A.

Redundancy Representation

If two Gateways are part of a redundant pair, the diagram will show each Gateway node with an orange circle around it. In addition to the Gateway Name, Network Address, Version, and Edition, the Gateway Node will also display the **Gateway's role** in the redundant pair:

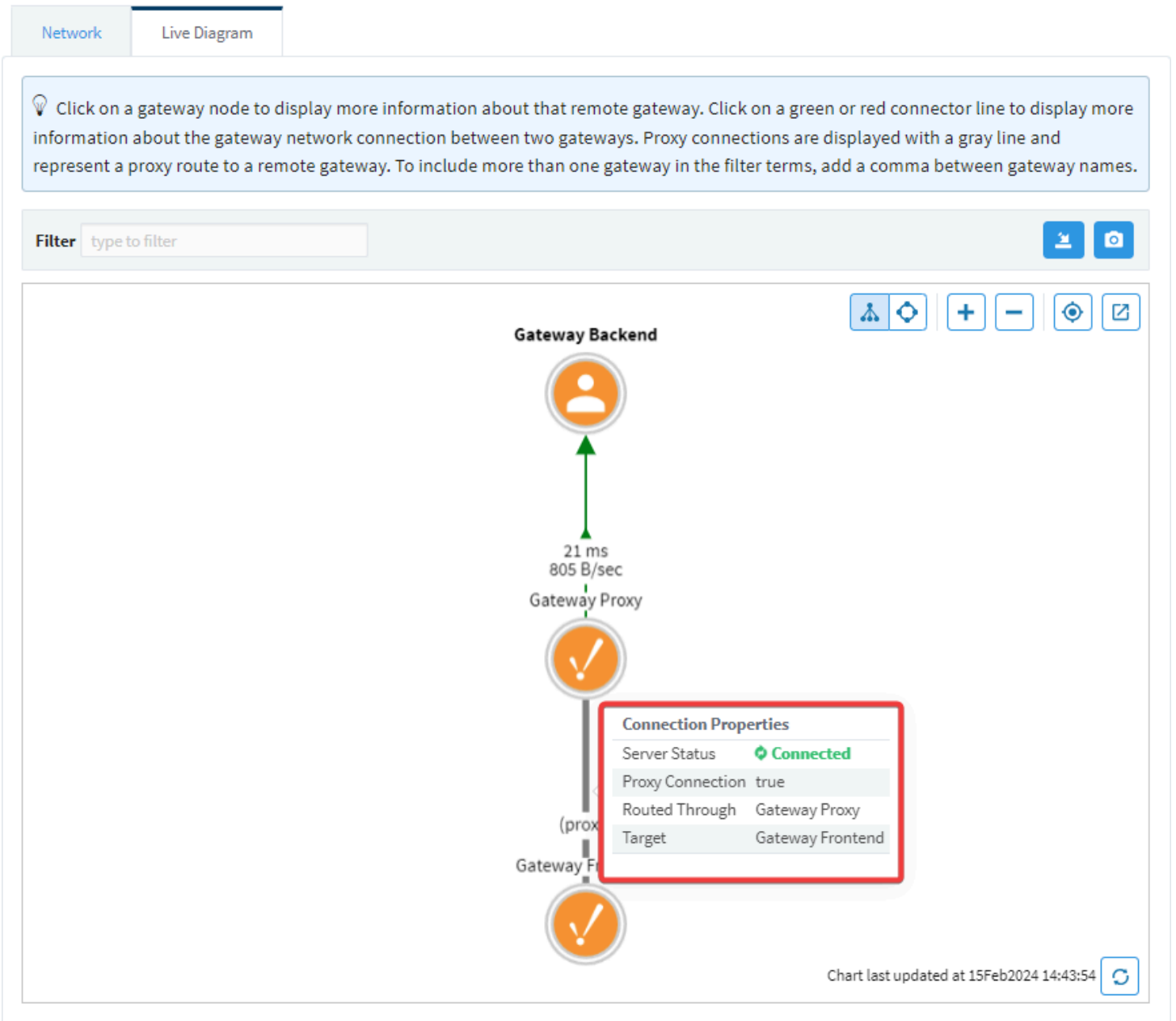


Proxy Connections

The Gateway Network Diagram will also display proxy connections differently. Instead of a green arrow indicating status and direction, the connection will be grey with no direction indicator. Clicking on a proxy connection will give the following information:

- The status of the server
- Whether or not the two Gateways are using a Proxy connection
- Which Gateway the proxy is routed through

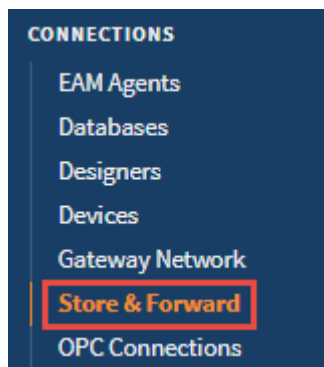
- The proxy connection's target Gateway



Connections - Store & Forward

Store & Forward

The **Store and Forward** page displays a list of the Store and Forward engines, including their status, as well as the number of records currently in each Store and Forward system. If the database connection becomes faulted, the database records wait in the Store and Forward system until the database connection is restored.



Store & Forward Page

The main Store and Forward page lists out all store and forward engines. Typically, each database connection gets its own store and forward engine, so there should be one engine for each database connection. In addition to displaying some basic stats for each engine, you can also find some totals for all store and forward systems, to get an idea of how much data is being pushed through the system to databases and if any records are being dropped.

Store and Forward Connections

Attribute	Description
Aggregate Throughput	Aggregate number of records inserted into a database from any Store and Forward engine per second.
Total Quarantine	Number of quarantined items for all Store and Forward engines.
Total Dropped	Number of records dropped from the Store and Forward engines. A record is considered dropped if it can not be added to one of the buffers, (i.e., when a buffer is full and the Store and Forward engine can no longer accept new records).

Store and Forward Engines

Attribute	Description
Name	Name of the Store and Forward engine.
Store Throughput	Number of records that go through the Store and Forward Engine per second.
Forward Throughput	Number of records to be forwarded on to the database per second.
Quarantined	Is data that has erred-out multiple times during attempts to forward it, or data that could not be stored because of some configuration issues.
Activity	Current state of the Store and Forward engine.
Actions	By clicking Details, shows additional information about Store and Forward engines.

Configuration

Aggregate Throughput

5.6^{per second}

Total Quarantined

10

Total Dropped

0

Store and Forward Engines

Filter

type to filter

View

20

Name ▲	Store Throughput	Forward Throughput	Quarantined	Activity	Actions
MySQL	5.6/sec	6.0/sec	10	✓ Available	Details

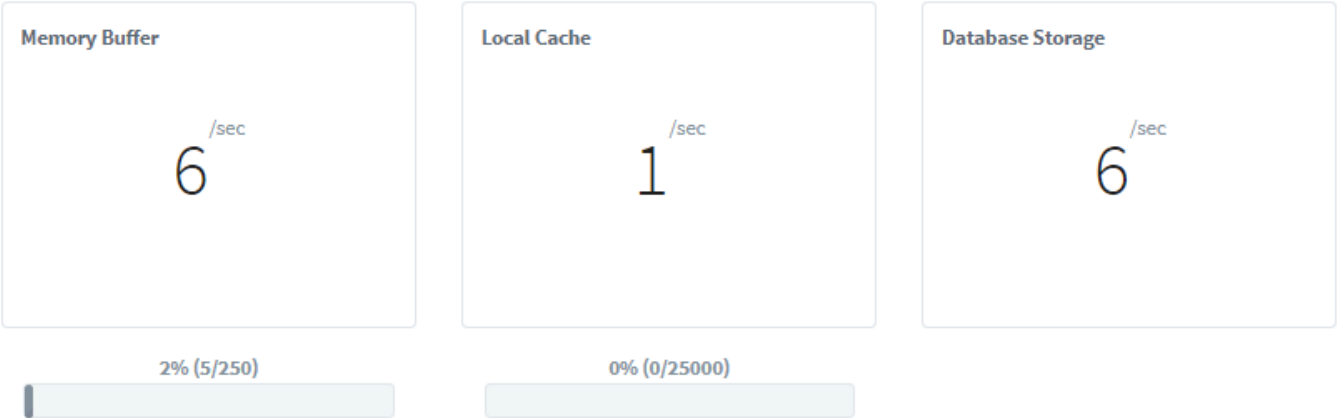
Store and Forward Details

Clicking the **Details** button brings up a new window that will show even more details about the records in the selected Store and Forward Engine. Here, we can see a count of the number of records in the memory buffer and local cache, as well as the number of quarantined records. The quarantined items at the bottom of the Details page will have some buttons that allow you to **control the data that is in the quarantine**. The quarantined item can be retried, where it will be thrown back through the Store and Forward system to see if it will go through properly, assuming the original reason why it was quarantined has been fixed. It can also be deleted so that it is no longer taking up space in the Store and Forward system, or exported to your local machine where you can save it to try again later. You can then import the file back from the same page when you resolved the issue that caused the data to be quarantined in the first place.

Attribute	Description
Memory Buffer	Number of records entering the Memory Buffer per second. The progress bar shows the percent of the buffer being utilized, along with the current and max number of records.
Local Cache	Number of records entering the Local Cache per second. An "Idle" state means the engine is able to successfully store all records into the database before the Write Size or Write Time values have been reached. The progress bar shows the percent of the buffer being utilized, along with the current and max number of records. Note: On Edge Gateways, the meter for the local cache represents the rows stored within the Edge Historian database. This value will update when pruning is triggered by Edge's one week storage policy or when storing 10 million data points.
Database Storage	Displays the number of records pushed from either buffer to the database per second.
Quarantined Items	Shows a list of quarantine items and allows you to choose the quarantined file and import it.
ID	Identification number of the quarantine item.
Count	Number of occurrences for the quarantined item.
Description	Description of where the quarantine item originated from.
Reason	Explanation why the record was placed into quarantine.
Actions	Provides and opportunity to retry, delete, or export the items from quarantine.

Configuration

Store Details



Quarantined Items

Import quarantine file

<

Retry All

Delete All

<<

<

1

of 1

>

>>

Filter

type to filter

View

20

▼

ID ▼	Count	Description	Reason	Actions
1	10	SQLTag History Data	This data sink does not accept data of the given type.	RetryDeleteExport

<<

<

1

of 1

>

>>

Connections - MongoDB

MongoDB

The MongoDB page shows a list of configured MongoDB connections. To view this page, go to your **Gateway webpage > Status > Connections > MongoDB**. You can filter by name to search for a specific MongoDB connection, and change how many connections are displayed on this page.

NOTE

The MongoDB option will only show up if the MongoDB Cloud Connector Module is installed.



MongoDB Page

The main MongoDB page contains useful information about your configured MongoDB connections.

Attribute	Description
Name	Name of the MongoDB connection,
Status	Current status of the MongoDB connection.
Connections	Current number of connections between Ignition and the specified MongoDB database.
Throughput	Number of requests per second.

« < 1 of 1 > »

Filter

type to filter

View

20



Name ▲

Status

Connections

Throughput

MongoDBTEST

✓ Valid

0 / 100

0.0 request/sec

« < 1 of 1 > »

Connections - OPC Connections

OPC Connections

The OPC Connections page displays all currently configured OPC (both UA and DA) connections.

NOTE

If you are using an OPC UA connection, you should be using the [OPC UA Module](#). If you are using the DA connection, you should be using the [OPC COM Module](#).



OPC Connections Page

Here on the main OPC Connections page, we can see a list of all current OPC connections, as well as their status. If any are faulted, you can click the red faulted status to get an error message popup with a full description of the error.

Attributes	Description
Connected Servers	Displays the list of OPC servers out of configured servers, and their status.
Name	OPC server name.
Filter	Search criteria to filter for specific server names.
Type	OPC server type - UA or DA
Uptime	Total time OPC server is connected.
Status	Current status of OPC server.
Diagnostics	Displays diagnostic information for any connected OPC UA server. • Server - Shows server diagnostics. • Client - Shows client connection subscription diagnostics.

Status > Connections > OPC Connections

Configuration

Connected Servers

1 / 1

Filter type to filter

Name ▼	Type	Uptime	Status	Diagnostics
Ignition OPC UA Server	OPC UA	33 minutes	✓ CONNECTED	Server Client

Server

Click the **Server** button to get information on the server. By default, diagnostics are set to off since they can generate a considerable amount of network overhead and impact performance. To turn on diagnostics, click **Enable Diagnostics**. Not all OPC UA servers support diagnostics.

Status > Connections > OPC Connections > Ignition OPC UA Server - Diagnostics

Configuration

Ignition OPC UA Server

[Return to Servers](#)

Server Information

Session Diagnostics

Server Status

Parameter ^	Value
currentTime	2020-07-10T10:37:36.900-07:00
startTime	2020-07-09T09:35:29.474-07:00
state	CONNECTED

Build Info

Parameter ^	Value
buildDate	2020-07-09T09:35:28.127-07:00
buildNumber	dev
manufacturerName	Inductive Automation
productUri	urn:inductiveautomation:ignition:opcua:server
softwareVersion	dev

Server Diagnostics

Enable Diagnostics

This server does not have diagnostics enabled.

Clients

By clicking on the **Client** button, it brings up the subscription information for that particular server. It will list out all of the subscriptions to that server with the publishing rates, as well as the number of items within that subscription.

Attributes	Description
Filter	Search criteria to filter for specific subscriptions.
Refresh	Refreshes subscription data.
Name	Displays the subscription name.
Rate	The rate defined in the Tag Group, used as the requested sampling interval for monitored Items belonging to the corresponding subscription.
Request Publishing Interval	The rate a subscription will report accumulated change notifications at. The interval is derived from Rate, unless explicitly defined.
Revised Publishing Interval	The server's revised rate for accumulated change notifications.
Tag Count	The number of Tags currently subscribed to that Tag Group.

Status > Connections > OPC Connections > Ignition OPC UA Server - Subscriptions

Configuration

Ignition OPC UA Server

Filter type to filter

↻

Name ▾	Rate	Request Publishing Interval	Revised Publishing Interval	Tag Count	
tag-group-exporttags_default	10000	1000	1000	3	Nodes
tag-group-default_time driven	60000	1000	1000	2	Nodes
tag-group-default_driven machine state	10000	1000	1000	2	Nodes
tag-group-default_direct 5 seconds	5000	1000	1000	4	Nodes
tag-group-default_direct	1000	500	500	2	Nodes
tag-group-default_default	10000	1000	1000	188	Nodes

Nodes

Clicking the **Nodes** button for one of the subscriptions will bring up the list of subscribed OPC items.

Attributes	Description
Filter	Search criteria to filter for a specific node.
Refresh	Refreshes node data.
Node ID	The OPC item path.
Requested Sampling Interval	The rate the underlying tag/node will be polled at.
Revised Sampling Interval	The revised rate at which the underlying tag/node will be polled at.
Requested Queue Size	Determines how many data points can be stored and transferred to the client once the sampling rate elapses when the sampling rate is slower than the publishing rate.
Status Code	Status of the node.

Configuration

Ignition OPC UA Server > tag-group-default_driven machine state-unleased

Filter

Node ID ▼	Requested Sampling Interval	Revised Sampling Interval	Requested Queue Size	Revised Queue Size	Status Code
ns=1;s=[Generic]_Meta:Sine/Sine9	10000	10000	1	1	Good
ns=1;s=[Generic]_Meta:Sine/Sine8	10000	10000	1	1	Good
ns=1;s=[Generic]_Meta:Sine/Sine0	10000	10000	1	1	Good
ns=1;s=[Generic]_Meta:Ramp/Ramp9	10000	10000	1	1	Good
ns=1;s=[Generic]_Meta:Ramp/Ramp8	10000	10000	1	1	Good
ns=1;s=[Generic]_Meta:Ramp/Ramp7	10000	10000	1	1	Good

Connections - SECS/GEM Equipment

SECS/GEM Equipment

The SECSGEM Equipment page displays a list of all equipment connections, their status, as well as the number of sent requests and received messages. If any piece of equipment becomes faulted, it will show a status of "Not Connected". If you click the **Details** button, it opens a new page with some Connection Stats. Note: the SECSGEM Module is not standard and will be missing for most installs of Ignition. The SECSGEM Equipment Connection will only be displayed in the Status section of the Gateway webpage under Connections when the module is installed.



SECS/GEM Equipment Page

The main SECS/GEM Equipment page lists out all equipment connections and displays the number of messages sent between them and Ignition.

Attribute	Description
Connections	The total number of active SECS/GEM Equipment connections.
Aggregate Throughput	The messages per second the system is sending and receiving from all devices at that time.
Name	The name of the equipment connection in the list.
Sent Messages	The number of messages sent to the equipment.
Received Messages	The number of messages received from the equipment.
Status	The status of the equipment.

Configuration

Equipment Stats

Connections

1

Aggregate Throughput

0.2^{per second}

Name	Sent Messages	Received Messages	Status	
SimEquipOne	154	77	✓ Communicating	Details

SECS/GEM Equipment Details

Clicking the **Details** button to the right of a piece of equipment will take you to a page that shows more detailed information for that particular piece of equipment.

Sent Messages

Attribute	Description
Throughput	The messages per second the system is currently sending.
Average	The average messages sent per second from when the equipment was first enabled.
Total	The total messages sent.

Received Messages

Attribute	Description
Throughput	The messages per second the system is currently receiving.
Average	The average messages received per second from when the equipment was first enabled.
Total	The total messages received.

Configuration

Connection Stats

Sent

Last to: S1F14



Received

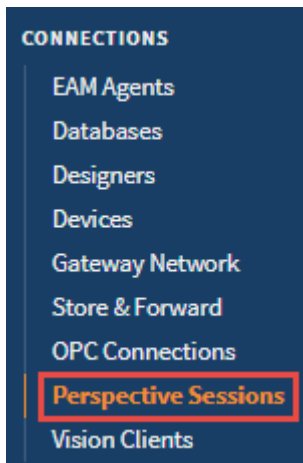
Last from: S1F13



Connections - Perspective Sessions

Perspective Sessions

Much like the Designers page, the Perspective Sessions page shows a ton of information regarding currently open Sessions. All the open Perspective Sessions are displayed on the page along with some basic information about each session, such as what user is logged into each session and the project they are currently working on, and their IP address. Each session has a Details button that allows you navigate all the elements of a session: pages, view instances, and components.



Perspective Sessions Page

The main Perspective Sessions page displays a list of all currently running Designer and Client Sessions to show how many are open, and the name of the users that are currently using them. By clicking on the **Details** button to the right of a session will display even more information about that particular session, including any Log Activity pertaining to errors recorded while the session was active.

Session Details

Attribute	Description
Total Sessions	The number of currently active Designer and Perspective Sessions.
Device	Type of device running the Session.
User	The user logged into the Session.
Project	The name of the project open in the Session.
Uptime	The total uptime of the Session.
Last Comm.	Date and time recorded for the last communication with the Session.
Address	The IP Address and computer name where the Session is launched.
Session Scope	Indicates what browser opened the Session, and the Perspective icon indicates the Designer is open.
Actions	New in 8.1.23 More > Terminate: Allows users to terminate the session. Note the Terminate option is not available for any Designer Perspective sessions and is only visible for other session scopes if the user has Config-level permissions. Details: Accesses a new Perspective Sessions page that displays performance stats, pages information, session details, and log activity.

Ignition

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Devices

Gateway Network

Store & Forward

OPC Connections

Perspective Sessions

Vision Clients

Status > Connections > Perspective Sessions

Session Stats

Total Sessions

2

Session Details

Device	User	Authorized?	Project	Uptime	Last Comm.	Address	Session Scope	Actions
Windows 10	Unauthenticated	Yes	samplequickstart	a minute	a few seconds		Browser, Chrome	More Details
Unknown	admin	Yes	samplequickstart	a minute	a few seconds		Designer	Terminate Details

Perspective Session Details

The Performance Page within the session displays more in depth information such as the Page Id and how many views are on each Page. Hit the **Details** button to get more detailed information about each page in the session.

Performance

Attributes	Description
Total Views	The number of currently active pages.
Total Bytes Sent	Displays total number of bytes sent out.

Pages

Attributes	Description
Id	Page Id.
Views	Displays total number of views on a page.
Actions	Displays the details of the view instances in the session.

Log Activity

Attributes	Description
Min level	Dropdown menu with options Info, Debug, and Trace.
Live Values	Toggle switch to turn live values on or off.
Merge to Logs	Merge the settings of the current view with the main Diagnostics Log Viewer.
Logger	Name of the logger that describes the context of the message.
Time	Time of log.
Message	Message for the log.
 (Log Properties)	Displays log properties of the logged event.

Performance

Total Views

2

Total Bytes Sent

60^{MB}

Pages

Id ▾	Views	Actions
2c3e945	2	Details

Details

Session Details	
User	Unauthenticated
Project	Perspective
Device	Windows NT 10.0; Win64; x64
Address	0:0:0:0:0:0:1
Uptime	20 hours
Last Comm.	a few seconds
Session Scope	

Log Activity

Min level INFO ▾ i			Live Values ON	Merge to Logs ↗
Logger	Time	Message		
 DesignSession	29Mar2019 10:37:26	Socket connected to session. pageId=nav topbar		
 DesignSession	29Mar2019 10:37:21	Socket connected to session. pageId=New View		
 ClientSession	29Mar2019 09:45:04	WebSocket disconnected from session.		

View Instances

The View Instances page shows the number of View Instances on a Page and the number of Components in each view instance. Press the **Details** button next to each View Instance to get even more information about the type of components used in each view.

Sessions Details

Attributes	Description
InstanceID	Displays View Instances for each view.
Components	Total number of components used in the specified view.
Actions	By clicking on the Details button, shows more information for each view instance.

View Instances

Instance ID ▾	Components	Actions
nav topbar@T[0]	7	<button>Details</button>
New View@C	7	<button>Details</button>

Components

The Components page lists all the components used in a View Instance of Page along with the following information about each component.

Attributes	Description
Name	Name of the component.
AddressPath	Address of the component.
Bindings	Displays the number of bindings for each component.
Children	Displays the number of children for each component.
Properties	Displays the number of properties for each component.
PropertyChangeScripts	Displays the number of property change scripts for each component
Actions	Displays the number of actions for each component.

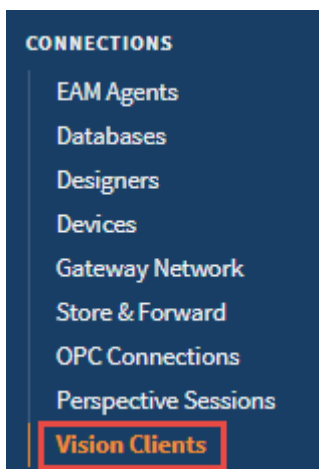
Components

Name ▼	Address Path	Bindings	Children	Properties	Property Change Scripts	Actions
LedDisplay_2	0:15	1	0	4	0	0
LedDisplay_1	0:9	1	0	4	0	0
LedDisplay_0	0:8	1	0	4	0	0
LedDisplay	0:7	1	0	4	0	0
Label_3	0:14	0	0	4	0	0
Label_2	0:10	0	0	4	0	0
Label_1_0	0:6	0	0	4	0	0
Label_1	0:5	0	0	4	0	0
Label_0	0:4	0	0	4	0	0
Label	0:3	0	0	4	0	0
CylindricalTank_3	0:2	1	0	4	0	0
CylindricalTank_0	0:1	1	0	4	0	0
CylindricalTank	0:0	1	0	4	0	0
Button_0_0	0:13	0	0	4	0	0
Button_0	0:12	0	0	4	0	1
Button	0:11	0	0	4	0	1

Connections - Vision Clients

Vision Clients

Much like the Designers page, the Vision Clients page shows information regarding currently opened Clients. The Clients are listed and show some basic information such as the address of the Client. From here, the Client session can be terminated by selecting the **More** button and hitting **Terminate**, or select the **Details** option to see more details about the Client session such as the number of Tags that the session is currently subscribed to, as well as a log of errors that may have happened with that Client.



Vision Clients Page

The main Vision Clients page displays a list of all currently running Clients which show how many clients are open and what users are currently using them.

Client Stats and Details

Attribute	Description
Active Clients	The number of currently active Clients.
Requests/sec	The number of requests per second coming from all Clients.
Id	The Client Id.
User	The user logged in on the Client session.
Project	The name of the project open in the Client session.
Uptime	The total uptime of the Client session.
Activity	Denotes whether the Client session is currently connected and Active, or Dormant. A Dormant status means the Gateway hasn't received any activity from the Vision Client, but the Client hasn't been logged out yet. Dormant statuses can also be caused by a user opening multiple Clients without closing or logging out of previously opened ones. Note: Dormant Clients should automatically clear after a period of time, but they can also be terminated manually or resolved by logging out of the Vision Client, either by the user or through a Client Event Timer script. You can utilize <code>system.util.getInactivitySeconds()</code> and <code>system.security.logout()</code> for the Client Event Timer script.
Address	The IP Address and computer name where the Client is launched.
Memory	The Client's current memory usage.
Actions	The option to terminate the Client session or view additional session details.

Client Stats



Client Details

1 items « < 1 of 1 > »

Filter type to filter View 10 ▾							
<u>Id</u> ▾	<u>User</u>	<u>Project</u>	<u>Uptime</u>	<u>Activity</u>	<u>Address</u>	<u>Memory</u>	<u>Actions</u>
38638402	admin	NewProject	18 minutes	✓ Active	ws3 (127.0.0.1) 27.0.0.1	68mb	More ▾ Details

1 items « < 1 of 1 > »

Client Session Details

Clicking on the **Details** button for a Client session will take you to a page that displays more in depth information for that particular Client session. It also gives a logger at the bottom where errors coming from that particular Client can be seen.

Client Performances and Details

Attribute	Description
Memory	The Client's current memory use.
Subscriptions	The number of Tags the Client is currently subscribed to.
User	The user logged in on the Client session
Project	The name of the project open in the Client session.
Address	The IP Address and computer name where the Client is launched.
Uptime	The total uptime of the Client session.
Last Comm	The last time the Gateway communicated with the Client.
Client JVM Version	The Java version that the Client is currently running on.

Performance



Details

Session Details	
User	admin
Project	NewProject
Address	ws3 (127.0.0.1) v7.8.0.1
Uptime	34 minutes
Last Comm	485ms
Client JVM Version	11.0.2

Diagnostics - Execution

The Execution page reports the status of all tasks that your Gateway runs on a schedule. Here you can find helpful information such as the duration and execution time of an alarm journal update or the average time it takes your Gateway to execute a Tag Group.

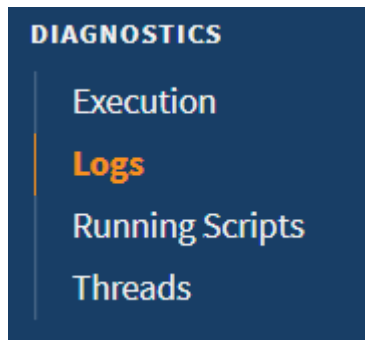
Attributes	Description
Throughput	Number of executions that come through per second.
Total Executions	Total number of times the task executed.
Delay	Amount of time waiting to execute the task.
Avg. Duration	Average time to run the task.
Last Duration	Amount of time to run the last task.

 Shared Execution Engine

Owner / Tasks	Throughput	Total Executions	Delay	Avg. Duration	Last Duration
databaseconnectionmanager					
txtimeoutdaemon	0.500 exec/sec	3,639	2 sec	0 millis	0 millis
eam					
agentupdate	0.999 exec/sec	7,258	1 sec	0 millis	0 millis
emailackmanager					
orphanedacknowledgementcleanup	idle	122	1 min	0 millis	0 millis
gateway					
license-checker	idle	114	1 min	4 sec	4 sec
logfile cleanup	idle	1	2 hours	0 millis	8 millis
performance monitor	0.200 exec/sec	1,451	5 sec	4.7 millis	8 millis
gatewayareanetworkconnectionmanager					
connection monitor	0.200 exec/sec	1,453	5 sec	0.1 millis	0 millis
gatewaysystemtags					
basictags	0.999 exec/sec	7,274	1 sec	0 millis	0 millis

Diagnostics - Logs

One of the most important troubleshooting tools of the Gateway Webpage is the Logs page. This console shows errors caused by Gateway events including things like Database or Device connections, Authentication profiles, Alarm Journals and Pipelines, and anything else that is Gateway scoped. You can find logs in the Status tab of the **Gateway Webpage** under **Diagnostics > Logs**.



The Gateway Logs also provide a wealth of information about the running state of the Gateway. To learn more, refer to the section on [Troubleshooting the Gateway](#). The Logs page is where the Gateway Console is located that allows you to see a live flow of log events in the system.

Attribute	Description
Logger	Name of the logger that describes the context of the message.
Time	Time of log.
Message	Message for the log.
Filter	Search criteria to filter for specific tasks or events. Click the Calendar  icon to set a filter date and time range. Options are Last Month, Last Week, Last 24 Hours, or Custom.
Min Level	Dropdown menu with options: All, Trace, Debug, Info, Warn and Error.
Live Values	Toggle switch to turn live values on or off.

37978 items « < 1 of 380 > »

Filter

type to filter

View

100

Min. Level

ALL

Live Values

ON

Logger	Time	Message
I ModuleManager	26Mar2019 10:46:23	Uninstalling module "secsgem" cannot find the path specified
I ModuleManager	26Mar2019 10:30:52	Starting up module 'secsgem' (v2.9.10 (b2018112813))...
W ModuleManager	26Mar2019 10:30:51	Module "SECS/GEM" requires Ignition 7.8.0 (b0) and is not compatible with Ignition 8.0.0-beta0 (b2019032202)
I ModuleManager	26Mar2019 10:30:51	Installing module: "secsgem"
I DesignSession	26Mar2019 09:15:58	Socket connected to session. pagelId=Test/FirstView
I DesignSession	26Mar2019 09:15:20	Socket connected to session. pagelId=session
I InternalDatabase	26Mar2019 09:08:07	Created auto-backup of internal database "config.idb" in 1 seconds
I InternalDatabase	26Mar2019 09:08:06	Creating auto-backup of internal database "config.idb"...
W LicenseManager	26Mar2019 09:04:20	Could not read license from HASP key. HASP login() failed. Last error = 14.
E TimerScriptTask	26Mar2019 09:03:37	Error executing global timer script: Perspective/Print to Diagnostic Logs @1,000ms . Repeat errors of this type will be logged as 'debug' messages.
W SubscriptionManager	26Mar2019 09:03:37	[Ignition-ignition8-ubuntu-64bit] Subscription path model set detected to be out of sync. Will re-synchronize.
I IgnitionGateway	26Mar2019 09:03:36	Ignition[state=STARTING] ContextState = RUNNING
I IgnitionGateway	26Mar2019 09:03:36	Gateway started in 31 seconds.

Changing Logging Levels

The logs can be filtered by using a search term or by date.

1. To change logging levels, go to the Gateway's **Status > Diagnostics > Logs** page and click on the Settings  icon.
2. On the Log Configuration popup that will open, search for the logger name in the Filter box, and select the desired logging level from the dropdown to the right of the logger name.

Downloading the Logs

Gateway logs can also be exported using the Download Logs  icon the right.

Printing to the Logs

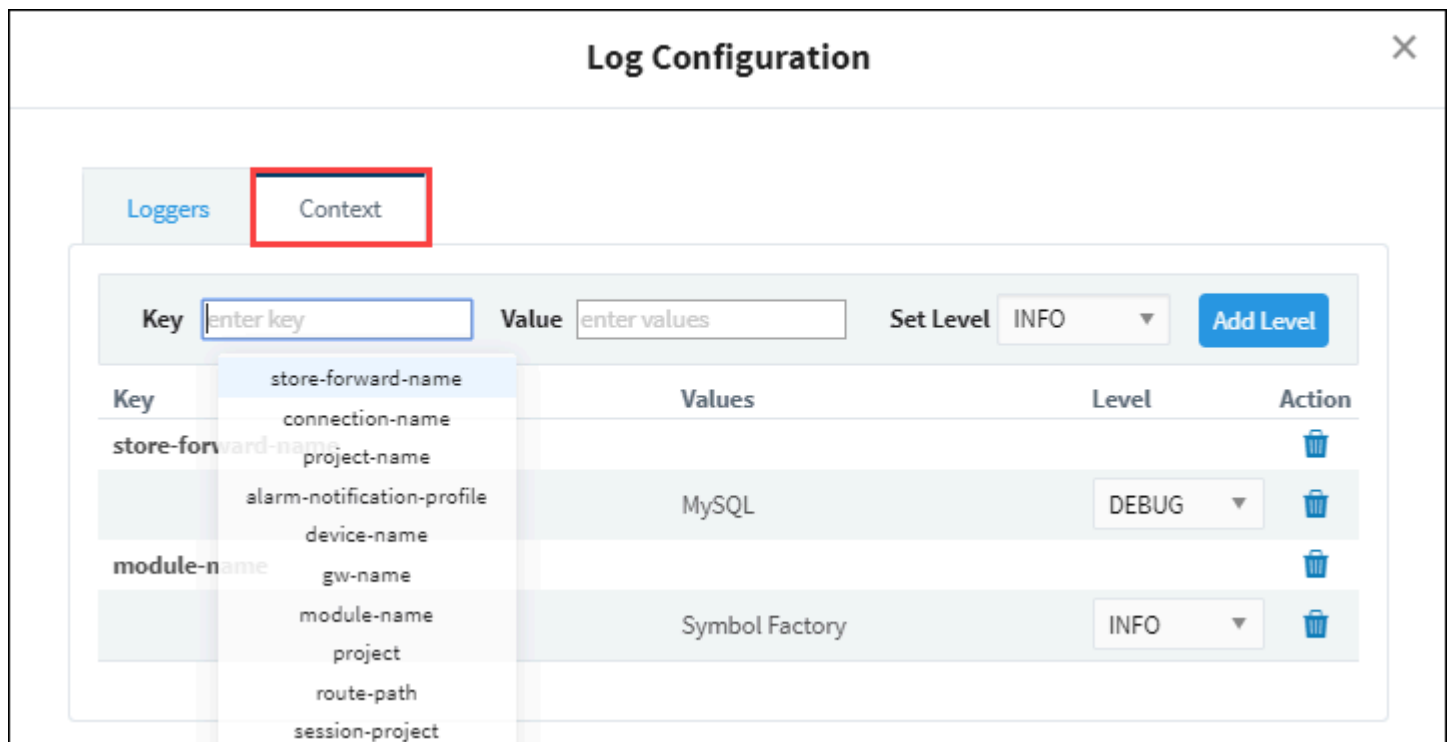
You can print to Gateway logs by using the `system.util.getLogger()` function. Below is a simple example, you can look in the [appendix](#) for more options.

```
logger = system.util.getLogger("My Logger Name")
logger.warn("My Warning Message")
```

Mapped Diagnostics Context Keys

Mapped Diagnostic Context Keys (MDC Keys) allow you to specify a specific context, such as a particular project, and then set a logging level for it. This will set all loggers that pertain to the specified project to the logging level. This is useful to help diagnose an issue with a specific system within the

Gateway. To use MDC Keys, click the **Settings**  icon on the Logs page and navigate to the Context tab. Here, you can choose specific Key-Value pairs that match a particular system. Selecting the Key text field will bring up a list of possible keys in your system. Once a Key has been selected, selecting the Value text field will bring up a list of possible values that relate to the selected Key.



Key	Values	Level	Action
store-forward-name	MySQL	DEBUG	
module-name	Symbol Factory	INFO	

Filter by Mapped Diagnostics Context Key

The Logs can also be filtered to show only logs that pertain to an MDC Key. This can be useful when altering the logging level of one or more MDC Keys.

To set an MDC filter on the logs, simply click the **Add Mapped Diagnostic Context Filter**  icon on the Logs page to open a window where MDC Key filters can be set. The filter can be specified for all values in a Key by not specifying a Value.

MDC Filter Configuration

Key

enter key

Value

enter values

Add Filter

Key	Values	Action
No Log Filters Configured		

Merging to Logs

Many of the other pages in the Status tab also contain a logger that will just show logs that are relevant for that particular section. These log views all contain a button on the right side called **Merge to Logs**. This button allows the current filter to be applied to the main logs page, allowing you to still see only the logs for that section but use all of the tools available.

⏮

⏪

⏩

⏭

Live Values

ON

Merge to Logs

🔑

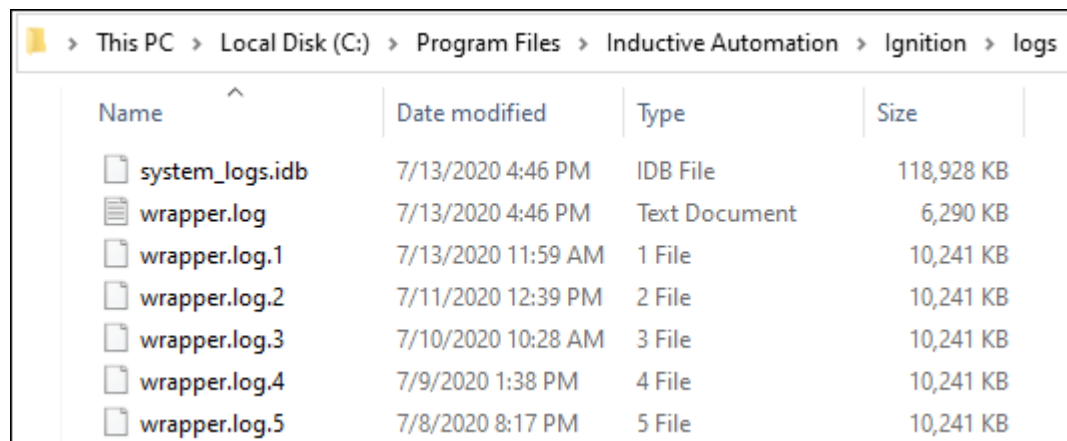
Wrapper Logs

Wrapper logs are a set of plain text log files located inside the installation directory on the computer where Ignition Gateway is installed. The exact path may vary depending on the installation directory, but the typical path to the location of the wrapper logs is `C:\Program Files\Inductive Automation\Ignition\logs\` on a Windows operating system and `/usr/local/bin/ignition` on Linux installations.

Wrapper Log Location

There are typically six wrapper log files. The file containing the most recent information is the one called `wrapper.log`. Older information is contained in the `wrapper.log.1`, `wrapper.log.2`, `wrapper.log.3`, etc., the higher the number, the older the information. A very recent installation of Ignition may have fewer than six wrapper log files.

Some operating system settings may cause the file extensions to be hidden. In that case, check your operating system's documentation on how to show file extensions, or simply look for the files with the name starting with "wrapper".



Name	Date modified	Type	Size
 system_logs.idb	7/13/2020 4:46 PM	IDB File	118,928 KB
 wrapper.log	7/13/2020 4:46 PM	Text Document	6,290 KB
 wrapper.log.1	7/13/2020 11:59 AM	1 File	10,241 KB
 wrapper.log.2	7/11/2020 12:39 PM	2 File	10,241 KB
 wrapper.log.3	7/10/2020 10:28 AM	3 File	10,241 KB
 wrapper.log.4	7/9/2020 1:38 PM	4 File	10,241 KB
 wrapper.log.5	7/8/2020 8:17 PM	5 File	10,241 KB

Wrapper Log Content

Wrapper logs are similar to Gateway logs in that they contain information about the operation of the Ignition Gateway and its sub-systems, as well as the errors generated by Gateway scoped resources. However, there are some important differences between the Gateway log and the wrapper logs:

- The wrapper logs contain information about issues during the Gateway startup, including any issues that may have prevented the Gateway from starting. The most recent wrapper log file is

the first place to look for the cause if the Gateway has failed to start, or if the Gateway stopped or restarted unexpectedly.

- The wrapper logs (but not the Gateway log) contain the output of any print statements in Gateway-scoped scripts.
- Unlike the Gateway log, the wrapper log files can only be obtained from their directory on the computer where the Ignition Gateway is installed. There is no way to view them via the Gateway's Web interface.

Diagnostics - Running Scripts

The Running Scripts page shows all actively running Gateway scripts, as well as providing a way to terminate any running script. In addition, the Vision client and Designer consoles have a Running Scripts tab, which also lists running scripts and provides a way to terminate them.

Attributes	Description
Thread Id	Thread Id number.
Description	Name and description of the script.
Execution Start	Time script started running.
Elapsed Time	Amount of time the script has been running.
Actions	Lists actions that can be performed against the running script, such as canceling it.

Status > Diagnostics

Currently Running Scripts

« < 1 of 1 > »

Filter

View

20

Thread Id	Description	Execution Start	Elapsed Time	Actions
3188	TimerScript - project:Production GatewayLogger @10,000ms	26Mar2020 10:56:07	24 seconds	<button>Cancel</button>

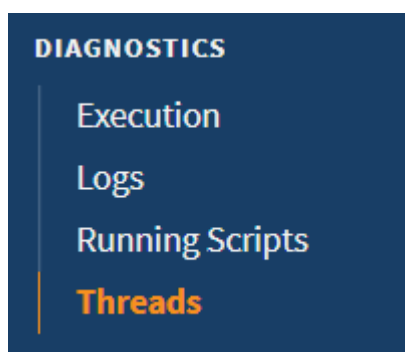
« < 1 of 1 > »

New in 8.1.29 Users who have Status webpage access but not Config webpage access can view Running Scripts without the ability to terminate them.

Diagnostics - Threads

The Threads page displays a snapshot of information about Gateway's execution threads. This information may be important when troubleshooting certain types of issues. If you are working with Support, you may be asked for a thread dump.

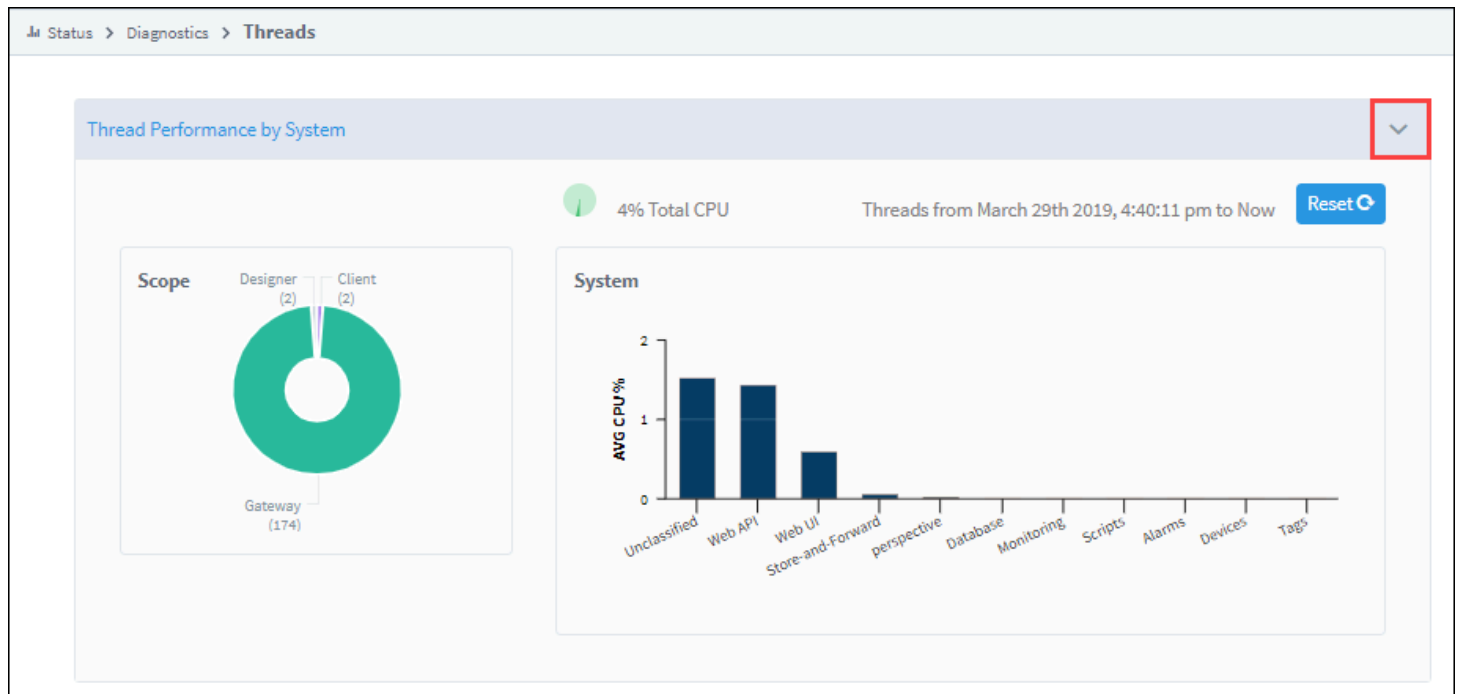
Their state and CPU usages are displayed to easily find problem threads, as well as a chart of what systems are using the threads and the ability to filter the threads based on a keyword. Each thread can be expanded to give details on what it is currently doing, and that individual thread process can be copied to the clipboard.



Thread Performance by System

The upper section of the Diagnostics - Threads page depicts graphical representation of the current threads including percentage of total CPU used, overall scope, and average CPU usage per system.

- Click the **Expand**  icon to see the display.
- Click the **Reset**  icon to reset the information.



Individual Threads

The lower portion of the Diagnostics - Threads page displays statistics for individual threads.

To download a thread dump, click the **Download**  icon on the right of the page. In order to be useful, a thread dump must be taken at the time the issue is observed. Unlike logs, which maintain a record of past messages, a thread dump is a time-specific snapshot and will not contain a record of past states. To see more information on thread dumps, including other methods of obtaining them such as [system functions](#) or the command line, click [here](#).

Attributes	Description
Thread Name	Name of the thread.
Filter	Search criteria to filter for specific threads.
CPU(%)	Percentage of CPU usage.
State	Current state / status of the system.
System	Search criteria to filter for specific tasks or events.
Actions	View thread details.
Live Values	Toggle switch to turn live values on or off.

Status > Diagnostics > Threads

Thread Performance by System

Filter

Live Values ☒

Thread Name	CPU (%) ▼	State	System	Actions
platform-executor-266, id=706212	4.14	TIMED_WAITING	Unclassified	Show 
ws-ping-executor, id=142	0.94	TIMED_WAITING	Unclassified	Show 
WebSocketClient@1233122752-706903, id=706903	0.08	TIMED_WAITING	Unclassified	Show 
webserver-706021, id=706021	0.08	RUNNABLE	Web API	Show 
gateway-shared-exec-engine-4, id=46	0.08	WAITING	Unclassified	Show 
gateway-logging-sqlite-appender, id=20	0.08	TIMED_WAITING	Unclassified	Show 
ws-ping-executor, id=141	0.00	TIMED_WAITING	Unclassified	Show 
ws-ping-executor, id=139	0.00	TIMED_WAITING	Unclassified	Show 
WrapperSimpleAppMain, id=19	0.00	WAITING	Unclassified	Show 
Wrapper-Control-Event-Monitor, id=14	0.00	TIMED_WAITING	Unclassified	Show 

Click the **Show**  icon to display additional details for a single thread. You can click the **Clipboard**  icon to copy that thread to the clipboard.

Thread Performance by System

Filter type to filter

Live Values

OFF



Thread Name	CPU (%)	State	System	Actions
-------------	---------	-------	--------	---------

platform-executor-267, id=706857	5.15	TIMED_WAITING	Unclassified	Hide
----------------------------------	------	---------------	--------------	------

Thread [platform-executor-267] id=706857, (TIMED_WAITING for java.util.concurrent.SynchronousQueue\$TransferStack@7a8acfc5)

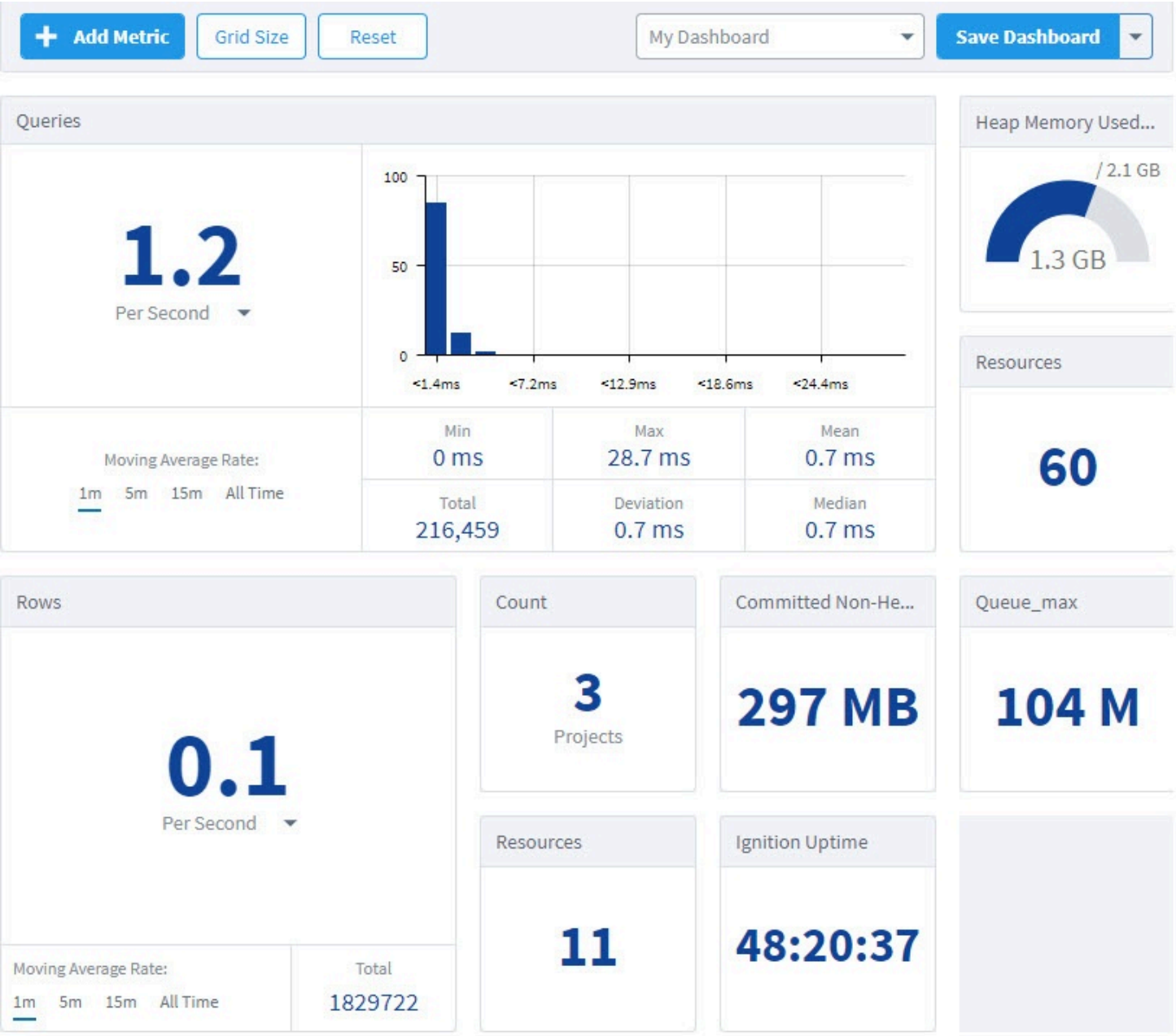
```
java.base@11.0.6/jdk.internal.misc.Unsafe.park(Native Method)
java.base@11.0.6/java.util.concurrent.locks.LockSupport.parkNanos(Unknown Source)
java.base@11.0.6/java.util.concurrent.SynchronousQueue$TransferStack.awaitFulfill(Unknown Source)
java.base@11.0.6/java.util.concurrent.SynchronousQueue$TransferStack.transfer(Unknown Source)
java.base@11.0.6/java.util.concurrent.SynchronousQueue.poll(Unknown Source)
java.base@11.0.6/java.util.concurrent.ThreadPoolExecutor.getTask(Unknown Source)
java.base@11.0.6/java.util.concurrent.ThreadPoolExecutor.runWorker(Unknown Source)
java.base@11.0.6/java.util.concurrent.ThreadPoolExecutor$Worker.run(Unknown Source)
java.base@11.0.6/java.lang.Thread.run(Unknown Source)
```

ws-ping-executor, id=142	0.94	TIMED_WAITING	Unclassified	Show
--------------------------	------	---------------	--------------	------

Diagnostics - Metrics Dashboard

New in 8.1.13

The Metrics Dashboard allows users to visualize a variety of metrics on their own customizable dashboards. Users may browse and search for any registered metric and add it to a dashboard, expanding the diagnostic capabilities available on the Status page. With the addition of this dashboard, developers can contribute diagnostics to the Status page without any additional UI design.



User Interface

+ Add Metric

Grid Size

Reset

My Dashboard

Save Dashboard

Attribute	Description
Add Metric	Select from a list of available metrics to drag and drop onto the dashboard grid.
Grid Size	Control the number of rows and columns on the grid.
Reset	Clear all metrics tiles from the current dashboard.
Dashboard Dropdown	Switch between saved dashboards.
Save Dashboard Dropdown	Save changes, rename a saved dashboard, or delete the current dashboard.

Types of Metrics

Gauge

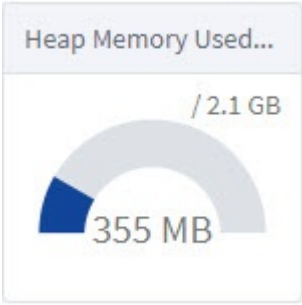
Gauges can be any kind of instant-read measurement, such as the number of megabytes of memory consumed, the count of faulted database connections, or the length of a pending task queue. Gauges are used to display a dynamic number.



Property	Description
value	A numeric value.

X/Y

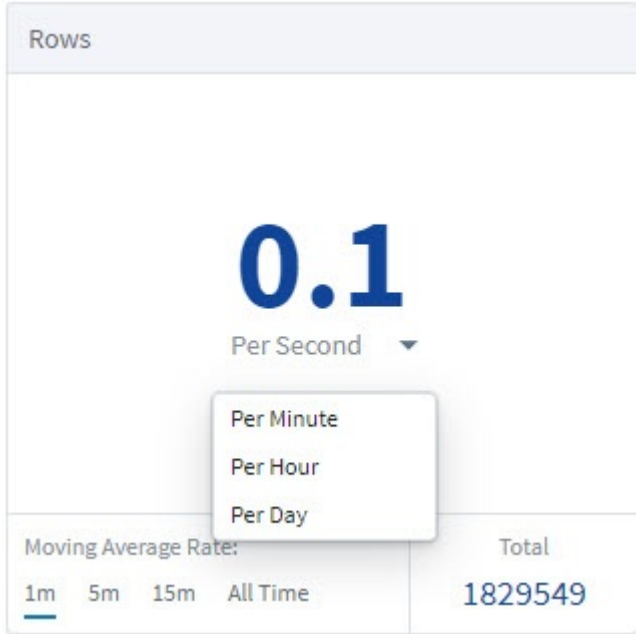
An X/Y metric is a pair of gauges that can be interpreted as a ratio. This is an instant-read gauge on a value that has a maximum, such as heap size or a fixed-size thread pool.



Property	Description
value	A numeric value.
max	The maximum value.

Meter

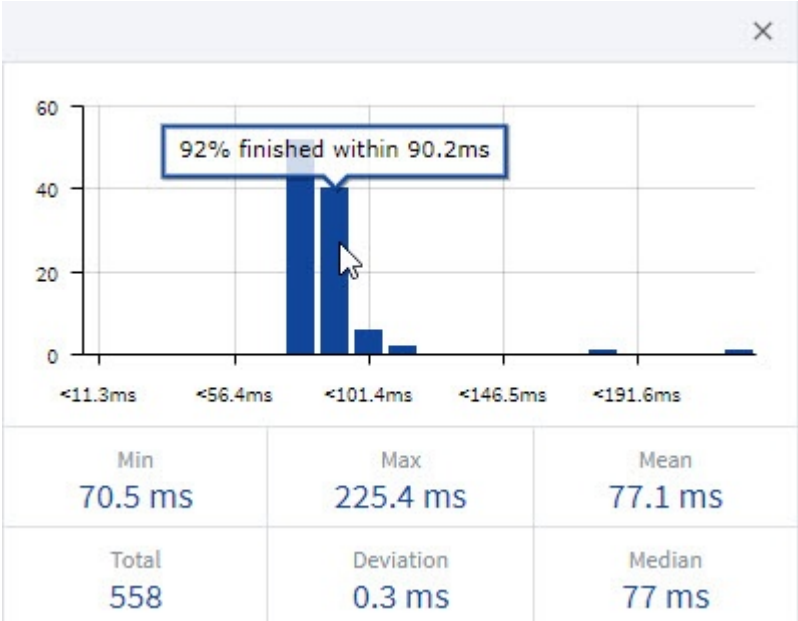
A meter measures the rate at which something occurs, such as the number of messages sent per second. Users can select the units as well as which of the moving average rates to display.



Property	Description
count	The number of events seen.
meanRate	The mean rate, overall.
oneMinuteRate	The one-minute moving average rate.
fiveMinuteRate	The five-minute moving average rate.
fifteenMinuteRate	The fifteen-minute moving average rate.

Histogram

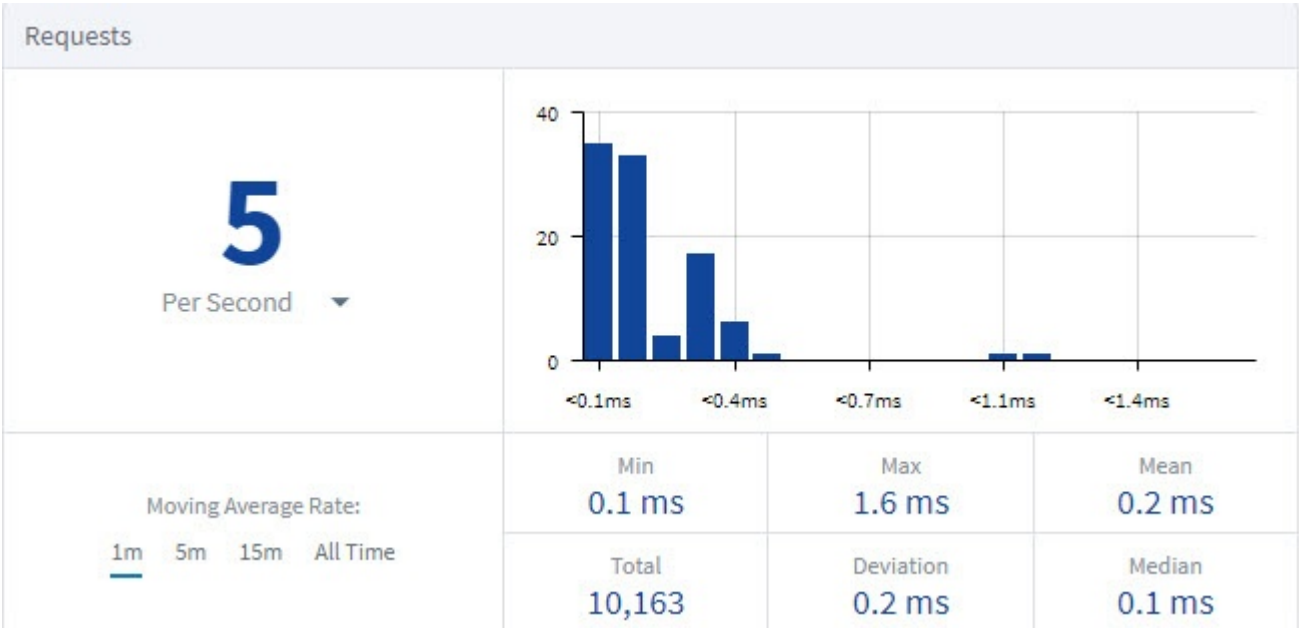
A histogram measures the statistical distribution of values in a stream of data. Hovering over a quantile reveals the value at that quantile.



Property	Description
count	The number of values or events seen.
min	The minimum value (in milliseconds).
max	The maximum value (in milliseconds).
mean	The mean value (in milliseconds).
stdDev	The standard deviation (in milliseconds).
median	The median value (in milliseconds).

Timer

A timer is used to understand both the frequency of and duration of events. It is a combination of a meter (rate of occurrence) and a histogram (distribution of duration). A timer combines the functions and properties of both a meter and a histogram.



Available Metrics

The table below includes all metrics currently available to view on the Metrics Dashboard. New metrics may be made available with the development of new systems, modules, and features.

Metric - authTokenRecords

New in 8.1.37 There are authTokenRecords for both the Client and Designer.

Metric - changeEventDistributionOperationAccumulator

Metric	Description	Size	Type
batchProcessDuration	The amount of time that the ChangeEventDistributionOperationAccumulator takes to process a batch.	4x2	Time
changeEventDistributions	- batchSize - Number of ChangeEvent Distributions in the ChangeEventDistributionOperationAccumulator batch. - Size: 1x1 - Type: Gauge - dispatchedThroughput - The throughput of ChangeEvent Distributions dispatched to the Execution task for batch processing. - Size: 2x2 - Type: Meter - queuedThroughput - The throughput of ChangeEvent Distributions added to the batch. - Size: 2x2 - Type: Meter	---	---

Metric	Description	Size	T
changeEventListenersMutations	- batchSize - Number of ChangeEvent Listener Mutations in the batch. - Size: 1x1 - Type: Gauge - dispatchedThroughput - The throughput of ChangeEvent Listener Mutations dispatched to the Execution task for batch processing. - Size: 2x2 - Type: Meter - queuedThroughput - The throughput of ChangeEvent Listener Mutations added to the batch. - Size: 2x2 - Type: Meter	---	--

Metric - changeEventListeners.count

The number of ChangeEvent Listeners registered with the system.

- Size: 1x1
- Type: Gauge

Metric - changeEventPersistenceOperationAccumulator

Metric	Description	Size	Type
batchProcessDuration	The amount of time that the ChangeEventPersistenceOperationAccumulator takes to process a batch.	4x2	Timer
batchSize	The number of ChangeEvent Contexts in the ChangeEventPersistenceOperationAccumulator batch.	1x1	Gauge
dispatchedThroughput	The throughput of ChangeEvent Contexts dispatched to the Execution task for batch processing.	2x2	Meter
queuedThroughput	The throughput of ChangeEvent Contexts added to the batch.	2x2	Meter
synchronizerDuration	The amount of time that the File Synchronizer takes to synchronize files with memory.	4x2	Timer

Metric - maintenance

Metric	Description	Size	Type
cleaner.duration	The amount of time that the Cleaner takes.	2x4	Timer
pruner.duration	The amount of time that the Pruner takes.	2x4	Timer
reaper.duration	The amount of time that the Reaper takes.	2x4	Timer

Metric - records.count

The number of AuthTokenRecords in the system.

- Size: 1x1
- Type: Gauge

Metric - touchEventAccumulator

Using the metrics below, you can identify that a system is processing the incoming volume of touch events efficiently if the dispatchedThroughput keeps up with the queuedThroughput minus the collisionThroughput.

Metric	Description	Size	Type
batchProcessDuration	The amount of time that the TouchEventAccumulator takes to process a batch.	4x2	Timer
batchSize	The number of touch events in the TouchEventAccumulator batch.	1x1	Gauge
collisionThroughput	The throughput of touch events added to the batch resulting in a collision.	2x2	Meter
dispatchedThroughput	The throughput of touch events dispatched to the Execution task for batch processing.	2x2	Meter
queuedThroughput	The throughput of touch events added to the batch.	2x2	Meter

Metric - ClockDriftDetector

Metric	Description	Size	Type
driftGauge	The most recent clock drift, in milliseconds.	1x1	Gauge
driftTimer	A timer that tracks the distribution of the duration of clock drifts.	4x2	Timer

Metric - databases

Metric	Description	Size	Type
connection- {dbName}	Each connected database will have the following associated metrics: - active-connections - Count of active connections. - Size: 1x1 - Type: Gauge - queries - Measures the rate and distribution of query execution. - Size: 4x2 - Type: Timer - rows - Measures how many rows the queries being executed against the given database connection are returning. - Size: 2x2 - Type: Meter - throughput - Throughput of queries per second. - Size: 1x1 - Type: Gauge	---	---
queries	Measures the rate and distribution of query execution on all database connections.	4x2	Timer

Metric - gateway-network

New in 8.1.37

Metric	Description	Size	Type
activeMsgCountAll	Total count of all active messages currently being sent over the Gateway Network.	1x1	Gauge
IncomingBytesSecAll	Accumulation of the number of bytes received per second across all Gateways.	1x1	Gauge
IncomingMsgsPerSecAll	Accumulation of messages received per second across all Gateways.	1x1	Gauge
OutgoingBytesSecAll	Accumulation of the number of bytes sent per second to all Gateways.	1x1	Gauge
OutgoingMsgsPerSecAll	Accumulation of messages sent per second to all Gateways.	1x1	Gauge
pendingAcksExpired	Indicates how many pending acknowledgements were purged during the last cleanup execution. This metric is relevant for outgoing connections. Note: Some messages create a pending acknowledgement object. When the message is uploaded to another Gateway and that Gateway acknowledges receiving the message, the pending acknowledgement object is cleared. If no acknowledgement is received, these objects can become orphaned. Orphaned pending message acknowledgements are regularly purged.	1x1	Gauge
pendingMessagesExpired	Records how many messages were purged during the last cleanup execution, giving an estimate of potentially lost messages. This metric is relevant for incoming connections. Messages that were dispatched, but not downloaded by the other Gateway are regularly purged.	1x1	Gauge
PendingMsgCountAll	Total count of all messages waiting to be sent over the Gateway Network.	1x1	Gauge

Metric	Description	Size	Type
proxyMsgsPerSec	The number of messages per second that are forwarded through this Gateway. Only applies when this Gateway is configured as a proxy Gateway.	2x2	Meter
services	incomingServiceCalls - Get Service State - Number of calls per second. This metric is queried by other Gateways to see if a specific service is available. - Size: 2x2 - Type: Meter - Enumerate Services - Measures the rate and distribution of enumerate service calls. - Size: 2x2 - Type: Meter	---	---

Metric - ignition

Metric	Description	Size	Type
designer.requests	Measures the rate and distribution of designer requests.	4x2	Timer
performance	- committed-non-heap - Committed non-heap memory. - Size: 1x1 - Type: Gauge - cpu - CPU usage as percent utilized. - Size: 1x1 - Type: Gauge - disk - Disk used out of total space available. - Size: 1x1 - Type: X/Y - heap - Heap memory used out of total memory available. - Size: 1x1 - Type: X/Y - heap-max - Maximum heap memory. - Size: 1x1 - Type: Gauge - heap-used - Current heap memory used. - Size: 1x1 - Type: Gauge - non-heap - Current non-heap memory used. - Size: 1x1 - Type: Gauge - non-heap-pct - Non-heap memory used out of total non-heap memory available. - Size: 1x1 - Type: X/Y	---	---
uptime	Total uptime.	1x1	Gauge

Metric - perspective

Metric	Description	Size	Type
bindings	Perspective Binding count.	1x1	Gauge
components	Perspective Components count.	1x1	Gauge
expressions	Measures the rate and distribution of expressions.	4x2	Timer
fetches	Measures the rate and distribution of fetches.	4x2	Timer
pages	Perspective pages count.	1x1	Gauge
property-changes	Measures the rate of property changes.	2x2	Meter
scripts	Measures the rate and distribution of script executions	4x2	Timer
session- <code>{sessionName}</code>	Each connected Perspective session will have the following associated metrics: - expressions - Measures the rate and distribution of expressions. - Size: 4x2 - Type: Timer - fetches - Measures the rate and distribution of fetches. - Size: 4x2 - Type: Timer - messages-received - Count of messages received. - Size: 2x2 - Type: Counter - messages-sent - Count of messages sent. - Size: 2x2 - Type: Counter - property-changes - Measures the rate of property changes. - Size: 2x2 - Type: Meter	---	---

Metric	Description	Size	Type
	- queue-length - Current length of queue. - Size: 1x1 - Type: Gauge - queue-tasks - Measures the rate and distribution of queued tasks. - Size: 4x2 - Type: Timer - reconnects - Count of reconnects. - Size: 2x2 - Type: Counter - scripts - Measures the rate and distribution of script executions. - Size: 4x2 - Type: Timer - uptime - Total uptime for the Perspective session. - Size: 1x1 - Type: Gauge		
sessions	Count of active sessions.	1x1	Gauge
views	Count of views.	1x1	Gauge

Metric - projects

Metric	Description	Size	Type
(projectName).resources	Count of resources per project.	1x1	Gauge
count	Count of projects.	1x1	Gauge
disk-sync	Measures the frequency and duration of projects directory synchronization.	4x2	Timer
saves	Measures the rate and distribution of project saves.	4x2	Timer

Metric - redundancy

Metric	Description	Size	Type
config.updateThroughput	Rate of updates.	2x2	Meter
alarmpipelinemanager	- taskSendThroughput - Rate of tasks sent. - Size: 2x2 - Type: Meter - taskRecvThroughput - Rate of tasks received. - Size: 2x2 - Type: Meter - queueSize - Current queue size. - Size: 1x1 - Type: Gauge	---	---
sync.queue_max	Maximum queue size.	1x1	Gauge

Metric - scripts

Metric	Description	Size	Type
gateway	• compile - Measures the rate and distribution of script compiles. ◦ Size: 4x2 ◦ Type: Timer • execute - Measures the rate and distribution of script executions. ◦ Size: 4x2 ◦ Type: Timer	---	---
project-(projectName)	• compile - Measures the rate and distribution of script compiles. ◦ Size: 4x2 ◦ Type: Timer • execute - Measures the rate and distribution of script executions. ◦ Size: 4x2 ◦ Type: Timer	---	---

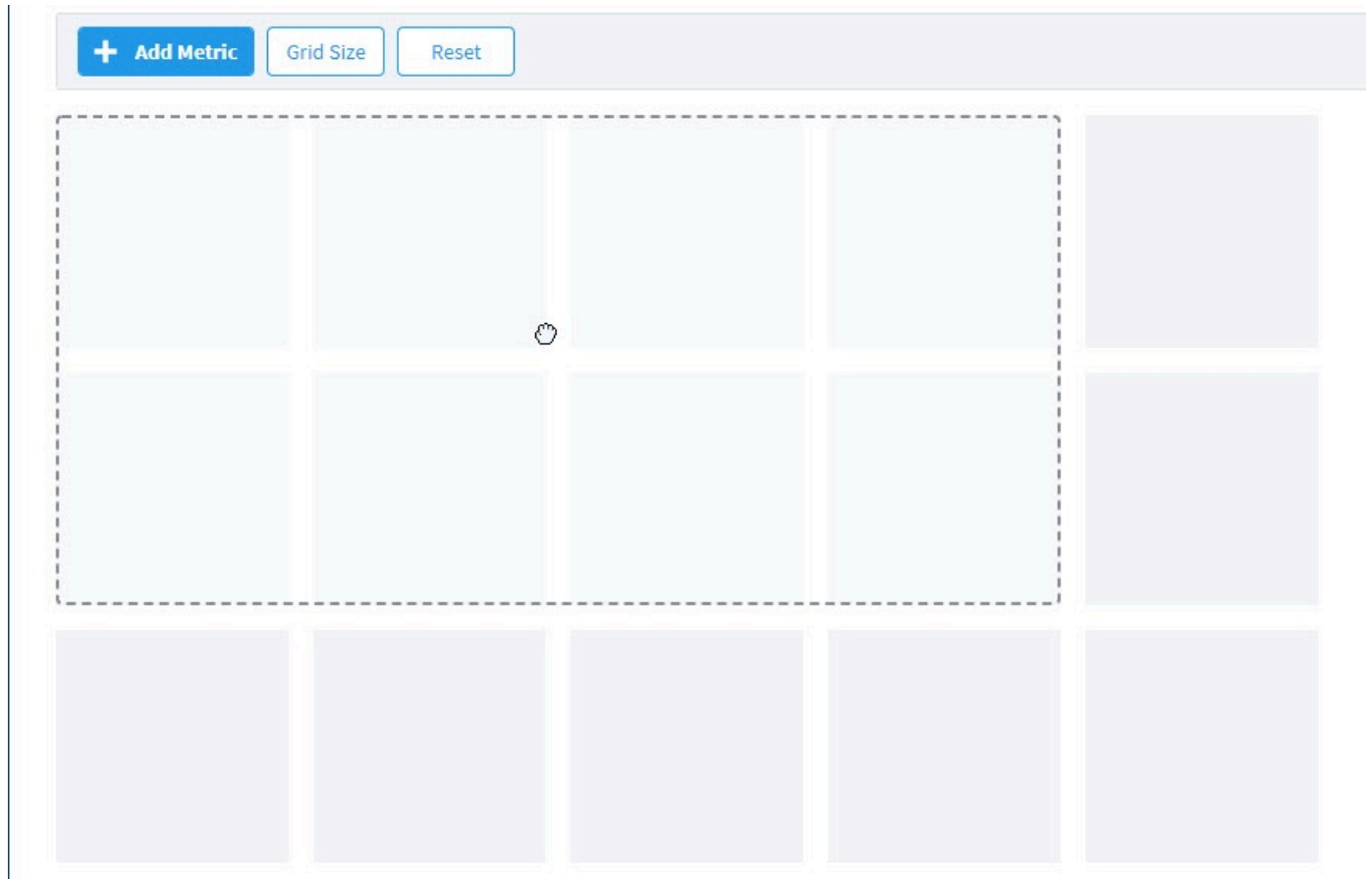
Metric - vision.requests

Measures the rate and distribution of Vision requests.

Examples

Adding Metrics to a Dashboard

1. Click **Add Metric**.
2. Select a metric from the list and click **Add**.
3. Hover over the grid to position the metric.



- Click to snap the metric to the dashboard. To reposition your metric, you can drag and drop it anywhere else on the grid.



Config

Gateway Configuration

The Config tab provides access to configuration options for **Gateway settings**. This is where most of the settings that affect the whole Gateway are set up. We can add database and device connections, users and roles, adjust alarm settings, set up security, and create a schedule for a Gateway backup to be taken automatically at specific times.

The list of Config options on the left menu change based on what modules are installed on your Gateway. Third-party modules have settings that are not discussed on this page.

Once you have the **Gateway** up and running, you start by configuring some or all of the general services in Ignition. You make the configuration changes from the **Config** section of the Gateway Webpage. The different broad categories of what you can configure are as follows:

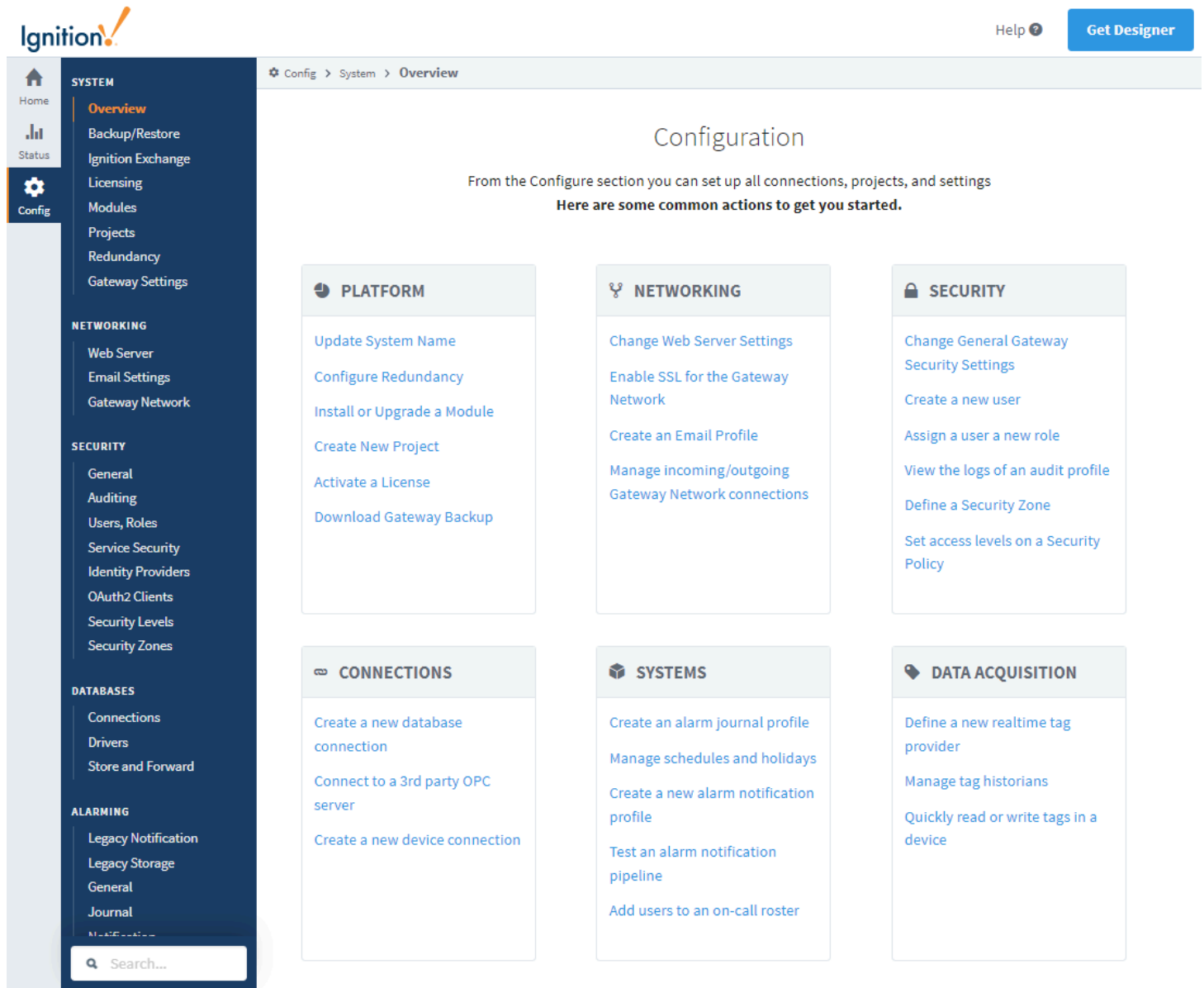
- **System** (Overview, Backup/Restore, Licensing, Modules, Projects, Redundancy and Gateway Settings)
- **Networking** (Web Server, Gateway Network and Email Settings)
- **Security** (Auditing, Users, Roles, Service Security, Identity Providers, OAuth2 Clients, Security Levels, and Security Zones)
- **Databases** (Connections, Drivers, and Store and Forward)
- **Alarming** (General, Journal, Notification, On-Call Rosters, and Schedules)
- **Tags** (History and Realtime)
- **OPC Client** (OPC Connections and OPC Quick Client)
- **OPC UA** (Device Connections, Security, and Server Settings)
- **Enterprise Administration** (Event Thresholds, Controller Settings, Agent Management, License Management, and Agent Tasks)
- **Sequential Function Charts** (Settings)
- **New in 8.1.20**
 - Perspective** (Branding Customization)

- New in 8.1.28

Connectors (MongoDB)

NOTE

Depending on what modules you have installed, some categories may be missing.



System

The System section is a sort of catch all section that can do a lot of different things. The first window is the Overview page, which is what will first show up when navigating to the Configure tab. The Overview page only has links to other sections of the Config tab, but it is useful if you aren't exactly sure where the setting you are looking for is located, because the Overview page lists the most common configuration changes.

Page	Description
Backup/Restore	The Backup/Restore page is where you can manually take a backup, and restore a previous backup.
Ignition Exchange	On the Ignition Exchange page you can access the Ignition Exchange to browse for resources. You can also import an Ignition Exchange Package that you've downloaded.
Licensing	The Licensing page allows you to control any and all licenses currently activated on the Gateway. It will show all the modules that the license is currently good for, and have some options for activating a new or additional license.
Modules	The Modules page displays all currently installed modules and if they are active or not. This is where you can install a new module or upgrade an existing module.
Projects	The Projects page can easily manage all of the projects currently configured in the Gateway, with settings that change the Name and Title, or the default database and authentication profile of the project.
Redundancy	The Redundancy page is where all of Ignition's redundancy settings are configured. This is where the master and backup nodes are configured as well as the network settings to make sure the two nodes can properly communicate.
Gateway Settings	The Gateway Settings page is where settings are located for the system name, homepage redirect URL, launch settings, scheduled backups, error reporting and other miscellaneous.

Networking

The Networking section deals with setup and management of the **Gateway Network**.

Page	Description
Web Server	The Web Server page is for configuring the http and https ports, setting up the SSL / TLS certificate, redirecting traffic through a known address, and whether or not all http traffic should be forcefully redirecting to https. If you are allowing users to access your Gateway from outside your network (through the internet), you will need to configure the Public HTTP Address settings. You can find out more about SSL in Secure Communication (SSL/TLS).
Gateway Network	The Gateway Network allows you to connect multiple Gateways together over a wide area network. The Gateway's connection settings can also be changed to only allow certain connections. The Gateway Settings set the basic rules for the system.
Email Settings	The Email Settings section allows you to create an SMTP server connection in the Gateway that can be used by several different resources such as Alarm Notification and Report Schedules.

Security

Ignition provides several [Security](#) options to safeguard data and applications in Ignition which fall into the following categories, and are set up in the Config section.

Page	Description
General	New in 8.1.0 The Gateway General Security Settings page is new for 8.1.0. It determines security permissions for the Gateway and Designer. For more information, see Security .
Auditing	Here you can set up an Audit Profile to record details about specific events that occurred.
Users and Roles	This is where you set up users and roles . Security policies are defined in terms of the roles set up in the system.
Service Security	A security policy can be defined for each Security Zone and is set up in Service Security . The Security Policy has four sections: Alarm Notification, Alarm Status, History Provider Access, and Tag Access. They work together to define how the local Gateway gives access to incoming Gateway connections.
Identity Providers	Identify Providers (IdP) provide a way for users to log in to Ignition using credentials stored outside of Ignition. An IdP creates, maintains, and manages identity (login) information while providing authentication services to Ignition. This provides a secure login that allows Ignition to use SSL and two-factor authentication (2FA).
OAuth2 Clients	New in 8.1.24 Set up OAuth 2.0 Clients here.
Security Levels	Security Levels define a hierarchy for access inside a Perspective Session or Vision Client using IdP authentication. This authorization system provides a way to map roles from an Identity Provider (IdP) to Ignition roles.
Security Zones	A Security Zone is a list of Gateways, Computers, or IP addresses that are defined and grouped together. This group now becomes a zone on the Gateway Network , which can have additional policies and restrictions placed on it. Security Zones provide this functionality to the Gateway Network, limiting locations instead of people to be read-only for specific actions. This allows for greater control over the type of information that is passing over the network, improving security and helping to keep different areas of the business separate, while still allowing them to interconnect.

Databases

The Databases section is where **database connections** are set up. Databases are used in historical data logging, reporting, storing alarm logs, and Tag storage.

Page	Description
Connections	Many of the advanced features of Ignition, such as the Transaction Groups and Tags Historian require a connection to an external database, and most databases require special permissions for each computer that wants to connect. Ignition takes care of all of this. You create a connection to your database once, and every system in Ignition will use that central connection. From here, you can create new database connections and edit existing connections.
Drivers	JDBC drivers used in database connections are imported and configured in Drivers of the Database section.
Store and Forward	The Store-and-Forward system provides a reliable way for Ignition to store data to the database. The Store-and-Forward system settings offer a good deal of flexibility in tuning. Different types of situations and goals will likely require different configurations.

Alarming

The Alarming section provides general **alarm configuration** settings to provide up-to-date status of alarms, store alarm history, build the logic for how, why, and when alarm notifications are delivered, manage alarm notifications for user groups, and send Email, SMS, or Voice notifications. With all these features and functions in Alarming, you can easily create alarms, and design and manage your alarm notifications any way you choose.

Page	Description
General	This General setting provides of some basic alarm configuration settings.
Journal	Alarm Journals are configured in the Alarming section to store basic historical information in a database about alarms that occurred, such as their source and timestamp, associated data on the alarm, and the values of the alarm's properties at the time the event occurred.
Notification	Notification Profiles are configured in the Alarming section to allow for Email , SMS , or Voice notifications to be sent out when an alarm event occurs.
On-Call Rosters	The On-Call Roster is where you create user groups to be notified when an alarm occurs. When an alarm is triggered, it is sent to a designated On-Call Roster where it evaluates the users schedules, and only notifies those users that have an active schedule. Users that are off-schedule will not be notified.

Tags

The Tags section is where both **Realtime Tag Providers** as well as **Historical Tag Providers** are configured. Note that this is not where individual Tags are set up.

Page	Description
History	Configure the settings for each of the configured Historical Tag Providers, or create new remote or split providers.
Realtime	Configure the settings for each of the configured Realtime Tag Providers, or create new standard or remote providers.

OPC Client

The OPC Client section is where connections from Ignition's internal OPC UA server to other OPC servers are located.

Page	Description
OPC Connections	Configure OPC Connections to Ignition's built in OPC Server.
OPC Quick Client	The OPC Quick Client allows for quick and simple testing of any OPC Connections connected to the OPC server.

OPC UA

The OPC UA Server is where Ignition's internal OPC UA server is configured.

Page	Description
Device Connections	This is where all device connections to our internal OPC UA server are configured.
Security	Upload and trust client and server OPC UA certificates .
Server Settings	Configure Ignition's internal OPC UA Server's settings.

Enterprise Administration

The **Enterprise Administration** section controls the majority of **EAM functions**. Setting the Gateway to be a Controller or Agent as well as creating Agent Tasks and managing the various Agents from the Controller Gateway can all be done in this section.

Sequential Function Charts

A **Sequential Function Chart** (SFC) is a series of scripts that are defined in a single location and then called in sequential order.

Page	Description
Settings	This is where the SFC Settings are configured.

Perspective

New in 8.1.20 Perspective co-branding customization allows you to add your own flair on your Perspective apps by incorporating custom colors and logos.

Page	Description
Branding Customization	This is where Co-Branding settings are configured.

Connectors

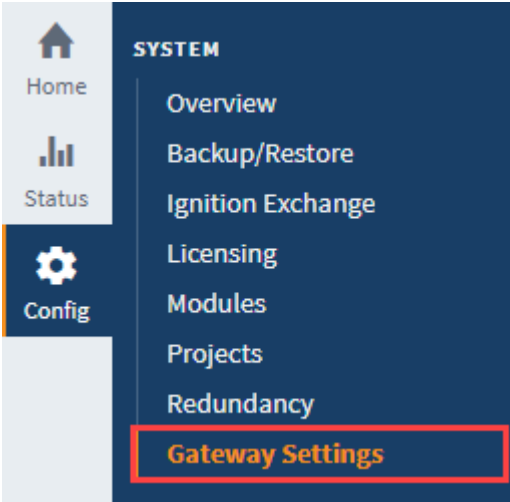
Cloud Connectors are geared towards Ignition Cloud Edition and cloud infrastructure, although the connectors can also be used on a standard Ignition Gateway.

Page	Description
MongoDB	This is where MongoDB Connections are configured.

Gateway Settings

Gateway Settings Property Reference

After you [launch the Gateway](#), you can define the high-level settings that apply to the entire Gateway by going to the **Config > Gateway Settings** on the Gateway Webpage. From this page, you can use the default values or define a new setting. The Gateway is at the heart of the Ignition software. It runs as a web server and you can access it through a web browser. Once running, you can get various status information about the Gateway and access important functions.



New in 8.1.0

The Gateway Settings Properties were updated significantly for release 8.1.0. Many security related settings have been moved to [Gateway General Security Settings](#).

The following tables describe all the properties on the Gateway Settings.

Gateway Settings

Setting	Description
System Name	Is a unique name for this Ignition installation. It is used to distinguish this server from others on the network when working with multiple Ignition installations. CAUTION: It is not recommended to change the Gateway's System Name after initial Gateway setup. Renaming your Gateway may break critical dependencies, affect data collection, and halt production. To see a list of features dependent on the Gateway name, click here .
Homepage Redirect URL	The URL this gateway will redirect to when <code>http://ip:port/</code> is visited. Can either be a relative path (e.g., <code>/web/home</code>), or fully qualified (e.g., https://inductiveautomation.com).
Gateway Scripting Project	The Gateway Scripting Project is a Project in which Gateway-scoped scripts with no project affiliation can access user script libraries.
enable Tag Reference Tracker Store	New in 8.1.34 Enables the storing of Tag Reference entries to a database on the local Gateway for analysis in a Designer for third party modules. Default is true.

Launch Settings

Setting	Description
Designer Memory	The maximum amount of memory that the Designer has access to.
Disable Direct3D	Disables the Direct3D rendering pipeline launched clients. Direct3D can cause performance problems with XOR painting. (affects clients on Windows only)
Disable DirectDraw	Disables the DirectDraw system for launched clients. Can be useful for some video cards that don't support DirectDraw well. (affects clients on Windows only)
Use Condensed Font	New in 8.1.4 Designers and Vision Clients will use a condensed version of the "Dialog" font for better compatibility with pre-8.0 Vision project design. (affects clients on Windows and Linux only). Defaults to false.

Local Client Fallback

Ignition provides a **Local Vision Client Fallback** mechanism that lets you use a Gateway running on the local machine. If the Gateway is lost, the Client can automatically retarget to a project that you specify in the local in the local Gateway.

Local Client Fallback Settings

Setting	Description
Enable Local Fallback	Enables a client to fall back to a project in a local Gateway if communication is lost to the central Gateway. Note that port 6501 must be open on the local machine.
Seconds Before Failover	The number of seconds to wait before switching to the local Gateway project after communication loss.
Fallback Project	The local project to use during fallback.

Scheduled Backups

The Scheduled Backup Settings control the Gateway's scheduled backup system. This system automatically creates **Gateway backups** at scheduled times and stores them in a specified destination folder. Scheduled backups are executed by the Ignition Gateway service. When enabled, you must specify a destination folder, which can be one of the following:

- A local folder, such as `C:\backups` or `/var/backups`
- A network location, such as `\\fileserver\backups`

Scheduled Backup Settings

Setting	Description
Enable Scheduled Backups	Enables the scheduled backup system which automatically makes backups at a scheduled time.
Backup Folder	The folder where scheduled backups are stored. This can be a local directory or a network location specified using a full UNC path.
Backup Schedule	A UNIX 'crontab' format scheduling string representing when to make the backups. See the Crontab Formatting Reference page for more details.
Retention Count	The maximum number of Gateway backups the Gateway manages in the backup folder location. The Gateway deletes older backup files to make room for new ones.
Filename Pattern	New in 8.1.4 The filename pattern used for creating scheduled and manually downloaded Gateway backups. Default pattern is <code>\${gatewayName}_Ignition-backup-\${edition}\${timestamp}.gwbk</code>. There are a few possible placeholder pattern values: <code>\${os}</code>: The operating system the Gateway is installed on. <code>\${version}</code>: The Ignition Gateway version. <code>\${gatewayName}</code>: The System Name of your Gateway. <code>\${edition}</code>: The Ignition edition you are using (for example, <code>edge</code>). Standard Ignition versions will be blank. <code>\${timestamp}</code>: The current date and time at which the backup initializes.

NOTE

Scheduled backups are executed by the Ignition Gateway service. When using a network location, mapped network drives are not supported, and the Gateway service must have permission to create and write files in the backup folder.

Scheduling Automatic Backups Example

This example uses an Ignition installation in a Windows environment.

1. Navigate to **Config > Gateway Settings** on your Gateway and scroll down to **Scheduled Backup Settings**.
2. Check the **Enable Scheduled Backups** box.
3. Enter your backup folder path into the **Backup Folder** field. If you are using a network location, ensure the path is specified as a full UNC path and that the Ignition Gateway service has permission to write to the destination.
4. Adjust the **Backup Schedule**, **Retention Count**, and **Filename Pattern** fields as desired.

 TIP

While testing your configuration, you can temporarily set the Backup Schedule to `* / 5 * * *`. This schedules a backup every five minutes and makes it easy to confirm that backups are being created successfully. Once verified, update the schedule to the desired frequency.

5. Click **Save Changes** at the bottom of the page.

After saving, Ignition tests for the presence of the backup location. If the location does not exist, the Gateway attempts to create one. For example, if the file location `\\fileserver\` exists, but does not contain a folder named `backups`, a folder of the same name will be created at that location. If the Gateway cannot create or write to the location, an error appears in the Gateway console, which typically indicates a permissions or access issue with the destination.

As an additional verification step, restarting the Gateway and confirming that new backup files continue to appear in the backup folder can help ensure that scheduled backups persist after restarting the Gateway.

The image below displays an Ignition Gateway configured to save to a network location every evening at midnight.

Scheduled Backup Settings	
Enable Scheduled Backups	☒ Enables the scheduled backup system which will automatically make backups at a scheduled time. (default: false)
Backup Folder	\\10.10.1.13\backups\Ignition\ A path to a folder in which to put the scheduled backups.
Backup Schedule	0 0 * * * A UNIX crontab style scheduling string representing when to make the backups. (default: 15 1 * * *)
Retention Count	5 The number of backups to keep in the backup folder. (default: 5)
Filename Pattern	\${gatewayName}_Ignition-backup-\${e} The filename pattern used for creating scheduled and manually downloaded gateway backups. (default: \${gatewayName}_Ignition-backup-\${edition}\${timestamp}.gwbk)

Automatic Thread Dump

New in 8.1.13

When enabled, Ignition will conduct automatic thread dumps at the specified interval when above the target CPU Usage Threshold. If the threshold is met or exceeded, a timestamped thread dump will be saved to the logs folder. When the number of thread dumps in the logs folder exceeds the Retention Count, old files will be automatically removed. The default sample rate (1 second) can be overridden by adding an **additional parameter** to the Ignition configuration file.

Automatic Thread Dump Settings

Setting	Description
Enable Automatic Thread Dumps	Enables automated thread dump generation when CPU utilization exceeds the threshold below.
Thread Dump Capture Interval	Number of seconds between thread dumps when utilization threshold+duration is met.
CPU Usage Threshold	CPU Usage Threshold (%) that when exceeded for a given duration (below) will trigger a thread dump capture.
CPU Usage Exceedance Duration	Duration (seconds) during CPU Usage Threshold exceedance to delay a thread dump capture.
Retention Count	The number of thread dumps to keep in the logs folder.

Error Reporting

When an error occurs in the Client or Designer, the users can click a link on the Details tab to report the error via email.

Message Tab

Error

Message

Details

Error executing script for event: **actionPerformed** on component: **Button**.

<

>

1 / 3

<

>

Close

Details Tab

Error

Message

Details

Traceback (most recent call last):
File "<event:actionPerformed>", line 1, in <module>
ZeroDivisionError: integer division or modulo by zero

Ignition v(Dev Version)
Java: Azul Systems, Inc. 11.0.6

compact / full

copy report error

<

>

1 / 2

<

>

Close

These settings define how the errors are reported.

Error Reporting Settings

Setting	Description
SMTP Server	The address of the SMTP server used for sending emails, such as <code>mail.example.com</code> . Optionally, specify a port, like <code>mail.example.com:25</code> , or include STARTTLS settings, such as <code>mail.example.com:587</code> .
To Address	The email address(es) that will receive the error notification. Separate multiple email addresses with a semicolon (;)
From Address	The email address that the error notification is from.
SMTP Username	A username for the SMTP server, if required.
Change Password?	Check this box to change the existing password.
Password	A password for the SMTP server, if required.
Password	Re-type password for verification.

Multicast

These properties allow the Gateway to broadcast information about itself via multicast UDP packets. This allows the Gateway to be discoverable by any components that are also listening to the same multicast address. For example, native client launchers listen on a multicast address to provide a list of available Gateways on the network. Verify that the send ports and receive ports are open on the Gateway machine in order to be able to broadcast multicast message.

Multicast Settings

Setting	Description
Enable Multicast	Allows this Gateway to be discoverable on your local network.
Multicast IP Address	Gateway messages are broadcast on this address.
Send Port	This port must be open on this machine to send multicast messages.
Receive Port	This port must be open on any machine that will receive multicast messages.
Message Interval	The interval in milliseconds at which multicast messages will be sent.

Email Settings

Email Profiles

In Ignition, there are several places that you might want to send an email from. Instead of setting up a new email server connection at each one, you can add Email Profiles in the Gateway Config section and reference them in other places. For example, you can use a pre-configured connection in any of these places:

- **Alarm Notification** - While the alarm notification system allows you to set up an Email Notification Profile that is separate from the Email Profile, you can instead choose to use the settings configured in the Email Profile.
- **Report Schedules** - When Scheduling an Email Action in a report, the Action requires a configured Email Profile before the report can be emailed out.
- **`system.net.sendEmail()`** - Instead of manually entering in values for the Email Profile inside each of your scripts, this function can instead use the settings from an existing Email Profile.

Once your Email Profile is set up, you only need to reference the name of the connection and Ignition will take care of the rest.

Setting Up an Email Profile

The Email Settings page allows you to select either basic authentication or OAuth 2.0 and configure an Email Profile from there. These Email Profiles can be used by several different resources in the Gateway. This means that instead of setting up an Email Profile within each resource (i.e., Alarm Notification Profile, Reports, etc.), you can configure them once here, and have those resources all use the same SMTP server. You can find the Email Settings in the Config section of the **Gateway** under the Networking heading. Here, you can create a new Email Profile, or manage your existing profiles.

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Gateway Settings

NETWORKING

Web Server

Email Settings

Gateway Network

Config > Network > Email Profiles

Name	Type	Description
No Email Profiles		

→ [Create new Email Profile...](#)

Classic SMTP Profile Settings

Below is a list of properties available on a classic SMTP server connection.

Main

Property Name	Property Description
Name	The name of the SMTP profile.
Description	A description of the SMTP profile.

SMTP Server Settings

Property Name	Property Description
Hostname	Hostname of the SMTP server to send email through.
Port	Port SMTP service is running on. Default is 25.
Use SSL/TLS port	Connect using dedicated the SSL/TLS port. Default is false.
Use STARTTLS	Enable use of the STARTTLS command, allowing the connection to be upgraded to an SSL or TLS connection if supported by the server. This is not necessary for connections that are already SSL/TLS. Default is false.
Username	The username the Gateway will use when authenticating against the mailserver. This is only required if the SMTP server expects authentication.
Password	The password the Gateway will use when authenticating against the mailserver. This is only required if the SMTP server expects authentication.
Password	Retype password for verification.

Advanced Properties

Property Name	Property Description
SMTP Timeout	Timeout (in milliseconds) to use when connecting to, reading from, and writing to the SMTP server. Default is 10,000.
Debug Mode Enabled	Enable email session debugging. Information is printed to standard output (wrapper.log). Default is false.
SSL Protocols	A comma separated list of protocols that will be allowed if connecting via SSL/TLS. Default is TLSv1.2.

OAuth2 SMTP

New in 8.1.24

Besides setting up classic SMTP Email Profiles, you can also set up OAuth2 SMTP Profiles. To set up an OAuth2 SMTP Profile, go to the Email Settings properties of the Gateway's **Config** section.

OAuth2 SMTP Profile Settings

Below is a list of properties available on an OAuth2 SMTP server connection.

Main

Property Name	Property Description
Name	The name of the SMTP profile.
Description	A description of the SMTP profile.

SMTP Server Settings

Property Name	Property Description
Hostname	Hostname of the SMTP server to send email through.
Port	Port SMTP service is running on. Default is 25.
Use SSL/TLS Port	Connect using the dedicated SSL/TLS port. Default is false.
Use STARTTLS	Enable use of the STARTTLS command, allowing the connection to be upgraded to an SSL or TLS connection if supported by the server. This is not necessary for connections that are already SSL/TLS. Default is false.

OAuth2 Settings

Property Name	Property Description
Username	The username that the Gateway will use along with the access token which together make up the credential in the SMTP protocol's XOAUTH2 SASL authentication mechanism.
OAuth2 Client	The name of the OAuth2 Client which will be used by this Email Profile to obtain access tokens.
Interactive	If enabled, user interaction is required to obtain access and refresh tokens (3-legged OAuth 2.0 flow). If disabled, user interaction is not required to obtain access tokens - the Gateway will obtain access tokens using its own client credentials (2-legged OAuth 2.0 flow). Default is false.
Scope	The OAuth 2.0 scope values representing the access token's set of permissions requested by the Gateway.

Advanced

Property Name	Property Description
SMTP Timeout	Timeout (in milliseconds) to use when connecting to, reading from, and writing to the SMTP server. Default is 10,000.
Debug Mode Enabled	Enable email session debugging. Information is printed to standard output (wrapper.log). Default is false.
SSL/TLS Protocols	A comma separated list of protocols that will be allowed if connecting via SSL/TLS. Default is TLSv1.2.

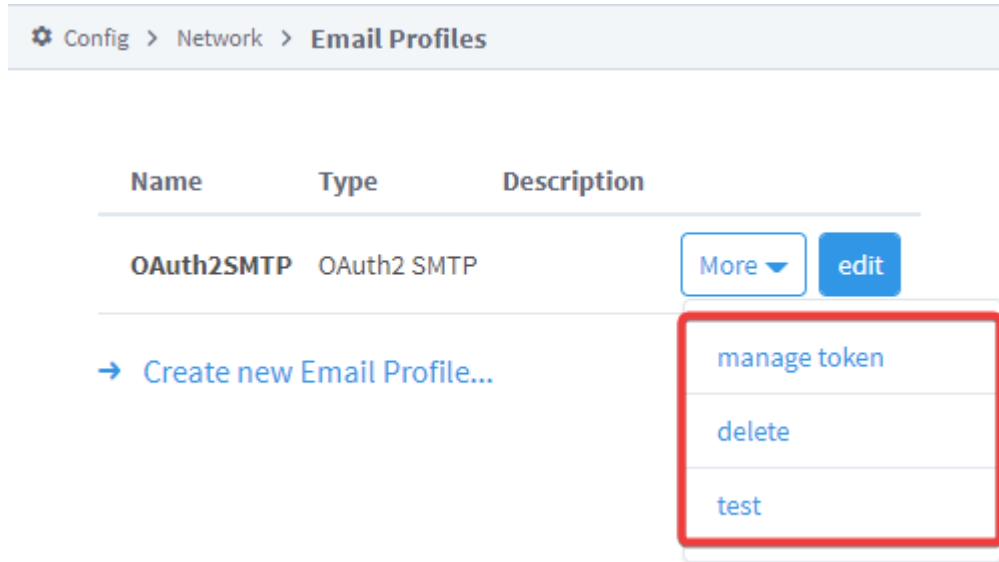
Advanced OAuth2 Settings

Property Name	Property Description
Access Token Timeout	Amount of time in seconds to wait for a valid access token before giving up on sending an email. Values less than or equal to zero will cause the profile to expect a valid access token to be available immediately and will fail fast if one is not available at the time an email needs to be sent. Default is 120.
Default Access Token Expiration	The amount of time in seconds before an access token expires by default. This value only applies for access tokens which do not have an explicit expiration from the authorization server. Values less than or equal to zero means access tokens do not expire by default. Default is 0.
Refresh Before Expiration	The amount of time in seconds before an access token expires when a new token should be requested. Values less than or equal to zero results in new access token requests exactly when the last access token expires. Default is 300.
Additional Authorization Request Parameters	Add any additional parameters which should be encoded on the OAuth 2.0 authorization request (interactive only).
Additional Authorization Code Access Token Request Parameters	Add any additional parameters which should be encoded on the OAuth 2.0 access token request granted using an authorization code (interactive only).
Additional Client Credentials Access Token Request Parameters	Add any additional parameters which should be encoded on the OAuth 2.0 access token request granted using client credentials (non-interactive only).
Additional Refresh Token Access Token Request Parameters	Add an additional parameters which should be encoded on the OAuth 2.0 access token request granted using a refresh token (interactive only).

 **NOTE**

When using OAuth2 Email Profiles, you must set up predefined OAuth2 Clients for authorization. An OAuth2 Client may be used for multiple OAuth2 Email Profiles. See the [OAuth 2.0 Client](#) page for more information.

Once you set up OAuth2 SMTP Email Profile, you will have options to manage your token, delete the SMTP Profile, or test it by composing and sending a test email.



Manage Token Example

This page will allow you to view the current state of the access token managed by the OAuth2 SMTP Email Profile. If the Email Profile has any issues obtaining or refreshing tokens, details about the issue(s) will be shown here. There will be actions you may take to correct the issue(s), such as granting a new access token, or manually refreshing an access token. In some cases, you may need to adjust your Email Profile configuration settings to fix a problem, depending on the error shown.

NOTE

The "Refresh Token" button will only be available if the OAuth2 SMTP Email Profile is not interactive OR if it is interactive and a refresh token is available. Additionally, the "Grant New Token" option will only be available when the Email Profile is interactive.

This option will allow you to grant the Client a new access token, or refresh the current token and its expiration time.

1. Set up your OAuth2 SMTP Email Profile if you haven't already. In this example, we will be using the OAuth2 Email Profile in the screenshot above.
2. Click on **More**, and then on **manage token**.

Name	Type	Description
OAuth2SMTP	OAuth2 SMTP	More ▾ edit
→ Create new Email Profile... manage token delete test		

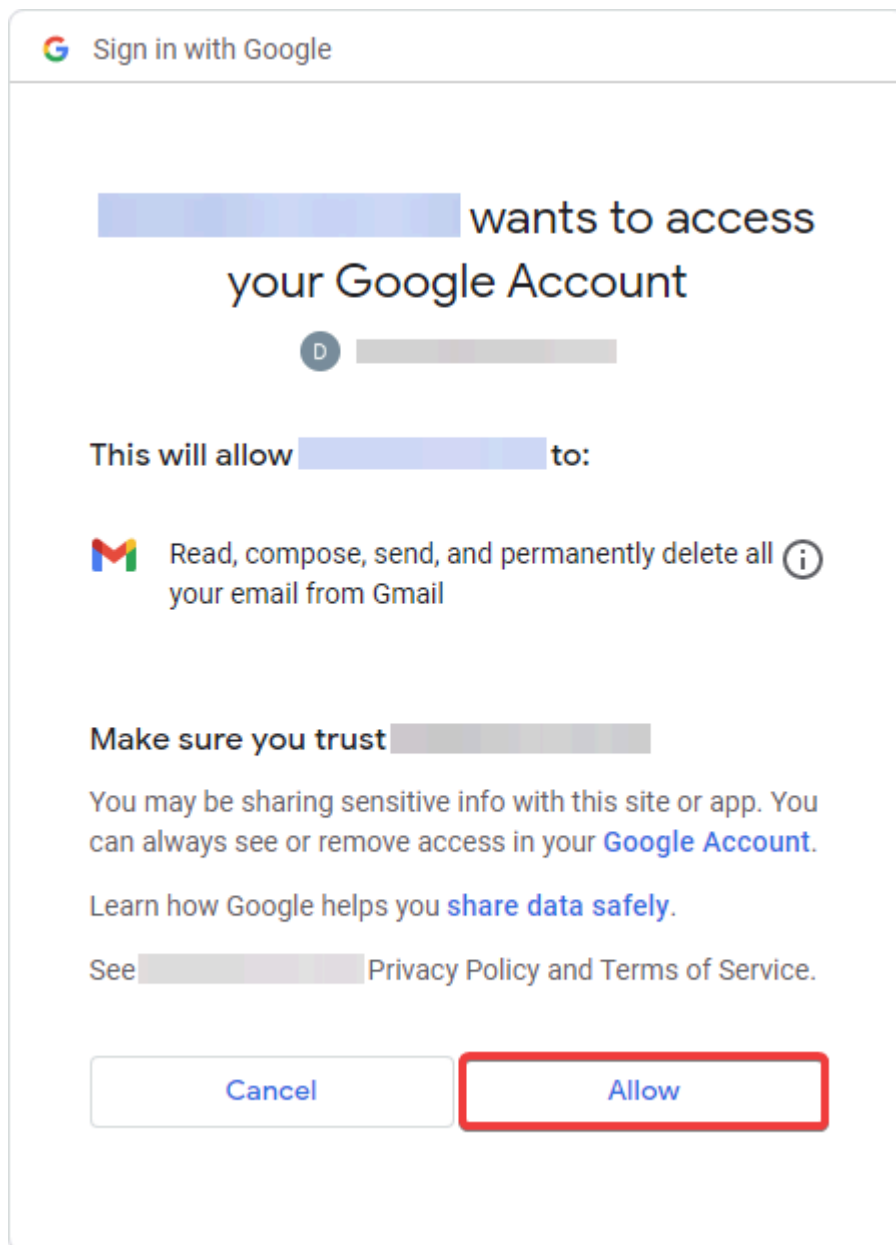
3. If you are using an interactive-based token, your access token will show as invalid the first time you click on **manage token**. To fix this, click on **Grant New Token**.

Access Token is Invalid

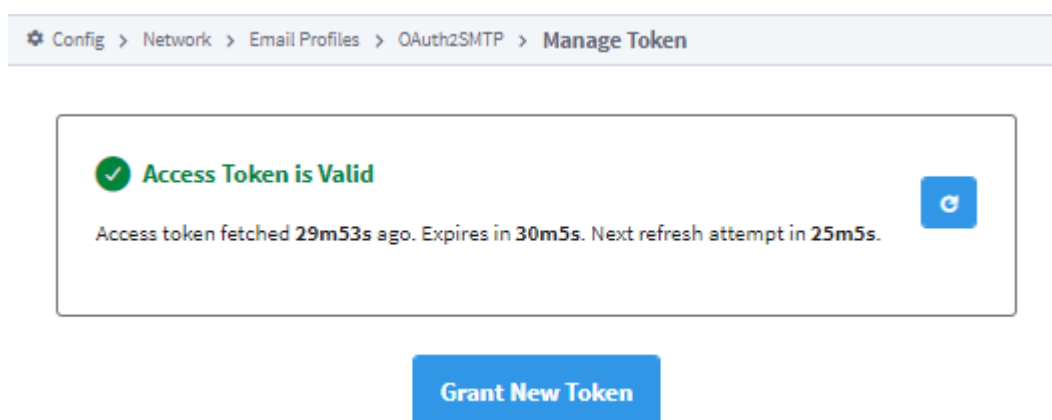
Access token is not yet set. Click the "Grant New Token" button to grant Ignition a new access token.

Grant New Token

4. Since we are using a Google Email Profile, we are redirected to a Google permission prompt. Click **Allow** to continue.



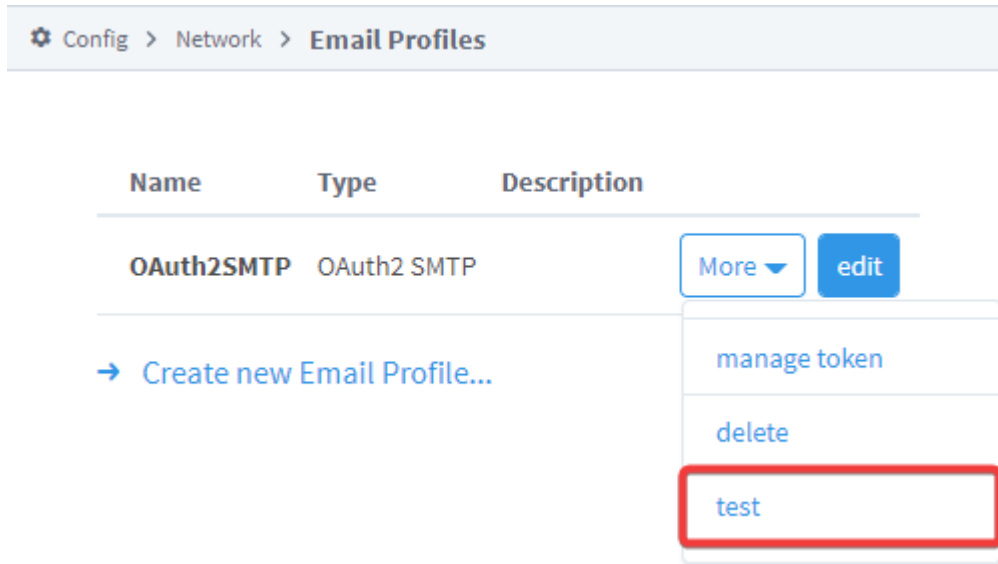
5. After the authorization server grants the initial access token, you will be redirected back to the Gateway. After a few seconds, the Gateway will refresh, showing a valid access token.



Test OAuth2 Email Profile Example

This option will allow you to send a test email using the OAuth2 Email Profile and OAuth2 Client you set up.

1. Navigate to your OAuth2 Email Profile. Click on **More**, and then **test**.



2. This will bring you to a page where you can compose your test email.

Compose Test Email	
From	
To	
Subject	Test Email
Body	
Content Type	text/plain

Send Test Email

[< Back to Email Profiles](#)

3. Fill out the form. The **From** field should be populated with the email address that will be sending the email, and the **To** field should be the test email's recipient. Click on **Send Test Email** when you are done.

Compose Test Email	
From	
To	
Subject	Test Email
Body	Test OAuth2
Content Type	text/plain

Send Test Email

[< Back to Email Profiles](#)

4. If the email sent successfully, you should receive a notification below the **Send Test Email** button.

Send Test Email

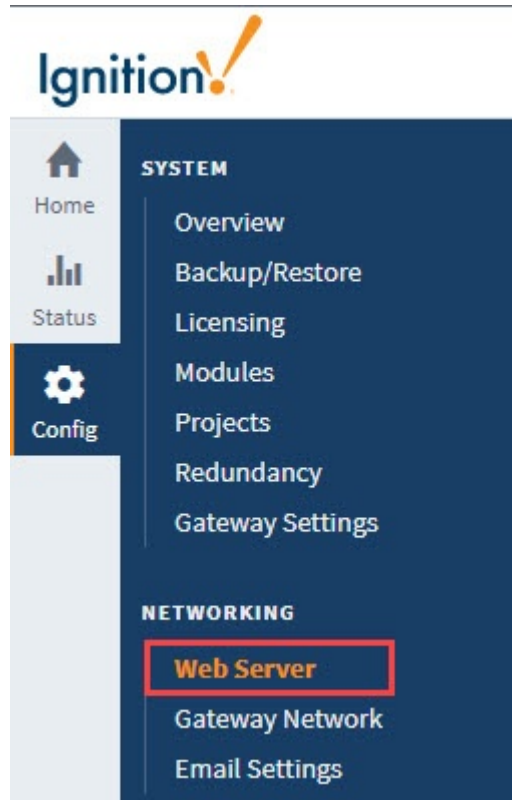
Email sent in 2 seconds

[< Back to Email Profiles](#)

Web Server Settings

The Web Server page is for configuring the HTTP and HTTPS ports, enabling SSL/TLS, redirecting traffic through a known address, and specifying whether or not all HTTP traffic should be forcefully redirecting to HTTPS.

If you are allowing users to access your Gateway from outside your network (through the Internet), you will need to configure the Public HTTP Address settings.



SSL/TLS Settings

On the Web Server screen you can view details of an SSL certificate details, export keys, remove the installed SSL certificate, and transition to a CA signed certificate.

From the Gateway Webpage, click on **Config > Networking > Web Server**. From the Web Server page, click on the **View Details** button. See [Adding a Signed Security Certificate](#) process for more information on enabling SSL/TLS and installing security certificates.



SSL / TLS ENABLED

CA-Signed SSL Certificate installed.

SSL / TLS

SSL / TLS Certificate

[View Details](#)

View the certificate details, export keys, remove the installed SSL certificate, and transition to a CA-signed Certificate

HTTP Settings

HTTP Port

The port to which Ignition will listen for incoming HTTP traffic. *Example: 8088*

HTTPS Settings

On the Certificate Details page, you can also generate a Certificate Signing Request (CSR) by clicking the **Generate CSR** button in the upper right.

**SSL / TLS ENABLED**

CA-Signed SSL Certificate installed.

Active SSL Certificate

[Generate CSR](#)[Delete](#)

Subject	
Country	US
State/Province	California
Locality	Folsom
Organization	Inductive Automation
Common Name	inductiveautomation.com
Issuer	
Country	US
State/Province	California
Locality	Folsom
Organization	Inductive Automation
Common Name	Ignition Test Intermediate Certificate Authority
Version	3
Signature Algorithm	SHA256withRSA
Not Valid After	Wed Oct 23 2019 08:47:17 GMT-0700  Expires Soon
Not Valid Before	Mon Jul 15 2019 08:47:17 GMT-0700

[→ Upload Trusted CA-signed SSL Certificate...](#)[→ Return to Web Server...](#)

Clicking on **Upload Trusted CA-signed SSL Certificate...** will open the Certificate Wizard. This will allow you to update your SSL/TLS configuration by uploading a second certificate that replaces the original.

Clicking on **Return to Web Server...** will take you back to the main Web Server Settings page.

For more information, see [Secure Communication \(SSL/TLS\)](#).

HTTP and HTTPS Settings

HTTP Settings

Property	Description
HTTP Port	The port Ignition will listen for incoming HTTP traffic, for example: <code>8088</code> .
Use Proxy Forwarded Headers	New in 8.1.10 When enabled, the Gateway inspects each incoming HTTP request in search for headers that indicate it has been forwarded by one or more proxies. If these headers are present, then the request is updated so that the proxy is not seen as the other end point of the connection from which the request originated. CAUTION: Enabling this setting when users can directly connect to the Gateway is a security risk. This setting is intended to be used in scenarios where untrusted users will not be able to bypass a trusted proxy that is responsible for setting the appropriate headers. For more information, see Use Proxy Forwarded Headers Explained.
Resolve Client Hostnames	New in 8.1.10 When enabled, Ignition's web server will attempt to resolve the remote HTTP client's hostname by performing a reverse DNS lookup using the remote HTTP client's IP address where appropriate. Enabling this setting could have a performance impact as the Gateway may attempt an expensive hostname lookup when handling requests. When disabled, Ignition's web server will not attempt to resolve hostnames and any queries for the remote HTTP client's hostname will result in their IP address instead. When enabling this setting, it is highly recommended that reverse DNS is configured to prevent host lookup failures. This includes configuring valid mappings from user IP addresses to their hostnames, and from user hostnames back to their IP addresses. If reverse DNS isn't configured, then DNS queries could block certain requests until the queries time out (default of 10 seconds).

HTTPS Settings

Property	Description
HTTPS Port	The port Ignition will listen for incoming HTTPS traffic, for example: <code>8043</code> .
Force Secure Redirect	When enabled, and if SSL/TLS is enabled, all HTTP traffic will be redirected to its HTTPS counterpart. Disabled by default.
Included Cipher Suites	A whitelist of included cipher suites for clients connecting to Ignition using SSL/TLS.
Excluded Cipher Suites	A blacklist of excluded cipher suites for clients connecting to Ignition using SSL/TLS. Takes precedence over allowed cipher suites. Note: The Excluded and Included Cipher Suites settings only apply to the port specified in the HTTPS Port field. If you need to whitelist or blacklist cipher suites for port 8060, refer to the HTTPS settings information on the Gateway Configuration File Reference page.

HTTP and HTTPS Connectors Restart

Certain actions will cause the HTTP port and/or the HTTPS port to restart. Refer to the following table for details.

Configuration Change	HTTP Port Restarted?	HTTPS Port Restarted?
HTTP Port	Yes	Yes
HTTPS Port	Yes	Yes
Force Secure Redirect	No	Yes
User Included Cipher Suites	No	Yes
User Excluded Cipher Suites	No	Yes
SSL/TLS Setup	No	Yes

Use Proxy Forwarded Headers Explained

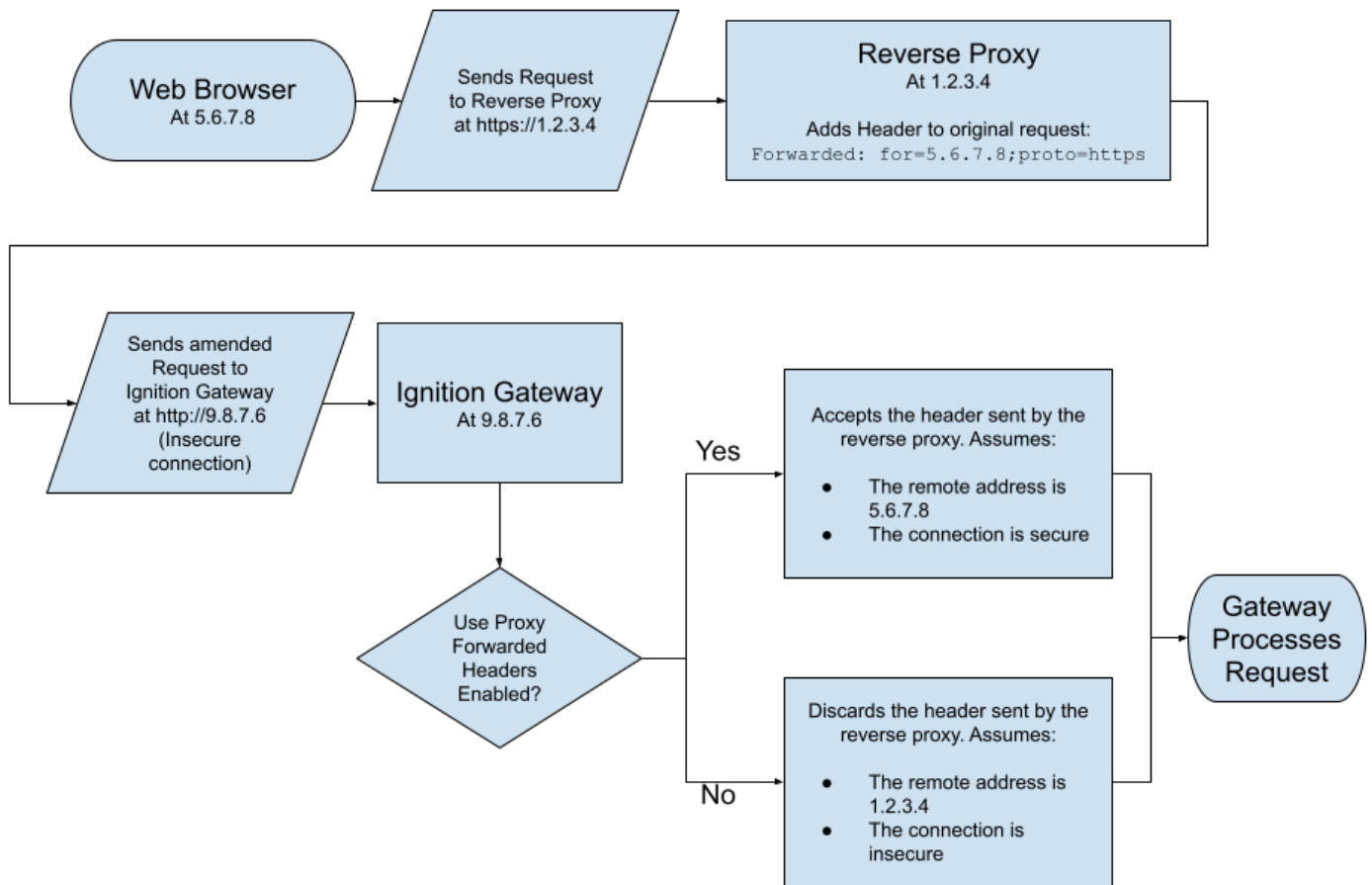
While enabled, the Gateway's web server will look for request headers mentioned on this page:

ForwardRequestCustomizer. Depending on what headers come in, the web server will alter its view of the remote client's connection on the incoming http request. The following is a list of which parts of the request that can be altered, although it's not exhaustive:

- The remote HTTP client's IP address
- The remote HTTP client's port
- The scheme used by the remote HTTP client when connected to the Gateway through one or more proxies (i.e., http/https)
- Whether or not the connection is considered secure
- The host/IP and port that the remote HTTP client used to connect to the Gateway through one or more proxies

While this setting is enabled, if the Gateway does not see any of the mentioned headers, then the request will not be altered, effectively acting as if the setting is disabled.

The diagram below represents a request originating from a browser, and demonstrates how this setting can impact the request.



Public HTTP Address

If you are allowing users to access your Gateway from outside your network (through the Internet), you will need to configure the Public HTTP Address settings.

Public HTTPS Address Settings

Property	Description
Auto Detect HTTP Address	To specify an explicit HTTP address that Vision Clients and Perspective Sessions will use, turn this off. Most users will leave autodetect on. Enabled by default.
Public Address	The public facing address that Vision Clients and Perspective Sessions must use to connect. If Force Secure Redirect is enabled, redirected connections will use this address, for example: yourcompany.com.
Public HTTP Port	The public facing HTTP port that Vision Clients and Perspective Sessions must use to connect, for example: 80.
Public HTTPS Port	The public facing HTTPS port that Vision Clients and Perspective Sessions must use to connect. If Force Secure Redirect is enabled, redirected connections will use this port, for example: 443

Cipher Support

Listed below are the supported cipher suites for both 8043 and 8060 TLS ports.

Cipher suites enabled by default:


```
TLS_AES_128_GCM_SHA256
TLS_AES_256_GCM_SHA384
TLS_CHACHA20_POLY1305_SHA256
TLS_DHE_DSS_WITH_AES_128_CBC_SHA256
TLS_DHE_DSS_WITH_AES_128_GCM_SHA256
TLS_DHE_DSS_WITH_AES_256_CBC_SHA256
TLS_DHE_DSS_WITH_AES_256_GCM_SHA384
TLS_DHE_RSA_WITH_AES_128_CBC_SHA256
TLS_DHE_RSA_WITH_AES_128_GCM_SHA256
TLS_DHE_RSA_WITH_AES_256_CBC_SHA256
TLS_DHE_RSA_WITH_AES_256_GCM_SHA384
TLS_DHE_RSA_WITH_CHACHA20_POLY1305_SHA256
TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256
TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384
TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384
TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384
TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384
TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256
TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA256
TLS_ECDH_ECDSA_WITH_AES_128_GCM_SHA256
TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA384
TLS_ECDH_ECDSA_WITH_AES_256_GCM_SHA384
TLS_ECDH_RSA_WITH_AES_128_CBC_SHA256
TLS_ECDH_RSA_WITH_AES_128_GCM_SHA256
TLS_ECDH_RSA_WITH_AES_256_CBC_SHA384
TLS_ECDH_RSA_WITH_AES_256_GCM_SHA384
TLS_EMPTY_RENEGOTIATION_INFO_SCSV
```

Cipher suites disabled by default:

TLS_DHE_DSS_WITH_AES_128_CBC_SHA
TLS_DHE_DSS_WITH_AES_256_CBC_SHA
TLS_DHE_RSA_WITH_AES_128_CBC_SHA
TLS_DHE_RSA_WITH_AES_256_CBC_SHA
TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA
TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA
TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA
TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA
TLS_ECDH_RSA_WITH_AES_128_CBC_SHA
TLS_ECDH_RSA_WITH_AES_256_CBC_SHA
TLS_RSA_WITH_AES_128_CBC_SHA
TLS_RSA_WITH_AES_128_CBC_SHA256
TLS_RSA_WITH_AES_128_GCM_SHA256
TLS_RSA_WITH_AES_256_CBC_SHA
TLS_RSA_WITH_AES_256_CBC_SHA256
TLS_RSA_WITH_AES_256_GCM_SHA384

Secure Communication (SSL/TLS)



INDUCTIVE
UNIVERSITY

Requiring SSL

[Watch the video](#)

Inductive Automation recommends enforcing secure communication in Ignition using digital certificates. The Ignition Gateway web server can provide modern end-to-end security using Transport Level Security (TLS) technologies. This protects externally-originated connections such as: Perspective sessions, Vision clients, Designers, and Ignition web configuration. Users should be familiar with the browser padlock icon (secure session) from online banking, shopping, or medical portals. TLS assures users of the distant end identity and offers protection from attackers and eavesdroppers through strong encryption. This configuration is different from Gateway-originated outbound communication such as database and device (OPC UA) connections, alarming, and web services (REST) calls, which are secured separately and have configuration that depends on distant nodes.

Ignition versions 8.0.4 and later default to TLS versions 1.2 and 1.3 with a valid certificate. Older versions of Ignition should be upgraded to offer protection against known vulnerabilities. If you are looking for additional security settings, check out the [Ignition Security Hardening Guide](#) and the [Let's Encrypt Guide](#) for recommendations.

Enabling Force Secure Redirect

Normally, Clients, Sessions, Designers, and Web browsers that communicate with the Gateway will do so over an HTTP. However, you can force these communications to be redirected to the more secure HTTPS.

1. Go to the **Config** section of the Gateway Webpage.
2. Choose **Networking > Web Server** from the menu on the left.
3. Select the checkbox for **Force Secure Redirect**, and click the **Save** button at the bottom of the page.

HTTPS Settings	
HTTPS Port	8043 The port to which Ignition will listen for incoming HTTPS traffic. <i>Example: 8043</i>
Force Secure Redirect	☒ When enabled, and if SSL / TLS is enabled, all http traffic will be redirected to its https counterpart. (Default: disabled)
Included Cipher Suites	 Whitelist of included cipher suites for clients connecting to Ignition using SSL/TLS
Excluded Cipher Suites	 Blacklist of excluded cipher suites for clients connecting to Ignition using SSL/TLS. Takes precedence over allowed cipher suites.

When enabled, all requests between the host Gateway and any Clients, Sessions, Designers, or web browsers will be redirected to the HTTPS port (by default, port 8043), and thus encrypted. However, you will likely want to install a security certificate signed by a certificate authority.

Note that although the Gateway Network may share the same port as HTTP traffic, Force Secure Redirect settings will not apply.

Adding a CA Signed Security Certificate

We are not able to ship a real certificate with Ignition because security certificates have to be obtained individually from a Certificate Authority (CA). Ignition supports certificates from both your organization's internal CA, as well as commercial CAs (Verisign, GoDaddy, Comodo, etc.). In either case, the procedure for how to install a certificate is listed below.

NOTE

After you have added a certificate, the KeyStore will automatically refresh every 15 minutes. You can disable this in the `ignition.conf` file by altering the `ignition.ssl.refresh` entry (Set to 0 to not refresh).

Get a Certificate Signing Request

Since SSL/TLS requires the installation of a security certificate, filling out the form below will generate a certificate signing request (CSR) to provide to a certificate authority.

1. Go to the **Config** tab of the Gateway Webpage and choose **Networking > Web Server**.
2. You'll see a warning message indicating that SSL/TLS is not enabled.
3. Click on **Setup SSL/TLS**.

**SSL / TLS NOT ENABLED**
SSL / TLS allows for secure communication with the gateway. In order to be enabled, it requires an SSL certificate to be installed.
[Click here](#) to be guided through the process of installing an SSL certificate in order to enable SSL / TLS.

SSL / TLS	
Setup SSL / TLS	Setup SSL / TLS Guided process for installing an SSL certificate in order to enable SSL / TLS.

4. Click on the **I don't have all the items above button**. The Create Certificate screen is displayed.
5. Fill in the required fields on the screen, then click the **Generate Certificate Signing Request** button. This can be brought to a Certificate Authority.

Basic Details

Field	Definition
Common Name	Full DNS name (required). This is typically what you type in your browser URL bar in order to navigate to this Gateway, for example: yourdomain.com.
Organization Name	Name of company (required). For example: Inductive Automation.
Organization Department	Department or section (required). For example: Engineering.
Email	Email address. For example: your@email.com .
Country	Typically an ISO 3166 2 character code (required). For example: US.
State/Province	State, province or region, for example: California.
Locality (City)	Name of city. For example: Folsom.
Street	Street number and street name. For example: 90 Parkshore Dr.
Postal Code	Postal Code Example: 95630.
Key Type	The algorithm of the key pair which will be generated for the self signed certificate. Options are RSA or EC. Recommended: RSA.
Key Size	The strength of the generated Key. Recommended: 2048 bits.
Expires in	The number of days the generated Certificate will be valid. This number will only apply to a self-signed certificate. The certificate authority will determine a final expiration date as needed for the CA signed certificate.

Subject Alternative Names

Field	Definition
IP Addresses	The IP addresses of all the servers you plan on installing the certificate. Click the Add button for each additional IP address. Changed in 8.1.17 In versions 8.1.17 and newer, click the Add IP Address button for each additional IP address.
DNS Names	DNS names which map to the list of IP addresses above. Click the Add button for each additional DNS name. Changed in 8.1.17 In versions 8.1.17 and newer, click the Add DNS Name button for each additional DNS name.

Demonstrate Proof of Ownership over your Domain

After providing a CSR to your CA and before your CA issues a new **domain-validated (DV) certificate**, your CA will require you to demonstrate proof of control over the domain(s) used to access the Ignition Gateway Web Server. These domains should be set as the subject common name and/or subject alternative names in your CSR. Your CA will require you to perform additional actions and to provide additional information if you are seeking an organization validation (OV) class certificate or an **extended-validation (EV) certificate**. See the [Wikipedia article on Public Key Certificates](#) and consult your CA for more details.

Methods for determining control over a domain varies based on the CA. Typical methods include:

- Responding to email sent to the email contact in the domain's whois details
- Responding to email sent to a well-known administrative contact in the domain, e.g. (admin@, postmaster@, etc.)
- Publishing a DNS TXT record
- Publishing a nonce provided by an automated certificate issuing system

The first three methods are performed out-of-band as far as Ignition is concerned. Let's drill a little bit deeper into the fourth method. Typically, the CA will provide a randomly generated cryptographic string of data which may only be used once. This value is called a **"nonce"**. The CA expects you to configure your web server to serve the nonce as a special HTTP resource referenced using a well-known path. Once you configure your web server to serve this resource, you give your CA permission to make an HTTP request with a URL containing the domain you are trying to validate as the hostname component of the URL (which should resolve to an IP address of the host running your web

server), an agreed-upon port (usually standard HTTP port 80 or HTTPS port 443, though sometimes this is configurable), and the well-known path as the path component of the URL.

There exists software purpose-built to stand-up a temporary web server for the purpose of exposing the special nonce value to the CA. The idea is that this web server is only listening for HTTP requests until you confirm that the CA has issued an HTTP request to the server and has validated the nonce value as correct, then the web server is shut down. In some cases, using such software is not possible if the Ignition Gateway is already listening on whatever port is required by the validation method. In these cases, shutting down the Ignition Gateway for the purpose of starting up one of these other tools would cause potentially unacceptable downtime.

To work around the downtime issue mentioned in the previous paragraph, Ignition supports two open standard specifications which accomplish the fourth validation method mentioned above. The first is the ACME Protocol's "HTTP Challenge", detailed in [section 8.3 of RFC 8555](#) (ACME is the protocol used by [Let's Encrypt](#)). Ignition's web server will map HTTP requests with a path pattern of **/.well-known/acme-challenge/<challenge-nonce>** to files located at **\$GATEWAY_HOME/.well-known/acme-challenge/<challenge-nonce>** (where **\$GATEWAY_HOME** is the path to the home directory of your Ignition Gateway installation). No Gateway restart is required to start serving new files recently added to the above directory to the web. The **challenge-nonce** placeholder is the nonce value provided by the ACME server which should be base64-url-encoded.

The second method is defined as the "Agreed-Upon Change to Website v2" process and procedure of validation of domain authorization or control, detailed in [section 3.2.2.4.18 of version 1.81](#) of the CA/Browser Forum's Baseline Requirements for the Issuance and Management of Publicly-Trusted Certificates. Ignition's web server will map HTTP requests with a path pattern of **/.well-known/pki-validation/<challenge-file>** to files located at **\$GATEWAY_HOME/.well-known/pki-validation/<challenge-file>**. Again, no Gateway restart is required to start serving new files recently added to the above directory to the web. The **challenge-file** placeholder in this case is arbitrary—check with your CA for more detailed instructions as to what the value should be.

For both methods above, it is best practice to stop exposing the challenge value to the web by deleting the file on the Gateway filesystem as soon as the CA is done verifying your control over the domain.

These standard challenge mechanisms can be used to automate certificate renewal—in fact, that's what the ACME Protocol and Let's Encrypt is all about. To learn more about how to use Ignition with ACME and Let's Encrypt, see the [Let's Encrypt Guide for Ignition](#).

Install Security Certificates

Once you have an SSL certificate, it needs to be added to Ignition.

1. Go to the **Config** tab of the Gateway Webpage and choose **Networking > Web Server**.
2. You'll see a warning message indicating that SSL/TLS is not enabled. Click on the **Click here** link.
3. The Setup SSL/TLS screen is displayed. Review the following list:
 - Private Key
 - Certificate Signed By A Certificate Authority (CA)
 - Any Intermediate CA Certificates (Provided by your CA)
 - Root CA Certificate (Provided by your CA)
4. If you have the items, click on the **I have all the items above** button. If you don't have all the items, click on the **I don't have all the items above** button, and follow the previous procedure, [Get a Certificate Signing Request](#).

Setup SSL / TLS

Securing web communications requires the installation of a *SSL Certificate* and requires the following items:

- Private Key
- Certificate Signed By A Certificate Authority (CA)
- Any Intermediate CA Certificates (Provided by your CA)
- Root CA Certificate (Provided by your CA)

Do you currently have all items listed above? If you don't, we can create a certificate signing request (CSR) to provide to a CA for signing and a private key.

I have all the items above

I don't have all the items above

Return

5. The Certificate Wizard is displayed. The first step is to import your private key in one of the following three ways.
 - Drag and Drop your certificate from your computer onto the screen.
 - Click anywhere on the grey box to browse for the private key.
 - Click **Manually enter data** button to type in the private key information.

Note: If you upload your own private key, it will be done over an unsecured network. It is important to understand the risks and mitigations before proceeding. The certificates provided by a CA build a chain of trust. Follow the steps below in order to build this chain of trust.

1) Private Key*

The DER or PEM encoded private key in SSLeay or PKCS8 format. Provide a password if the private key is encrypted.



Drag and drop or click to browse
[Manually enter data](#)

☒ Enable a password for this Certificate Key

Cancel

Continue

6. If the private key is encrypted, click the **checkbox** to enable a password for this certificate and enter the password in the field. Click **Continue**.
7. The next step is to import the server certificate. This is the The DER or PEM encoded X.509 SSL Certificate that Ignition will use for SSL/TLS. Drag and drop the certificate file, browse for it, or manually enter the data.

Note: If you upload your own private key, it will be done over an unsecured network. It is important to understand the risks and mitigations before proceeding. The certificates provided by a CA build a chain of trust. Follow the steps below in order to build this chain of trust.

1) Private Key*

The DER or PEM encoded private key in SSLeay or PKCS8 format. Provide a password if the private key is encrypted.



Private Key Successfully Uploaded



2) Server Certificate*

The DER or PEM encoded X.509 SSL Certificate that Ignition will use for SSL / TLS.



Drag and drop or click to browse

[Manually enter data](#)

Cancel

Continue

8. The next step is to import the certificate chain. This gives you the Intermediate CA Certificate. Drag and drop the certificate file or bundle, browse for it, or manually enter the data. You'll see a message that the Intermediate CA Certificate was successfully uploaded.
9. Finally, import the root CA certificate. You can drag and drop the certificate file, browse for it, or manually enter the data. You'll see a message that the Root CA Certificate was successfully uploaded.
10. Click the **Continue** button.
11. You'll see a confirmation message that the certificate is installed and SSL/TLS is enabled.



SSL / TLS ENABLED

CA-Signed SSL Certificate installed.

SSL / TLS

SSL / TLS Certificate

[View Details](#)

View the certificate details, export keys, remove the installed SSL certificate, and transition to a CA-signed Certificate

HTTP Settings

HTTP Port

8088

The port to which Ignition will listen for incoming HTTP traffic. *Example: 8088*

12. If you have a redundant installation, you'll need to repeat this procedure on your backup server.

What is a Self-Signed Certificate?

SSL/TLS can still be setup without a CA signed certificate by installing a self-signed certificate. This gives you the encryption benefits of SSL, but not the identity validation, and it isn't a "real" certificate. When a self-signed certificate is used to enable SSL/TLS, a web browser will display warnings to users that they shouldn't trust the website. Users will then have to choose to proceed to the "unsafe" connection through Advanced options.



Your connection is not private

Attackers might be trying to steal your information from **192.168.1.1** (for example, passwords, messages, or credit cards). [Learn more](#)

NET::ERR_CERT_AUTHORITY_INVALID



To get Chrome's highest level of security, [turn on enhanced protection](#)

Hide advanced

Back to safety

This server could not prove that it is **192.168.1.1** its security certificate is not trusted by your computer's operating system. This may be caused by a misconfiguration or an attacker intercepting your connection.

Proceed to **192.168.1.1** (unsafe)

How to Install a Self-Signed Certificate

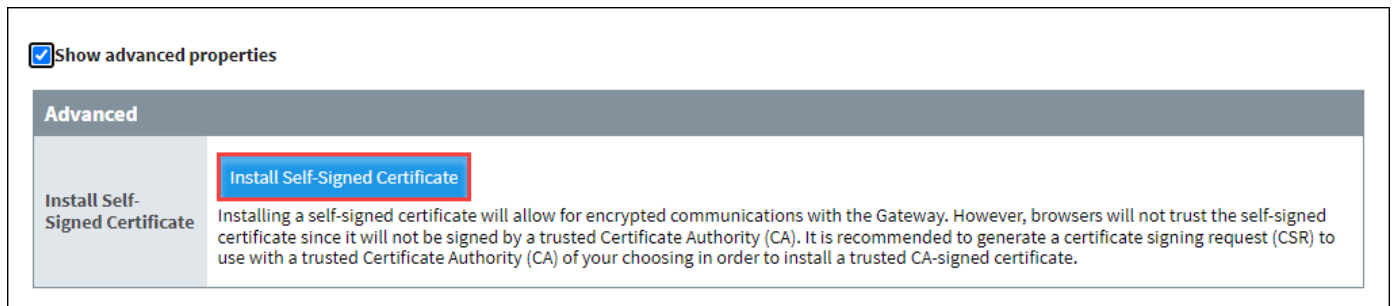
1. Go to Config section of the Gateway Webpage.
2. Choose **Networking > Web Server** from the menu on the left.
3. Under SSL/TLS click on **Setup SSL/TLS**.
4. Select **"I don't have all the items above"**.
5. Under the Basic Details section, fill in all of the required fields (*). This includes the Common Name, Organization Name, Organization Department, and Country.

NOTE

The Common Name is typically what you input into your browser URL bar in order to navigate to this gateway. If you do not have a dedicated domain for your gateway, use the IP address.

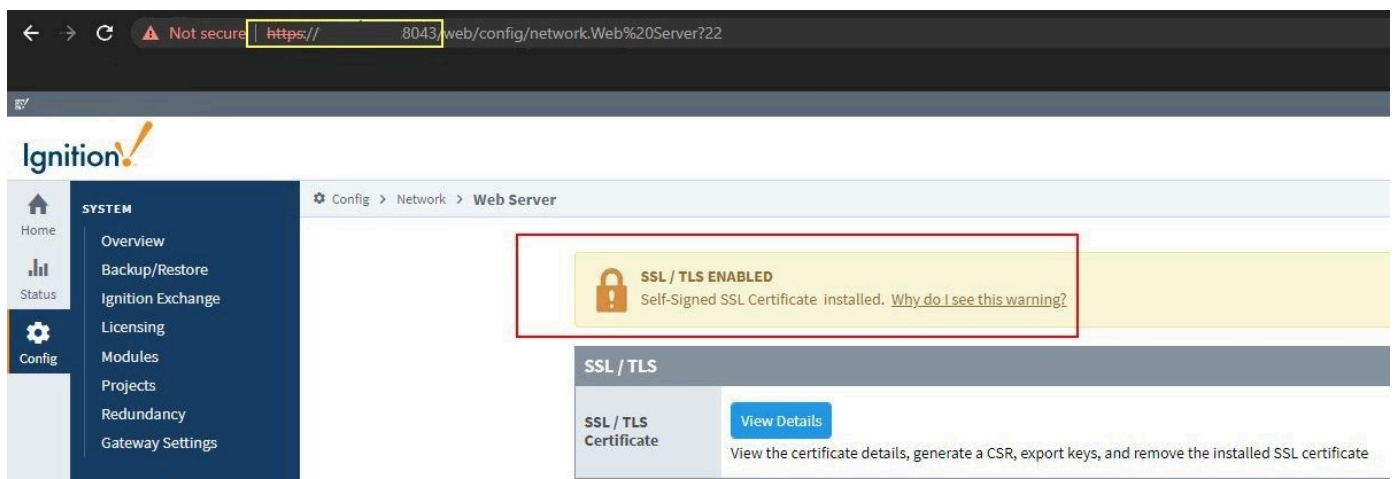
6. Under Subject Alternative Names, enter in the IP Address along with any DNS associated with your gateway server.

7. Select **Show Advanced Properties** and click on **Install Self-Signed Certificate**.



8. This will take you to a page that displays the privacy warning that all connections will now see.

9. SSL/TLS is now enabled on your Gateway. The URL for your gateway now uses HTTPS and port 8043, which is the default port for SSL.



Gateway Backup and Restore

Gateway Backups vs Project Exports



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Project Backup vs. Ignition Gateway Backup

[Watch the video](#)

There are two main types of backups available in Ignition: Gateway backups and Project exports. Gateway backups are all inclusive while Project exports are simply a backup of an individual project. This page discusses making Gateway backups and restoring from a Gateway backup. To learn more about project backups and restoring projects, refer to the [Project Export and Import](#) page.

Gateway Backup and Restore



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Making Ignition Gateway Backups

[Watch the video](#)

Creating Gateway backups and restoring from a Gateway backup are super easy in Ignition. Gateway backups are all inclusive, and typically takes less than a minute to run. It includes everything you find in the Ignition Gateway Webpage. Everything gets backed up - all your projects, Gateway settings, authentication profiles, Tags, database connections, OPC and device connections, alarm pipelines, scripts, sequential function charts, reports, and Image Management Library (i.e., png, jpg, and jpeg files). The only data that is not included in a Gateway backup is data stored in other programs such as SQL databases, PLC programs, other files you manually added to the install directory, and any additional files you may be using. This information needs to be backed up separately.

Perspective custom assets such as fonts, icons, and themes are included in a Gateway backup. In addition, any custom assets in a backup file will be restored when performing a Gateway restore.

The [Tag Reference Store](#) made available in 8.1.34 is not included in Gateway backups. To save the recorded tag reference data, access the data\diagnostics\tags folder within the Data directory of your Ignition installation.

You have the option of creating a Gateway backup and restoring a backup from the Gateway Webpage or [Gateway Command-line Utility - gwcmd](#). We recommend using Gateway Webpage since it's much easier.

Scheduled Gateway Backups

In addition to manually taking a Gateway backup, an Ignition Gateway can be configured to automatically collect Gateway backups on a schedule. See the [Gateway Settings](#) page for more details.

Contents of a Gateway Backup

A Gateway backup represents a number of resources and configurations to apply during restoration. Restoring from a Gateway backup replaces the following resources on the target Gateway:

- Database connections
- JDBC drivers
- Gateway settings
- Web server settings
- Gateway network settings
- Email settings
- Auditing settings
- User Sources
- IdP configurations
- Security Levels
- Security Zones
- Alarming settings
- Alarm Journal profiles
- Alarm notification settings
- On-call rosters
- Alarm schedules
- SECS/GEM equipment configurations and module settings
- Tag history providers

- All Tag providers, and the Tags, UDT definitions, and Tag groups within
- Device connections
- OPC UA client connections
- OPC UA Settings
- BACnet local device configurations
- EAM settings
- SFC settings
- All projects, and their resources within

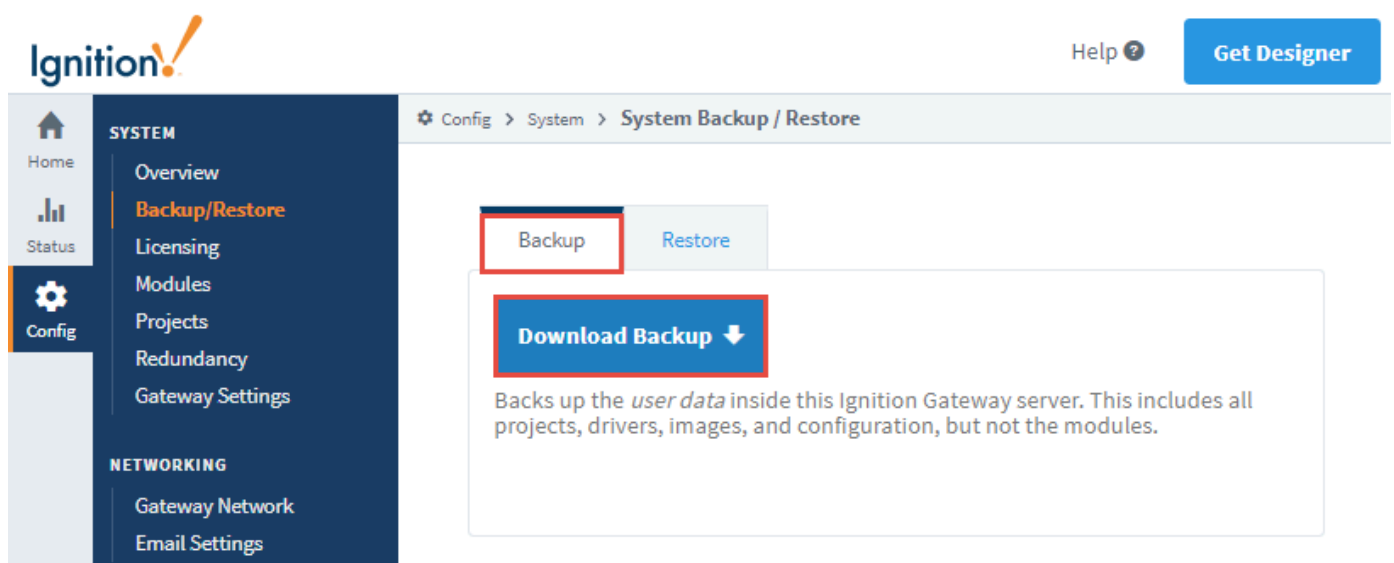
Notably, when restoring a Gateway backup on an existing Gateway, the following items are **not** changed or replaced by the backup:

- Modules
- License information/grants
- Redundancy settings

Manually Collecting a Gateway Backup

The easiest way to create a backup of the Gateway is using the Gateway Webpage.

1. Go to the **Config** tab of the Gateway Webpage, and click on **System > Backup/Restore**.
2. The System Backup/Restore page will be displayed. Make sure the **Backup** tab is selected, then click **Download Backup**.



3. By default, this downloads a `.gwbk` file extension to your local file system in your **Downloads** folder.

NOTE

The Gateway Backup default filename will look like `GatewayName_Ignition-backup-YYYYMMDD-HHMM.gwbk` where `YYYYMMDD-HHMM` is the timestamp of when it was created.

Command-line Utility

In Windows and Linux, you can use the command-line utility to create a Gateway backup. To run the Command-line Utility, open a shell and enter the command below.

NOTE

If you want to add a timestamp, you need to enter the date and time in the filename. Refer to the [Command-line Utility](#) page for a complete list of 'gwcmd' options.

```
gwcmd -b C:\Backups\Ignition\IgnitionBackup.gwbk
```

Gateway Restore



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Restoring Ignition Gateway
Backups

[Watch the video](#)

Restoring a Gateway backup is just as easy as backing it up and can also be done from the Gateway Webpage.

CAUTION

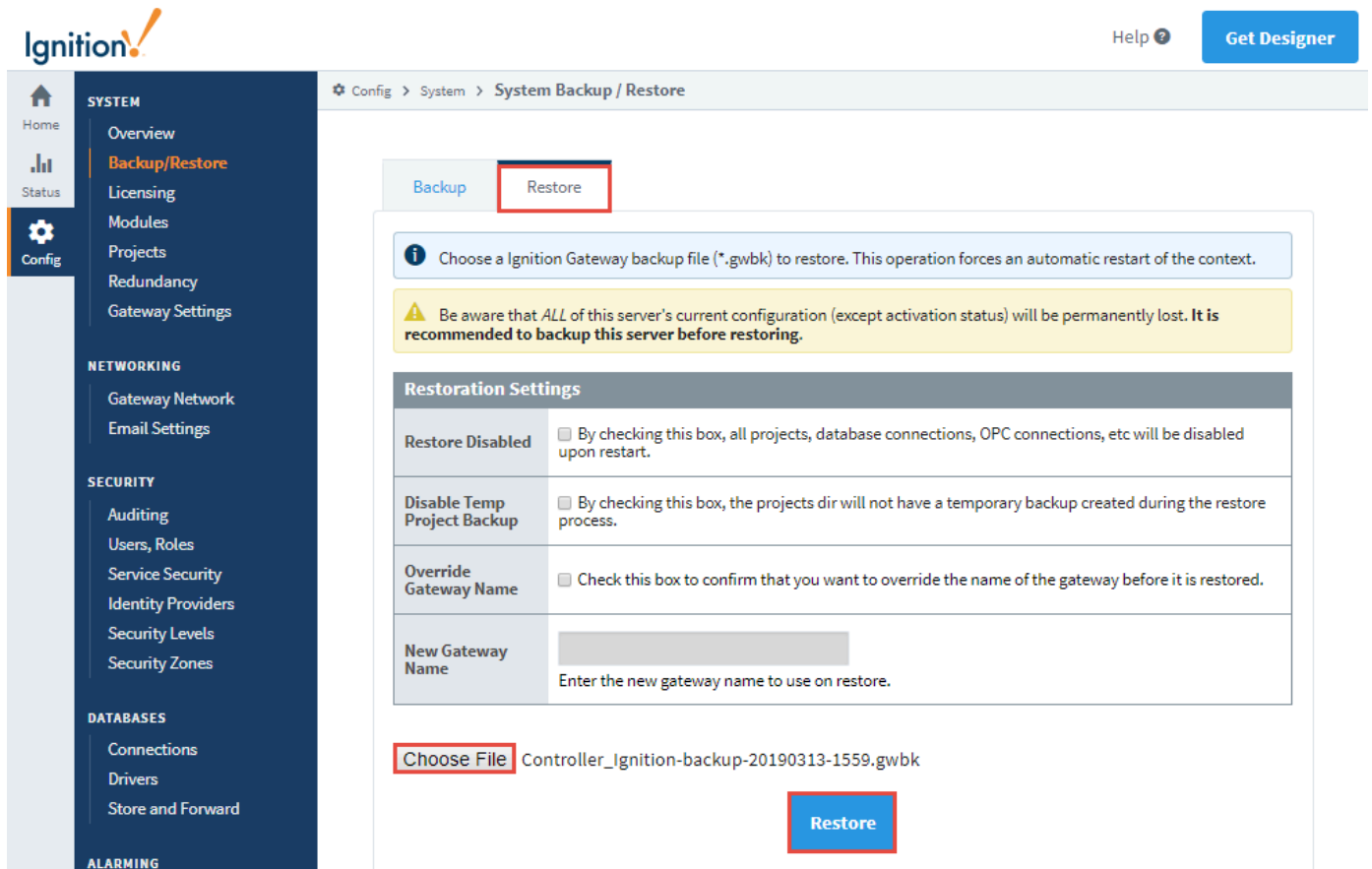
When you perform a Gateway Restore, **ALL** of the server's current configuration will be permanently lost. Restoring a Gateway backup overwrites all of the existing settings including your projects. There is no merge option for a Gateway backup. We recommend you always make a backup of the existing server immediately before performing a Gateway Restore.

1. Go to the **Config** tab and click on **System > Backup/Restore**.
2. The System Backup/Restore screen will be displayed. Click on the **Restore** tab. Read carefully through the restoration settings, and check the ones you wish to enable.

NOTE

If you check the **Restore Disabled** box, the imported resources will be disabled upon restoration.

3. Click **Choose File**, then navigate to your Gateway backup file (*.gwbk). By default, all your Gateway backup files are saved in your Downloads folder unless you select another folder location to choose an existing Gateway Backup file (*.gwbk) to restore.
4. Choose your Ignition backup file (.gwbk), and click **Open**.
5. Click **Restore** at the bottom of the System Backup/Restore screen. The Gateway stops while restoring the backup file. When restoring is complete, the Gateway restarts itself to apply the restored settings. The Gateway Webpage is refreshed and your projects are loaded and your whole Gateway is restored in less than a minute.



The screenshot displays the Ignition Gateway web interface for the 'System Backup / Restore' configuration. The left-hand navigation pane includes sections for SYSTEM (Overview, Backup/Restore, Licensing, Modules, Projects, Redundancy, Gateway Settings), NETWORKING (Gateway Network, Email Settings), SECURITY (Auditing, Users, Roles, Service Security, Identity Providers, Security Levels, Security Zones), DATABASES (Connections, Drivers, Store and Forward), and ALARMING. The main content area is titled 'Config > System > System Backup / Restore'. It features two tabs: 'Backup' and 'Restore', with the 'Restore' tab currently selected. A blue information box at the top states: 'Choose a Ignition Gateway backup file (*.gwbk) to restore. This operation forces an automatic restart of the context.' Below this is a yellow warning box: 'Be aware that ALL of this server's current configuration (except activation status) will be permanently lost. It is recommended to backup this server before restoring.' The 'Restoration Settings' section contains three checkboxes: 'Restore Disabled' (unchecked), 'Disable Temp Project Backup' (unchecked), and 'Override Gateway Name' (unchecked). Below these is a text input field for 'New Gateway Name' with the placeholder text 'Enter the new gateway name to use on restore.' At the bottom, the 'Choose File' button is highlighted with a red box, followed by the file path 'Controller_Ignition-backup-20190313-1559.gwbk'. The 'Restore' button is also highlighted with a red box.

The following table describes different Gateway restoration settings.

Gateway Restore Settings

Property	Description
Restore Disabled	Checkbox for toggling if the Gateway Backup file's contents such as projects, database connections, OPC connections, Tag Providers, etc will be disabled upon restore.
Disable Temp Project Backup	Checkbox for toggling if the projects directory will have a temporary backup created during the restore process.
Override Gateway Name	Checkbox for toggling if the name of the Gateway should be overridden before the Gateway is restored. CAUTION: It is not recommended to change the Gateway's System Name after initial Gateway setup. Renaming your Gateway may break critical dependencies, affect data collection, and halt production. To see a list of features dependent on the Gateway name, click here .
New Gateway Name	The name of the new Gateway. Requires "Override Gateway Name" to be enabled.

Command-line Utility

In Windows and Linux, you can use the command-line utility to restore a Gateway backup. To run the Command-line Utility, open a shell and enter the command below. Refer to the [Command-line Utility](#) page for a complete list of '**gwcmd**' options.

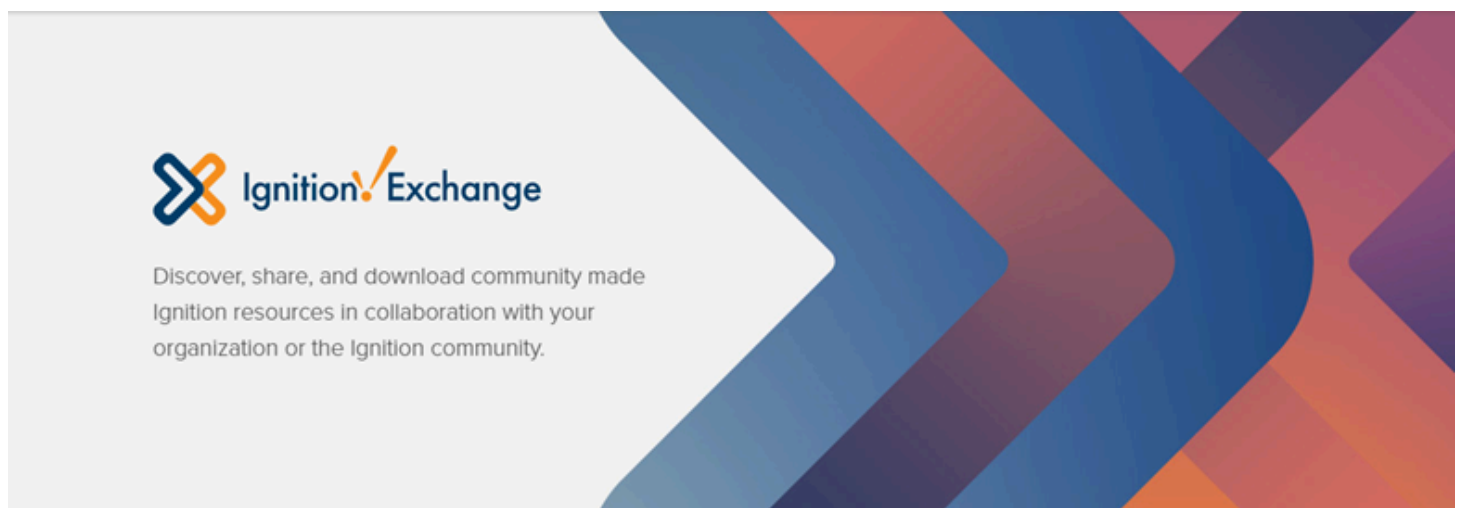
```
gwcmd -s C:\Backups\Ignition\IgnitionBackup.gwbk
```

Ignition Exchange

In the Ignition Exchange you can access resources, templates, and tools that you can use in your own Ignition projects. The Ignition Exchange offers a wide variety of ways to store and access these resources. Ignition assets designed by others in various industries can be shared through the Exchange. This collection encompasses anything that can be built inside of Ignition including screens, graphics, templates, views, reports, alarm pipelines, scripting functions, database backups, projects, full systems, and Ignition demos.

As an individual, you can upload, browse, or download your own tools. If you'd like to keep these tools private, you can store them for your own use, or you can make the resource public, so anyone can access and use it.

Organizations or teams can use the Exchange to store and access private resources they want to make available to a select user group. This gives them the opportunity to collaborate and access company templates, and use them across corporate projects.



+ New Resource

Sort by: **New** | Popular | Recently Updated

Search

X All Resources

My Resources

My Organization

Watched

Downloaded

12 Results

Clear Filters

SCRIPTS
Advanced

ICC Machine

PERSPECTIVE VIEW
Intermediate

Perspective Historical

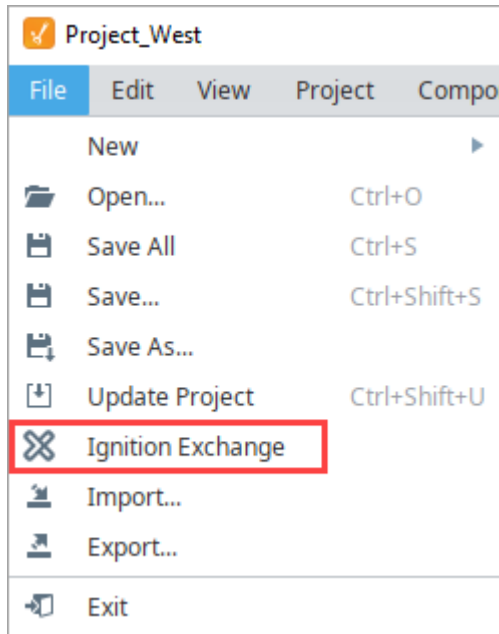
VISION TEMPLATE
Beginner

Vision Ad Hoc Trend

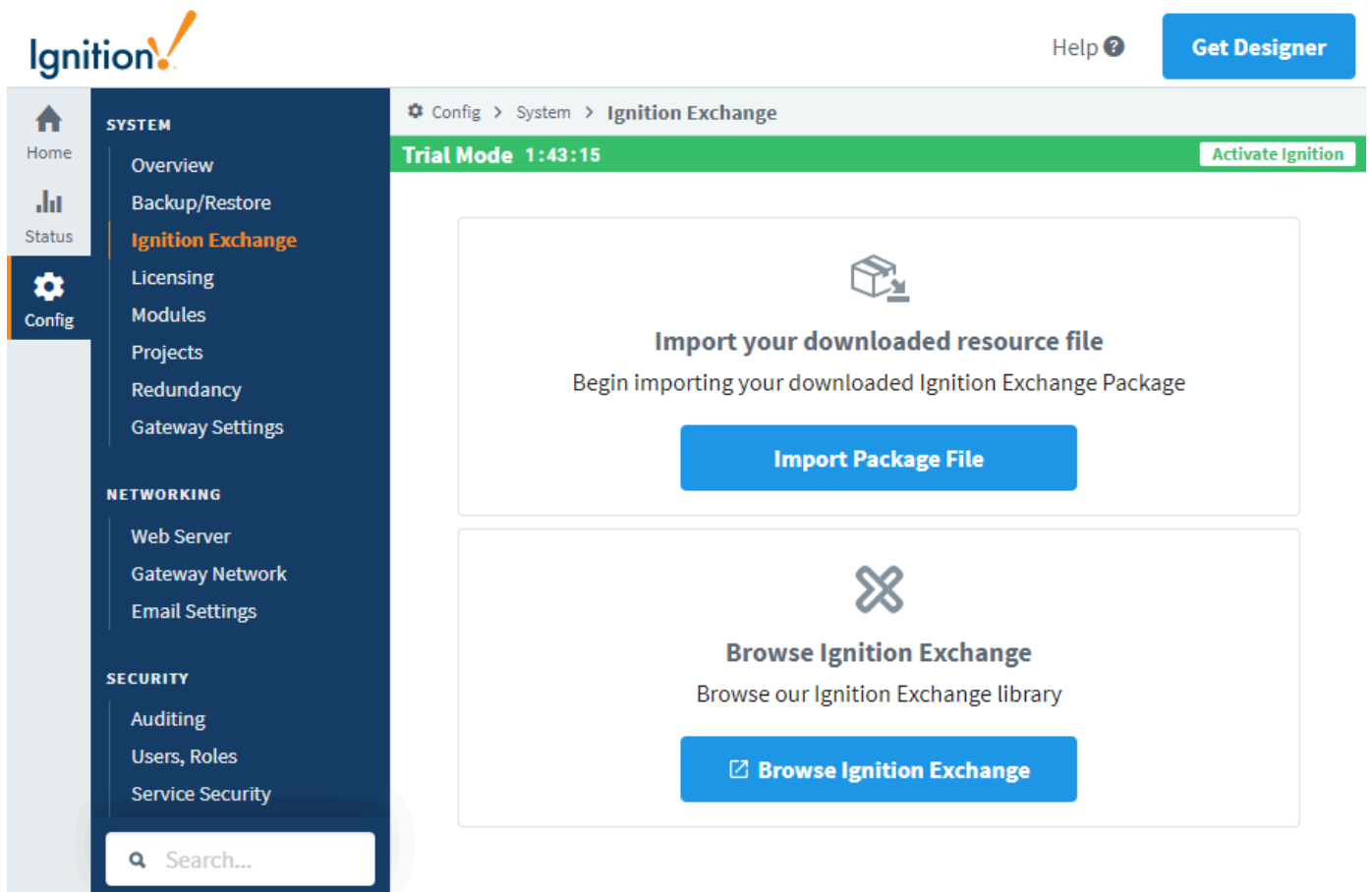
Access the Exchange

You can access the Ignition Exchange in several ways:

- Go to <https://inductiveautomation.com/exchange/>.
- Within the Designer, select **File > Ignition Exchange**.



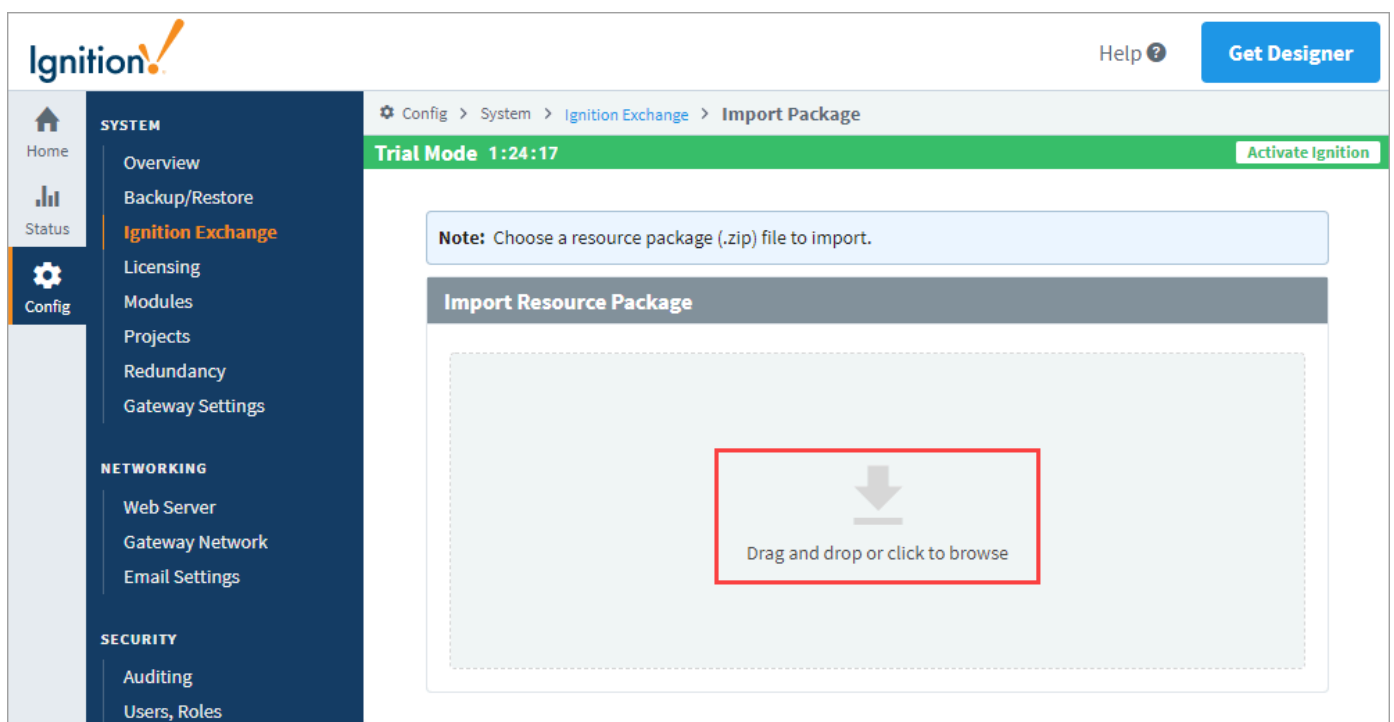
- Within the Gateway webpage, click on **Config > Ignition Exchange**. Then click **Browse Ignition Exchange**.



Import an Ignition Exchange Package from the Gateway

When you import a project from an exported file in the Gateway, it will be merged into your existing Gateway. To import a downloaded resource file:

1. Go to the Gateway, and click **Config > Ignition Exchange**.
2. Click on **Import Package File**.
3. Drag and drop your resource package file, or click to browse for the file you want to import and click **Open**.



4. The Gateway will display a confirmation message if the package is valid. It will then display a README file with instructions. Click **Next**.
5. Use the down arrow in the Target Project box to choose a project. Then click **Import**.

CAUTION

Resources with the same name in the target project will be overwritten.

Package Import Preview

^ Projects (1)

Resources with the same name in the target project will be overwritten

Target Project

Project_West_1

New

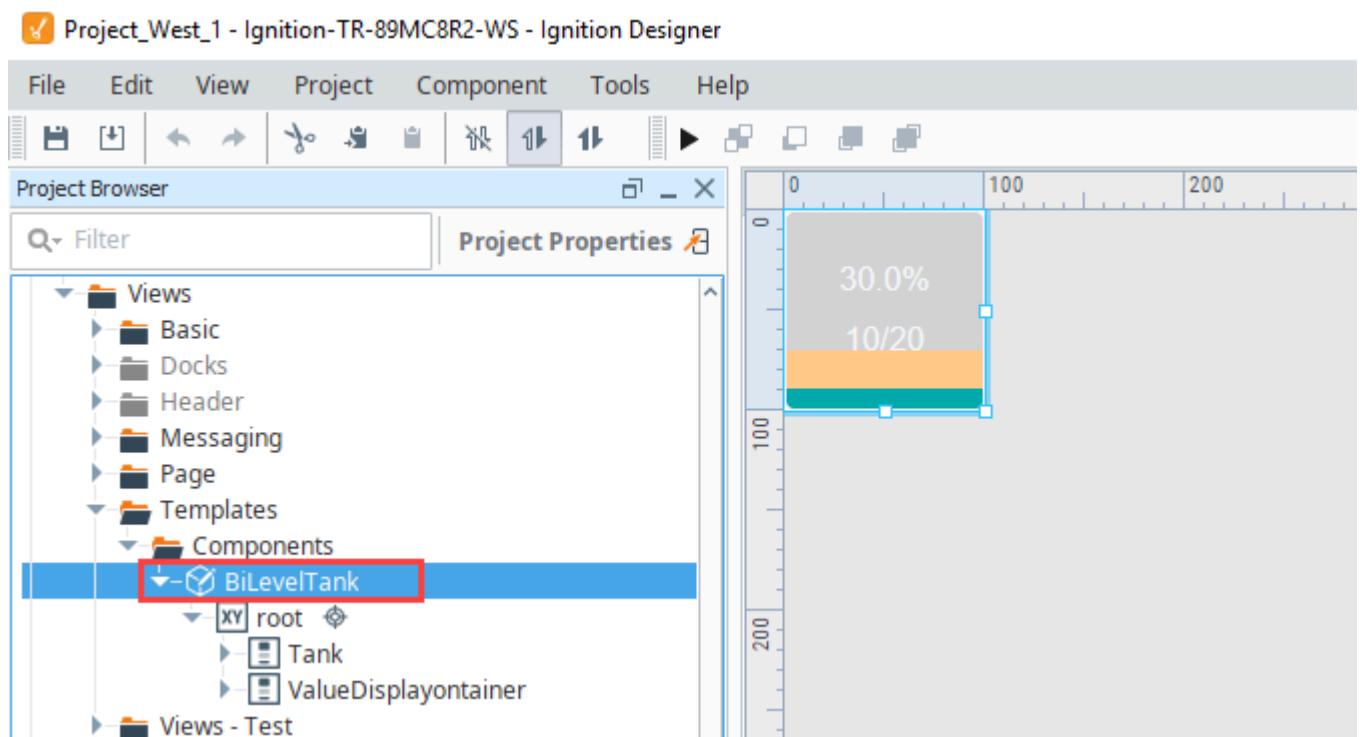
Name

BiLevelTank.zip

Back

Import

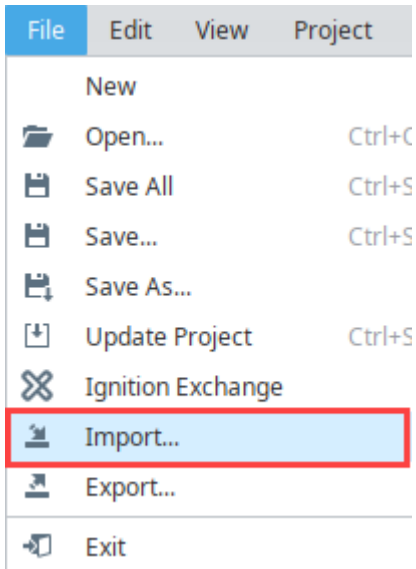
A confirmation message is displayed if the package was successfully imported. You can now go to your project in the Designer and see the new resource.



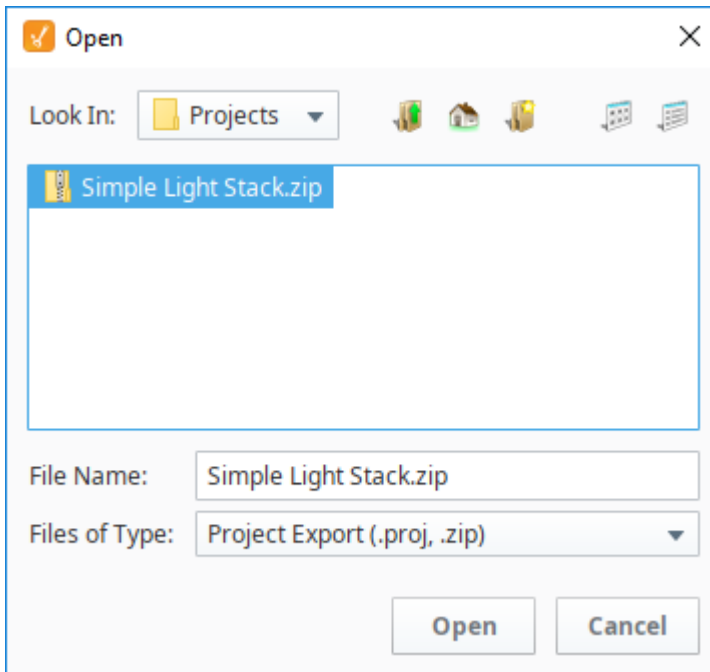
Import an Ignition Exchange Project Package from the Designer

In this example, we're going to import the Simple Light Stack project that we already downloaded from Ignition Exchange. Note that we also extracted the initial `.zip` file that was downloaded. This project contains a Perspective view with a light stack graphic. To import this view into a project that is open in the Designer, do the following.

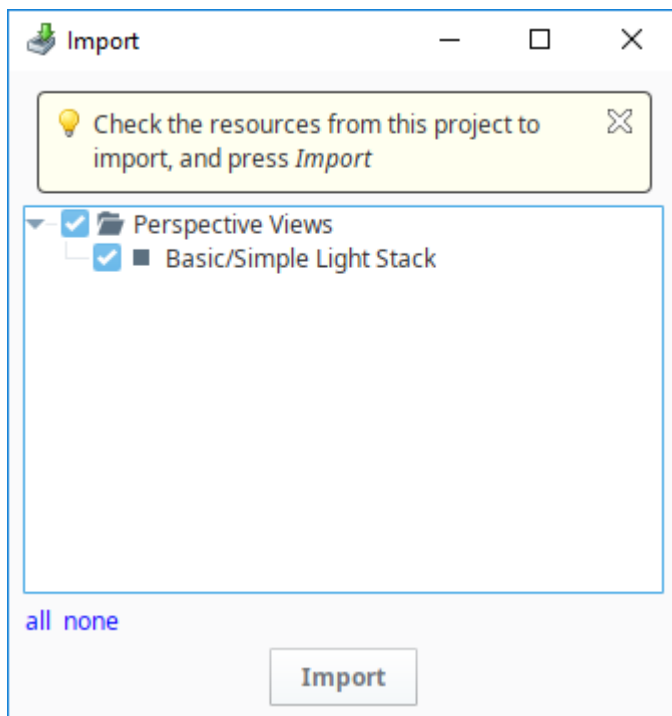
1. In the Designer, click **File > Import**.



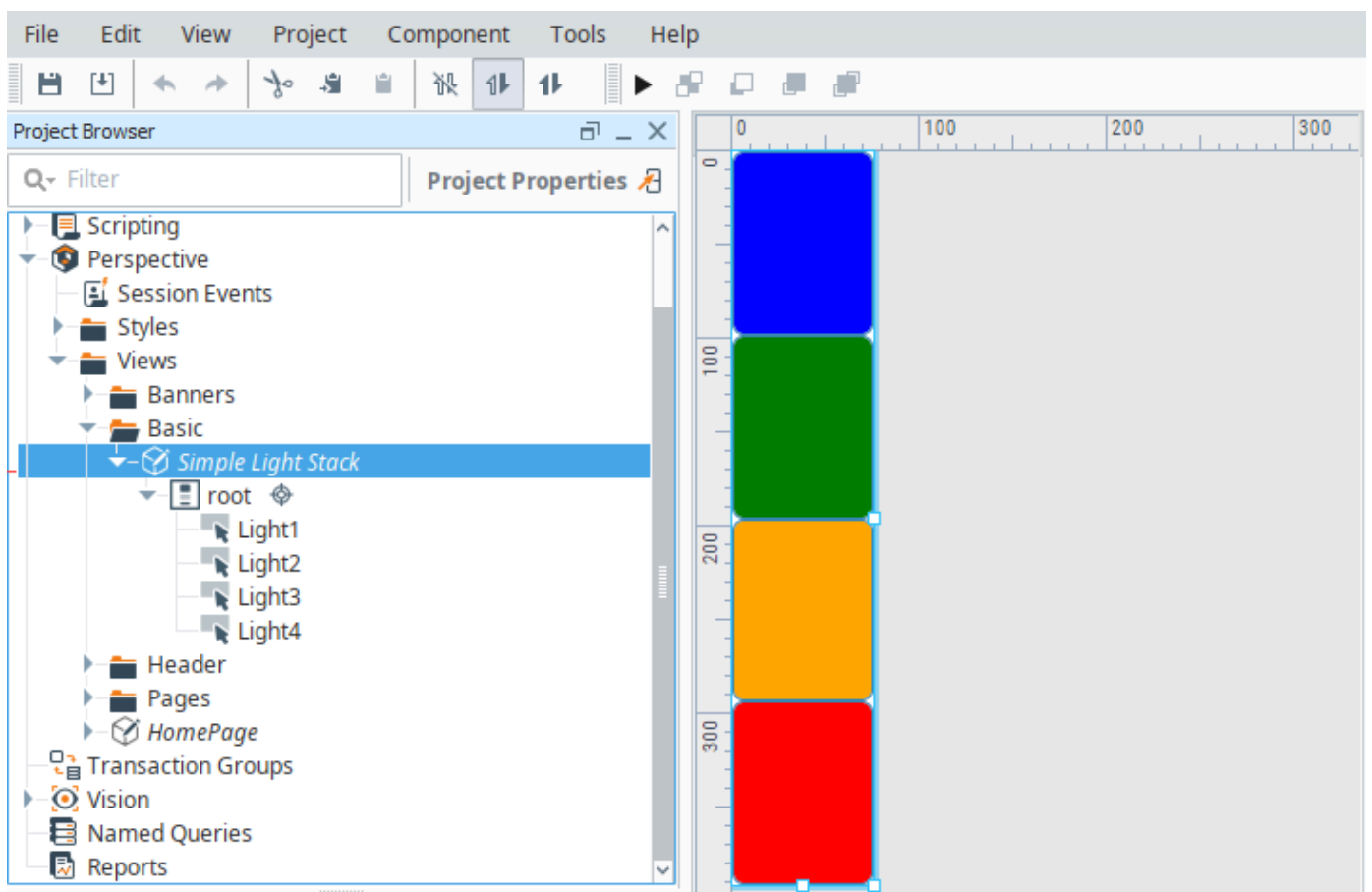
2. Navigate to the project file (`.proj` or `.zip`) you want to import, then click **Open**.



3. In the Import popup, select the resources that you want to import from the project. Click **Import**.



The view is now part of the current project.



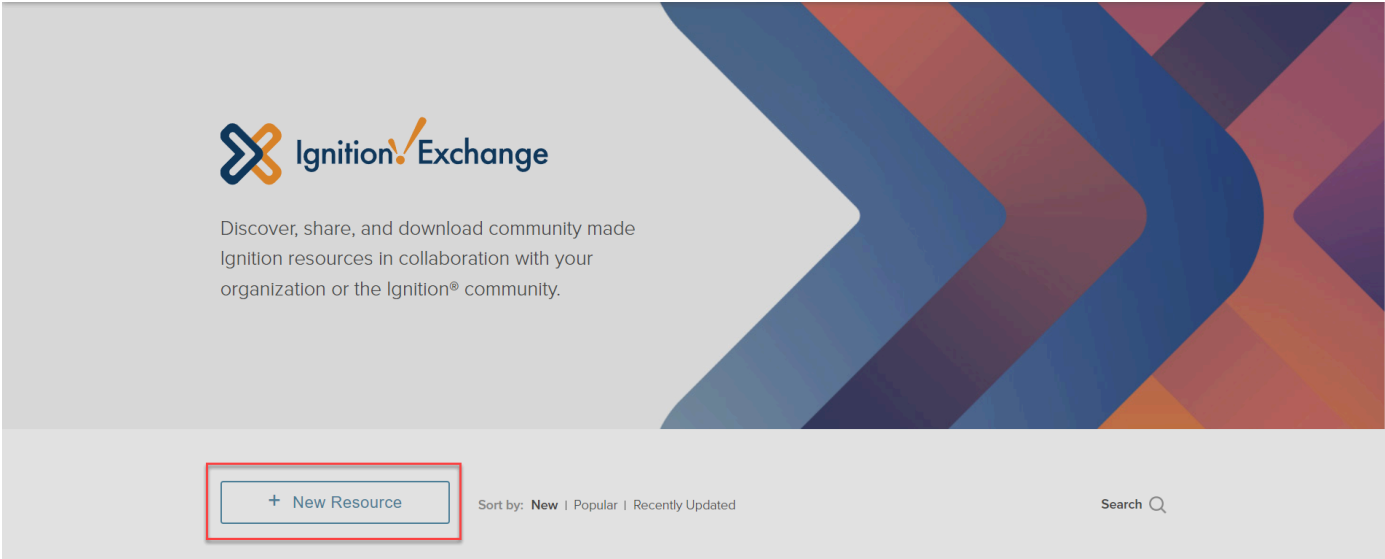
Upload a Resource to Ignition Exchange

1. Use your credentials to log into your account. If you do not have an account, you can sign up at <https://account.inductiveautomation.com/>.

2. Click on **+ New Resource** to open a popup that will start the resource upload draft.

NOTE

The **+ New Resource** option will only appear once signed in.



3. Fill out the **Overview** tab based on your resource requirements. The following table shows the description for each section of the Overview:

Section	Description
Visibility	Choose how your resource should appear on the Exchange.
Title	Create an easily identifiable title for your resource. Organization resources must have a unique title.
Tagline	Create a short but descriptive tagline to help identify your resource.
Description	Create a detailed description of your resource. Include information like how you envision it being used, what types of people might benefit from this package, any relevant industries, etc.
Resource Type	Choose a primary resource type that best describes your resource.
Skill Level	Choose a skill level that best describes the complexity of installation and use.
Background Image (optional)	Customize the background of your resource with a colorful design.
Category	Resources are displayed by category. You can select up to three.
Contact the Developer (optional)	This feature allows contributors to contact you via email directly from the resource page.
Tags (optional)	Tags make your resource more searchable. You can create up to 10 tags.
Images & Screenshots (optional)	Choose any additional images that showcase your resource in use. Be sure to follow the Exchange Guidelines .

4. Click **Save & Continue** when finished. This will take you to the Package tab.

Overview

Package

1 Versions Available

Sort by: **Draft** | In Review | Published | Rejected

+ Create version

Version	Release Tagline	Last Updated	Ignition Platform	Status
Close X Version 1 0 0 Version will auto-increment by patch unless otherwise specified. Ignition Platform 8.1 .30 Choose the minimum version of Ignition required. Release Tagline Test release tagline				

5. Fill out the **Package** tab based on your resource requirements. The following table shows the description for each section of the Package:

Section	Description
Version	Version will auto-increment by patch unless otherwise specified.
Ignition Platform	Choose the minimum version of Ignition required.
Release Tagline	Create a short but descriptive tagline to help identify what changes were made in this version.
Release Notes	List detailed release notes explaining what changed in this version. Think about what improvements were made and how they will impact the resource.
Required Modules (optional)	Choose any modules that are required when using this resource.
Maker Edition (optional)	Let people know this resource is Maker Edition compatible. Note: This option is unavailable for resources requiring unsupported Maker Edition modules. Learn more about Ignition Maker Edition™ .
Other Requirements (optional)	List any other external or custom requirements as separate line items.
Package Files	Choose a package file (up to 10mb) to upload. Note: Uploaded files will be packaged into a .zip format. A README file with your documentation will be created and added to the package.

6. Review your resource information and then click **Publish** to complete the resource upload.

** NOTE**

Use the **Update** option if you are not ready to publish yet or if you need to revise your published resource.

Your resource will be submitted to Ignition Exchange for a review process before becoming available to the community. The review process may take up to a few weeks and only resources available to the public will be reviewed. Make sure to adhere to the guidelines and provide accurate details to ensure a successful upload.

Restore a Gateway Backup from Ignition Exchange

Ignition Exchange can also have Gateway backup files as resources. After you've downloaded the file from Ignition Exchange, follow the steps for a Gateway Restore in [Gateway Backup and Restore](#).

CAUTION

When you perform a Gateway Restore, **ALL** of the server's current configuration will be permanently lost. Restoring a Gateway backup overwrites all of the existing settings including your projects. There is no merge option for a Gateway backup. We recommend you always make a backup of the existing server immediately before performing a Gateway Restore.

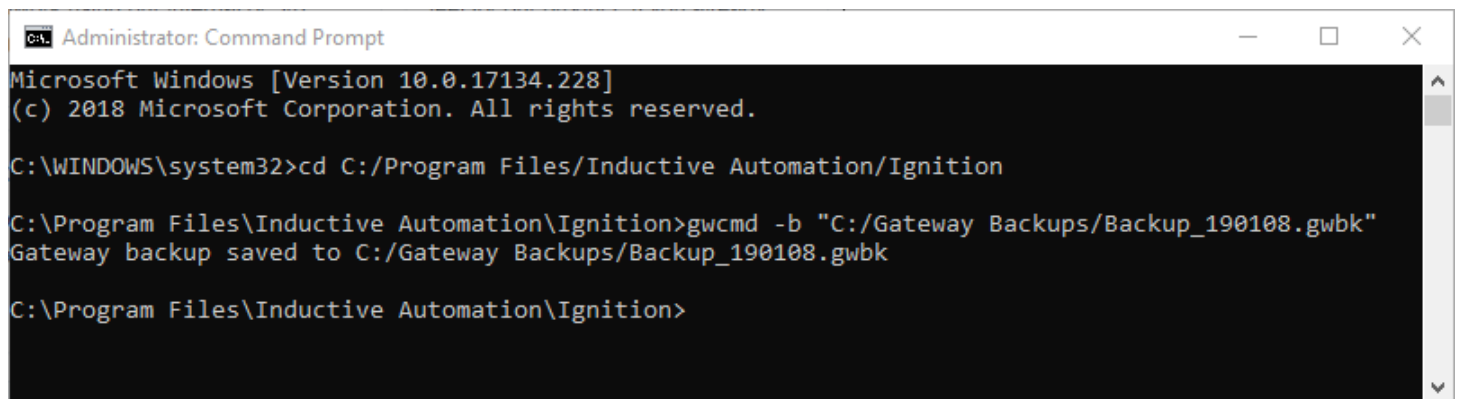
Gateway Command-line Utility

- gwcmd

The Gateway Command-line Utility provides a list of commands you can use to perform specific functions in the Gateway. The Gateway Command-line Utility or **gwcmd** provides basic commands, such as resetting the main password, changing the Gateway's port, or restarting the Gateway.

Invoking **gwcmd** can only be done from command line, so you'll need to utilize a command line interface of some sort (Power Shell, Terminal, etc). Because gwcmd is a file sitting in the Gateway's installation directory, these commands can only ever be invoked from where the Gateway is installed. Furthermore, interacting with gwcmd requires administrative privilege.

The gwcmd file sits at the root of the Gateway's installation directory. See the [Installing and Upgrading Ignition](#) page for more details on default installation directories.



```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.17134.228]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd C:/Program Files/Inductive Automation/Ignition

C:\Program Files\Inductive Automation\Ignition>gwcmd -b "C:/Gateway Backups/Backup_190108.gwbk"
Gateway backup saved to C:/Gateway Backups/Backup_190108.gwbk

C:\Program Files\Inductive Automation\Ignition>
```

A NOTE TO OUR LEGACY USERS...

Older versions of Ignition featured a visual Gateway Control Utility or GCU that could start and stop the Ignition service. This visual element of the GCU, as well as the ability to start and stop the service have since been removed in Ignition 8.0. For more information on starting or stopping the service, please see [Use the Command-line Utility to Start or Stop the Gateway](#) below.

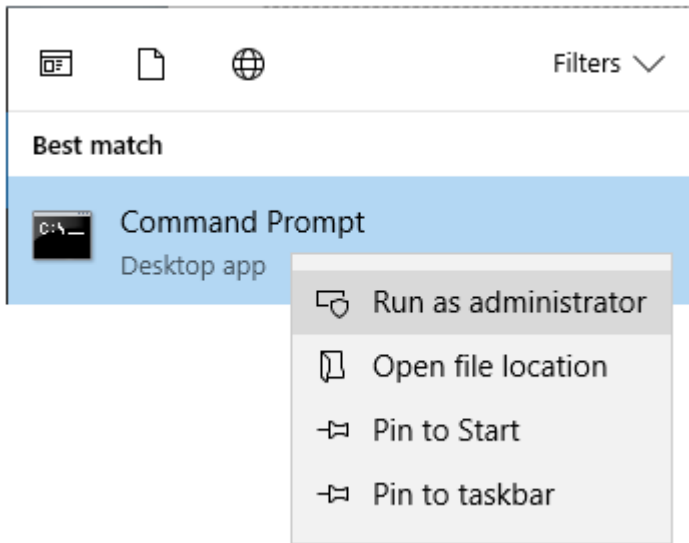
More information on the older version of the GCU can be found in [Deprecated Features](#) of the user manual.

Command-line Utility Options

The Gateway command-line utility supports Windows, Linux, and Mac OS platforms. The 'gwcmd' only runs on the same machine as the Ignition Gateway and requires administrative privileges.

To run the Gateway Command-line Utility, open a command shell and type: `gwcmd <option>`. This example uses the Windows platform:

1. Open the **Command Prompt** with admin privileges. In the search bar, enter **cmd** then right click next to the **Command Prompt** to select **Run as administrator**.



2. Any time you run any of the Gateway command utility options, you need to run them from the directory that Ignition is installed in. The default install directory is: **C:/Program Files/Inductive Automation/Ignition**.
3. From here, you can enter any of the command options listed in the table below. This example is of a Gateway backup using the following command: **gwcmd -b "C:/Gateway Backups/Backup_190108.gwbk"**.

USING SPACES IN A FILE PATH

When using spaces in a file path name, use quotation marks around the full path name, as shown in the example above. Forward or backward slashes can be used to separate folders. The file path includes the disk name, folder path, and file name.

4. The above command created a Gateway Backup on the C drive, in the Gateway Backups folder with a file name of Backup_190108.gwbk. The image below shows all the commands used in Steps 2 and 3.

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.17134.228]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd C:/Program Files/Inductive Automation/Ignition

C:\Program Files\Inductive Automation\Ignition>gwcmd -b "C:/Gateway Backups/Backup_190108.gwbk"
Gateway backup saved to C:/Gateway Backups/Backup_190108.gwbk

C:\Program Files\Inductive Automation\Ignition>
```

Use the Command-line Utility to Start or Stop the Gateway

One of the common uses for the Command-Line Utility is to start or stop the Gateway.

Windows

Ignition's installation directory contains `start-ignition.bat` and `stop-ignition.bat`, which can start or stop the service. Example:

```
C:\Program Files\Inductive Automation\Ignition> start-ignition.bat
```

However, you can also use Windows native service commands to control the running state of the Gateway:

```
net start ignition
```

```
net stop ignition
```

Linux

You can control the service using the `ignition.sh` script. It can be called with the `start` and `stop` parameters to perform the relevant operations.

For example:

```
/usr/local/bin/ignition/ignition.sh start
```

Additionally, you can use native terminal commands to start or stop the service:

```
service Ignition-Gateway start
```

```
service Ignition-Gateway stop
```

Mac OS X

You can access the service from the install directory using the `ignition.sh` script. On a typical Mac install using the dmg installer, the full command (without a custom location specified) is the following:

```
/usr/local/ignition/ignition.sh start
```

Command-line Utility 'gwcmd' Options

The following table lists all available '**gwcmd**' options.

Options	Description
<code>-a, --activate <license-key></code>	Creates an <code>activation_request.txt</code> file that can be used to request a <code>license.ip1</code> file from the Inductive Automation website. You must specify the license key to use for activation. The <code>activation_request.txt</code> file is saved in the current directory. Note that eight-character license keys cannot be activated through <code>gwcmd</code> .
<code>-b, --backup <new filepath></code>	Downloads a Gateway backup <code>.gwbk</code> file and saves the file to the specified path. The path can be either an absolute path or a relative path. If another <code>.gwbk</code> file with the same name already exists, you will be prompted whether it is OK to overwrite the file. You can override with the <code>-y</code> option to force the file to always be overwritten.
<code>-c, --clearks</code>	Clears the gateway's SSL/TLS setup. The gateway's SSL/TLS connector will be immediately shut down.
<code>-d, --disabled</code>	Use with the <code>--restore flag</code> to disable all items after gateway restoration and restart.
<code>-e, --exportks <new filepath></code>	Exports the gateway's SSL KeyStore in PKCS #12 format and saves to the specified path.
<code>-f, --exportpk <new filepath></code>	Exports the private key from the gateway's SSL KeyStore in PEM format and saves to the specified path.
<code>-g, --reloadks</code>	Reloads the Gateway's SSL KeyStore from disk. Any update to the KeyStore will be automatically applied to any new connections.
<code>-h, --help</code>	Shows the usage for this command.
<code>-i, --info</code>	Retrieves server status and port information from the Gateway if it is running.
<code>-k, --port <new port></code>	Changes the Gateway http port.
<code>-l, --sslport <new port></code>	Changes the Gateway https port.

Options	Description
<code>-m, --skip-gateway-contact</code>	New in 8.1.6 Use with the <code>--restore</code> flag to skip contacting a running gateway and stage the restore file directly.
<code>-n, --nocrypt</code>	Add to the export private key command to not encrypt the private key.
<code>-o, --name <new gateway name></code>	Specifies a Gateway name while restoring a backup. Additionally, the <code>-y</code> command now skips prompts asking for a Gateway name override.
<code>-p, --passwd</code>	Enables a password reset command, which will allow you to create a temporary user that can access the gateway again. Requires a gateway restart to take effect. See Gateway Password Reset below.
<code>-r, --restart</code>	Restarts the Gateway.
<code>-s, --restore <backup file path></code>	Restores from a Gateway backup, using the file specified at the path.
<code>-t, --tdump</code>	Performs a thread dump in the Gateway and prints the dump to the command-line.
<code>-u, --unactivate</code>	Creates an <code>unactivation_message.txt</code> file that you can use to unactivate a license via the Inductive Automation website. The <code>unactivation_message.txt</code> file is saved in the current directory.
<code>-w, --uselicense <license.ipl path></code>	Applies a <code>license.ipl</code> file that was downloaded from the Inductive Automation website. You must supply the location of the <code>license.ipl</code> file. If it is in the current directory, use <code>license.ipl</code> for the location.
<code>-y, --promptyes</code>	Automatically answers <code>yes</code> to any prompt that may appear in the above commands, such as permission to overwrite an existing file.
<code>-z, --timeout <seconds></code>	New in 8.1.17 Number of seconds to wait for a backup to be generated. Starting in 8.1.17, the default timeout value is 60 seconds. In older versions, the default timeout value is 30 seconds.

Gateway Password Reset



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Password Reset with GWCMD

[Watch the video](#)

If you can no longer access the Gateway (due to, say, a forgotten password), you can use the **-p** command to cause a password reset. During a password reset, instead of just changing the initial user's password, a partial commissioning process will trigger upon the next Gateway restart (which can be accomplished with the **-r** command), allowing you to create a new user that can access the Gateway. From there you'll be able to address any issues that prevented you from using your normal credentials.

A screenshot of a Windows PowerShell terminal window titled "Select Windows PowerShell". The terminal has a dark blue background with white text. The commands and output are as follows:

```
PS C:\Program Files\Inductive Automation\Ignition> gwcmd -p
Password has been reset. Gateway needs to be restarted.
PS C:\Program Files\Inductive Automation\Ignition> gwcmd -r
Waiting for Gateway restart.
Gateway needs to be commissioned
PS C:\Program Files\Inductive Automation\Ignition>
```

New in 8.1.0

However when performing this process, several things will happen to the Gateway:

- During commissioning, you'll be asked to provide a user name and password for a new user.
- A "temp" **user source** is created.
- The user you provided credentials for will be added to the "temp" user source.
- The new user will be assigned the role "Administrator".

- A "temp" Ignition Identity Provider will be created. The "temp" user source will be assigned as the provider backing the Identity Provider.
- On the **General Gateway Security Settings**, the following properties will be changed:
 - **System Identity Provider** will be set to the "temp" user source.
 - **Designer Authentication Strategy** will be set to the "Classic" strategy.
 - **System User Source** will be set to the "temp" user source.
 - **Designer Role(s)** will be set to the "Administrator" Security Level.
 - **Gateway Config Permissions** will be set to the "Administrator" Security Level.

Thus, if you trigger a password reset and are able to use your normal credentials again, you'll want to make sure you change the values on the modified Gateway Security Settings to their property value. Also, you'll likely want to remove the "temp" user source and Identity Providers.

Licensing and Activation



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About Licensing

[Watch the video](#)

Ignition's licensing is unique and easy to use because Ignition is licensed by the server, not the client. You only need one license for your server; any clients are automatically included. In addition to that, an Ignition license is unlimited and sold based on which modules you want. There are unlimited clients, tags, and projects. Buy only the modules you need, and don't worry about running into limits. If you want to test other modules, you don't need to do anything extra because of our built-in Trial mode. All unlicensed modules can be reset in 2 hour trial mode.

Trial Period



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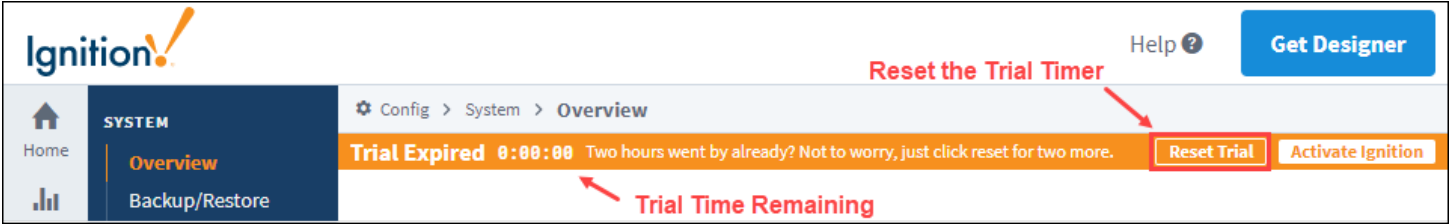
About the Trial Period

[Watch the video](#)

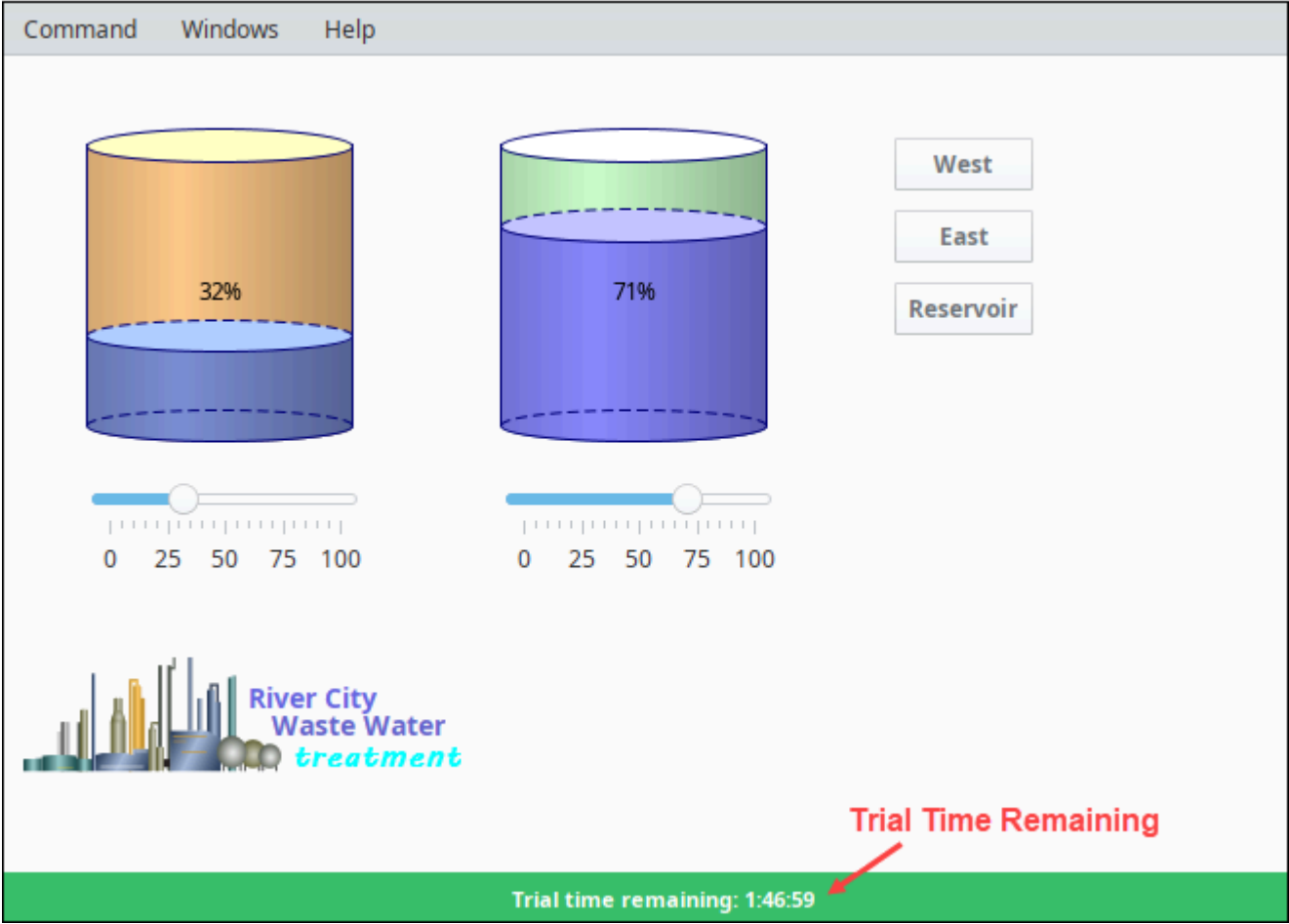
Our goal at Inductive Automation is to provide an easy way to access and learn Ignition. We want everyone to have the opportunity to try Ignition and start working with it with no restrictions. You can download Ignition from our webpage, install it, and start using it for two hours at a time. At the end of the two hour time period, all modules will stop running, but don't panic, you can reset the timer to run for another two hours. You can reset the timer as many times as you want, so go for it! The Gateway Webpage and the Designer are not affected by this trial, so you can develop for as long as you want without interruption. If you do have a license, any unlicensed modules will run in this Trial mode, but licensed modules will never timeout.

You can re-start the Trial period by logging into the Gateway, and clicking **Reset Trial** to enable another two hours of execution. The Trial Timer may be restarted any number of times. Depending on the module, you may need to take some additional actions. For example, the Vision Clients requires you to log out and back in again in order to continue the Trial.

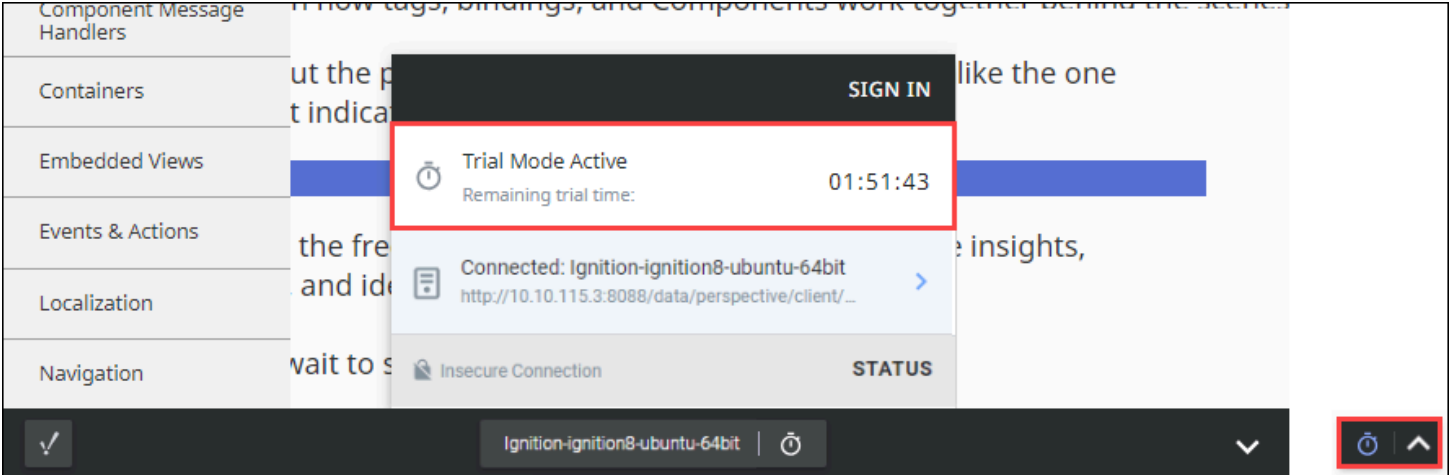
In the Gateway, the Trial Time banner is displayed near the top of the screen. To reset the trial timer, click the Reset Trial button:



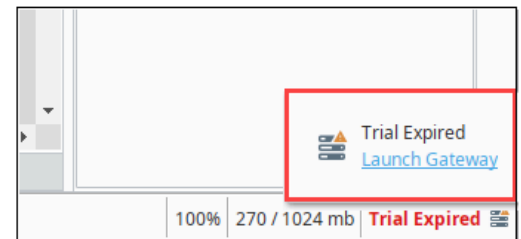
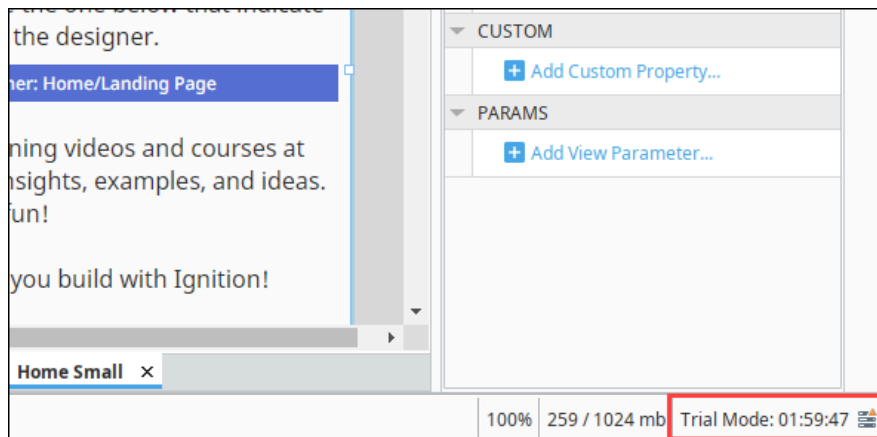
In a Vision Client (for Edge or Ignition Standard), the banner appears near the bottom of the screen.



Perspective sessions display the trial period timer in the Session Status bar when expanded.



New in 8.1.43 The Designer now displays the trial timer status in the lower right-hand corner. When the timer has expired, a warning will appear. Click the trial timer or the warning link to access the Gateway and reset the trial.



Activating a Standard License (Six-Character Key)

When you purchase a license for Ignition Standard edition or Edge, you receive a license key, a six-digit code that identifies your purchase. Use this license key to activate the software online through the Ignition Gateway. If you later want to add any additional modules, your account is updated and you can re-use your existing license key to activate the new features. You can also deactivate your license key, and reuse it to activate Ignition on a different machine as many times as you want, allowing you to transfer a license from one Gateway to another.

You can activate your license in two ways:

- **Online Activation** - From the **System > Licensing** section on the Gateway Webpage, your request to activate your Gateway is activated over the internet.
- **Offline Activation** - If you don't have an internet connection, you can follow the manual activation process in the Offline Activation section.

TIP

Regardless of following the online or offline process, activating Ignition with a six-character key requires outbound initiated TCP communication to <https://api.inductiveautomation.com/activation/activate>. Inductive Automation recommends blocking all other unnecessary TCP/IP traffic.

Online Activation Example

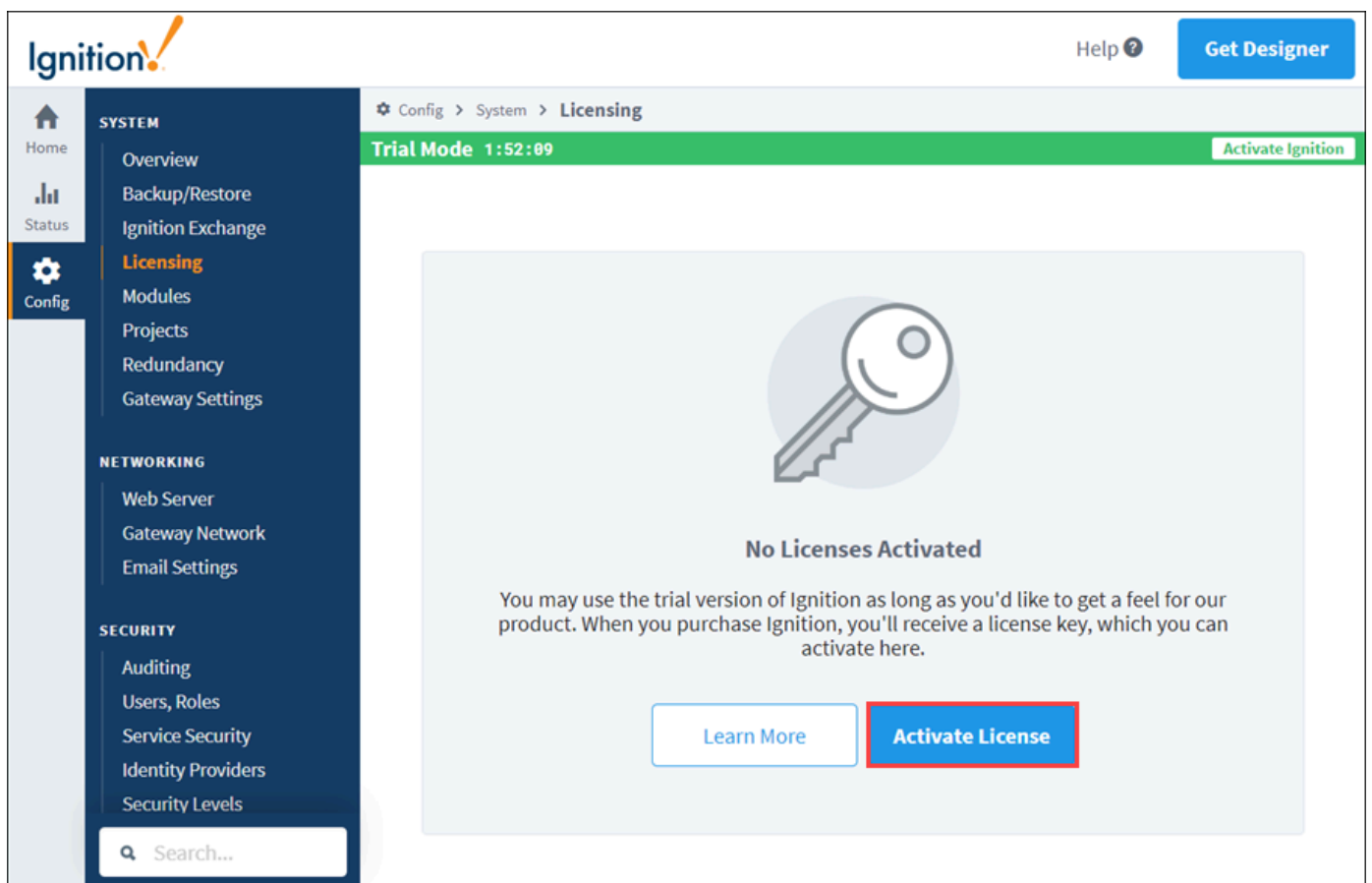


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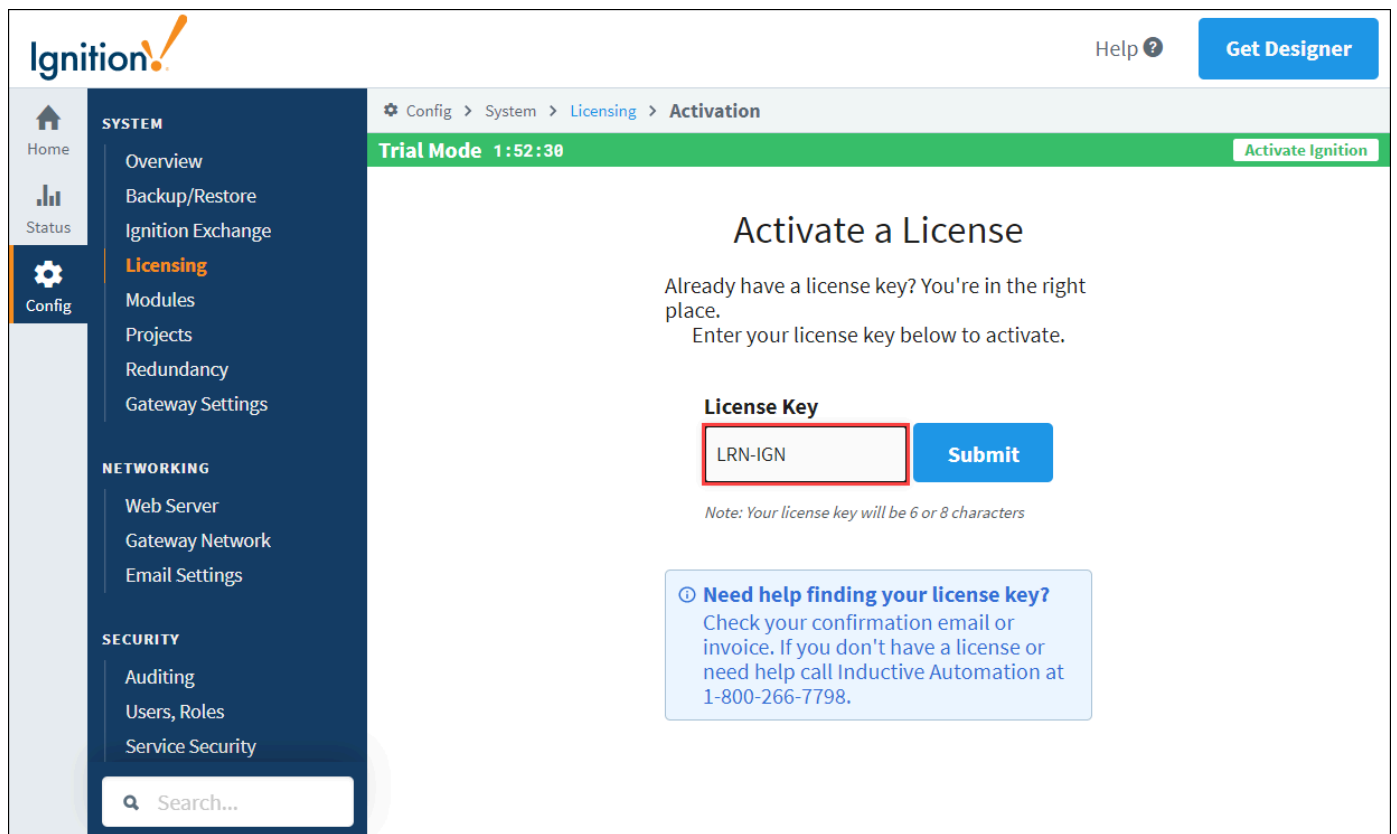
Online Activation

[Watch the video](#)

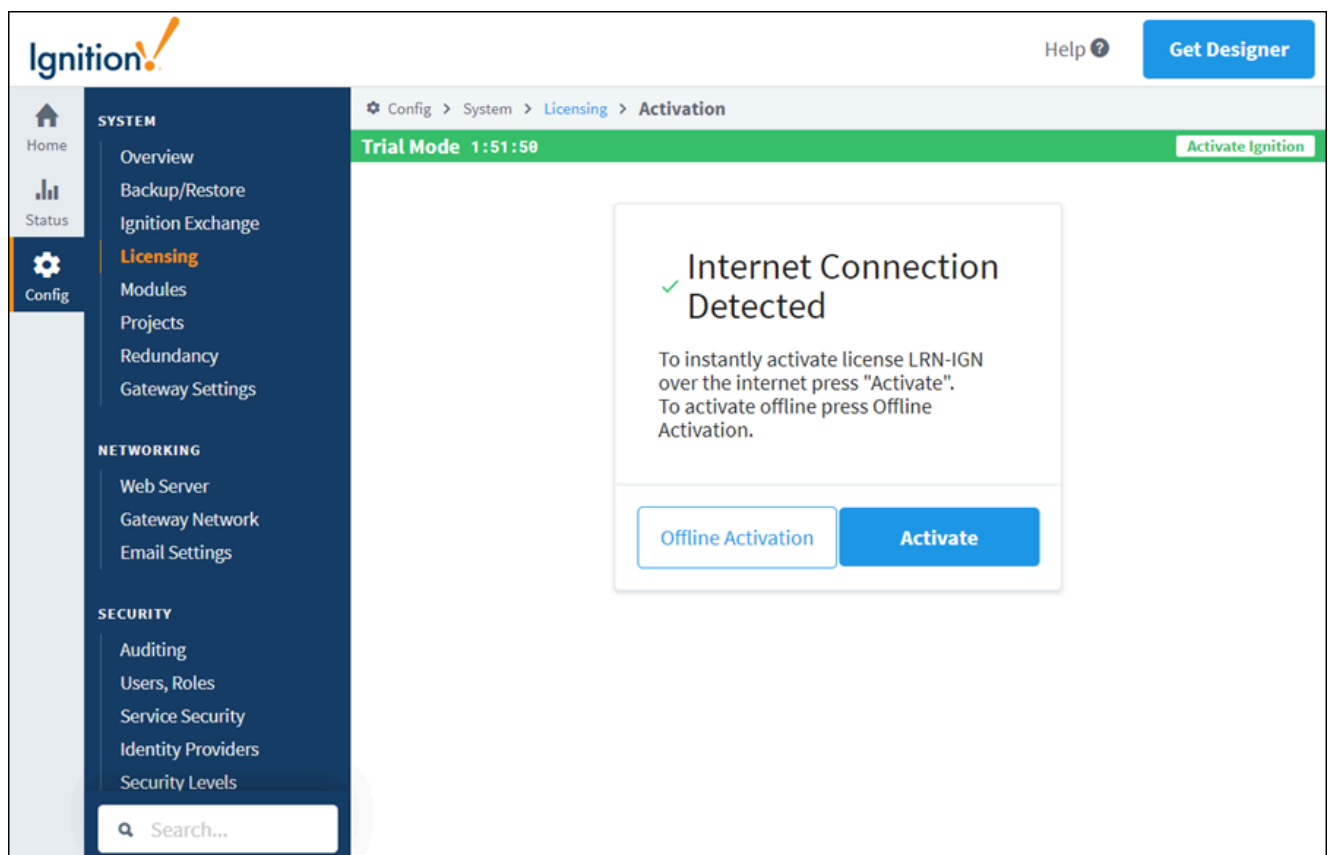
1. Go to the Gateway Webpage and select the **Config** section.
2. From the menu on the left, select **System > Licensing**. The Licensing page will appear. If you already have a license key, click the **Activate License** button.



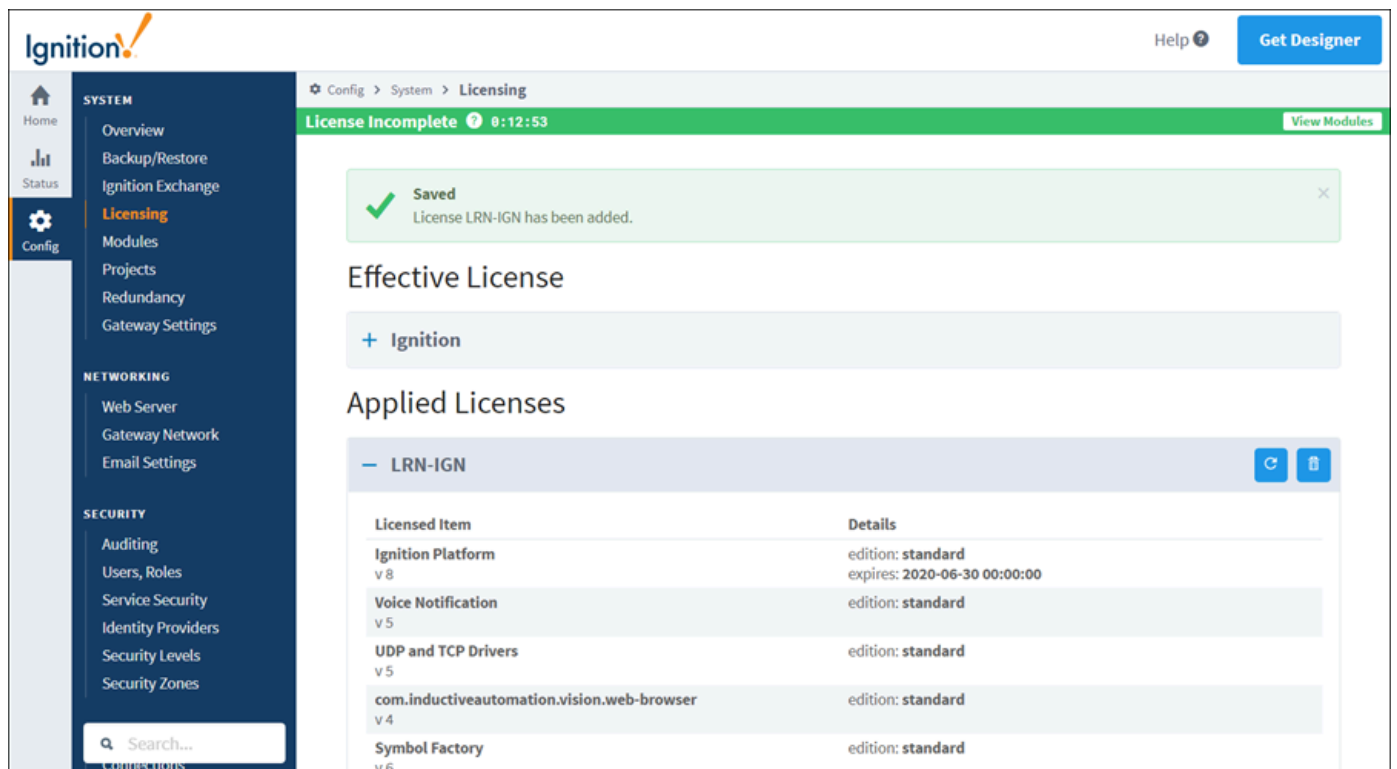
3. The **Licensing/Activation Online** page will be displayed. Enter your **License Key** and click **Submit**.



- i. If you are connected to the internet, click the **Activate** button.
- ii. If you want to activate the license offline, click the **Offline Activation** button.



4. The Licensing page will refresh, and your Current License will be successfully activated.



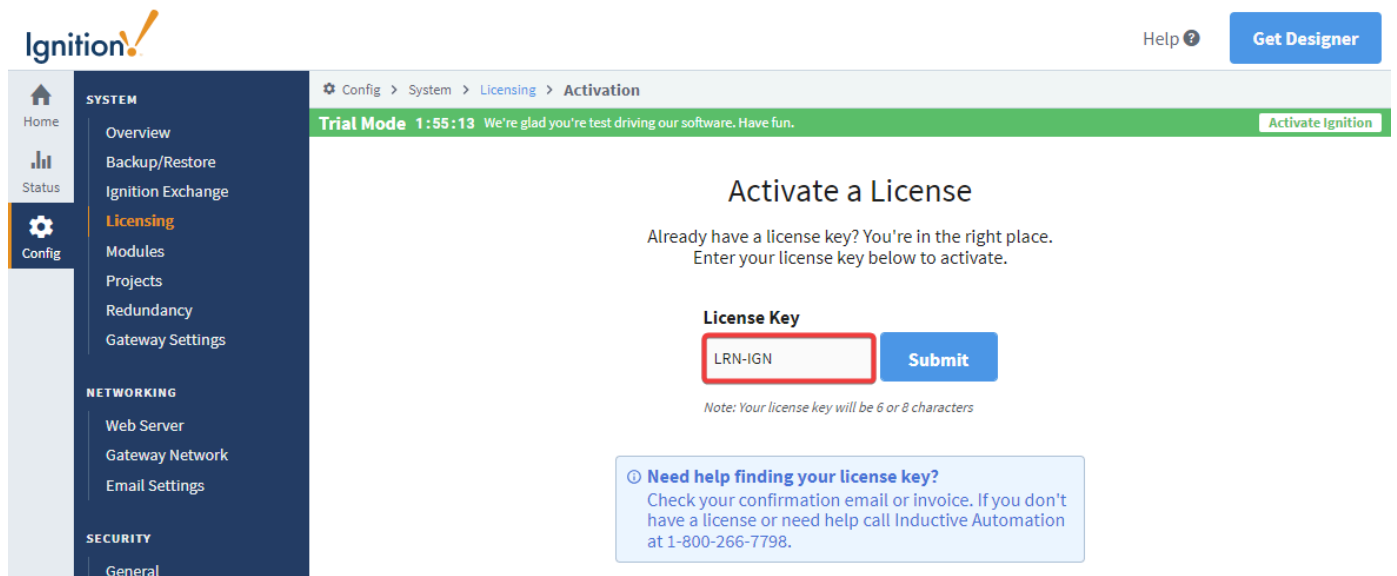
Offline Activation Example

When you do not have an internet connection, you can do the following steps to activate your license manually. Note that offline activation is only available for license keys with six-digit codes.

NOTE

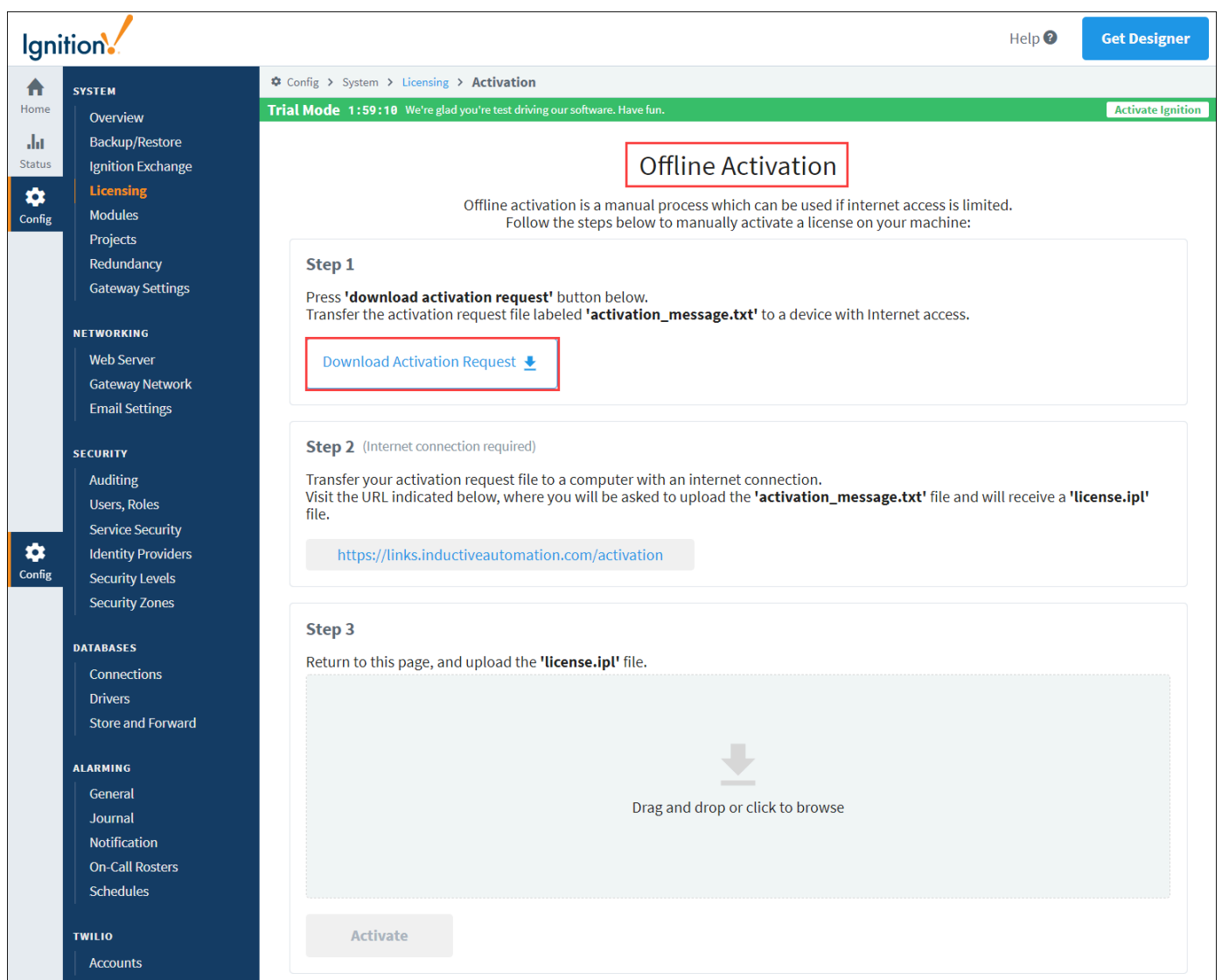
If you're planning on performing an offline activation to update a license, make sure to **unactivate the license** first. Otherwise your system may enter **emergency mode** after attempting another activation.

1. Go to the Config tab on the Gateway Webpage.
2. Scroll down to **System > Licensing**. The Licensing Activation page appears.
3. Click on **Activate License**.
4. Enter your **License Key** and click **Submit**.



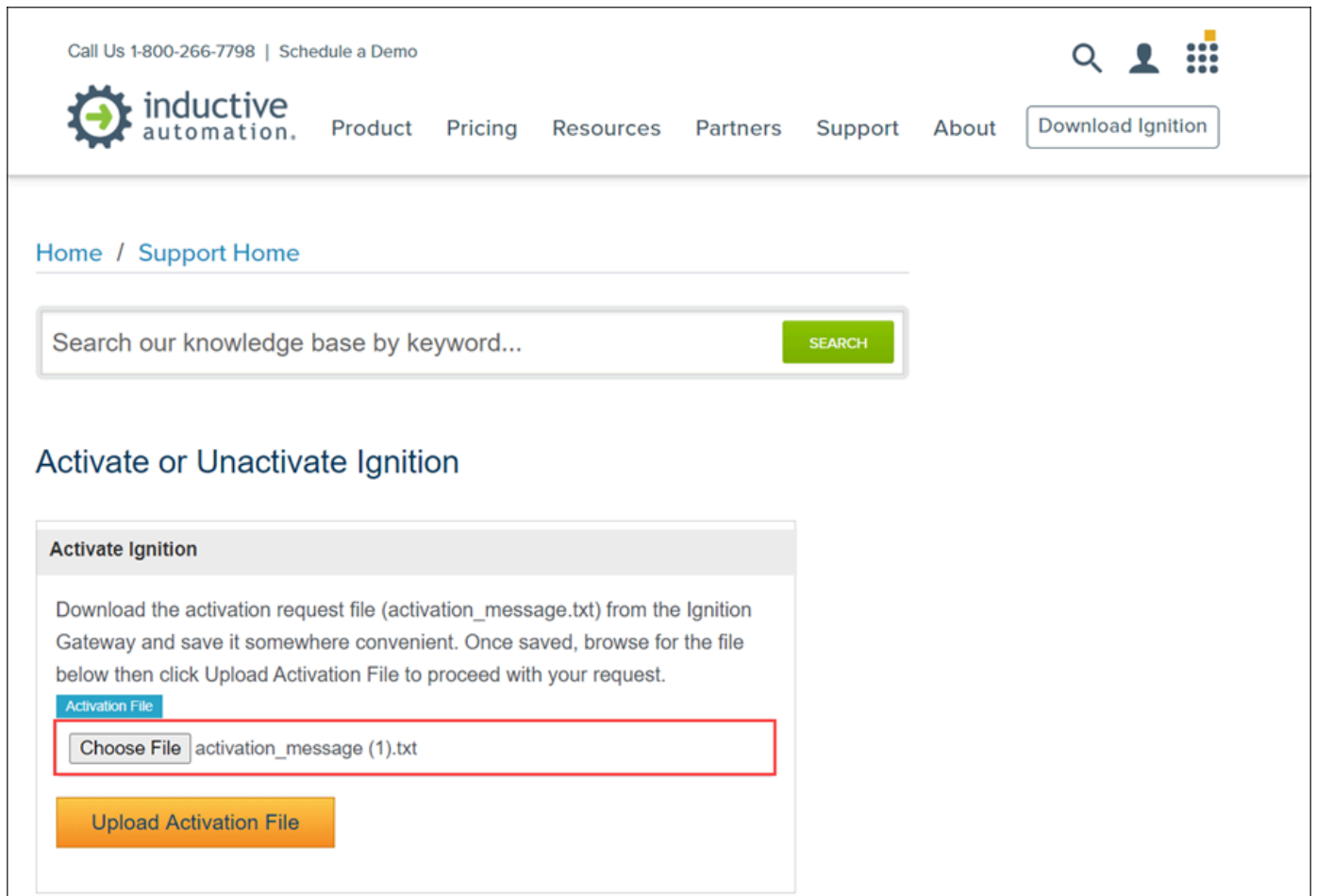
5. Click the **Offline Activation** button.

6. Click the **Download Activation Request**. An activation request file, called `activation_message.txt` is generated and downloaded.



7. Take the `activation_message.txt` file to a machine with internet access and go to <https://links.inductiveautomation.com/activation>.

8. Click **Choose File** and select the `activation_message.txt` file.



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Activate or Unactivate Ignition

Activate Ignition

Download the activation request file (activation_message.txt) from the Ignition Gateway and save it somewhere convenient. Once saved, browse for the file below then click Upload Activation File to proceed with your request.

[Activation File](#)

[Choose File](#) activation_message (1).txt

[Upload Activation File](#)

NOTE

Should any trouble occur with the upload process, please contact our Support department.

9. Once you upload the `activation_message.txt` file, a license file called `license.ip1` is generated.
10. Bring the `license.ip1` file back to the computer on which you're licensing Ignition. Back on the Offline Activation page, upload the `license.ip1` file. Then click **Activate** to finish the process.

The screenshot shows the Ignition software interface. The left sidebar contains navigation links for Home, Status, Config, and various system settings. The main content area is titled 'Offline Activation' and provides instructions for manual license activation. It includes three steps: Step 1 (Download Activation Request), Step 2 (Transfer file to a computer with internet access), and Step 3 (Upload the license file). A trial mode banner at the top indicates the software is in trial mode for 1:59:10.

Ignition Help ? Get Designer

Config > System > Licensing > Activation

Trial Mode 1:59:10 We're glad you're test driving our software. Have fun. **Activate Ignition**

Offline Activation

Offline activation is a manual process which can be used if internet access is limited. Follow the steps below to manually activate a license on your machine:

Step 1

Press '**download activation request**' button below.
Transfer the activation request file labeled '**activation_message.txt**' to a device with Internet access.

[Download Activation Request](#)

Step 2 (Internet connection required)

Transfer your activation request file to a computer with an internet connection.
Visit the URL indicated below, where you will be asked to upload the '**activation_message.txt**' file and will receive a '**license.ipl**' file.

<https://links.inductiveautomation.com/activation>

Step 3

Return to this page, and upload the '**license.ipl**' file.

Drag and drop or click to browse

[Activate](#)

11. The Licensing page will refresh showing your license was successfully activated.

12. Click **View Modules** to see a list of all your activated modules.

Leased Licenses (Eight-Character Key)

A license key with eight characters signifies a **Leased License**. These types of licenses also require an **activation token**, which is a very long, unique string of characters that must also be provided before a Gateway is licensed. Leased licenses are ideal for containerized environments (Docker, Kubernetes), as well as cloud-based deployments.

See the [Leased Licensing](#) page for more information.

WHITELISTING ENDPOINTS

Use an HTTP POST request for any activation whitelisting purposes you may have. The 8-character activation server is at <https://licensing.inductiveautomation.com/v1->

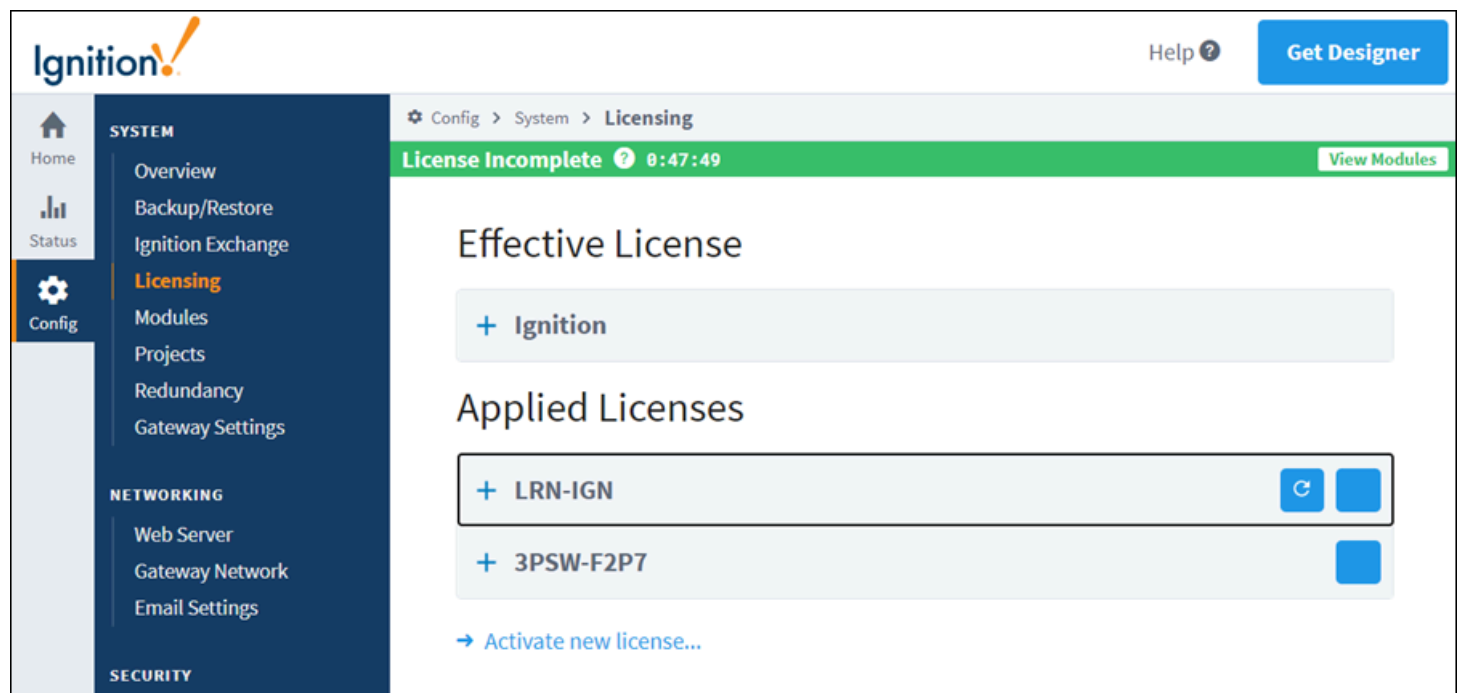
activation/leased/activate and `https://licensing.inductiveautomation.com/v1-activation/leased/nonce`.

Adding Multiple Licenses to a Single Gateway

In order to better support our community of third-party module authors, we also allow for multiple license keys to be installed on a single Gateway. A third-party module author can issue a license key for their module directly to a customer, whereby, they can immediately do an install of the module. To learn more, check out the [Third-Party Module Showcase](#) to find and purchase modules that extend Ignition's functionality.

It is important to note that there may only be one license on it with a platform version per Gateway. The platform will look similar to the picture below. If you try and activate a second license with a platform onto a Gateway that already has a license with a platform, the new license will overwrite the previous license.

In the image below, two licenses have been applied to this Gateway, but only one is active.



Effective vs Applied Licenses

The Licensing page has two sections, which detail different information.

Applied Licenses shows all licenses that have been applied to the Gateway. Entries here are typically purchased or given, and have a license key associated with them.

Effective Licenses provides a summary of modules active on the Gateway. Modules are active if they're provided by an applied license. This area is the result of potentially multiple licenses across various activation mechanisms. For example, if **license A** provides **module A**, and **license B** provides **module B**, then Effective Licenses would show that **both** modules A and B are active on the Gateway. The caveat here is that the modules will only appear if they're installed on the Gateway. In this same scenario with licenses A and B, if module B was not installed, then it will not appear under Effective Licenses.

In addition, the Effective Licenses area may have "synthetic" items that are translated to modules. For example, in the case of Edge Gateways, their Applied Licenses will show products. These products will be translated to modules under the Effective License section.

Licensing Modules

To function properly, each module in your system must be provided by a license that supports the related module's version. Once a module is installed, the module version and license status are displayed in the Status section on the **System > Modules** page.

This page lists all the modules that are currently running with their license status as either Trial, Activated, or Free mode. If you are licensed for a module you are running, it will run in Activated mode. If you are not licensed for a module you are running, it will run in Trial mode until the Trial time is expired. Navigate to the Config section and click on **System > Licensing** to [reload or update any problematic licenses](#).

Other required module adjustments may be better addressed on the Config section's [Module Configuration](#) page. The Module Configuration page can be accessed directly by clicking the Licensing Configuration link on the top right of the Modules page.

License Incomplete

Don't be alarmed by a 'License Incomplete' message on the green banner. Clicking on the View Modules link within the banner will open an informational message box that will provide context to the warning, such as a module running in Trial mode.

Ignition Help [Get Designer](#)

Status > Systems > Modules

License Incomplete ? 1:59:03 [View Modules](#)

[Licensing Configuration](#)

Running Modules
19 / 22

Licensed Modules
19 / 22

License Details

License Key	LRN-IGN
Version	8
edition	standard

Inductive Automation, LLC

Name	Version	License	Status
Alarm Notification	5.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
Allen-Bradley Driver	5.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
DNP3 Driver	3.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
Enterprise Administration	3.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
Logix Driver	4.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
Modbus Driver	6.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
OPC-UA	8.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
Omron Driver	3.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
OpCom	5.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
Perspective	1.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
Reporting	5.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
Vision	10.0.0-beta0 (b2019032202)	Activated ?	✓ RUNNING
Voice Notification	4.9.10 (b2018112821)	Trial	✓ RUNNING

Updating a License

Online License Update

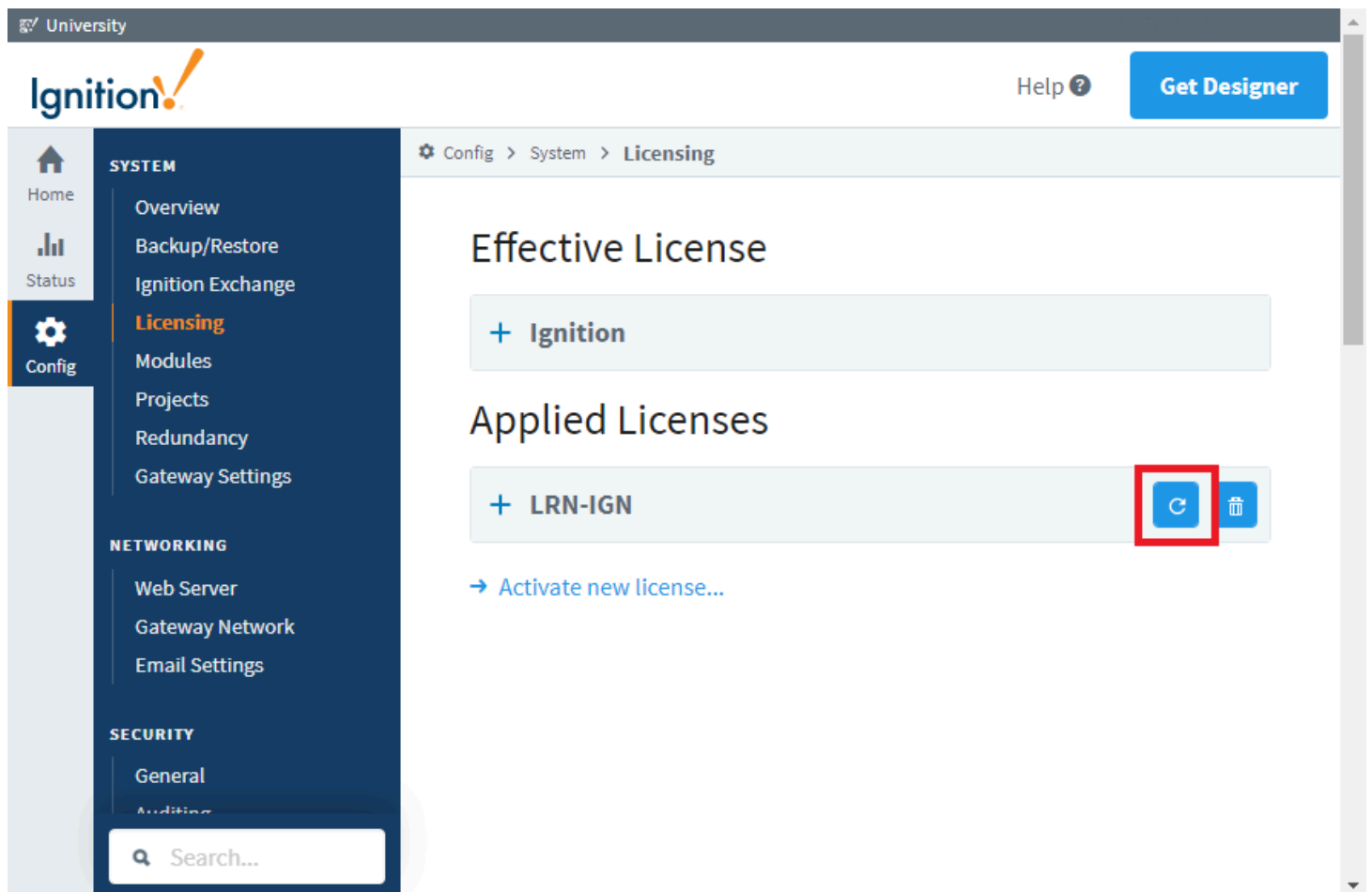


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Reactivating a License

[Watch the video](#)

If you added new modules or updated the versions existing modules, then you'll need to update (Reactivate) your license. Licenses are reloaded from the **Config > System > Licensing** section on the Gateway webpage. Simply click the Reactivate button next to the license that was changed, as shown below.



Pressing the Reactivate button will cause the Gateway to attempt to reach out to our licensing server, and will update shortly after.

Offline License Update

If the Gateway does not have a server connection, it will be unable to update automatically. Note that offline activation is only available for license keys with six-digit codes. In this case you'll need to do the following:

1. Unactivate the license following the [Offline Unactivation](#) steps mentioned in the next section.
2. Activate the license via an [Offline Activation](#).

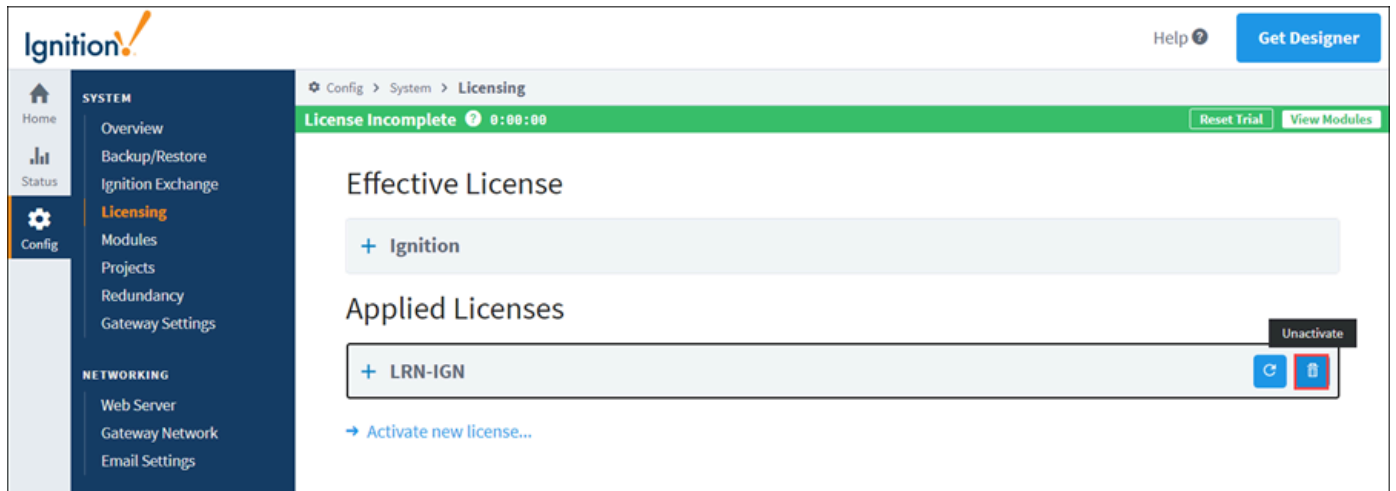
Unactivating a License

For a given license key, a limited amount of simultaneous activations are allowed at a given time. If you want to activate Ignition on a different server, you must first unactivate it on the current server. You can unactivate the license on one Gateway, and then activate it on a different Gateway if needed. Unactivation occurs immediately over the internet, and makes this license available for activation on another machine.

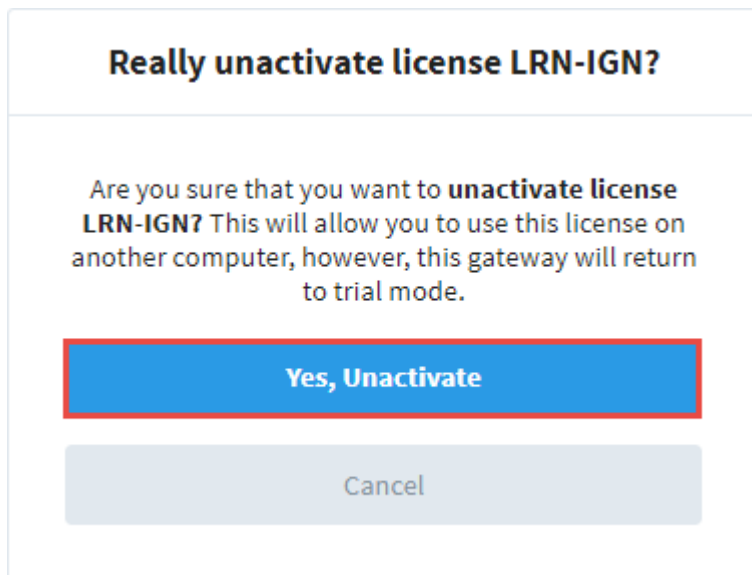
Online Unactivation

To unactivate the Gateway, do the following steps:

1. From the **Config** section of Gateway, go to **System > Licensing**. The **Licensing** page is displayed and you can see the currently installed license key.
2. Click on **Unactivate License** icon.



3. A Licensing/Confirm Unactivate window will appear asking you to confirm the unactivation. Click the **Yes, Unactivate** button. It may take a minute or so for the request to finish.



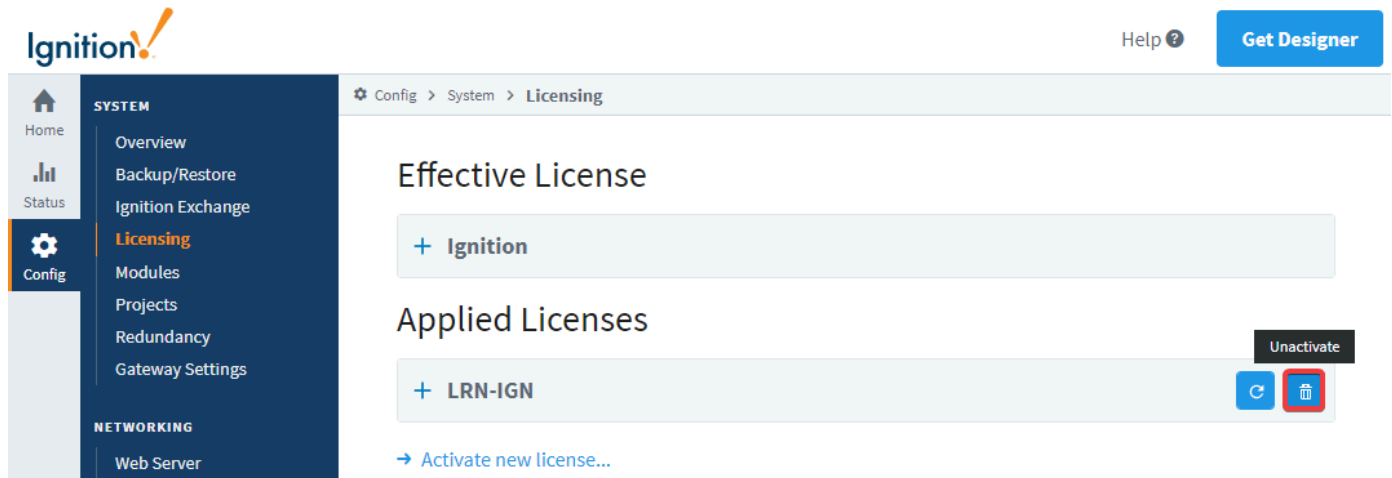
4. The unactivation request will be sent to Inductive Automation's licensing servers, and the license will again be available for activation on another Gateway.

Offline Unactivation

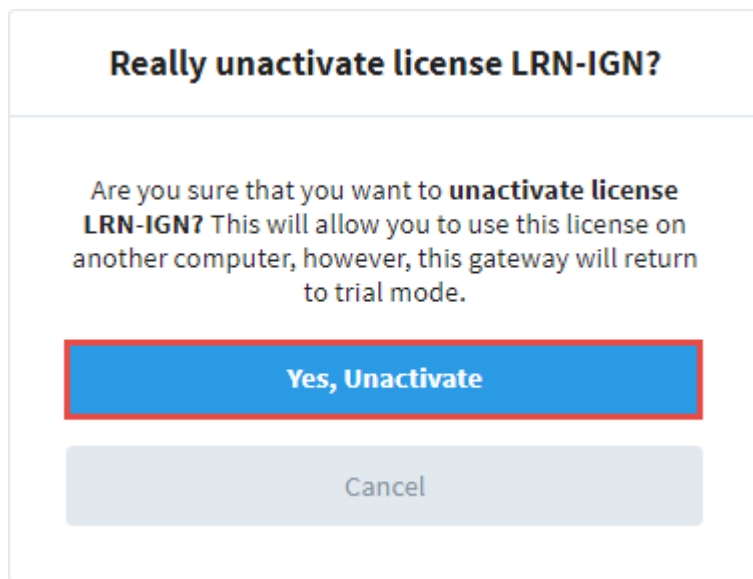
In the event your Gateway is unable to reach our licensing server, you will need to perform an offline unactivation. Note that offline activation is only available for license keys with six-digit codes.

To perform an offline unactivation, do the following steps:

1. Go to your Gateway's **Config** section > **System** > **Licensing**. You will be able to see any licenses that are currently applied.
2. Click the **Unactivate** button (trash can icon) under **Applied Licenses**.



3. A confirmation window will appear, asking you to confirm the unactivation. Click the **Yes, Unactivate** button. It may take a minute or so for the request to finish.



4. An unactivation request file, called `unactivation_message.txt` will be generated and downloaded.
5. Take the `unactivation_message.txt` file to a machine with internet access and go to <https://links.inductiveautomation.com/activation>.
6. Click **Choose File** and select the `unactivation_message.txt` file.

Unactivate Ignition

Download the unactivation request file (unactivation_message.txt) from the Ignition Gateway and save it somewhere convenient. Once saved, browse for the file below then click Upload Unactivation Notice to proceed with your request.

Unactivation File

Choose File

unactivation_message (1).txt

Upload Unactivation Notice

7. You will see a visual confirmation that your `unactivation_message.txt` file has been successfully uploaded, and the license key can now be activated on a different Gateway.

Unactivate Ignition

Download the unactivation request file (unactivation_message.txt) from the Ignition Gateway and save it somewhere convenient. Once saved, browse for the file below then click Upload Unactivation Notice to proceed with your request.

Unactivation File

Choose File

No file chosen

Successfully uploaded unactivation notice.

Upload Unactivation Notice

Emergency Activation Mode

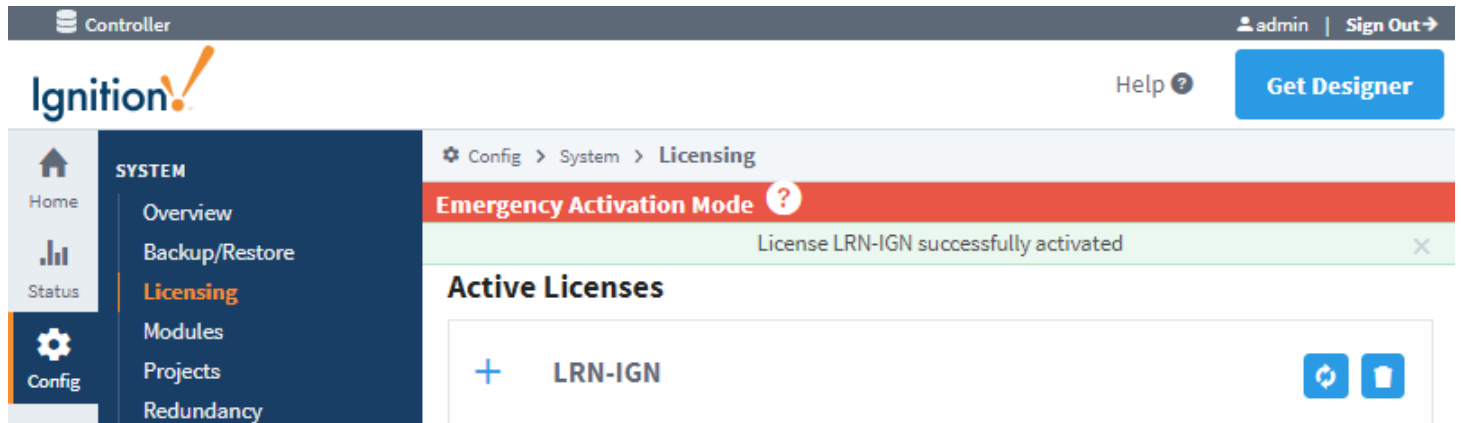
In cases where you may have a hardware or OS failure and you cannot unactivate a standard license, Ignition provides an Emergency Activation mode. In this mode, you can temporarily activate your license for 7 days, giving you time to contact [Inductive Automation Support](#) to get your license fixed. Activating your license in Emergency mode follows the same process detailed above in the Online Activation Example. The Gateway will know to run in Emergency Activation mode and an Emergency Activation Mode banner will display a timer stating how many days, hours, and minutes you have remaining.

See the [Emergency Activation Mode](#) page for information.

Emergency Activation Mode

What is Emergency Activation?

After activating your License Key in Ignition, you may see a banner that says Ignition is in **Emergency Activation Mode**.

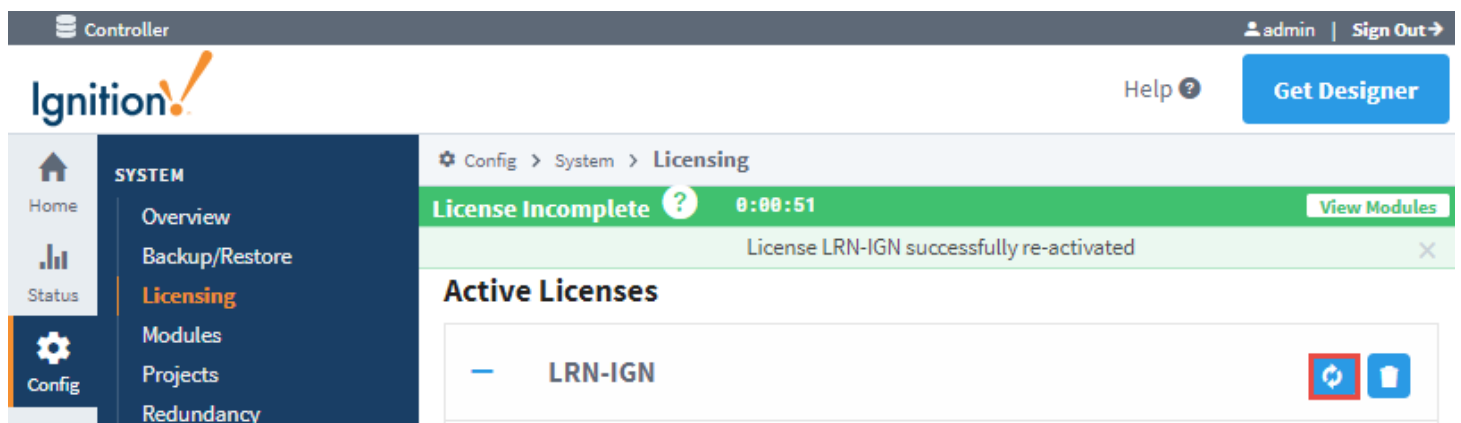


What Does this Mean?

This means the License Key that you used has already been activated. Either it was used previously on another computer, or something went wrong during activation and it registered twice. Fortunately, you have plenty of time to fix this problem. Emergency Activation Mode means **you are fully licensed for 7 days**, so even at night or over the weekend, you can still run without interruption until it is fixed.

How Do I Fix it?

In order to fix your License Key, you must [contact Inductive Automation](#). You can reach us by email or by phone and we will walk you through fixing your license. It is usually a very quick procedure that involves you re-activating a license after we fixed your License Key from our end. Once your license key is fixed, press the **Refresh** button and your license will be re-activated.



Why Does this Exist?

Basically, computers sometimes fail and you need to get running again, fast.

When you initially activate your copy of Ignition, it will run as long as your computer does. As we all know, sometimes there are hardware failures or your computer just stops working. There are many things you can do to minimize this, but once it happens you need to be able to get Ignition up and running again quickly. This Emergency Activation Mode allows you to do this without having to involve Inductive Automation until after your facility is back on track.

Quick Disaster Recovery Plan

If you already have Ignition installed and running in your facility, it's easy to get back to running quickly. Just make sure you have the following stored on a computer or shared drive **that is not your Ignition Gateway**:

- A **Gateway Backup**. If you haven't already, you should set up **Scheduled Backups**.
- Your Ignition License Key. Make sure you store the 6 digit code somewhere that you can easily retrieve it if your computer fails.
- The **Ignition software Installer**. In an emergency, it's best to have the installer for the version you are currently using. You can always download an archived version from our website, but having one on hand is preferred. *Pro tip*: Edit the installer filename to include your License Key so it's easily available.

Emergency Restore Steps

1. Find another computer or create a new Virtual Machine. You need to get something up and running to put Ignition on first. We recommend having something on standby that is the same as the original computer. Further considerations:
 - i. Set your new computer to the same IP Address of the original Ignition Gateway. This way your clients won't need to do anything special to start running again.
 - ii. Make sure your firewall is set correctly. At minimum, you must have the Ignition port open (8088 by default). In an emergency situation, you may want to just disable the firewall temporarily.
2. **Install Ignition** on the new computer.
3. **Load a Gateway Backup**. Everything in Ignition is in the Gateway Backup, once it's loaded, you are running again!
4. **Activate your License**. Your existing License Key will only work normally the first time it is used. After that, if you try to use it again, it will instead go into an **Emergency 7-Day Trial**. This gives

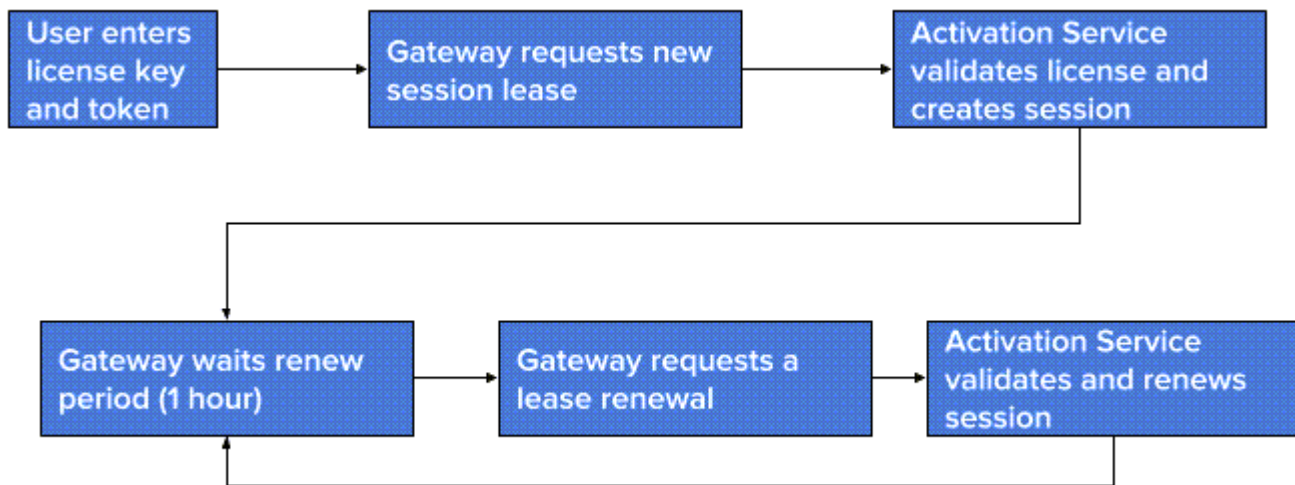
you plenty of time to get back up and running before you have to deal with the License Key, even if your failure is on the weekend or outside Inductive Automation's business hours.

5. **Contact Inductive Automation.** You can reach us by email or by phone (**1-800-266-7798**), and we will walk you through fixing your license.

Leased Licensing

A leased license is identified by a license key with eight characters. These types of licenses need to frequently check in with an activation service in order for the license to remain valid. Activating a leased license also requires an activation token, which is a very long, unique string of characters.

Leased licenses check for the number of uses at a time so they are ideal for a containerized environment, as well as cloud-based deployments. However, due to the frequent checks, they require extra attention and depend on the Gateway having internet access at all times.



Leased License Activation

Activating a Gateway with a leased license follows a similar process to the [standard license's online activation](#). This includes the recommendation to block any unnecessary TCP/IP traffic to best allow the required outbound initiated TCP communication to the following eight-character key locations:

- <https://licensing.inductiveautomation.com/v1-activation/leased/activate>
- <https://licensing.inductiveautomation.com/v1-activation/leased/nonce>

Additionally, all leased license activations require tokens, including Maker Edition installations.



Activate License

Enter your Maker Edition license key here to continue this installation. If you don't already have a license, one can be generated online from your Inductive Account profile.

License Key

Your key will be 8 digits, AAAA-BBBB.

Activation Token



Need help finding your key?

To generate a free Maker Edition key, sign in to your [Inductive Automation Account](#) online or create a profile. Within your account, navigate to the 'Licenses' page from the main menu.

Step 2 of 4

Next →

Once activated, the Gateway continues to reach out to the activation service every hour and as long as the service remains connected, the default 48 hour timeout period is reset and the license remains valid. If the activation service can't be reached, the timeout period provides time to resolve any issues.

Validation Feature	Description
Validation Timer	The Gateway will attempt to renew the lease every hour. A renewed lease will also reset the timeout period. This creates a buffer, allowing a Gateway to remain activated in cases where the Gateway is unable to reach the activation service in a timely manner.
Timeout Period	Leased sessions have a default timeout period of 48 hours. If a different timeout period is needed for specific special applications, please discuss your requirements with your Sales Representative.
After Timeout	After the timeout period has expired, the Gateway reverts to trial mode.

Maintaining a Leased License Connection

It is essential to monitor and maintain your Gateway connection when using a leased license. If the Gateway loses internet access, it will continue attempting to renew the license until the timeout period is reached. However, if connectivity is not restored in this time, the Gateway reverts to Trial mode, **NOT** the Emergency Activation mode, meaning your license has lapsed and will not run as expected.



TIP

Subscribe to our [Trust Center Updates](#) to receive timely notice regarding any issues on Inductive Automation's end that will impact your connection, such as licensing server outages.

License Manager

It is highly recommended to take advantage of the License Manager [portal](#) when using leased licenses as a proactive measure in monitoring and addressing your license statuses. It allows you to see the status of all of your licenses including both six-character key licenses and leased licenses. With leased licenses you can see if the license is in use, invalidate a session, generate a new activation token, see the session details, and licensing history. Simply contact your Sales Representative to receive access.

If you are an integrator, the License Manager is available on the [Inductive Automation Integrator Account](#) page under the Tools section.

Tools

License Manager

Get a complete overview of all your user licenses and easily filter through them by type, role and status. Get even more organized when you add custom locations, tags and notes.

[Request access](#)

Once you're logged into your License Manager portal, you can respond to issues immediately without needing to contact the Inductive Automation team. Additionally, if your activation token has been lost or compromised, all you need to do is select your License Key details and click Generate New Activation Token.

Configure Alarms to Report License Status

Ignition includes **System Tags** to provide leased license statuses. To view these tags, select **System** from the Tag Browser dropdown in the Designer and expand **Gateway > Licenses** to access the subfolders for all existing licenses on your Gateway. You can build a diagnostics screen in your application or configure an alarm to keep you informed on any potential issues and help mitigate risks that could cause Ignition to revert to Trial mode.

For example, adding an alarm to the **ConsecutiveErrorCount** tag for the license you want to track will alert you when action is needed if multiple errors have occurred when attempting to connect and your license is in danger of lapsing. When creating the alarm, be sure to use **Above Setpoint** as the mode and then define a value for the Setpoint. In the example below, we used **3** as the defined value.

Tag Editor

ConsecutiveErrorCount

System

Categories

All Properties

Meta Data

Basic

Numeric

Security

Scripting

Alarms (1)

History

Custom

Alarms

Alarm Eval Enabled

True

Alarms

Too Many Consecutive Errors

Properties (Too Many Consecutive Errors)

Main

Name

Too Many Consecutive Errors

Enabled

true

Priority

Medium

Timestamp Source

System

Label

Display Path

Ack Mode

Manual

Notes

Ack Notes Required

false

Shelving Allowed

true

Alarm Mode Settings

Mode

Above Setpoint

Setpoint

3

Inclusive

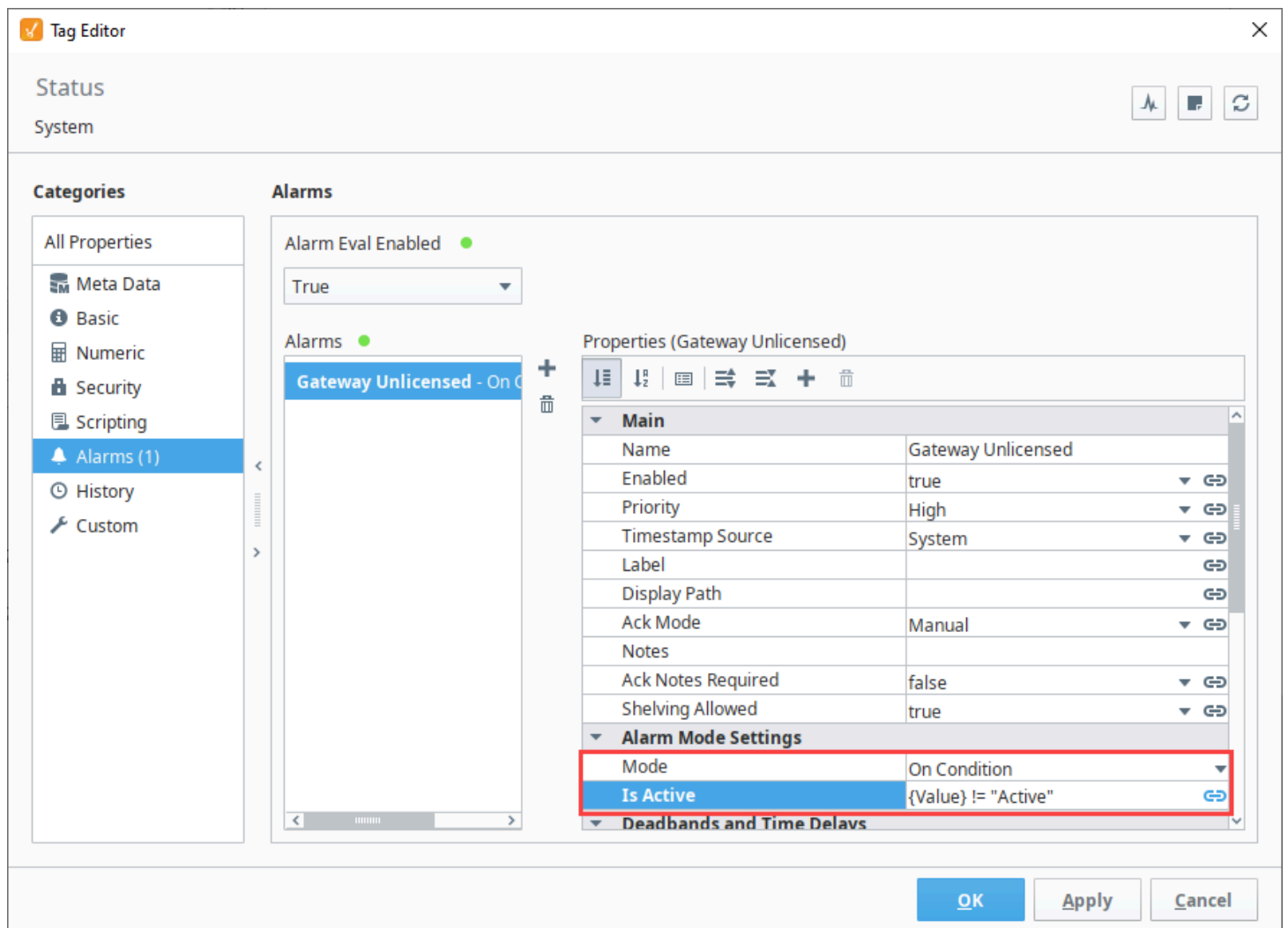
true

OK

Apply

Cancel

Similarly, you could configure an alarm on the **Status** tag with an **On Condition** mode and an expression of `{Value} != "Active"` to alert you when the status of your license is not active.



Keep in mind you will still need access to the License Manager to immediately address any issues.

System Crashes

If your system crashes, Ignition will not be able to terminate the session in the licensing system and it will still think the license is active. This means the license key will not work to reset your connection. You can either wait for the timeout period which will automatically terminate the session, or log into the [License Portal](#) to terminate the session manually. Once the session is properly terminated, you can activate your license again with the same license key and activation token.

Leased Licensing Server

The Ignition Leased License Service is engineered as a tier-one critical system, designed to ensure continuous license validation for production deployments. The architecture is built on a unified, high-performance Java microservice stack deployed via AWS services. These services are deployed across Multi-AZ replication, as the system guarantees robust availability. This service uses a "always-on" operational model, managed under strict Infrastructure as Code (IaC) protocols to ensure the environment is stable, reproducible, and resilient to regional hardware failures.

Transfer a License Key Between Two Gateways

License Key Transfer Process

Situations sometimes arise where your current Gateway or server is no longer able to fulfill your needs. In these cases, you may be required to set up a new server and move your license key over from your old Gateway.

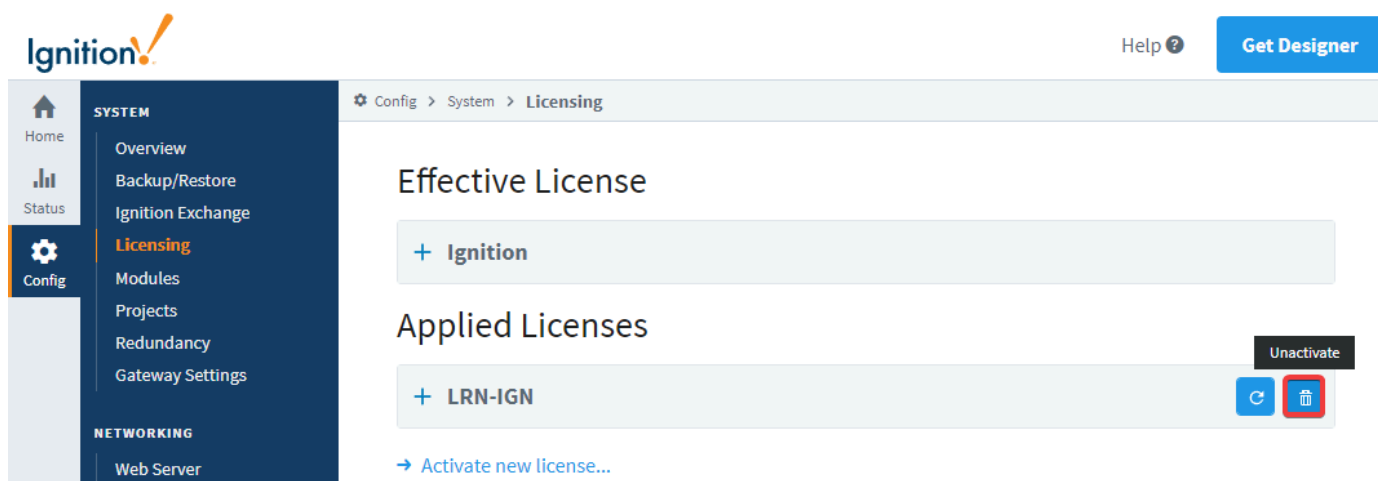
Transferring your license key combines two parts: the unactivation steps and activation steps, which are covered on the [Licensing and Activation](#) User Manual page. License keys can be transferred from an **online (connected to the Internet) Gateway** to an **offline (not connected to the Internet) Gateway**, and vice versa.

Part 1: Removing the Active License

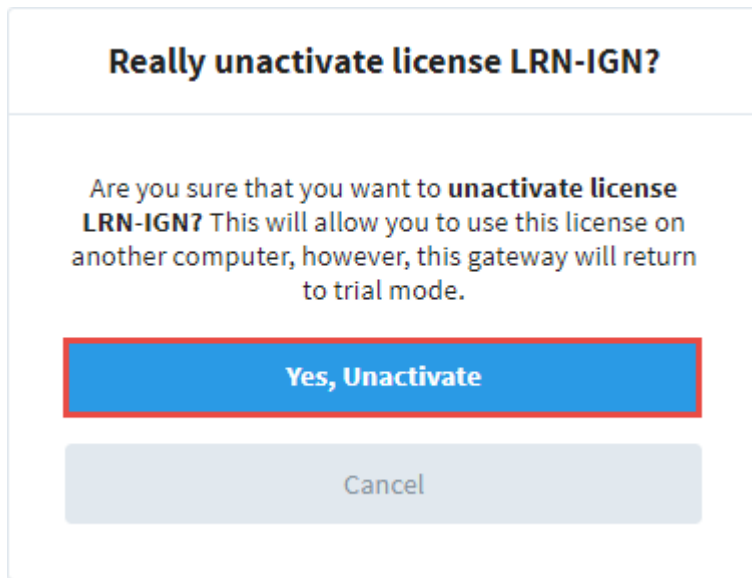
To move your license key to a different Gateway, do the following steps, depending on if your Gateway is online or offline:

Part 1a: Online Unactivation

1. Unactivate your license key from your old Gateway by going to the **Config** section > **System** > **Licensing**. You will be able to see any licenses that are currently applied.
2. Click the **Unactivate** button (trash can icon) under **Applied Licenses**.



3. A confirmation window will appear, asking you to confirm the unactivation. Click the **Yes, Unactivate** button. It may take a minute or so for the request to finish.

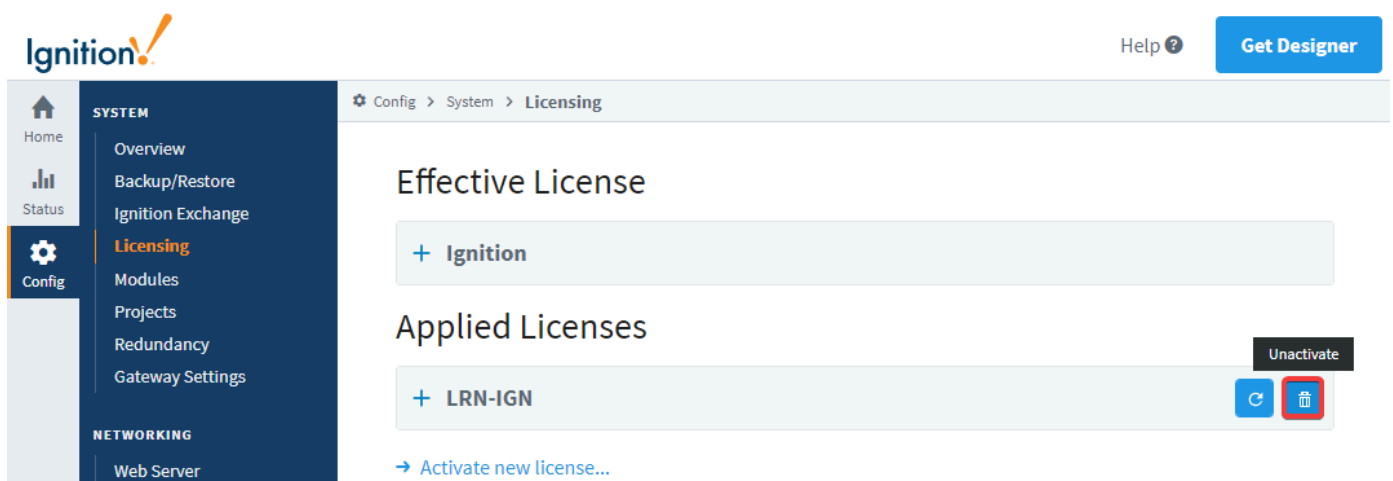


4. The unactivation request will be sent to Inductive Automation's licensing servers, and the license will again be available for activation on another Gateway.

Part 1b: Offline Unactivation

In the event your Gateway is unable to reach our licensing server, you will need to perform an offline unactivation. Be sure not to skip any of the following steps, as skipping a step may result in your license key going into **Emergency Activation Mode** when activating it on the new Gateway.

1. Go to your Gateway's **Config** section > **System** > **Licensing**. You will be able to see any licenses that are currently applied.
2. Click the **Unactivate** button (trash can icon) under **Applied Licenses**.



3. A confirmation window will appear, asking you to confirm the unactivation. Click the **Yes, Unactivate** button. It may take a minute or so for the request to finish.

Really unactivate license LRN-IGN?

Are you sure that you want to **unactivate license LRN-IGN?** This will allow you to use this license on another computer, however, this gateway will return to trial mode.

Yes, Unactivate

Cancel

- An unactivation request file, called `unactivation_message.txt` will be generated and downloaded.
- Take the `unactivation_message.txt` file to a machine with Internet access and go to <https://links.inductiveautomation.com/activation>.
- Click **Choose File** and select the `unactivation_message.txt` file.

Unactivate Ignition

Download the unactivation request file (`unactivation_message.txt`) from the Ignition Gateway and save it somewhere convenient. Once saved, browse for the file below then click Upload Unactivation Notice to proceed with your request.

Unactivation File

Choose File

`unactivation_message (1).txt`

Upload Unactivation Notice

- You will see a visual confirmation that your `unactivation_message.txt` file has been successfully uploaded, and the license key can now be activated on a different Gateway.

Unactivate Ignition

Download the unactivation request file (unactivation_message.txt) from the Ignition Gateway and save it somewhere convenient. Once saved, browse for the file below then click Upload Unactivation Notice to proceed with your request.

Unactivation File

Choose File

No file chosen

Successfully uploaded unactivation notice.

Upload Unactivation Notice

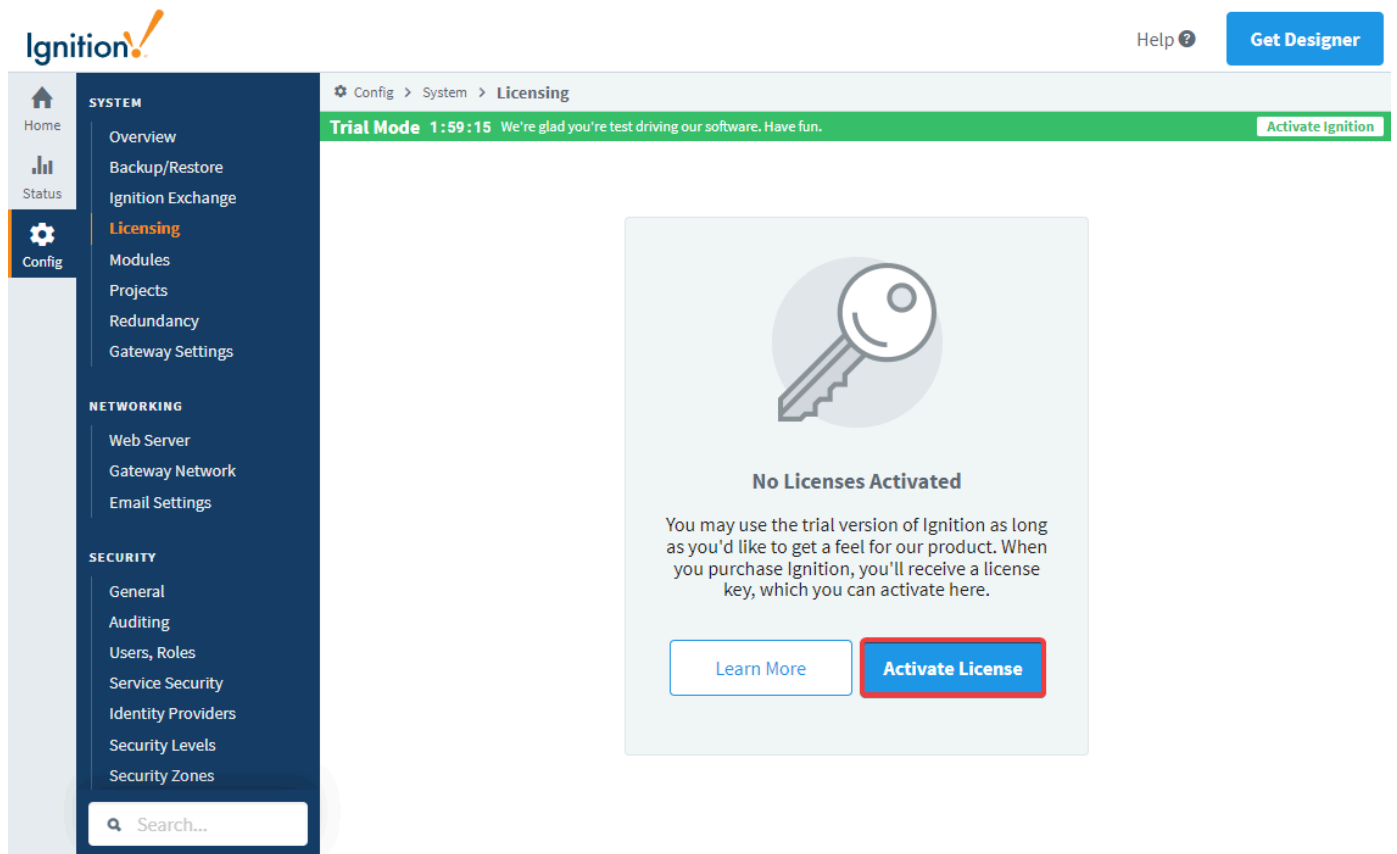
Part 2: Moving the License

Now that your license has been unactivated from the old Gateway, you are ready to activate the license on a separate Gateway.

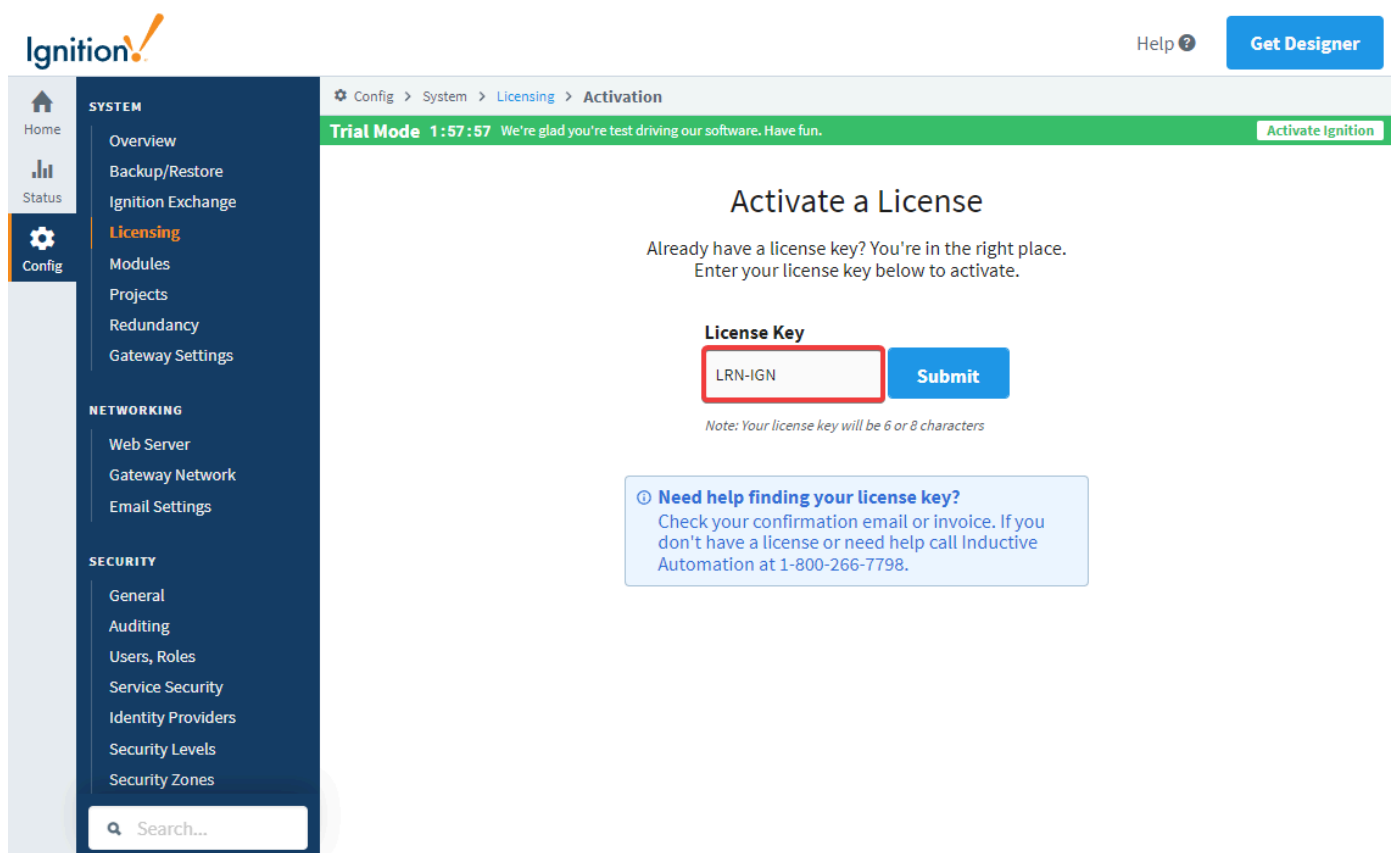
Part 2a: Online Activation

If the new Gateway that will house your license key is online, do the following steps:

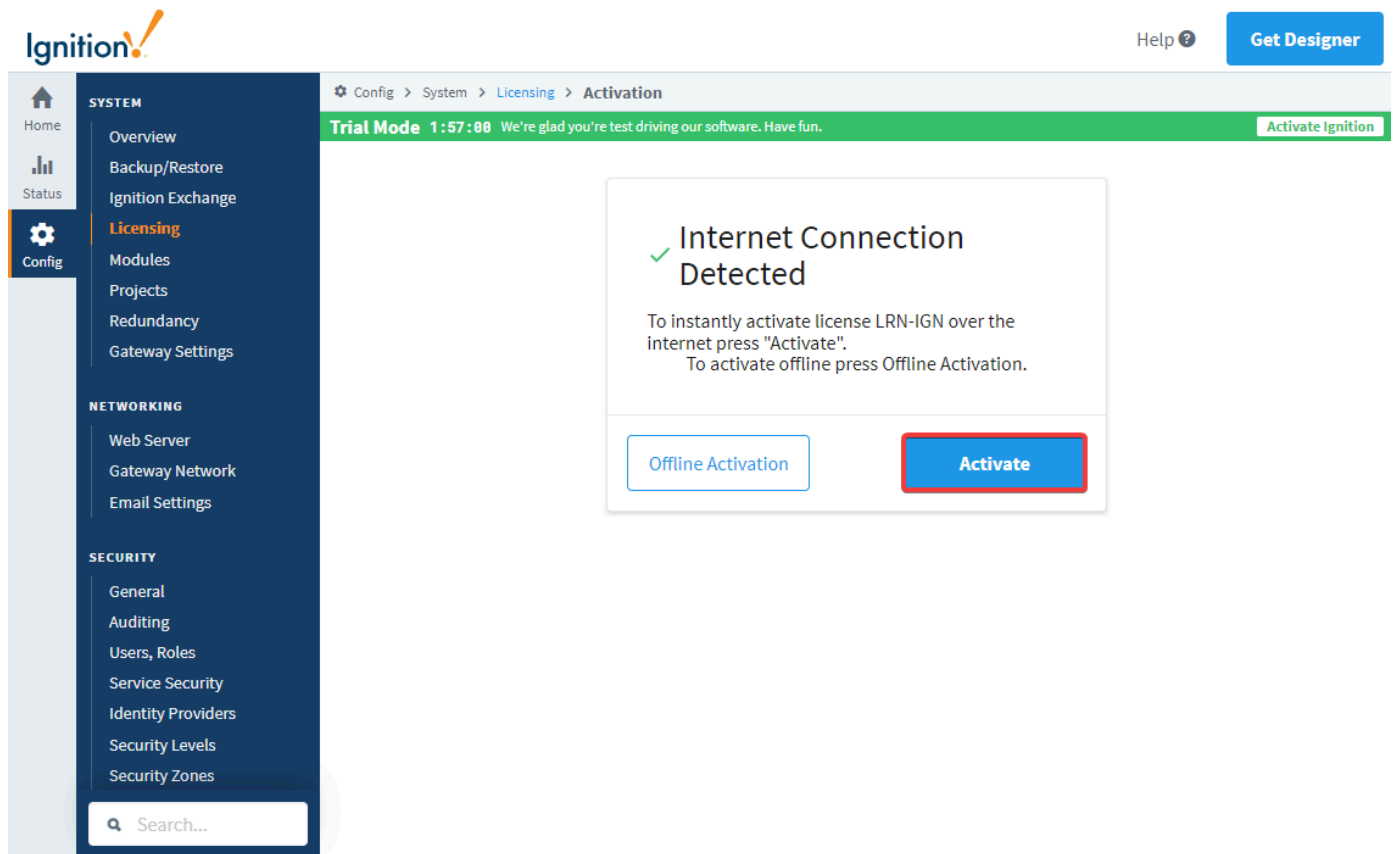
1. Go to the Gateway webpage and select the **Config** section.
2. From the menu on the left, select **System > Licensing**. The Licensing page will appear, from which you will need to click **Activate License**.



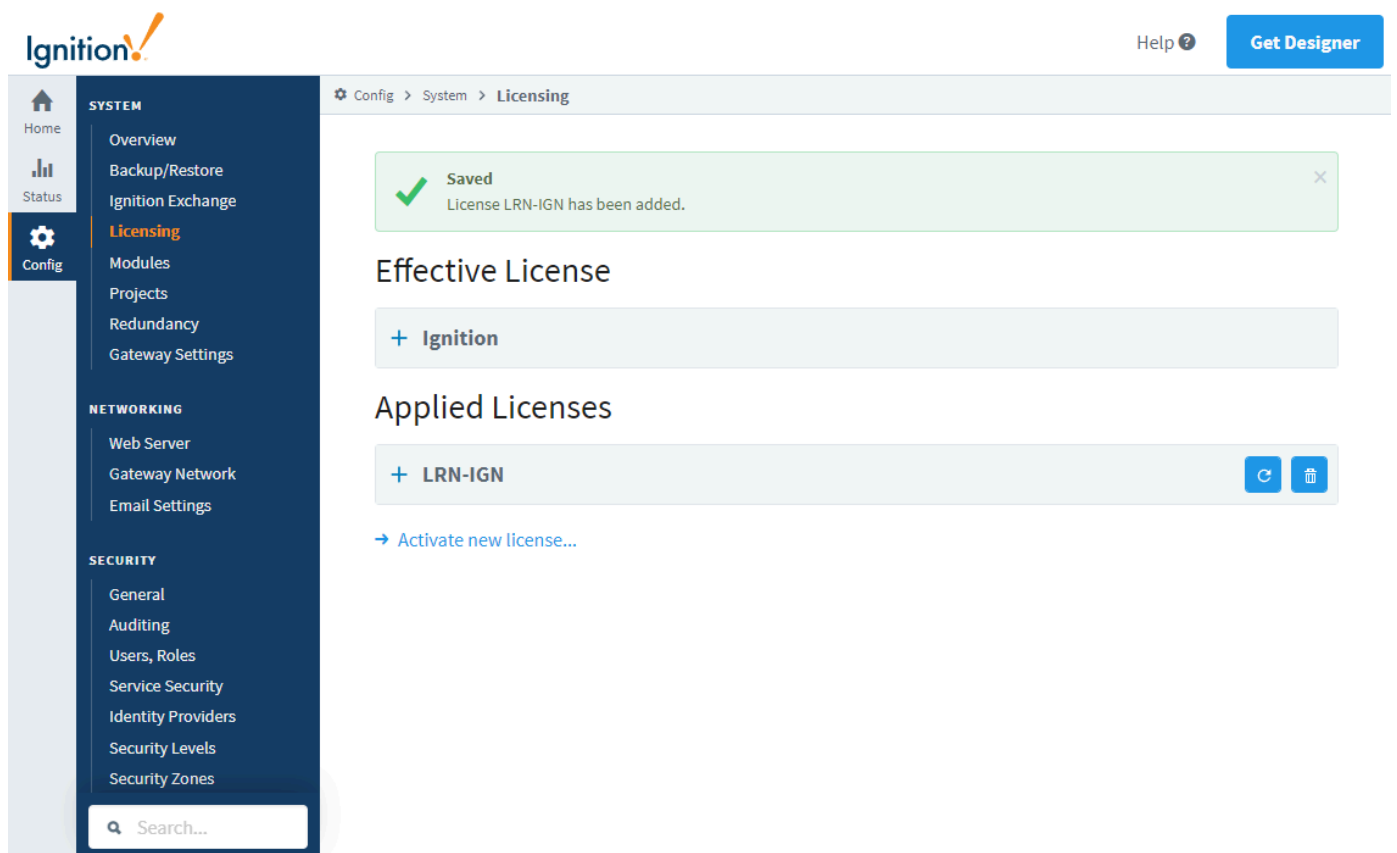
3. The **Activate a License** page will be shown. Enter the license key from the old Gateway and click **Submit**.



4. If you are connected to the Internet, click the **Activate** button.



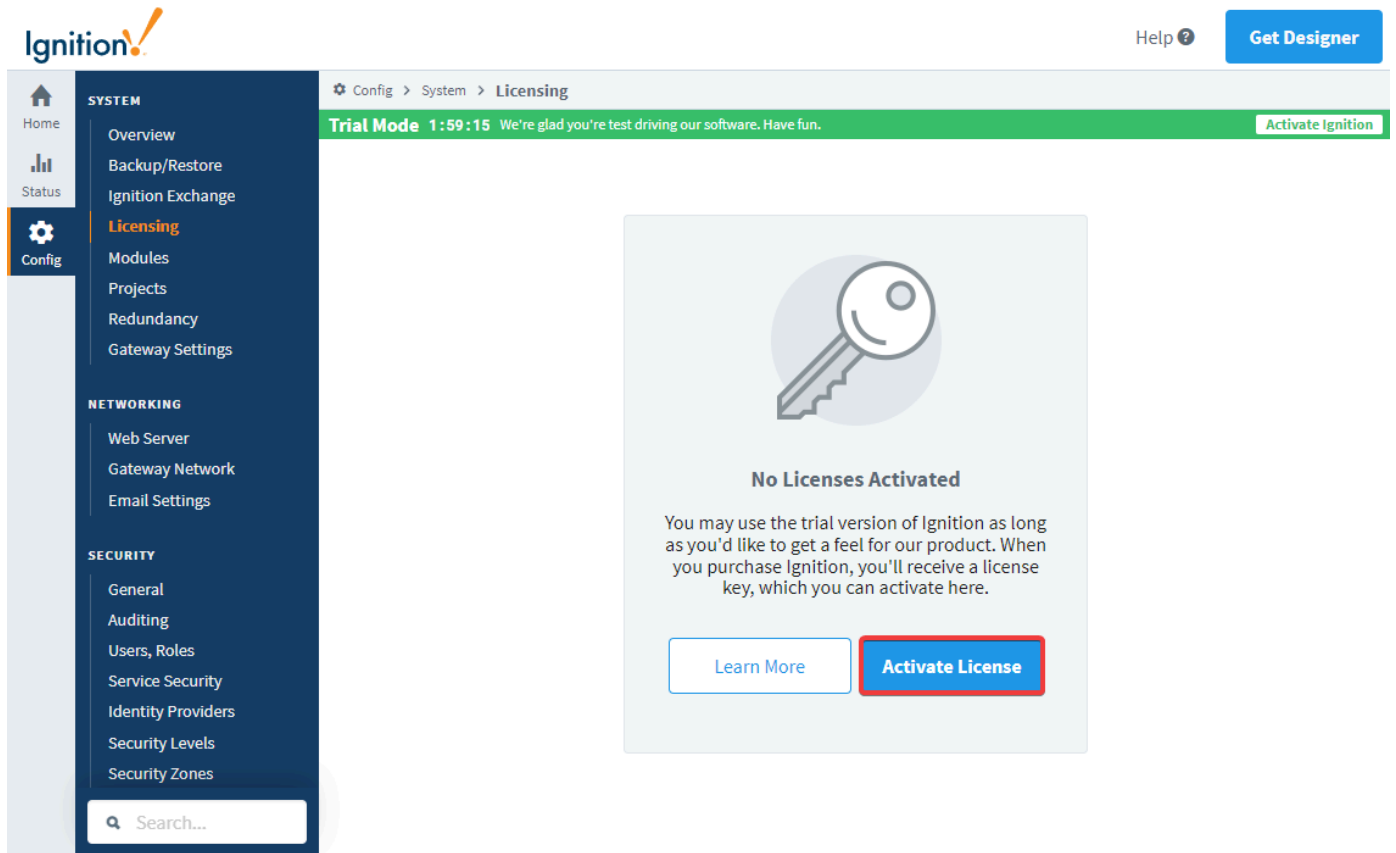
5. The **Licensing** page will refresh, and your license key will be successfully activated.



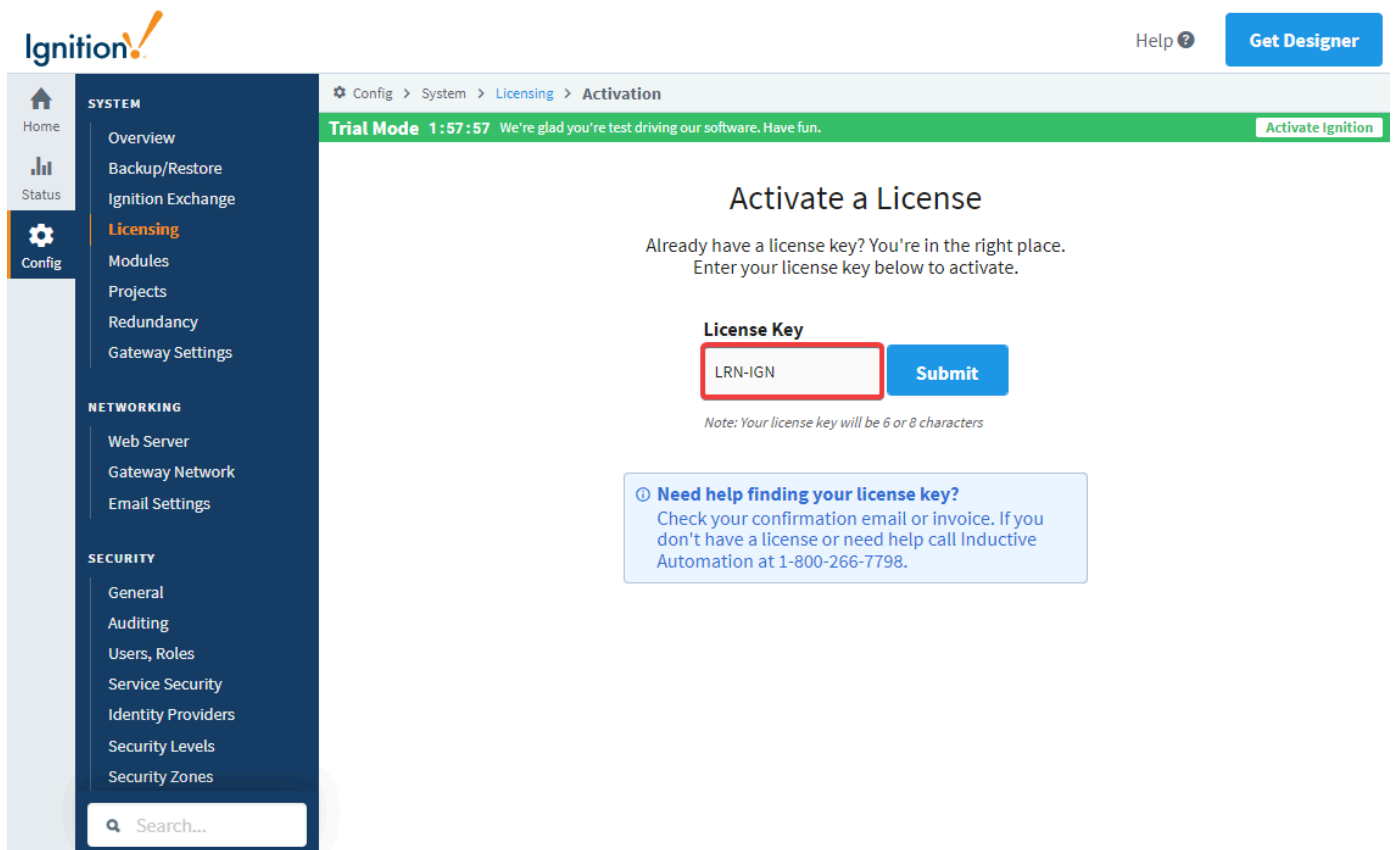
Part 2b: Offline Activation

If the new Gateway that will house your license key is offline, or if you want to perform an offline activation, do the following steps:

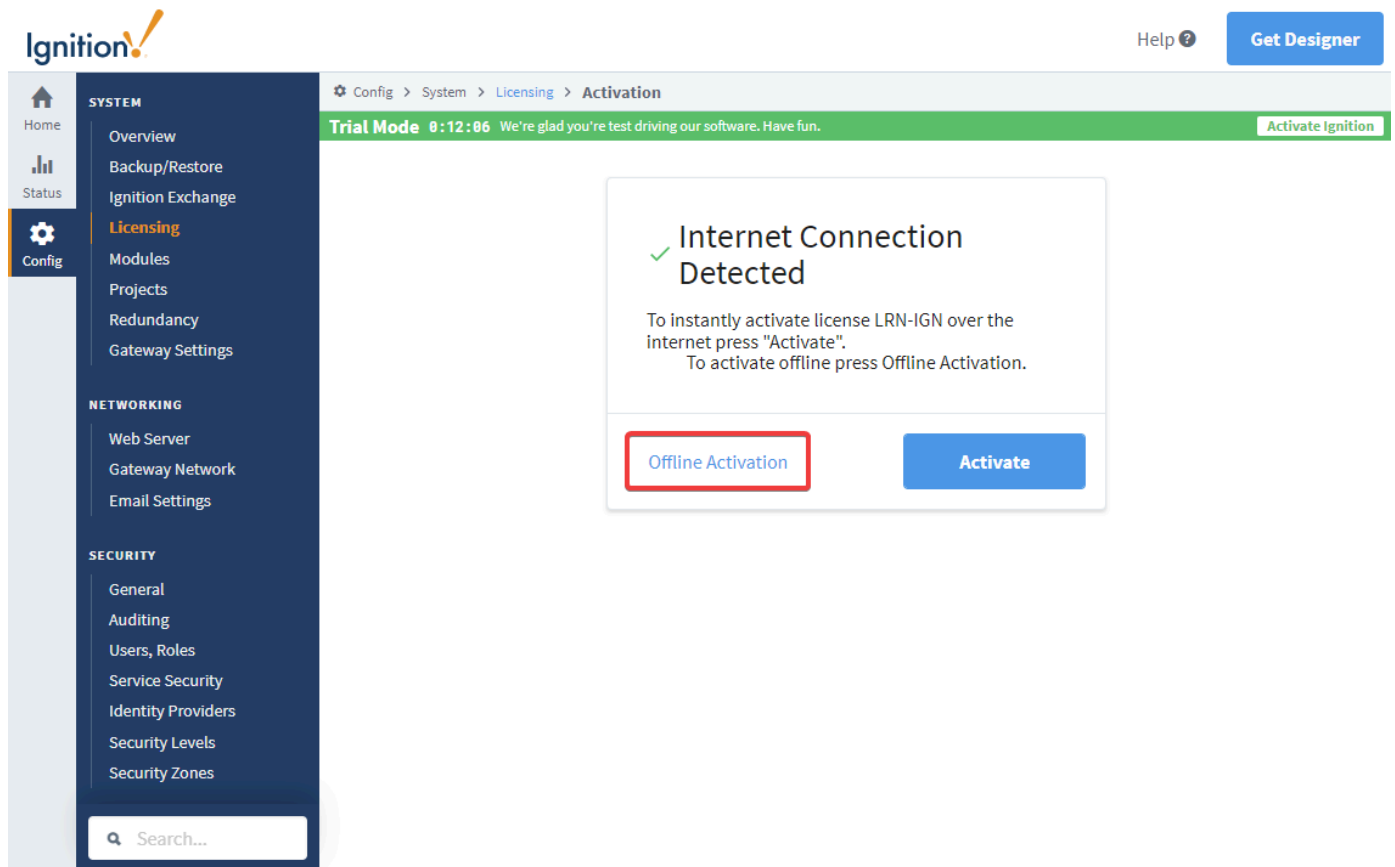
1. Go to the Gateway webpage and select the **Config** section.
2. From the menu on the left, select **System > Licensing**. The Licensing page will appear, from which you will need to click **Activate License**.



3. The **Activate a License** page will be shown. Enter the license key from the old Gateway and click **Submit**.



4. If you are not connected to the Internet, or if you want to activate your Gateway manually, click the **Offline Activation** button.



5. Click the **Download Activation Request** button. An activation request file, called `activation_message.txt` will be generated and downloaded.

The screenshot shows the Ignition Gateway configuration interface. The left sidebar contains a navigation menu with categories: SYSTEM (Overview, Backup/Restore, Ignition Exchange, Licensing, Modules, Projects, Redundancy, Gateway Settings), NETWORKING (Web Server, Gateway Network, Email Settings), SECURITY (General, Auditing, Users, Roles, Service Security, Identity Providers, Security Levels, Security Zones), DATABASES (Connections, Drivers, Store and Forward), and ALARMING (General). The main content area is titled 'Offline Activation' and includes a 'Trial Mode 1:59:16' banner. The steps are as follows:

- Step 1:** Press 'download activation request' button below. Transfer the activation request file labeled 'activation_message.txt' to a device with Internet access. A blue button labeled 'Download Activation Request' with a download icon is highlighted with a red box.
- Step 2 (Internet connection required):** Transfer your activation request file to a computer with an internet connection. Visit the URL indicated below, where you will be asked to upload the 'activation_message.txt' file and will receive a 'license.ipl' file. The URL <https://links.inductiveautomation.com/activation> is displayed in a light blue box.
- Step 3:** Return to this page, and upload the 'license.ipl' file. A large dashed box with a downward arrow and the text 'Drag and drop or click to browse' is shown.

6. Take the `activation_message.txt` file to a machine with Internet access and go to <https://links.inductiveautomation.com/activation>.

7. Click **Choose File** and select the `activation_message.txt` file in the **Activate Ignition** section.

Activate or Unactivate Ignition

The 'Activate Ignition' dialog box contains the following instructions and controls:

Download the activation request file (`activation_message.txt`) from the Ignition Gateway and save it somewhere convenient. Once saved, browse for the file below then click Upload Activation File to proceed with your request.

Below the instructions, there is a section labeled 'Activation File' containing a 'Choose File' button and the text `activation_message.txt`. This entire section is highlighted with a red box. Below this, there is an orange button labeled 'Upload Activation File'.

Should any trouble occur with the upload process, please [contact our Support department](#).

8. Once you upload the `activation_message.txt` file, a license file called `license.ip1` is generated.
9. Bring the `license.ip1` file back to the computer on which you're licensing Ignition. Back on the Offline Activation page, upload the `license.ip1` file. Then, click **Activate** to finish the process.

The screenshot displays the Ignition software's configuration interface. On the left, a dark blue sidebar lists various system settings categories. The main panel shows the 'Offline Activation' process. It includes a green status bar at the top indicating 'Trial Mode' and a timer. The activation steps are clearly outlined, with Step 3 currently active, showing a designated area for uploading the 'license.ip1' file. A red rectangle highlights this upload area, which contains a downward arrow icon and the instruction 'Drag and drop or click to browse'. An 'Activate' button is positioned below the upload area.

10. The **Licensing** page will refresh, showing your license was successfully activated.
11. Click **Modules** to see a list of all your activated modules.

i NOTE

If something goes wrong during the unactivation or activation step of the license key transfer, your license key may end up in [Emergency Activation Mode](#). If this happens, you will need to contact [Inductive Automation Support](#) to get your license fixed.

Gateway Network



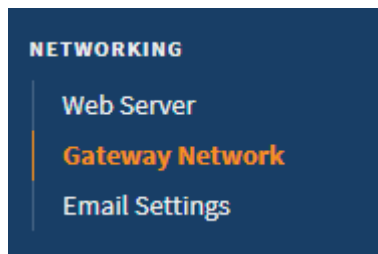
INDUCTIVE
UNIVERSITY

Gateway Network Overview

[Watch the video](#)

Overview

The Gateway Network allows you to connect multiple Gateways together over a wide area network, and opens up many distributed features between Gateways.



The Gateway Network provides the following features:

- A dedicated HTTP data channel that can handle multiple streams of message data.
- The ability to set up a node to act as a proxy for another node.
- Security settings that restrict incoming connections based on a white list or on manual approval of the connection. Incoming connections can also be disabled entirely.
- An available Secure Socket Layer (SSL) mode. When enabled, connections must send SSL certificates to prove their identity. A connection will not be accepted until its SSL certificate is approved.

Gateway Network Features

The Gateway Network opens up certain services for use that make managing multiple Gateways and having them effectively communicate with each other a snap. It also has special security that can restrict certain services from happening in certain zones of the Gateway Network.

Enterprise Administration

The **Enterprise Administration Module** (EAM) uses the Gateway Network for message and file transfer, and can monitor network connections for availability. The EAM reports whenever communications are lost via alarm events and system tags.

Distributed Services

Distributed services included the following:

- Remote Providers: Remote **Realtime** and **Historical** Tag Providers make remotely controlling and storing Tag data even easier.
- Remote Alarming: **Remote Alarming** makes notifying all Gateways in the network possible, to quickly and effortlessly track down issues.

Security Zones and Service Security

Security Zones can be set up to lock down or prevent access to certain parts of Gateways within the Gateway Network.

Outgoing vs. Incoming Connections

When using the Gateway Network, you will be working with two type of connections.

- **Outgoing Connections:** To establish communications, create an outgoing connection on the local machine. The outgoing connection always begins the connection process to a remote machine. After the outgoing connection is created, the local machine will attempt to use the connection to establish communications with the remote machine.
- **Incoming Connections:** On the remote machine, an incoming connection will automatically be created when the new connection attempt is detected. For connections where security settings require manual approval, you will need to approve the incoming connection before it can be used. If no security controls have been set, the incoming connection will automatically accept the connection from the local machine and begin sharing data.

Connections and Servers

Every machine on the Gateway Network is known as a Server. When you establish a connection to a remote machine, the remote Server sends data about itself and also sends data about any other Servers known to that machine. For example, assume your local machine is GatewayA. The remote machine is known as GatewayB. GatewayB also knows about another remote machine named

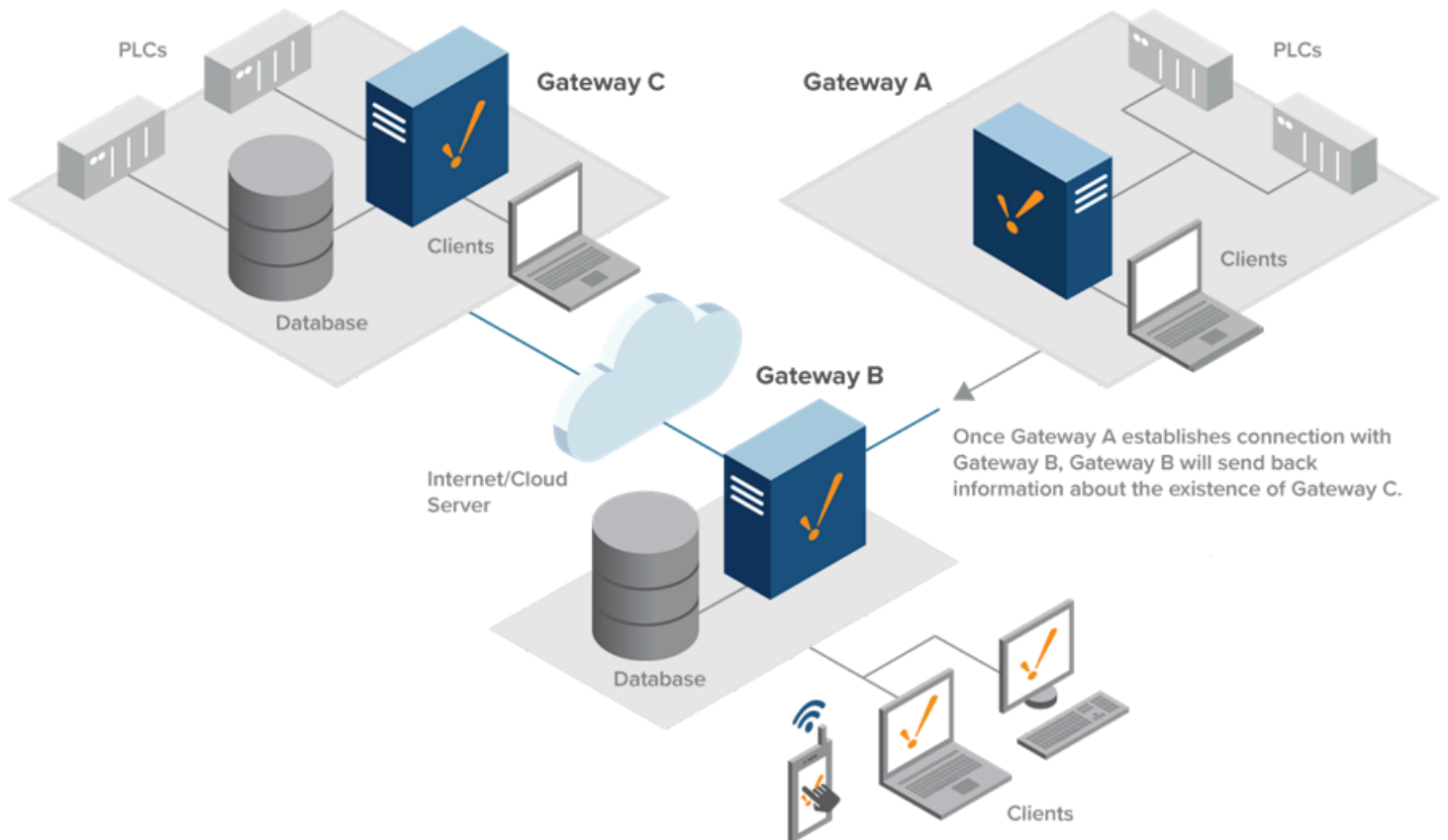
GatewayC. As soon as your local GatewayA establishes a connection with GatewayB, GatewayB also sends information about the existence of GatewayC.

Modules such as the Enterprise Administration Module (EAM) are aware of this relationship and allow communication between GatewayA and GatewayC, even though there is no direct connection from the local machine to GatewayC.

If you are cloning Gateways to then be connected via Gateway Network, it is important to notice that there is a Gateway unique identifier in %IgnitionInstallationDirectory%/data/.uuid. No two Gateways connected via Gateway Network should share a .uuid. Generally, Gateways are cloned by restoring the same Gateway backup on multiple servers. Since Gateway backups carry their .uuid with them, restoring the same Gateway on multiple servers will result in multiple Gateways having the same .uuid. To get around this, you must stop your Ignition service, delete %IgnitionInstallationDirectory%/data/.uuid, then start your Ignition service so that a new, unique .uuid is generated. Doing this before connecting two cloned Gateways will prevent any .uuid collisions.

Which Server Should I Configure the Outgoing Connection On?

In regards to connecting multiple Gateways over the Gateway Network, there is little difference between an Outgoing and Incoming connection: these terms simply indicate which server the connection was configured on, and are mostly ignored by the rest of Ignition. Thus, assuming GatewayA and GatewayB, configuring an outgoing connection from A to B is equivalent to configuring an outgoing connection from B to A. When connecting two Gateways, only a single connection is required between them.



General Settings

Main

The Gateway Network General Settings set the basic rules for the system. By default, these settings are lenient to allow for easy setup, but can be set for security.

Setting	Description
Enabled	Uncheck this checkbox to disable using the Gateway Network.
Require SSL	If true, only connections that use SSL to encrypt traffic will be allowed. This setting only applies to incoming connections. Default is true.
Require Two Way Auth	Enforces two-way SSL authentication. If true, you will need to install the remote machine's certificate on this machine, in addition to manual approval of this machine's certificate on the remote machine. To provide the remote machine's certificate, manually export a certificate from the remote machine's metro KeyStore, located in <code><installdir>/webserver/metro-keystore</code>. Default KeyStore password is metro, and the alias is metro-key. Place the certificate on the local machine in <code>data/certificates/gateway_network</code> Changed in 8.1.14 On Ignition versions 8.1.14 and greater, the certificate is stored at <code>data/gateway-network/client/security/pki/trusted/certs</code>.
Send Threads	The maximum number of threads that will be used to upload messages. Applies to outgoing connections. Default is 5. Changed in 8.1.37 This property was moved to the Gateway Network Settings > Outgoing Connections tab to be set when creating or editing an outgoing connection. See Connection Send Threads under Setting up a Gateway Network Connection for more details.
Receive Threads	The maximum number of threads that will be used to download messages. Applies to outgoing connections. Default is 5. Changed in 8.1.37 This property was moved to the Gateway Network Settings > Outgoing Connections tab to be set when creating or editing an outgoing connection. See Connection Receive Threads under Setting up a Gateway Network Connection for more details.
Processing Queue Limit	Number of received messages that can be held until they are processed by the local system. When this capacity is exceeded, new messages are rejected and errors are reported to the remote Gateway. Applies to incoming connections.

Setting	Description
Websocket Idle Timeout	New in 8.1.3 The maximum number of milliseconds that a websocket is allowed to remain idle before it is closed. This value should always be set higher than outgoing connection ping rates to avoid premature connection termination.
Proxy Service Call Intercept	New in 8.1.34 If enabled on a proxy Gateway, this setting will intercept recurring service enumeration calls that the proxy Gateway normally passes along. If the service enumeration information is available locally on a proxy Gateway, the information is returned directly instead of forwarding the call. Useful when too many service enumeration calls are occurring. Default is false.

Security

You have several options to control security from the Gateway Network settings.

NOTE

These settings are independent of SSL mode, which is detailed below. To change security settings, go to the Gateway Webpage and navigate to **Config -> Networking -> Gateway Network** and select the **General Settings** tab.

Setting	Description
Allow Incoming Connections	If false, only outward connections defined on this Gateway will be allowed. Uncheck this checkbox to disable all remote machines from being able to establish an incoming connection. To establish any connections with remote machines, you will need to create outgoing connections from this machine. Default is true.
Connection Policy	Dictates what connections are allowed. Options as follows: • ApprovedOnly: Default mode, where incoming connections are created, but cannot be used to send or receive data until you approve the connection under Gateway Network > Incoming Connections tab. To approve an incoming connection, click the Approve link on the right side of the connection. You can also deny a previously approved connection by clicking the deny link. The approve and deny links will appear next to a connection only if you have enabled the ApproveOnly setting. • Unrestricted: Allows all incoming connections unless the Allow Incoming Connections checkbox is unchecked. • SpecifiedList: An incoming connection will only be allowed if its server name is on this list. Separate server names with a comma.
Specified List	Connections with a Gateway Name in this list are automatically allowed if the Connection Policy is set to SpecifiedList. Separate Gateway names with a comma.
Allow Proxying	If enabled, this Gateway will be allowed to act as a proxy, and forward requests between Gateways that do not have direct connections. Default is false. Changed in 8.1.14 This setting was replaced in 8.1.14 with Allowed Proxy Hops.
Allowed Proxy Hops	New in 8.1.14 The maximum number of proxy hops which could be used to reach the destination Gateway. Any number less than or equal to zero is equivalent to no proxy hops allowed.

Setting Up a Gateway Network Connection



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Setting Up a Gateway Network Connection

[Watch the video](#)

When you create a new outgoing Gateway Network connection, you need to specify the address for the remote server. There are also settings for ping rates and timeouts. The defaults can be used for these fields. The following are all the available settings for setting up an outgoing Gateway Network.

Main

Main	
Host	The address of the remote server, not including the port.
Port	8060 The port of the remote server. (default: 8,060)
Enabled	☒ (default: true)
Use SSL	☒ Use SSL to connect to the remote machine. (default: true)
Description	Documentation about how the connection is used. (default:)
Connection Send Threads	5 The maximum number of threads that will be used to upload messages. Applies to outgoing connections. (default: 5)
Connection Receive Threads	5 The maximum number of threads that will be used to download messages. Applies to outgoing connections. (default: 5)

Setting	Description
Host	The address of the remote server, not including the port. Example: 1.2.3.4
Port	The port of the remote server. Default is 8060.
Enabled	Whether this connection is enabled. Default is true.
Use SSL	Use SSL to connect to the remote machine. Default is true.
Description	New in 8.1.26 Documentation about how the connection is used. The description will not be sent to other Gateways.
Connection Send Threads	New in 8.1.37 The maximum number of threads that will be used to upload messages for this outgoing connection. Default is 5.
Connection Receive Threads	New in 8.1.37 The maximum numbers of threads that will be used to download messages for this outgoing connection. Default is 5.

Ping

Ping	
Ping Rate	1000 How often, in milliseconds, to send a ping to a remote machine. (default: 1,000)
Ping Timeout	300 The maximum time, in milliseconds, allowed for a ping response. Pings that time out are counted as missed pings. (default: 300)
Missed Pings	30 The amount of missed pings that will force the connection to be considered faulted. (default: 30)

Setting	Description
Ping Rate	How often, in milliseconds, to send a ping to a remote machine. Default is 1,000.
Ping Timeout	The maximum time, in milliseconds, allowed for a ping response. Pings that time out are counted as missed pings. Default is 300.
Missed Pings	The amount of missed pings that will force the connection to be considered faulted. Default is 30.

Timeouts

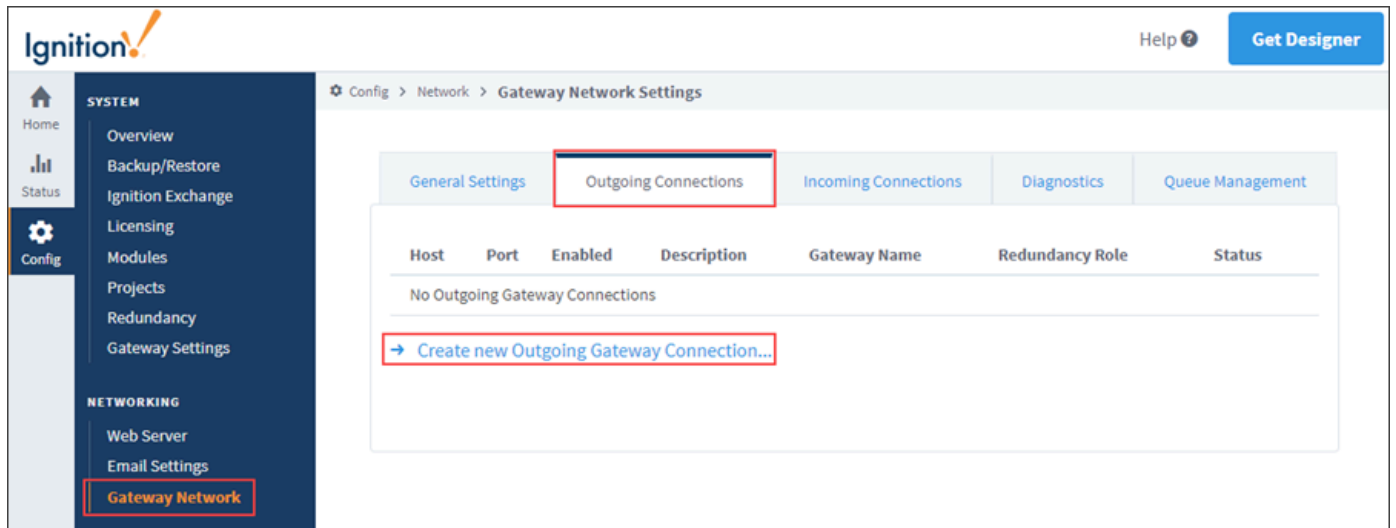
Timeouts	
Websocket Connect Timeout	10000 The maximum time, in milliseconds, allowed for a new web socket to connect to a remote machine. (default: 10,000)
Http Connect Timeout	10000 The maximum time, in milliseconds, allowed to establish an HTTP connection to a remote machine. (default: 10,000)
HTTP Read Timeout	60000 The maximum time, in milliseconds, allowed to read or send HTTP data to a remote machine. (default: 60,000)

Setting	Description
Websocket Connect Timeout	The maximum time, in milliseconds, allowed for a new web socket to connect to a remote machine. Default is 10,000.
HTTP Connect Timeout	The maximum time, in milliseconds, allowed to establish an HTTP connection to a remote machine. Default is 10,000.
HTTP Read Timeout	The maximum time, in milliseconds, allowed to read or send HTTP data to a remote machine. Default is 60,000.

Gateway Network Connection Example

To establish a basic communication link between two Gateways, first log into the Gateway where you want to establish the outgoing connection. For this example, we use an SSL connection.

1. On the Gateway Webpage, navigate to **Config > Networking > Gateway Network**.
2. Click on the **Outgoing Connections** tab. Click the **Create new Outgoing Gateway Connection** link.

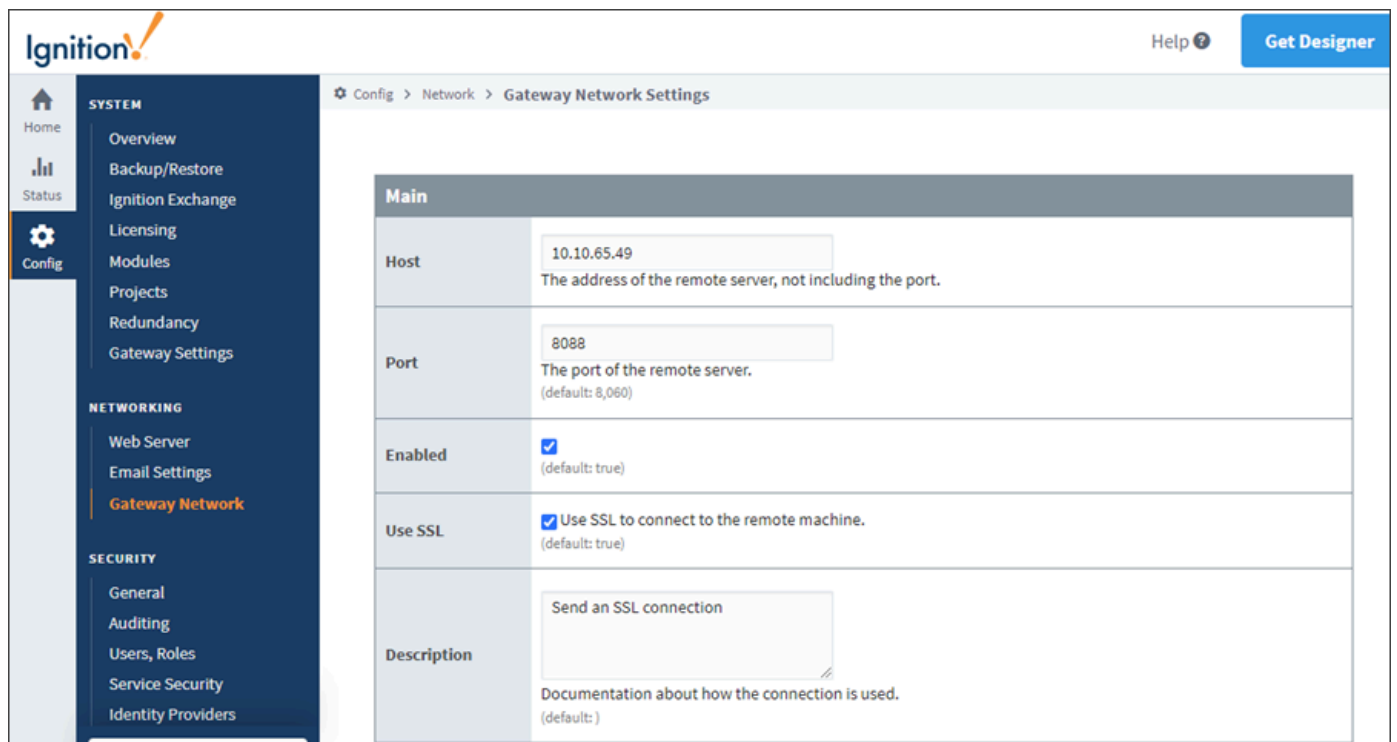


3. In the **Host** field, enter the network address of the remote server.
4. In the **Port** field, enter the SSL port used by the remote server. By default, this is set to **8060** (which is defined /data/gateway.xml).

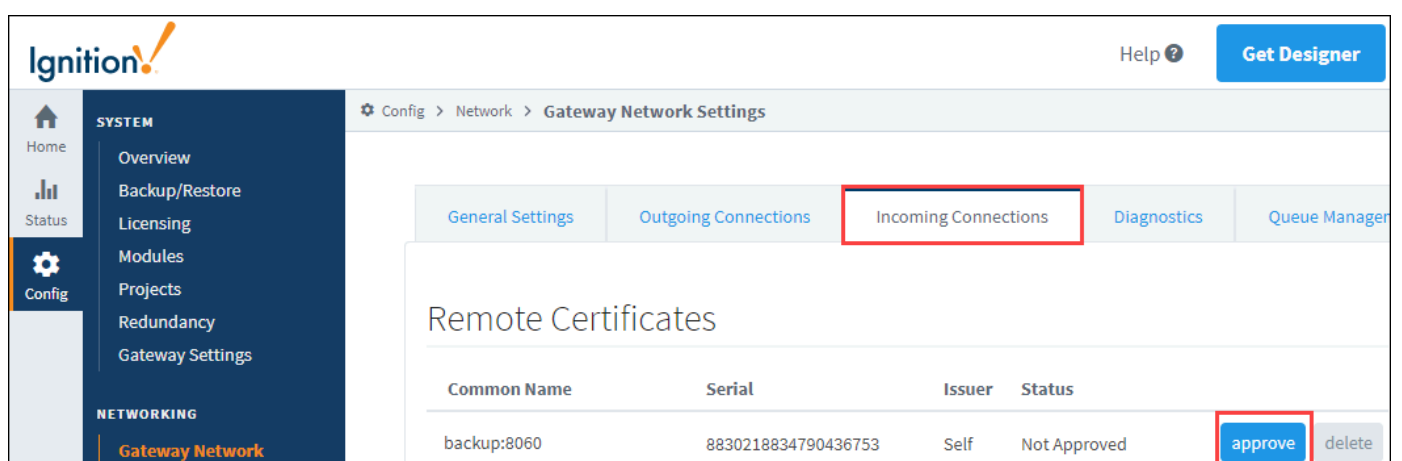
i NOTE

This port is different from the default SSL port an Ignition Gateway would use when communicating to a client (default port 8043).

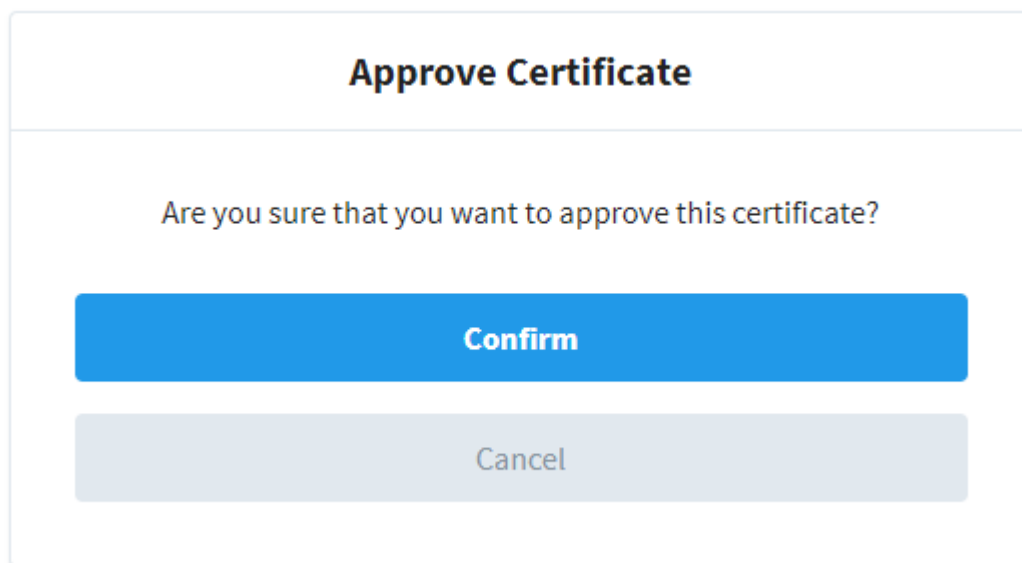
5. Check the **Use SSL** checkbox.
6. Enter any desired information in the **Description** field to easily identify how the connection is used from the Outgoing Connections list.



7. Use the default settings in the **Ping** section and **Timeouts** section of the page.
8. Click the **Create New Outgoing Gateway Connection** button at the bottom of the page.
9. You'll see a confirmation message that the connection was created.
10. At this point, your Gateway transmitted its certificate to the connected Gateway, but the incoming connection is not yet allowed. The Gateway's connection will not show up under the Incoming Connections section until after the certificate has been approved.
11. Log into the other Gateway. Navigate to **Config > Networking > Gateway Network**.
12. Click on the **Incoming Connections** tab. The first Gateway's certificate should be present. The certificate Common Name field holds the network address of the machine that transmitted the certificate. The Serial field holds a numeric string that is automatically generated when the certificate is created, and is unique to every certificate.



- Click the **approve** button to accept the certificate. You'll see a confirmation message. Click the Confirm button.



- Now, the Gateway's connection will appear under the Incoming Connections section with a **PendingApproval** security status. Click **More** > **Approve** to establish the connection.

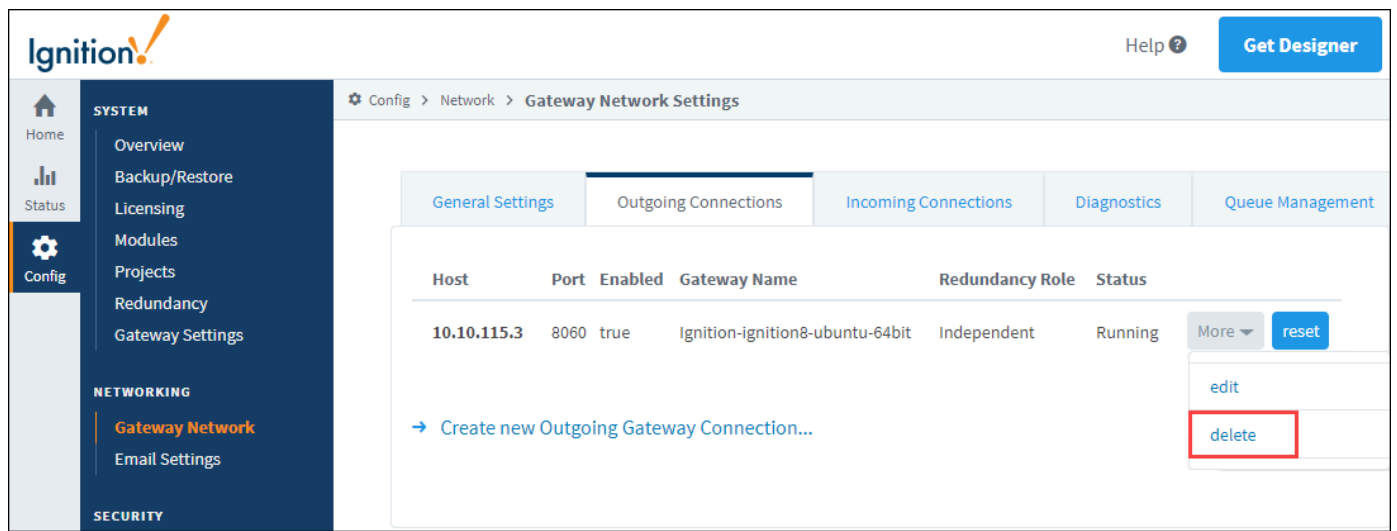
Deleting Connections

Outgoing and incoming connections can be deleted for cases when the connection no longer exists on the other side.

- To delete a connection, navigate to **Config** > **Networking** > **Gateway Network**.
- Click on either the **Outgoing Connections** tab or the **Incoming Connections** tab.
- Click **More**, and then select **Delete** next to the connection.

NOTE

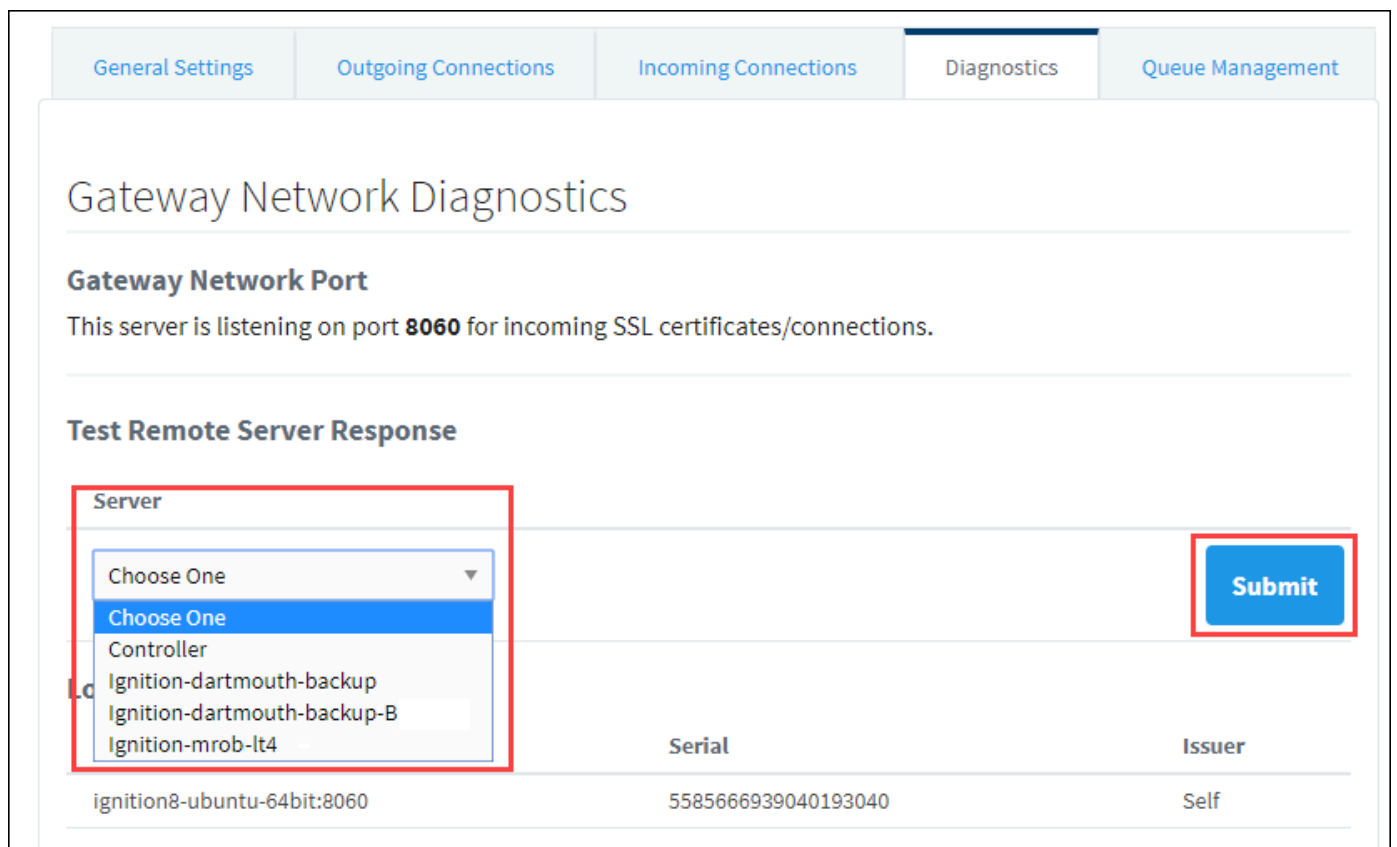
For incoming connections, if a remote machine is still connected to the local machine with an outgoing connection, a new incoming connection will be created after deletion. For these cases, you must log into the remote Gateway and delete the outgoing connection. Then you can delete the local incoming connection.



Gateway Network Diagnostics

The Diagnostics tab on the Gateway Network Settings page gives you insight to the Gateway and remote server response times.

1. To test the response time of a remote server, select the server name from the **Server** dropdown list.
2. Click the **Submit** button.



3. The results will be displayed indicating if the call to the remote server was successful, what the response time was, and if there were any errors.

General Settings

Outgoing Connections

Incoming Connections

Diagnostics

Queue Management

Gateway Network Diagnostics

Gateway Network Port

This server is listening on port **8060** for incoming SSL certificates/connections.

Test Remote Server Response

Server

Controller

Submit

Results

Call Result

SUCCESS

Response Time

24 ms

Error

None

Local Certificate Information

Common Name	Serial	Issuer
ignition8-ubuntu-64bit:8060	5585666939040193040	Self

Gateway Network Queue Management

The Gateway Network system shares information across Gateways using a configurable number of send and receive threads. Gateway Network Queues are named to reflect their purpose and enable Ignition to prioritize which subsystem should have access to send or receive a thread at any given time. The Queue Management tab allows users to further direct how a queue should behave.

Config > Network > Gateway Network Settings

General Settings

Outgoing Connections

Incoming Connections

Diagnostics

Queue Management

Queue Name	Description	Synchronous Delivery	Priority	Max Active	Settings Overridden?	
Call Results Queue	Handles results for remote service calls over the Gateway Network	false	Highest	Unlimited	false	modify
Default Queue	Generic Gateway Network queue	false	Normal	Unlimited	false	modify
Long Wait Queue	Handles messages that take up to an hour to deliver	false	Low	Unlimited	false	modify
Proxy Queue	Forwards requests through a proxy Gateway	false	AboveNormal	Unlimited	false	modify
Tag Value Publishing	Handles tag value change events	true	Normal	1	false	modify

Queue Settings

Clicking **modify** for a queue type accesses the Queue Settings page where the following information is available to view or edit.

Setting	Description
Queue Name	Name of the queue you are modifying (read only).
Description	Description for the queue you are modifying (read only).
Synchronous Delivery	This setting is configured by the queue and is unchangeable. If true, the queue will not dispatch another task until the current active task has completed. When a queue uses synchronous delivery, the maximum number of allowed active tasks is fixed at 1 and cannot be changed. Default is false. Note: Some queues are hard-coded as “Synchronous Delivery” queues, for example the Tag Value Update queue. For these queues, the Max Active setting is fixed at 1 and cannot be changed by the user. The user can only change the priority of the queue.
Max Active	The maximum number of active tasks allowed at a time. A task is considered active when it has been dispatched to the Gateway Network connection. You can set a limit to ensure that the Gateway Network connection will not become overloaded. Set this value to -1 to not enforce a limit on active tasks. Default is -1.
Priority	Determines the queue's priority in relation to other queues. A lower priority may result in messages in this queue taking longer to send, but can help prevent a Gateway Network connection from being overloaded.

Adjust Queue Message Capacity

Overloading a Gateway’s queue active messages can starve the send or receive threads for Gateway Network connections. Starving the send or receive threads for the connection can potentially prevent other subsystem messages from getting through. To solve this issue, edit the **Max Active** field to set a limit that will allow the Gateway Network connection to continue functioning correctly.

Since this is a known problem with Tag History Queues, we will use an example with a GatewayA and GatewayB, where GatewayA requests tag history data from GatewayB to display on a chart. A user

has noticed other items related to the Gateway Network connection, such as remote tags, are no longer displaying properly. They use the Gateway Network Diagnostics tab to confirm the network is not the issue, which indicates a slow database may be causing a cascading effect where other messages are delayed by all the Tag History Query calls.

This cascading effect happens because the Gateway Network asynchronously dispatches some functions. One Gateway thread handles the initial call, and a different Gateway thread dispatches the call's results. In our example, GatewayA is unaware that GatewayB is taking a long time to run the queries and will continue to dispatch more tag history requests. When the limit of send and receive threads available to a Gateway Network connection is reached, other messages can no longer get through. This can be verified as the issue by checking GatewayB's current Incoming/Outgoing Tasks and Results Response Time.

Gateway Network Diagnostics

Gateway Network Port

This server is listening on port **8060** for incoming SSL certificates/connections.

Test Remote Server Response

Server

controller

Submit

Results

Call Result	SUCCESS
Response Time	10098 ms
Error	None

Adjusting queue message capacity controls the flow of requests to prevent thread starvation across the network. Select **Modify** for the Tag History Queue to access Queue Settings and adjust capacity. Make sure the Gateway responsible for the thread requests is where the queue capacity is updated. In this example, GatewayA Tag History Queue Max Active count was set to 2 and saved by clicking **Create New Queue Override Settings**.

Queue Settings	
Queue Name	Tag History
Description	Retrieves tag historical data over the Gateway Network
Synchronous Delivery	☐ This setting is configured by the queue and is unchangeable. If true, the queue will not dispatch another task until the current active task has completed. Note that when a queue uses synchronous delivery, the maximum number of allowed active tasks is fixed at 1 and cannot be changed. (default: false)
Max Active	2 The maximum number of active tasks allowed at a time. A task is considered active when it has been dispatched to the Gateway Network connection. You can set a limit to ensure that the Gateway Network connection will not become overloaded. Set this value to -1 to not enforce a limit on active tasks. (default: -1)
Priority	Normal Determines the queue's priority in relation to other queues. A lower priority may result in messages in this queue taking longer to send, but can help prevent a Gateway Network connection from being overloaded. (default: Normal)

Create New Queue Override Settings

The Gateway Network Status page Remote Gateway Details now shows pending items since the Tag History Active upper limit has been met. Note that pending tasks are ones that have not yet been picked up for dispatch by the Gateway Network connection. These will be discarded if not dispatched within 1 minute. Be aware these requests being deleted may show more errors on components like the GatewayA chart, but all other subsystem messages can now get through without issue.

Outgoing Queues

Name ▲	Priority	Inserts/Sec	Pending	Active	Avg Pending Secs	Total	Actions	
Alarm Query Provider Service	Normal	0.0	0	0	0.0	0	<button>Pause</button>	<button>Clear</button>
Call Results Queue	Highest	0.0	0	0	0.0	0	<button>Pause</button>	<button>Clear</button>
Default Queue	Normal	0.0	0	0	2.3	44	<button>Pause</button>	<button>Clear</button>
Long Wait Queue	Low	0.0	0	0	0.0	0	<button>Pause</button>	<button>Clear</button>
Proxy Queue	AboveNormal	0.0	0	0	0.0	0	<button>Pause</button>	<button>Clear</button>
Remote Tags	Normal	1.8	0	0	0.2	2,612	<button>Pause</button>	<button>Clear</button>
Remote Tags (v7)	Normal	0.0	0	0	0.0	0	<button>Pause</button>	<button>Clear</button>
Tag History	Normal	3.8	2	2	0.6	1,949	<button>Pause</button>	<button>Clear</button>

Gateway Network Proxy Rules

New in 8.1.34 Gateway Network Proxy Rules allow you to control the amount of service enumeration calls over your Gateway Network. Service enumeration calls run every 60 seconds against every other Gateway the local Gateway is aware of, including Gateways on the opposite side of a proxy connection. Given enough Gateways, this may result in a large amount of network traffic, negatively impacting your Gateway Network.

NOTE

Setting up proxy rules is not mandatory when creating a proxy connection, as this is handled by the **Allowed Proxy Hops** property in the [Security](#) section above.

Proxy Rule Settings

The following table represents the various configurable settings within a proxy rule. In addition to specifying individual Gateways, you can use wildcards to list out Gateways you want.

Name	Description
Source Gateways	The list of Gateways that are asking for available routes. If the asking Gateway is on this list either by name or wildcard, the proxy Gateway will check the list of Destination Gateways to determine what to do next.
Destination Gateways	The list of Gateways the proxy Gateway will use to see if there is a name or wildcard match. The Action property will then either Allow or Deny the route.
Description	Description of the proxy rule. Useful for users to determine what the rule is used for.
Action	The action to take when a proxy route between a source Gateway and a destination Gateway matches this rule. Options include Allow or Deny . If set to Deny, the proxy route will not be reported to remote Gateways. Default is Allow.

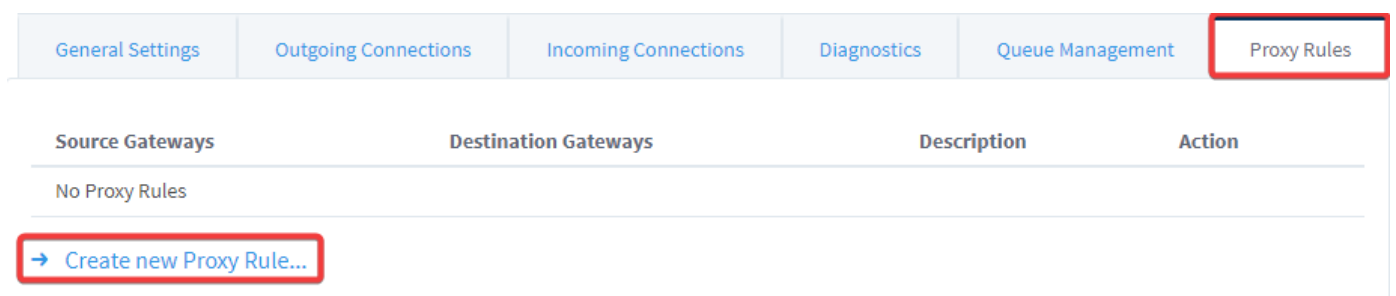
Remote Providers

Remote **Realtime** and **Historical** Tag Providers make remotely controlling and storing tag data even easier.

If a route does not match a proxy rule, that route will be allowed and be visible to the asking Gateway by default.

Setting up a Proxy Rule

1. Navigate to your Gateway Network configuration settings, located at **Config > Networking > Gateway Network**.
2. Go to the **Proxy Rules** tab and click on **Create new Proxy Rule...**



3. Set up your list of Source Gateways and Destination Gateways. See [Proxy Rule Settings](#) for a description of each setting.

Source Gateways	A comma separated list of gateway names. May use the wildcard '*', such as 'Manufacturing_*'.
Destination Gateways	A comma separated list of gateway names. May use the wildcard '*', such as 'Manufacturing_*'.

4. Give your rule a description. This will make it easier to identify the purpose of your rule in the future.

Description	
-------------	-------------

5. Set the Action setting to either allow the proxy route or deny the proxy route, then click **Create New Proxy Rule**.

Action	Allow The action to take when a proxy route between a source gateway and a destination gateway matches this rule. If set to Deny, the proxy route will not be reported to remote gateways. (default: Allow)
--------	---

Create New Proxy Rule

A few things to note about proxy rules:

- Proxy rules are followed in a top-down order, with the rule at the top of the list having the highest priority.
- Proxy rules are bidirectional. If a controller Gateway can access an agent Gateway with proxy rules, the agent Gateway can also access the controller Gateway.
- Proxy rules view redundant Gateway pairs as a single entity.

Gateway Network Certificates and SSL

When a remote machine establishes an incoming connection, its server name is transmitted and appears in the Server Name field under **Gateway Network > Incoming Connections**. Be aware that identity authentication is only performed when the connection is created using Secure Socket Layer (SSL). By default, SSL is enabled.

Note that SSL is also known as Transport Layer Security (TLS) after the Internet Engineering Task Force (IETF) made multiple improvements to SSL. However, it is common to still refer to TLS with the original name, SSL. Both of these terms will be used on the page.

GATEWAY NETWORK AND REDUNDANCY

When using the Gateway Network and Redundancy, SSL Certificates are automatically pushed from the redundant Master to the Backup.

Supported Standards

As a Java-based application, Ignition can establish many different connections across the network that require encryption through the use of keystores. The latest Java-based applications require TLS to use Public Key Cryptology Standards #12 (PKCS#12) keystores, which allow Ignition to store keys and digital certificates required for establishing TLS clients. Private keys should be in PKCS#8 format.

Self-signed certificates in the metro-keystore have a key size of 2048 by default, but this can be specified to a different length, such as 4096. When certificates are then generated, Ignition utilizes the SHA-256 Hashing Algorithm. Further security can be configured through your [Gateway connection approval settings](#) as desired.

Client Certificates

New in 8.1.14 Client certificates are the certificates of peer Gateways that the current Gateway trusts when it is making outgoing connections. Client certificates live under:

```
$GATEWAY_HOME/data/gateway-network/client/security/pki/
```

When the Gateway makes an outgoing connection to a peer Gateway whose certificate is not yet trusted, the peer certificate (or its certificate chain if one is configured) is copied into:

```
$GATEWAY_HOME/data/gateway-network/client/security/pki/rejected/
```

This model allows users to configure the Gateway Network client to trust the peer Gateways on outgoing connections by moving the certificate on the file system from `$GATEWAY_HOME/data/gateway-network/client/security/pki/rejected/` to `$GATEWAY_HOME/data/gateway-network/client/security/pki/trusted/certs/`. This file system change will be picked up immediately by the Gateway and the connection will be trusted when it attempts to reconnect again.

Server Certificates

New in 8.1.14 Server certificates are the certificates of peer Gateways that the current Gateway trusts when it is handling incoming connections. Server certificates live under:

```
$GATEWAY_HOME/data/gateway-network/server/security/pki/
```

The Gateway Network **Incoming Connections** tab was made compatible with this new model so that incoming connection certificates may continue to be approved, denied, or deleted there.

NOTE

If you are using your own CA to sign Gateway Area Network certificates, add the CA public key to:

```
$GATEWAY_HOME/data/gateway-network/server/security/pki/trusted/certs/
```

Denying a Certificate

To deny a certificate, navigate to **Config > Networking > Gateway Network > Incoming Connections**. The certificate **More** dropdown displays **deny** and **delete** options. If deny is selected, the connection that has been using that certificate will no longer be allowed to connect. Select delete for certificates that are no longer in use. Keep in mind that if you delete a certificate, and a remote machine is still using that certificate, it will reappear on the Certificates page. In this case, you must

navigate to the remote Gateway and delete its outgoing connection. Then you can permanently delete the certificate from the Certificates page.

Regenerating Gateway Network Certificates

Ignition generates a self-signed certificate for the Gateway Network on start up if no existing certificate is found. These self-signed certificates have a lifespan of 10 years. Unlike trusted certificates, self-signed certificates cannot simply be reuploaded and replaced. Regenerating the certificates creates a new certificate with an expiration date set for ten years from the date the certificate is regenerated. If you need to regenerate a self-signed certificate, remove the

`%IgnitionInstallationDirectory%/webserver/metro-keystore` file and restart the Gateway. The certificate will need to be trusted again by all other Gateways that trusted the expired certificate.

Setting Up Your Own Gateway Network Certificate

You can add your own certificates for incoming GAN connections by creating a metro-keystore using your own CA. To begin, you'll need Java JDK and OpenSSL installed. A majority of this process will be performed in a command window starting with the Gateway's runtime JRE `cd "<Ignition Home Folder>/lib/runtime/jre-<OS Type>/bin"`, where `<Ignition Home Folder>` is the path to your Ignition installation and `<OS Type>` is the OS you're using, such as:

- aarch64
- mac
- win

Using the Keytool Utility

The keytool utility allows you to create a new password protected Java keystore and generate the certificate signing request (CSR). Follow secure practices when creating your new password.

TEMPORARY FOLDER CONSIDERATIONS

The examples included in this section utilize temporary locations for ease of displaying more generic file paths, but it is recommended to use a permanent location. Creating a tmp location isn't standardized across operating systems, and there is a risk of automatic removal on a restart.

Creating a Keystore

To begin, you'll need to create a Java keystore that is a password protected repository with a private key and signed client certificate. The example command below will create a Java keystore named metro-key that contains a self-signed certificate valid for 365 days. Your inputs may vary based on your needs.

Creating a Keystore

```
keytool -genkey -alias metro-key -keyalg RSA -keysize 2048 -validity 365 -keystore "C:\tmp\gan-cert\new-metro-keystore"
```

The keystore values are populated based on Ignition defaults. For example, the first and last name field, often referred to as Common Name, defaults to `<hostname>:<gan port>`. Ignition does not validate Common Names or Subject Alternative Names (SAN) at this time. Certificate trust is handled only via explicit trust of a certificate or CA Root.

Creating a Certificate Signing Request

The following example command will create a CSR. You will want to update or remove values as you see fit. For instance, while adding the `-ext` parameters is good practice, it is not necessary for a certificate to function properly in Ignition. Note that if you want your certificate signed by a Certificate Authority (CA), additional steps are needed. You may need to show proof of ownership of the domain before a certificate will be created. Refer to the [Secure Communications SSL/TLS](#) page for more information.

Certificate Signing Request with SAN Details

```
keytool -certreq -alias metro-key -file "C:\tmp\gan-cert\metro.csr" -keystore "C:\tmp\gan-cert\new-metro-keystore" -ext SAN=dns:test.internal,ip:127.0.0.1,uri:https://test.internal/metro
```

Importing Signed Certificates

After you've sent the `metro.csr` file to a CA authority, the authority will process it and return signed certificates. These signed certificates need to be added into the Java keystore created above, in the order of `root-ca.crt`, `intermediate.crt`, and `new-metro-cert.crt`. Before adding, make sure you backup and rename the original GAN keystore to the new keystore.

Renaming the Keystore

```
cd "C:\Program Files\Inductive Automation\Ignition\webserver"
mv .\metro-keystore metro-keystore.orig
cp "C:\tmp\gan-cert\new-metro-keystore" "C:\Program Files\Inductive
Automation\Ignition\webserver\metro-keystore"
```

Signed Certificate Import Order

```
keytool -import -trustcacerts -alias root -file "C:\tmp\gan-cert\root-ca.crt" -
keystore "C:\Program Files\Inductive Automation\Ignition\webserver\metro-keystore"

keytool -import -trustcacerts -alias INTER -file "C:\tmp\gan-
cert\intermediate.crt" -keystore "C:\Program Files\Inductive
Automation\Ignition\webserver\metro-keystore"

keytool -import -trustcacerts -alias metro-key -file "C:\tmp\gan-cert\new-metro-
cert.crt" -keystore "C:\Program Files\Inductive
Automation\Ignition\webserver\metro-keystore"
```

File Modifications

A few more steps may be required depending on your setup to verify all necessary information is accessible:

- Update the `data/ignition.conf` file to use the new metro keystore password:
`wrapper.java.additional.7=-Dmetro.keystore.password=<newPassword>`
- If the CA signing your certificate is from an internal source, you will need to place the public root certificate in `/data/certificates/supplemental`.
- If using Ignition 8.1.13 or earlier, be sure to rename `data/certificates/cert-chain-store` to `cert-chain-store.orig` since the keystore password changed. This step can be skipped for 8.1.14+ as the file no longer exists, and the file location described [above](#) will be used to automatically trust the certificate.

Once all certificates are signed and configuration is complete, you can restart your Gateway and then navigate to **Config > Gateway Network** to access the **Diagnostics** tab and confirm the local certificate information.

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Gateway Network Diagnostics

Gateway Network Port

This server is listening on port **8060** for incoming SSL certificates/connections.

Test Remote Server Response

Server

[Submit](#)

Local Certificate Information

Common Name	Serial	Issuer
gw1:8060	80	gw1:8060 -> IA QA Intermediate Cert -> IA QA Cert Authority

Ignition Redundancy



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How Redundancy Works

[Watch the video](#)

Ignition redundancy supports a 2-node system, meaning there are two copies of the Gateway running. One node is the Master Gateway and the other is the Backup Gateway or backup node. All projects, Gateway settings, etc., are shared between nodes. The master node manages the configuration then replicates it to the backup node.

ⓘ HOW TO UPDATE REDUNDANT SERVERS

Refer to the [Updating or Patching a Redundant Ignition Pair](#) Knowledge Base Article to learn more about updating redundant servers and how to make the process a success.

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Architecture

Gateway

Version: (Dev Version)

License: licensed

Uptime: 2 days

1% cpu

792 mb

BACKUP

Redundancy

✓ Peer Connected

Activity Level: Active

Sync: Good

MASTER

Gateway Network

Active Connections	Remote Gateways	Bytes Sent	Bytes Received
1 / 1	1	371 B/sec	375 B/sec

Connections

Databases

1 / 3 connected

▲ 2 databases faulted

Designer Sessions

0 open

Devices

2 enabled

EAM Agents

0 / 0 agents

Gateway Network Connections

1 / 1 connections

OPC Connections

1 / 1 connected

Perspective Sessions

0 open

Store & Forward

0 stores quarantined

Vision Clients

0 open

Environment

Process Id	3936
Operating System	Windows 10 amd64
Java Version	11.0.15+10-LTS
Local Time	7:07:55 AM
Available Disk Space	278gb / 476gb
Detected NICs	

Systems

Alarm Pipelines	0 / 1 active
EAM Role	Controller
EAM Tasks	0 running
Modules	25 installed
Performance	1% CPU 793mb
Redundancy	Cold, Connected
Reports	0 scheduled
SFCs	0 running
Tags	447 tags

Diagnostics

Generate Diagnostic Bundle

When you have redundant systems in place, you can get detailed status information by going to Gateway webpage and selecting **Status > Redundancy** to view the system's status and events.



Home



Status



Config

SYSTEMS

- Overview
- Performance
- Alarm Pipelines
- Gateway Scripts
- Modules
- Redundancy**
- Reports
- SFCs
- Voice Alarming
- Tags
- EAM Tasks
- Transaction Groups

CONNECTIONS

- EAM Agents
- Databases
- Designers
- Devices
- Gateway Network
- Store & Forward
- OPC Connections
- Perspective Sessions
- Vision Clients

DIAGNOSTICS

- Execution
- Logs
- Metrics Dashboard
- Running Scripts
- Threads

Status > Systems > Redundancy

[Configuration](#)

Role

Backup

Peer Connected

Yes

Active Uptime

N/A

Redundancy Properties

Activity Level Cold

Synchronization Status Good

Local Address

Peer Address

[Force Re-Sync](#)
[Request Failover](#)

Redundancy Providers

Provider Name ^	Last Pull	Last Pull Duration	Last Apply Duration	Full Sync Needed?	System restart required
Alarm Events	2 days	12 ms	3 ms	false	N/A
Alarm Notification	2 days	10 ms	0 ms	false	N/A
Alarm Shelf	2 days	10 ms	6 ms	false	N/A
Internal DB	2 days	25 ms	13 ms	false	N/A
Project 'child'	never	0 ms	0 ms	false	N/A
Project 'global'	never	0 ms	0 ms	false	N/A
Project 'samplequickstart'	never	0 ms	0 ms	false	N/A
Project 'test'	never	0 ms	0 ms	false	N/A
Project Manager	2 days	12 ms	109 ms	false	N/A
SFC	2 days	10 ms	6 ms	false	N/A
Tag provider 'Sample_Tags'	never	0 ms	0 ms	false	N/A
Tag provider 'System'	2 days	71 ms	43 ms	false	N/A
Tag provider 'default'	never	0 ms	0 ms	false	N/A

System Events

Severity	Time	Event
1	16Sep2022 06:45:54	Redundancy state changed: Role=Backup, Activity level=Cold, Project state=Good, History level=Full
1	16Sep2022 06:45:54	Redundancy state changed: Role=Backup, Activity level=Active, Project state=Good, History level=Full
1	16Sep2022 06:42:35	Redundancy state changed: Role=Backup, Activity level=Active, Project state=OutOfDate, History level=Full
1	15Sep2022 20:45:33	Redundancy state changed: Role=Backup, Activity level=Active, Project state=Good, History level=Full
1	15Sep2022 07:16:53	Redundancy state changed: Role=Backup, Activity level=Cold, Project state=Good, History level=Full
1	15Sep2022 07:16:53	Redundancy state changed: Role=Backup, Activity level=Active, Project state=Good, History level=Full
1	15Sep2022 07:15:39	Redundancy state changed: Role=Backup, Activity level=Active, Project state=OutOfDate, History level=Full
1	14Sep2022 15:57:09	Redundancy state changed: Role=Backup, Activity level=Active, Project state=Good, History level=Full
1	14Sep2022 10:34:06	Redundancy state changed: Role=Backup, Activity level=Cold, Project state=Good, History level=Full
1	14Sep2022 10:34:05	Redundancy state changed: Role=Backup, Activity level=Cold, Project state=Unknown, History level=Full
1	14Sep2022 10:34:05	[_alarm_notification_] Will perform full pull. Reason: major change detected between nodes (sync provider UUIDs did not match).
1	14Sep2022 10:34:05	[com.inductiveautomation.sfc.ChartManager] Will perform full pull. Reason: major change detected between nodes (sync provider UUIDs did not match).
1	14Sep2022 10:34:05	[_alarm_system_] Will perform full pull. Reason: major change detected between nodes (sync provider UUIDs did not match).
1	14Sep2022 10:34:05	[_alarmshelf_] Will perform full pull. Reason: major change detected between nodes (sync provider UUIDs did not match).
1	14Sep2022 10:34:05	[tagprovider-System] Will perform full pull. Reason: major change detected between nodes (sync provider UUIDs did not match).

Log Activity



Min level

INFO



Live Values

ON

[Merge to Logs](#)

Logger

Time

Message

No log entries found

Redundancy Status Page Overview

New in 8.1.21 The Redundancy Status page was overhauled in 8.1.21. This section breaks down the Redundancy Status Page, describing each feature.

Metrics and Information

Configuration

Role

Backup

Peer Connected

Yes

Active Uptime

N/A

Redundancy Properties

Activity Level	Cold
Synchronization Status	Good
Local Address	
Peer Address	

Force Re-Sync

Request Failover

The top section of the Redundancy Status page gives information about the Gateway and your redundancy setup, including:

- Redundancy configuration settings
- The current Gateway's role in the Redundant pair
- If the Gateway has a peer connected
- The current node's uptime after failover
- Current redundancy settings
- Force re-sync and failover options

The following image is the Redundancy Status page from the Master Gateway's perspective. Many features of the Redundancy Status page remain the same, with a few notable exceptions.

Role

Master

Peer Connected

Yes

Active Uptime

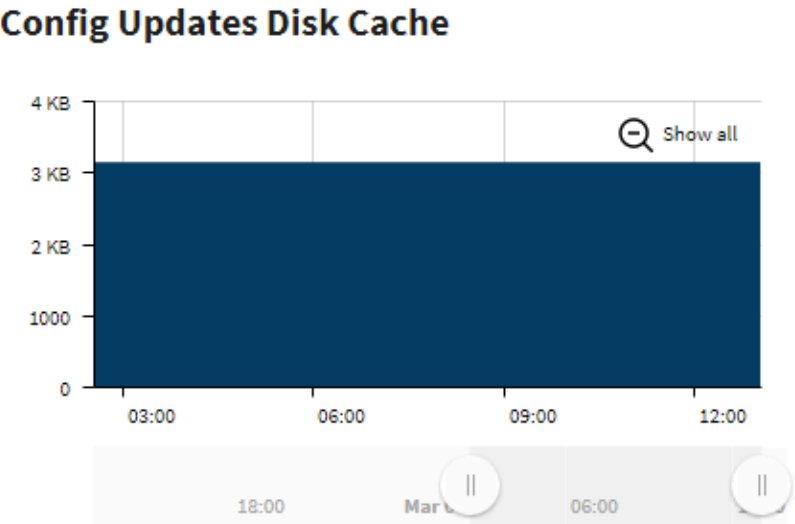
3 days 22 hrs

Redundancy Properties

Activity Level	Active
Synchronization Status	Good
Local Address	
Peer Address	

Force Re-Sync

Force Failover



- The **Role** is different, reflecting the Gateway's own role in the redundant pair.
- There is a **Config Updates Disk Cache** section, which can be adjusted to display information for different times using the date range slider. This section will only show on the Master Gateway, as you cannot make config updates on the Backup Gateway.

Redundancy Providers Statistics

The next section of the Redundancy Status page details metrics about applicable redundancy providers.

Data presented for **Backup** roles include:

- Provider Name: The name of the provider.
- Last Pull: Displays the time since the provider was last pulled.
- Last Pull Duration: The latest time duration (or how long it takes) for the Gateway to get data from the provider.
- Last Apply Duration: The latest time duration (or how long it takes) for the Gateway to apply the data received from the provider.
- Full Sync Needed?: Displays whether a full sync is needed.

- System Restart Required: Displays whether a system restart is needed.

Redundancy Providers

<u>Provider Name</u> ▲	<u>Last Pull</u>	<u>Last Pull Duration</u>	<u>Last Apply Duration</u>	<u>Full Sync Needed?</u>	<u>System restart required</u>
Alarm Events	2 days	12 ms	3 ms	false	N/A
Alarm Notification	2 days	10 ms	0 ms	false	N/A
Alarm Shelf	2 days	10 ms	6 ms	false	N/A
Internal DB	2 days	25 ms	13 ms	false	N/A
Project 'child'	never	0 ms	0 ms	false	N/A
Project 'global'	never	0 ms	0 ms	false	N/A
Project 'samplequickstart'	never	0 ms	0 ms	false	N/A
Project 'test'	never	0 ms	0 ms	false	N/A
Project Manager	2 days	12 ms	109 ms	false	N/A
SFC	2 days	10 ms	6 ms	false	N/A
Tag provider 'Sample_Tags'	never	0 ms	0 ms	false	N/A
Tag provider 'System'	2 days	71 ms	43 ms	false	N/A
Tag provider 'default'	never	0 ms	0 ms	false	N/A

Data presented for **Master** roles include:

- Provider Name: The name of the provider.
- Pending Updates: The number of updates waiting to be sent to the other node. If the other node is not connected, this number may grow continually.
- Queued Updates/sec: The number of updates per second over a 1 minute average that this redundant node has posted, which gives an indication of how quickly this node is posting updates.
- Dispatched Updates/sec: The number of updates per second over a 1 minute average that the other node has pulled, which gives an indication of how quickly the other node is asking for updates.

Redundancy Providers

<u>Provider Name</u> ▲	<u>Pending Updates</u>	<u>Queued Updates/sec</u>	<u>Dispatched Updates/sec</u>
Alarm Events	0	0.0	0.0
Alarm Notification	0	0.0	0.0
Alarm Shelf	0	0.0	0.0
Auth Tokens	0	0.0	0.0
Internal DB	N/A	0.0	0.0
Project Manager	0	N/A	N/A
SFC	0	0.0	0.0
tagprovider-System	0	0.0	0.0
tagprovider-default	0	0.0	0.0

System Event Information

System Events

Severity	Time	Event
	16Sep2022 06:45:54	Redundancy state changed: Role=Backup, Activity level=Cold, Project state=Good, History level=Full
	16Sep2022 06:45:54	Redundancy state changed: Role=Backup, Activity level=Active, Project state=Good, History level=Full
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	15Sep2022 20:45:33	Redundancy state changed: Role=Backup, Activity level=Active, Project state=Good, History level=Full
	15Sep2022 07:16:53	Redundancy state changed: Role=Backup, Activity level=Cold, Project state=Good, History level=Full
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	14Sep2022 10:34:05	[_alarm_notification_] Will perform full pull. Reason: major change detected between nodes (sync provider UUIDs did not match).
	14Sep2022 10:34:05	[com.inductiveautomation.sfc.ChartManager] Will perform full pull. Reason: major change detected between nodes (sync provider UUIDs did not match).
	14Sep2022 10:34:05	[_alarm_system_] Will perform full pull. Reason: major change detected between nodes (sync provider UUIDs did not match).
	14Sep2022 10:34:05	[_alarmshef_] Will perform full pull. Reason: major change detected between nodes (sync provider UUIDs did not match).
	14Sep2022 10:34:05	[tagprovider-System] Will perform full pull. Reason: major change detected between nodes (sync provider UUIDs did not match).

The third section of the Redundancy Status page displays a table that will log system events whenever a full sync is required, helping to establish a timeline of when full sync events were requested.

Information displayed in this table includes:

- How severe the system event was/is
- When the system event occurred
- The reason for the system event

Logging Activity

Log Activity

Min level

INFO

Live Values

ON

Merge to Logs

Logger

Time

Message

No log entries found

The final section of the Redundancy Status page shows logger activity and allows users to enable DEBUG and TRACE logs for a specific redundancy provider.

Features of the log activity table include:

- Minimum logging level. Options are:
 - INFO
 - DEBUG
 - TRACE
- An option to merge logs to the main diagnostic log viewer
- The specified logger
- The log's timestamp
- The issue being logged

Node Communication

The master and backup nodes communicate over TCP/IP. Therefore, they must be able to see each other over the network, through any firewalls that might be in place. All communication goes from the backup to the master node over the gateway network (default **port 8088** without SSL, **port 8060** with SSL). Therefore, that port must allow TCP listening on the master machine.

Configuration Synchronization

The master node maintains the official version of the system configuration. You must make all changes to the system on the master Gateway, the backup Gateway does not allow you to edit properties. Similarly, the Designer only connects to the master node.

When changes are made on the master, they are queued up to be sent to the backup node. When the backup connects, it retrieves these updates, or downloads a full system backup if it is too far out of date.

If the master node has modules that aren't present on the backup, they are sent across. Both types of backup transfers, **data only** and **full**, will trigger the Gateway to perform a soft reboot.

Runtime State Synchronization

Information that is only relevant to the running state, such as current alarm states, is shared between nodes on a differential basis so that the backup can take over with the same state that the master had.

On first connection or if the backup node falls too far out of sync, a full state transfer is performed. This information is light-weight and does not trigger a Gateway restart.

New in 8.1.19 After the Master Gateway and Backup Gateway reestablishes a redundancy connection, the Backup Gateway will check if it has any conflicting data compared to the Master Gateway's data. If the Backup Gateway has instances of conflicting data, the Backup Gateway will drop those instances in favor of the Master Gateway's data.

Changed in 8.1.31 The above behavior changes depending on if the Use Active Uptime to Resolve Conflicts property is toggled. If this property is toggled, the redundancy system will compare the Master and Backup nodes' active uptimes to each other, and use the data from the node with higher active uptime. This behavior can result in the Master overwriting its own data with data from an active Backup node.

Status Monitoring

Once connected, the nodes begin monitoring each other for liveliness and configuration changes. While the master is up, the backup runs according to the **stand by activity** level in the settings.

When the master cannot be contacted by the backup for the specified amount of time, it is determined to be down and the backup assumes responsibility. When the master becomes available again, responsibility is dictated by the recovery mode and the master either takes over immediately or waits for user interaction.

Historical Logging

Historical data presents a unique challenge when working with redundancy because it is never possible for the backup node to know whether the master is truly down or simply unreachable. If the master was running, but unreachable due to a network failure, the backup node becomes active and begins to log history at the same time as the master, who is still active.

In some cases this is OK because the immediate availability of the data is more important than the fact that duplicate entries are logged. But in other cases, it's desirable to avoid duplicates, even at the cost of not having the data available until information about the master state is available.

Ignition redundancy provides for both of these cases, with the **backup history level**, which can be either **Partial** or **Full**.

- In **Full** mode, the backup node logs data directly to the database.

- In **Partial** mode, however, all historical data is cached until a connection is reestablished with the master. At that time, the backup and master communicate about the uptime of the master, and only the data that was collected while the master was truly down is forwarded to the database.

Client Failover

Changed in 8.1.17 Failover to the other redundant node is now allowed if the nodes have different platform versions, which will allow attached clients to remain connected to at least one node during a redundant pair upgrade.

Vision Clients

All Vision clients connect to the active node. When this system fails and is no longer available, they automatically re-target to the other node. The reconnection and session establishment procedures are handled automatically, but the user is notified that they have been transferred to a different node so that they can notify the system administrator that the system may need attention.

Perspective Sessions

Like Vision clients, Perspective sessions connect to the active node. When connection to the active node is lost, or the activity level of the Gateway changes from **active**, the session will simultaneously attempt to:

1. Re-establish the connection to the Gateway it was connected to, and check to make sure its activity level is **active**.
2. Monitor the backup Gateway. If the backup Gateway becomes reachable and **active** before the connection to the active Gateway can be re-established, the Perspective session navigates in the browser to the same project and page on the backup Gateway.

TROUBLESHOOTING: BACKUP GATEWAY FAILOVER

If your backup Gateway is not able to fail back over to the primary when the primary takes back control, turning off the [Auto Detect HTTP Address](#) property may resolve the issue. When the Auto Detect HTTP Address property is disabled, a public IP address that is reachable by both Gateways must be set.

Setting Up Redundancy



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Setting Up Redundancy

[Watch the video](#)

In redundancy, both nodes will share the exact same configuration state. When a Backup node connects to a Master node, the Backup will attempt to synchronize itself with the Master. Therefore, before you set up for redundancy the following should be considered:

1. **Start with a fresh install for the Backup node.**

Because the current configuration of the Backup node will be overwritten, make sure that it does not contain anything valuable. It is a good idea to export any projects that are unique to the Backup before enabling redundancy.

2. **All system configurations relative to the Master node must also resolve on the Backup node.**

For example, OPC UA connections and database connections must use addresses that resolve from both nodes, or any OPC-COM servers must be installed and configured identically on both nodes. This means using "localhost" in any of the database connections won't work. You should use the IP address of the computer instead.

3. **Configure firewalls between the redundancy nodes.**

Redundant systems need TCP connectivity between each other on the default Gateway network ports. Turning off software firewalls or adding special exception rules for each others' addresses is required. The default Gateway Network port is **port 8088** (without SSL), and **port 8060** (with SSL), and the Backup node must be able to send outgoing data on that port. The port can be changed from Gateway Network settings.

NOTE

Two [Edge Gateways](#) can be set up with redundancy. An Edge Gateway can only failover to another Edge Gateway (not a standard Ignition Gateway). Also, an Edge Gateway cannot be used as backup to a Standard Ignition Gateway.

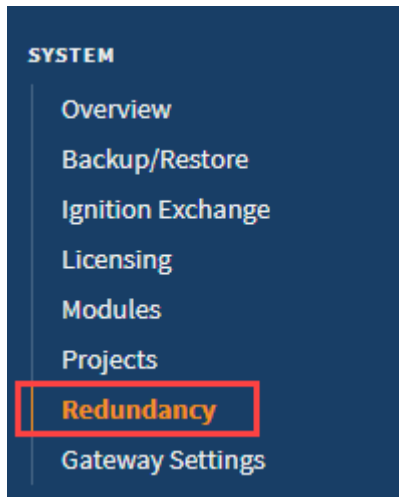
NOTE

While the OS platform (i.e., Windows, OS X, Linux) for the Master and Backup can differ, it is recommended to have similar OS platforms. If the OS platforms do differ, the Windows machine should be the master system or else the Force Failover option will not work.

However, different versions of the same operating system such as Windows 10 and Windows 8 or OSX 10 and OSX 11 have full functionality.

On the Master Gateway

1. Go to the **Config** section of the Master Gateway Webpage.
2. Select **System > Redundancy**. The Redundancy and Network Configuration page is displayed showing different sections and settings. See the table below for a description of all settings.



3. Change the following settings:
 - Under Redundancy Settings, set Mode to **Master**.
 - Optionally, configure any desired settings under Master Node Settings.

Redundancy Settings	
Mode	Independent Independent Backup Master
Standby Activity Level	Cold How the node should run when it is not currently the active node. If cold, the node will perform minimal operations until it becomes active. If warm, the node will run at a high level, reducing failover times.
Startup Connection Allowance	30000 The time in milliseconds that the system will wait at startup for a connection before making a decision on the node's responsibility level. (default: 30000)
Sync Timeout	60 The maximum time (in seconds) allowed for a redundancy sync operation. Sync operations that exceed this value will time out. (default: 60)

4. Click **Save Changes**. The Confirm change to Redundancy Settings page is displayed.

Confirm Change to Redundancy Settings

Altering redundancy settings can potentially have a large impact on the system, and may require a restart. Are you sure you want to continue?

Confirm

Cancel

5. Click **Confirm** to apply your settings.

6. Go to the Config tab and select **System > Redundancy** to ensure the redundancy mode and state is properly set.

On the Backup Gateway

Do the exact same steps 1-6 above on the Backup Gateway Webpage, except replace step 3 with the following:

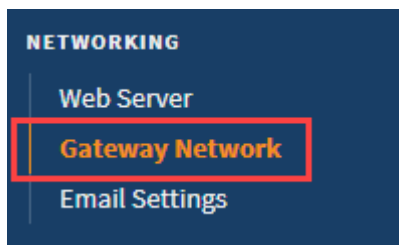
- Under Redundancy Settings, set **Mode** to **Backup**.
- Under Backup Node Settings, configure the Master Node Address and Port to point to the Master Gateway. The Master Node address should be a hostname or IP address. The Port setting (assuming default configurations) should be **8060** if using SSL, otherwise **8088**.

⚙️ Config > System > Redundancy and Network Configuration

Redundancy Settings	
Mode	Independent Independent Backup Master by this node's role. There should be one master and one independent turns off redundancy.
Standby Activity Level	Cold How the node should run when it is not currently the active node. If cold, the node will perform minimal operations until it becomes active. If warm, the node will run at a high level, reducing failover times.
Startup Connection Allowance	30000 The time in milliseconds that the system will wait at startup for a connection before making a decision on the node's responsibility level. (default: 30000)
Sync Timeout	60 The maximum time (in seconds) allowed for a redundancy sync operation. Sync operations that exceed this value will time out. (default: 60)

On the Master Gateway

1. Return to the Config section of the Master Gateway Webpage.
2. Select **Networking > Gateway Network**.



3. Navigate to the **Incoming Connections** tab. You should see a new incoming connection from the Backup Gateway. Find the connection, select **More**.

⚠ CAUTION

If you are not using SSL and your connection isn't displayed, make sure the **Require SSL** box is unchecked under the **General Settings** tab. Clearing the checkmark and returning to the **Incoming Connections** tab will now populate your new incoming connection.

A screenshot of the "General Settings" tab in a web interface. It has a header bar with tabs: "General Settings", "Outgoing Connections", "Incoming Connections", "Diagnostics", and "Queue Management". Below the header is a "Main" section with two settings: "Enabled" (checked, default: true) and "Require SSL" (unchecked, default: true). The "Require SSL" checkbox and its description are highlighted with a red rectangular box. The description reads: "If true, only connections that use SSL to encrypt traffic will be allowed. This setting only applies to incoming connections."

4. Select **approve**.

A screenshot of the "Gateway Network Settings" page. The breadcrumb trail is "Config > Network > Gateway Network Settings". There are four tabs: "General Settings", "Outgoing Connections", "Incoming Connections" (which is active), and "Diagnostics". Below the tabs is a section titled "Remote Certificates". It contains two tables. The first table has columns: "Common Name", "Serial", "Issuer", "Status", and two action buttons "deny" and "delete". It shows one entry with "Common Name" TR-0690157-SB:8060, "Serial" 699404284521096990, "Issuer" Self, and "Status" Approved. The second table has columns: "Id", "Security", "Certificate", "Gateway Name", "Redundancy Role", "Status", and two action buttons "More" and "reset". It shows one entry with "Id" ignition-tr-0690157-sb [be44105d-, "Security" PendingApproval, "Certificate" N/A, "Gateway Name" Unknown, "Redundancy Role" Unknown, and "Status" Unknown. A dropdown menu is open from the "More" button, showing "approve" (highlighted with a red box) and "delete".

5. To verify the redundancy setup, that is, to ensure the Master and the Backup Gateways are connected, go the Status tab of the Gateway Webpage and click on **System > Redundancy**. The Redundancy page will show the connected nodes and their current states.

After approving the connection, the Backup connects to the Master and downloads a system backup, then restarts. Once the restart is complete, the Backup node is synchronized and in communication with the Master.

Redundancy Settings

All redundancy settings are configured in the Gateway Webpage under the Config tab, **Systems > Redundancy**. Most settings are used by both the Master and Backup nodes, with their individual settings broken out into separate categories.

It is important to know that while the full system configuration is shared between nodes, redundancy settings are not shared between nodes. Therefore, it is perfectly acceptable to have different values for the same settings on the two nodes. For example, it is possible to have a different Standby Activity Level on both nodes, and, of course, the network settings will often be different.

NOTE

The Master node shares all configuration with the Backup node, and this means that changes cannot be made to your project from the Backup. In fact, the Designer can never be opened from a Backup node, even if the Master is currently offline.

Redundancy Settings

Property	Description
Mode	Enable or disable redundancy, and specify this node's role. There should be one master and one backup node per redundant pair. Independent turns off redundancy. • Independent - Redundancy is not enabled and this Ignition system runs as an independent node. • Master - This is the Master node, who listens for a connection from the Backup node, and is in charge of managing system synchronization. • Backup - This is the Backup node, who will connect to the Master and receive system updates.
Standby Activity Level	How the node should run when it is not currently the Active node. • Cold - The system connects to all OPC servers but does not subscribe to Tag values. The Ignition OPC UA server does not communicate with any device, but third party OPC UA servers may still have device connections. This allows the system to standby without putting additional load on the devices and network. Failover takes slightly longer, as Tags must be subscribed and initialized. • Warm - The system runs as if it were active, with the exception of logging data or writing to devices, allowing for faster fail-over.
Failover Timeout	This feature was removed from Ignition in version 8.1.37 The time of inactivity, in milliseconds, before the backup assumes responsibility. Default is 10000 milliseconds.
Startup Connection Allowance	The time in milliseconds that the system will wait at startup for a connection before making a decision on the node's responsibility level. This is used to prevent unnecessary switch over caused by a node starting as active, only to connect and find that the other node is active, resulting in one of the nodes being deactivated. Default is 30000 milliseconds. Note: It is important to notice that this setting can interfere with the Master Recovery mode:

Property	Description
	• If the Master is active, it will always request the Backup to deactivate. • If this setting is low, or 0, the Master will always become active before connecting to the Backup, and thus "manual recovery" will not be possible.
Sync Timeout	New in 8.1.22 The maximum time in seconds allowed for a redundancy sync operation. Sync operations that exceed this value will time out. Default is 60 seconds

Network Settings

Property	Description
Auto Detect Network Interface	If true, the system will automatically select which network interface to use. Most commonly disabled on systems with multiple network cards, in order to explicitly specify which interface to use. If false, the system will bind itself to the interface of the specified address.
Network Bind Interface	The IP address of the network interface to use for redundancy. Only used if "Auto Detect" is false.

Master Node Settings

Property	Description
Recovery Mode	How the Master node resumes responsibility after starting again. • Automatic - The Master automatically takes back responsibility, and becomes active. The Backup node goes to standby. • Manual - The Backup node is allowed to stay active. The Master will become active if the Backup node fails, or if the user requests a switchover from the Gateway configuration page.
Runtime Update Buffer Size	This feature was removed from Ignition in version 8.1.21 How many "runtime state" updates can be queued in memory before the system stops tracking and a full transfer is performed. These updates represent information that the other node should have in order to have the same running state as the Master when it's forced to take over. This is most often the values of static Tags and the current alarm state. Given that the update buffer is only used once the nodes are connected, the default value is usually fine, and only needs to be increased on systems that may have many alarms that change together, or many static Tag writes.
Config Update Queue Size	The maximum size (in megabytes) of config updates allowed before a full transfer is performed.

Backup Node Settings

Property	Description
Master Node Address	The address of the Master Ignition system.
Port	The Gateway Network port used by the Master to listen on. For the Backup, the port to connect to on the Master.
Use SSL	Use SSL to connect to the remote machine.
Ping Rate	How often, in milliseconds, to send a message from the Backup to the Master.
Ping Timeout	The maximum time, in milliseconds, allowed for a ping response. Pings that time out are counted as missed pings.
Ping Max Missed	The amount of missed pings that will force the connection to the master to be considered faulted.
Websocket Timeout	The maximum time, in milliseconds, allowed for a new web socket to connect to the Master.
HTTP Connect Timeout	The maximum time, in milliseconds, allowed to establish an HTTP connection to the Master.
HTTP Read Timeout	The maximum time, in milliseconds, allowed to read or send HTTP data to the Master.
History Mode	How history is treated by the Backup system. If Full , history will be stored normally, as it would be on the Master system. If Partial , history will be cached until the Master is available again and the Backup node is able to determine the exact time that the Master was down.
Use Active Uptime to Resolve Conflicts	New in 8.1.31 When enabled, the system will resolve data conflicts by examining if the Master node or Backup node have been active for longer. The redundancy data from the longer running active node will be selected, and will overwrite the data on the other node.

Troubleshooting

Redundancy Connectivity

When the two redundant nodes are connected, you will be able to see their state details in the [Status](#) section of the Gateway Webpage. There are also various other places where the redundancy state is shown as **connected**.

If the two nodes cannot connect, check the following:

- Verify that the Master address is correct in the Backup. Try to ping the Master machine from the Backup machine, and verify that you're using the correct address for the network card that the Master is connected through.
- If using system names (or domain names), verify that the name is resolving to the correct address by performing a ping.
- Verify that the firewall on the Master is set to allow TCP traffic to the designated port.
- Verify that the Backup is not connecting and then immediately disconnected for some reason.
- Viewing the error log in the Gateway console section should show this. If errors are occurring at regular intervals, look at the message for an indication of what is happening. An example of a potential problem is when the failover time is set too low for the given network, which results in many socket read timeout exceptions, which in turn leads to many disconnect/reconnect attempts.
- If errors are occurring, but the cause isn't clear, contact [Inductive Automation Support](#).

Advanced Troubleshooting

A variety of loggers can be found under the Gateway console section by going to "Levels" and searching for "Redundancy". By setting these loggers to a finer level, more information will be logged to the console. This is generally only useful under the guidance of Inductive Automation support personnel, though more advanced users may find the additional logged information helpful.

Database Considerations

Ignition Database Requirements

Given that many parts of the Ignition system interact with the database, it's important to give some thought as to how it will be used when redundancy is turned on, and the different database architectures that are possible.

When evaluating database architectures for use with Ignition, it's important to look carefully at how the system will use the database. Which pieces are critical? Which pieces are "optional" so that the system continues to function while the database is down? Which pieces can operate in "read-only" mode if necessary?

Ignition uses the database for many purposes. Here are some common areas where they are used, and how availability can impact the system:

Tags

Tags rely on the database for tags that execute queries. These tags will error out if the database is unavailable, but the status and control functionality of the system will function on the whole.

History - Tags and Other

All history in Ignition goes through the **Store-and-Forward** system, meaning that it will be cached until the database is available. However, while the data is cached, it will be unavailable to view or analyze on the clients. Therefore, when looking at how the database should be set up, it is necessary to determine how crucial rapid-availability of the data is.

Alarming

The alarm status system does not reside in the database, so it will continue to function if the connection is down. **Alarm Journal** information will go through the **Store-and-Forward** system as history data.

Project Screens

Almost all projects use database access for providing information on screens. These queries will error out as long as the database is unavailable. Screens that only use tags (in an internal provider) will

continue to function, so it would be beneficial to make a distinction between status screens and history screens, if a failover database is not used.

Database Architectures

Single Shared Server

A single database server is used. Any Ignition Gateways will use it, so it is expected to be available even when one of the nodes is not. For that reason, it almost always resides externally, on a separate server machine. This arrangement is the easiest to use with Ignition. A single database connection configured on the master will be replicated to the backup, and both nodes will use the connection as necessary.

Clustered/Replicated Database Servers

There is a wide variety of capabilities supported by the different brands of database servers. To obtain fault-tolerance on the database front, it is usually necessary to have some sort of cluster/replication system in place. However, it can be very important to examine how Ignition is using the databases, and what capabilities the clustering solution provides.

For example, in many replication scenarios, the master database copies data to the backup. The backup can be used for read purposes, but new data inserted will not be replicated back to the master. Therefore, it is possible to have a failover connection to the backup database, so that clients will continue to receive data, but it would be necessary to run in partial history mode, so that the historical data was cached and inserted only to the master database. The failover connection would be set to standard mode, so the primary connection would be used when possible.

In a more complete cluster environment, where writes to either node would be replicated, a sticky failover connection could be used with full history mode.

Pertinent Settings

When working with various database architectures, there are a few settings in various parts of the system that are important.

Database Connection Settings - Failover Datasource

Any database connection can have a failover datasource. If the main connection is unavailable, any queries executed on it will pass through to the secondary connection. In this way, a secondary

database can be used when the first is not available, and the system will continue to function. It is important to note that everything passed through to the failover will function normally- no special considerations will be made. For example, the system won't cache data for the primary connection, it will forward it to the secondary. In cases where you want to allow reading from the secondary database, but not writing, you can set up another connection directly to the first database, with no failover, and set all of your write operations to use that.

Clustering Settings - History Mode

The history mode dictates how history will be treated when the node is not active. If partial, the data will be cached, and only forwarded when the master node is available. This mode can be used to prevent data from being inserted into a backup database in some cases. This setting can be found on the **Redundancy** page under the **Config** section of the Gateway.

Redundant Licensing



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Types of Redundant Licensing

Redundancy is supported with Ignition, Ignition Edge, and Ignition Cloud Edition using standard licenses (six-character key) and leased licenses (eight-character key). When working with redundancy, the license for the backup node will contain the same modules as the master node. For example, if the master is storing history with the SQL Bridge module, then the backup would also require the module in the event a failover occurs. Otherwise, data would be lost.

Traditionally, redundancy involves two standard licenses: one license will be applied to the master Gateway, and the other license will be applied to the backup Gateway. Since two standard licenses are being used, this approach allows users to disable redundancy, and set both Gateways to independent modes.

Backup-Only Licenses

Backup-only licenses are available for purchase. This license forces the Gateway into a backup mode, and the mode can not be changed while the license is applied. The benefit of this type of license is that they come at a discounted price. For more details, contact your Account Representative.

If using a backup-only license, the Mode property on the backup Gateway's Redundancy page will look like the image below.

Redundancy Settings	
Mode	Backup ▼ Enable or disable redundancy, and specify this node's role. There should be one master and one backup node per redundant pair. Independent turns off redundancy.
Standby Activity Level	Cold ▼ How the node should run when it is not currently the active node. If cold, the node will perform minimal operations until it becomes active. If warm, the node will run at a high level, reducing failover times.
Failover Timeout	10000  The time of inactivity, in milliseconds, before the backup assumes responsibility. (default: 10000)
Startup Connection Allowance	30000 The time in milliseconds that the system will wait at startup for a connection before making a decision on the node's responsibility level. (default: 30000)

Instead of the dropdown list that normally appears on this property, the license forced this Gateway into a Backup mode.

If you would like to change the mode of this Gateway, the backup-only license must first be unactivated. Once unactivated, a new license will need to be applied. Otherwise, the Gateway will operate in the two hour trial mode.

Projects

What is a project?

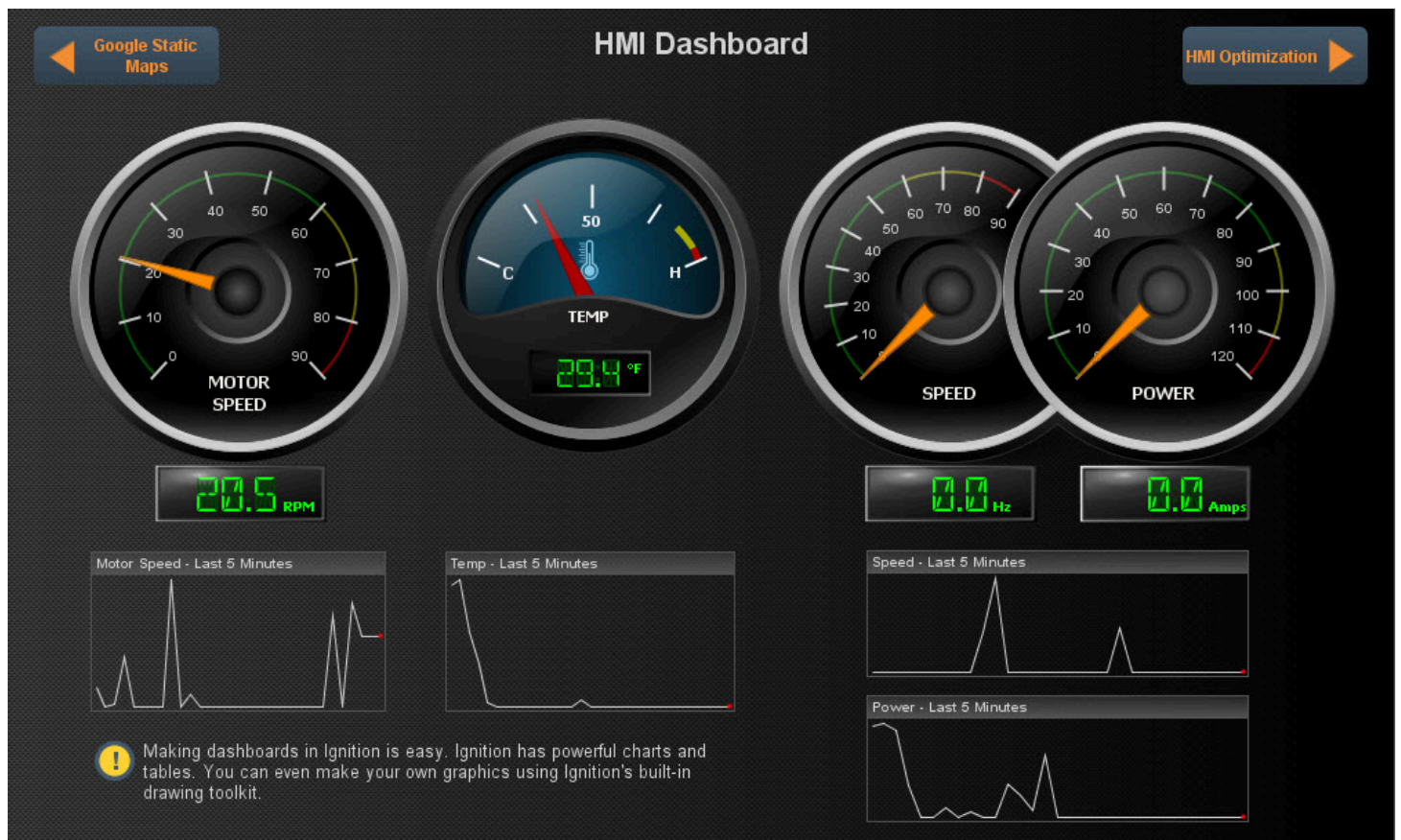
Ignition has two main parts, the Gateway and your projects. The Gateway holds all the shared information like database connections, device connections, and tags. Projects hold all the designed elements that do the real work. Your projects can hold both interactive elements (like controls, charts, reports, and entry forms) and persistent elements (like historical loggers, automated reports, etc.).

Projects are predominantly used to create the screens that your users can interact with, the visualization part of Ignition. Here you can create any system you want, from copying existing HMI/SCADA applications to whole new systems with anything you could want to do. The windows or views in your project can be used for history charts, reports, database forms, alarms, drawing components, scripting, and templates.

In Ignition, a project is a unit of configuration that contains:

- **Windows and components:** The HMI and SCADA controls to interact with tags and databases
- **Transaction Groups:** A bi-directional link between databases and PLCs
- **Templates:** A collection of components that can be re-used and quickly updated
- **Reports:** PDF reports for displaying and recording data
- **Scripts:** Timer and event based scripts used throughout the system
- **Alarm Pipelines:** Control alarm notification
- **Sequential Function Charts:** Logic to step through a process
- **General settings and properties:** The settings that control access, resource connections, layout, timing, and more

You use the Designer to configure and create projects. The projects are then viewed in the runtime ([Vision Clients](#) or [Perspective Sessions](#)). You can create as many projects as you want, and users can easily jump between projects on the fly or open multiple projects at the same time.



Visualization Systems - Vision and Perspective

When starting a new project, there are many things to consider, such as who the users will be, how much data you need, what kind of time and resources you have to work with, visualization needs, and so forth. Deciding whether to use Vision or Perspective really comes down to which module best fits your project at the visualization level.

When to Use Vision for a Project

Vision is the best choice for traditional industrial plant-floor and desktop screens, standalone HMIs, and the like. If you need a full, production-ready application right now, then it is best to choose Vision. Vision works best if you're using multi-monitor or multi-desktop workstations, dedicated control panels and applications, desktop-dedicated or dedicated-access applications, terminals, or parallel screens.

When to Use Perspective for a Project

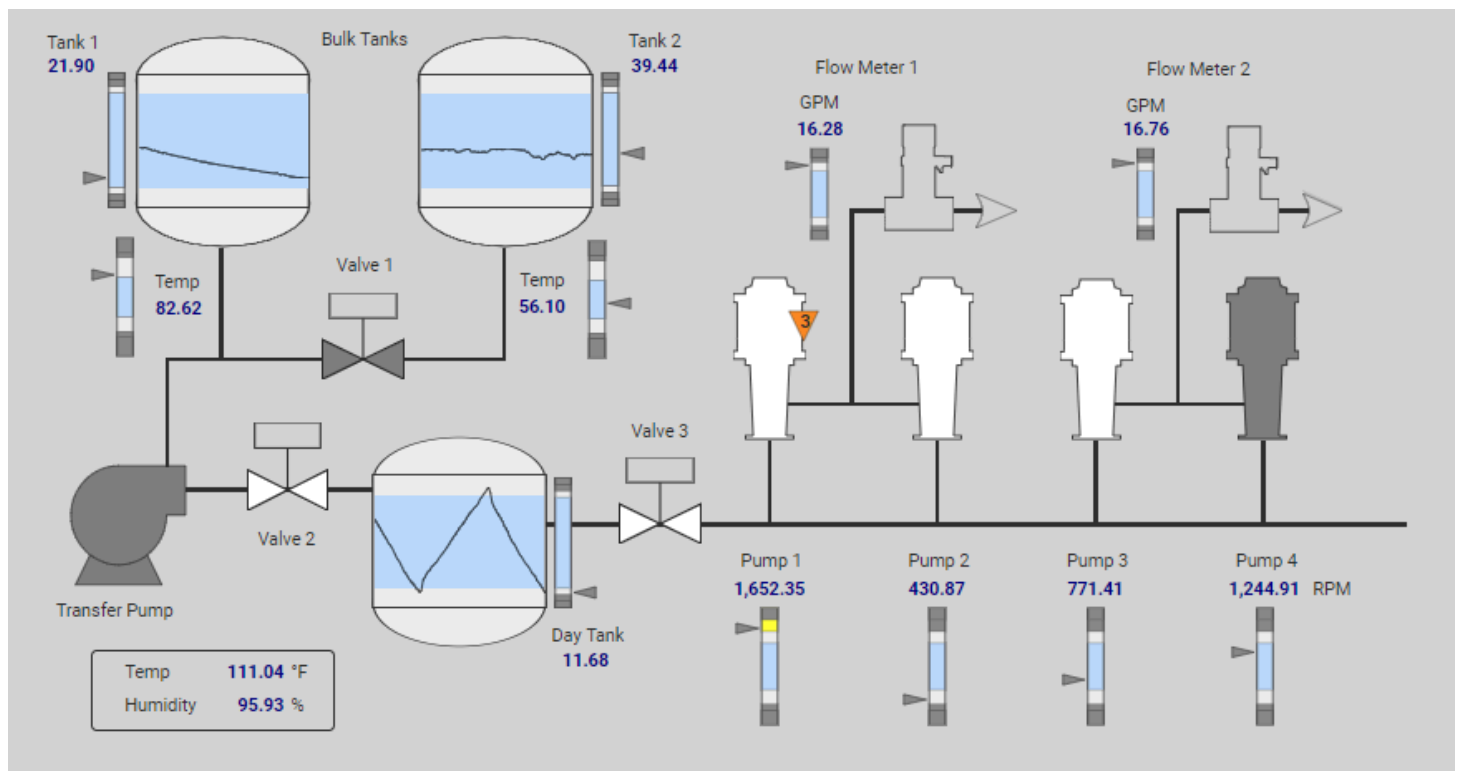
If you need to build mobile-responsive applications, then Perspective is the recommended way to go. If your application needs to run on a mobile OS, namely iOS or Android, then choose Perspective. If you need Two-Factor Authentication or federated identities for the application you're building, Perspective is recommended.

With Perspective, you can automatically adapt to fit any screen size using mobile-optimized container types. It also provides the ability to use your device's sensors and intuitive touch commands, as well as message handling, flexible property bindings, and CSS3 styles.

Designing a Project

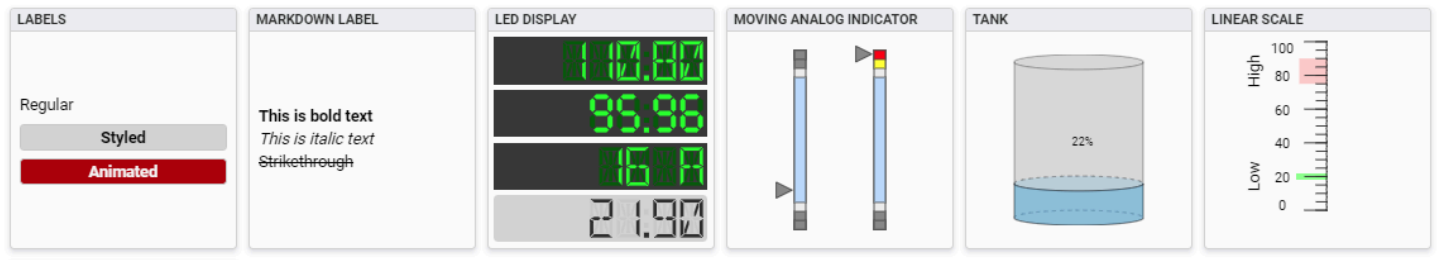
When you launch the Designer, you're prompted to select or create a project. The Designer then launches the project and you can set and modify the different types of project settings and resources. In the Designer, you can create any number of projects using either Vision or Perspective. Projects that contain viewable elements, such as Vision Windows and Perspective Views, will have a launch link on the Gateway homepage. Non-viewable elements such as **Transaction Groups**, **Named Queries**, **SFCs** and **Reports** exist in a project and execute in the Gateway. These resources do not have a runtime, and run independently of any **Vision Clients** or **Perspective Sessions**.

There are no limits to the number of projects that can be created on a Gateway, but each runtime Client, Session, or Designer can operate only on one project at a time.



You can use the different tools in Ignition such as components, shapes, images, Symbol Factory graphics, and Scalable Vector Graphics (SVGs) to create the components. Configuring components is the bulk of the Designer's work when designing a project. The basic workflow is to take a component from the palette and drop it into a container on a Vision Window or Perspective View. You can use the **Property Editor** panel to alter the component's properties, which changes the component's appearance and behavior.

To make the component do something useful, like display dynamic information or control a device register, you can configure property bindings for the component. A property binding simply links one component's property to another on the same window or view. To make the component react to user interaction, you can configure event handlers for it.



Switching Between Projects

When you launch a Vision Client, it opens a single project to display. If you want to open multiple projects you can have multiple clients open on the same computer, or you can use Ignition's **Retargeting** system to make seamless transitions between projects. The Retargeting feature allows you to jump from one project to another without closing the client. This allows your users to jump from area to area while still allowing you to keep your designs compartmentalized in multiple projects.

Your projects may all use different authentication sources or role sets for **security**. This means as your users jump from project to project, they may be able to use some or all of the controls on one project, but only see what is happening on another project.

Project Workflow

Getting up and running quickly with your project is simple:

1. Open the Designer.
2. Choose either Perspective or Vision.
3. Start designing.

The only challenge is figuring out exactly what you want to make with your system. For additional information, see **Creating a Project**.

Project Export and Import

In Ignition, a project backup and restore is referred to as Project Export and Import. Projects are exported individually and only include **project-specific** resources such as Perspective views, Perspective properties, Vision windows, Vision Templates, Client Event Scripts, alarm pipelines,

Named Queries to name a few. They **do not** include any Gateway resources like database connections and Tag Providers. A project is exported to a .zip file, and you can import it to any other Gateway that you have permission to access.

When you import a project from the `.zip` file, it will be merged into the existing Gateway. If a project already exists on the Gateway you are attempting to import it on, you have the option of renaming the project or overwriting the existing project.

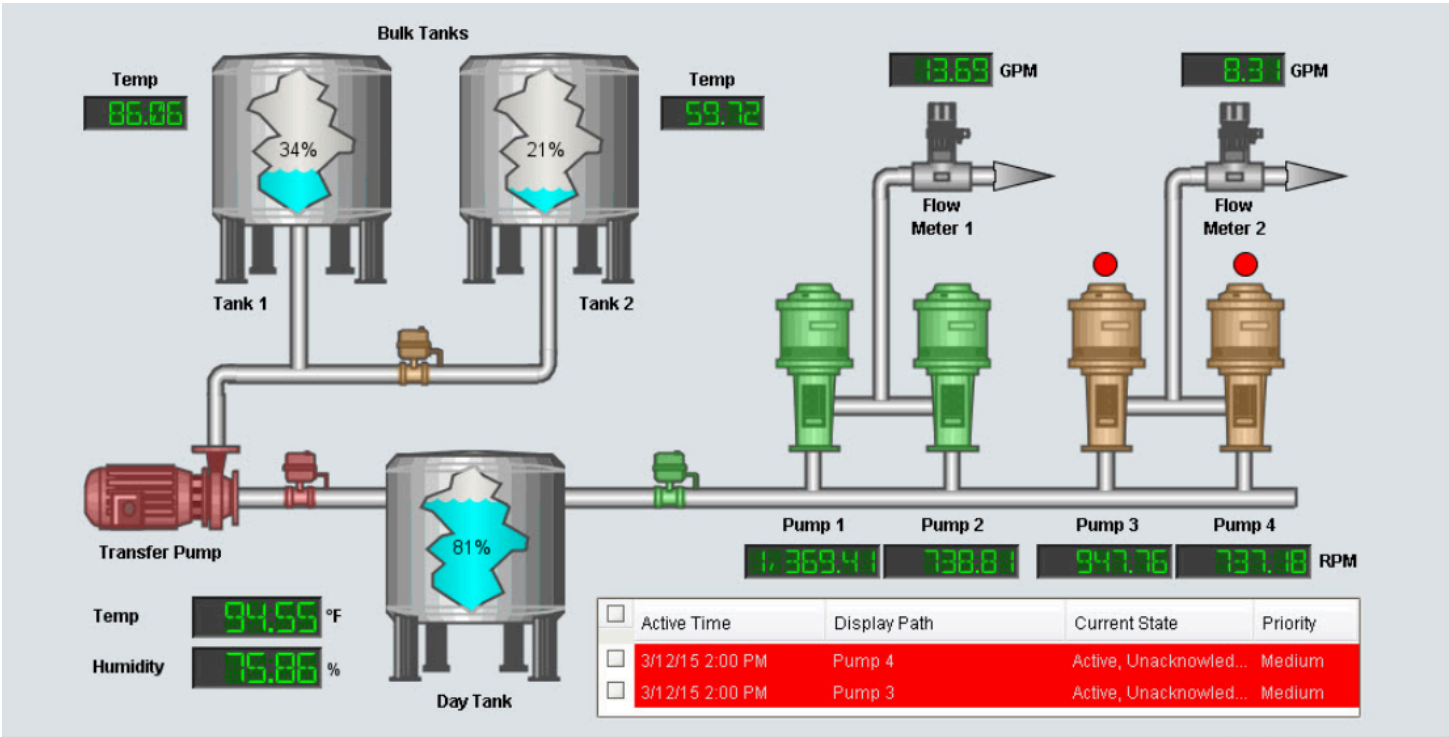
Project Export and Import are covered in detail on the [Project Export and Import](#) page.

Project Versioning and History

Project versioning is handled outside of Ignition. The file system that stores data in Ignition stores everything as a series of files. You can use any tool you'd like to save or export theses files outside of Ignition, including using versioning software to keep track of your changes.

Project Examples

Ignition is such a diverse application that it can work in any field you can imagine. Oil and gas, food and beverage, automotive, medical, air traffic control, water and waste water are just a few examples. You can get anything you want set up in Ignition. To see a few live example screens, check out our online [demo project examples](#). They are packed with samples of the features and functions you might want to use from reporting, to history, to HMI optimization.



What is Not in a Project?

The Designer allows you to create and modify several types of resources that are shared by ALL projects. Depending on the resource, this means that either they run independently of the projects, or they are available for use by any project. For example, tags and alarming are available to all projects.

- **Tags:** Basic or UDT Tags provide realtime data.
- **Alarming:** Alarms exist on Tags, and so are not in a project.

In addition to these resources, the Gateway connections and settings are available to all projects and are set up in the **Gateway**. These include resources such as **database connections**, **OPC server and device connections**, and more.

Project Inheritance



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Project Inheritance

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Project Inheritance allows one project to inherit resources from another project. If you have project resources that you want other projects to use such as views, windows, scripts, templates, or pipelines, you can create an inheritable project allowing other projects to inherit those resources. The project inheriting the resources can also overwrite the resources and let you re-define them specifically for that project.

Project inheritance is extremely flexible in that it allows inherited projects to also be configured as 'inheritable' and become a parent project itself. This allows for complex hierarchies of re-usable resources to be designed. Within each project, inherited resources may be used by other, "local" resources. For example, an inherited Vision template could be embedded in a window, or an inherited script could be executed by a button.

This page demonstrates how project inheritance allows you to share resources across multiple projects as you deem fit by pointing one project to another project, and overriding resources to re-define resources specifically for the project you're working on.

Configuring Project Inheritance

In order to make a project inheritable, you need to enable project inheritance on the project containing the resources that you want to share. In a similar way, these parent projects need to be assigned to the child projects that will be inheriting the resources to populate those resources. The following example demonstrates how to configure project inheritance for existing projects, but if you know a project needs to be inheritable or inherit a parent project's resources before creating, you can configure inheritance settings upon creation. This is available in the Gateway after selecting Create new project on the Config > System > Projects page and choosing the settings called out below, or in the [Designer](#).

In this example, we have two projects: one project called 'global' which contains some project resources, and another project that is not yet inheriting any resources called 'Project_X.' Since we will be sharing the resources from the 'global' project with Project_X, let's first configure the 'global' project to be inheritable.

Configuring Parent Project

1. Go to the **Config** tab on the Gateway Webpage, and select **Systems > Projects**. This brings up a list of all your projects. You'll notice that for each project listed, you'll see at a glance if a project is Inheritable, and if so, the name of the Parent Project will be displayed.

The screenshot shows the Ignition Gateway configuration interface. On the left is a sidebar with a 'Config' tab selected. The main content area is titled 'Config > System > Projects'. It features a table of projects with columns: Name, Description, Enabled, Inheritable, Parent project, and Actions. The 'Inheritable' and 'Parent project' columns are highlighted with a red box. The table lists three projects: 'global' (Inheritable: true, Parent project: global), 'Project_X' (Inheritable: false, Parent project: global), and 'Controller1' (Inheritable: false, Parent project: global). The 'Edit' button next to 'Project_X' is highlighted with a red box.

Name	Description	Enabled	Inheritable	Parent project	Actions
global		true	true	global	More Edit
Project_X		true	false	global	More Edit
Controller1		true	false	global	More Edit

2. Find the project you want to make inheritable, and click the **Edit** next to the project name (i.e., global) to open the Project Settings window.
3. Enable the **Inheritable** property, and click **Save**.

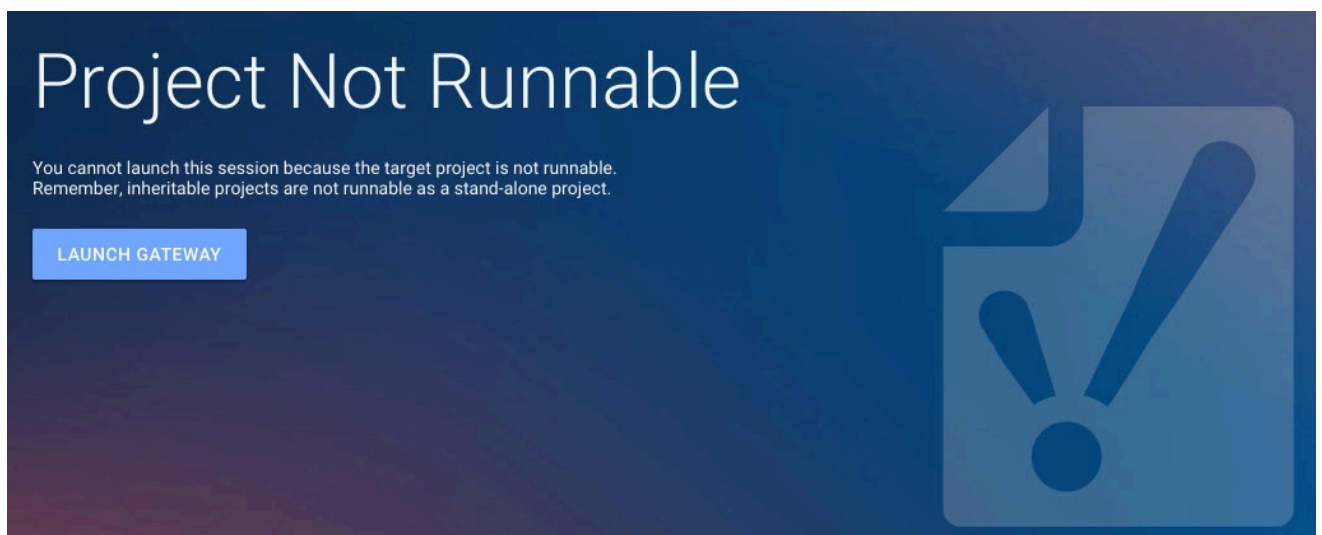
i ALLOW OVERRIDES

When you make a project inheritable, the Allow Overrides function is set by default on all project resources in the inheritable project. This allows all project resources to be propagated to all inherited projects

Project Settings	
Name *	global Choose a name to identify this project.
Description	
Title	 The title for the project. This can contain more characters than the name (space, etc), and will be used to represent the project to users. If empty, the name will be used.
Enabled	☒ A disabled project will not be active on the Gateway, but will remain editable in the Designer.
Inheritable	☒ Inheritable projects are not runnable as a stand-alone project, but are intended to provide shared resources to one or more child projects.
Parent Project	-None-

(i) CANNOT LAUNCH INHERITABLE PROJECTS

When you have a project that's flagged as inheritable, you can not launch it as a stand-alone project (i.e., Perspective Session or Vision Client). You will get a 'Project Not Runnable" error message. If you have an inheritable project that you want to launch, you must have another project to inherit from it.



Configuring Child Project

Now that we have an inheritable project, let's setup an existing project (i.e., Project_X) so it inherits resources from the 'global' project.

1. Under the **Config** tab select **System > Projects** page
2. Find your project and click the **Edit** button.
3. Select the inheritable project from the **Parent Project** dropdown list (i.e. global), and click **Save**.

Project Settings	
Name *	Project_X Choose a name to identify this project.
Description	
Title	The title for the project. This can contain more characters than the name (space, etc), and will be used to represent the project to users. If empty, the name will be used.
Enabled	☒ A disabled project will not be active on the Gateway, but will remain editable in the Designer.
Inheritable	☐ Inheritable projects are not runnable as a stand-alone project, but are intended to provide shared resources to one or more child projects.
Parent Project	global

Using Inherited Resources

You can treat an inheritable project as a library of resources for use in other projects. When project resources are changed in the original project, these changes will get passed down to the inherited projects. The same thing is true if new resources are added to the inheritable project. By using inheritable projects, you can create a resource library that will help designers build their projects more quickly, ensure consistency and reusability across all their projects.

To view your inherited resources, go to the Designer and open your child project (i.e., Project_X). Expand the folders that contain resources, and you'll notice that the inherited project resources are grayed out, including the Perspective Views and Vision Windows folders. Grayed out resources mean that those resources are inherited, and can only be edited from their parent project.

New in 8.1.26 Inherited resources will have one of two icons following the resource name.

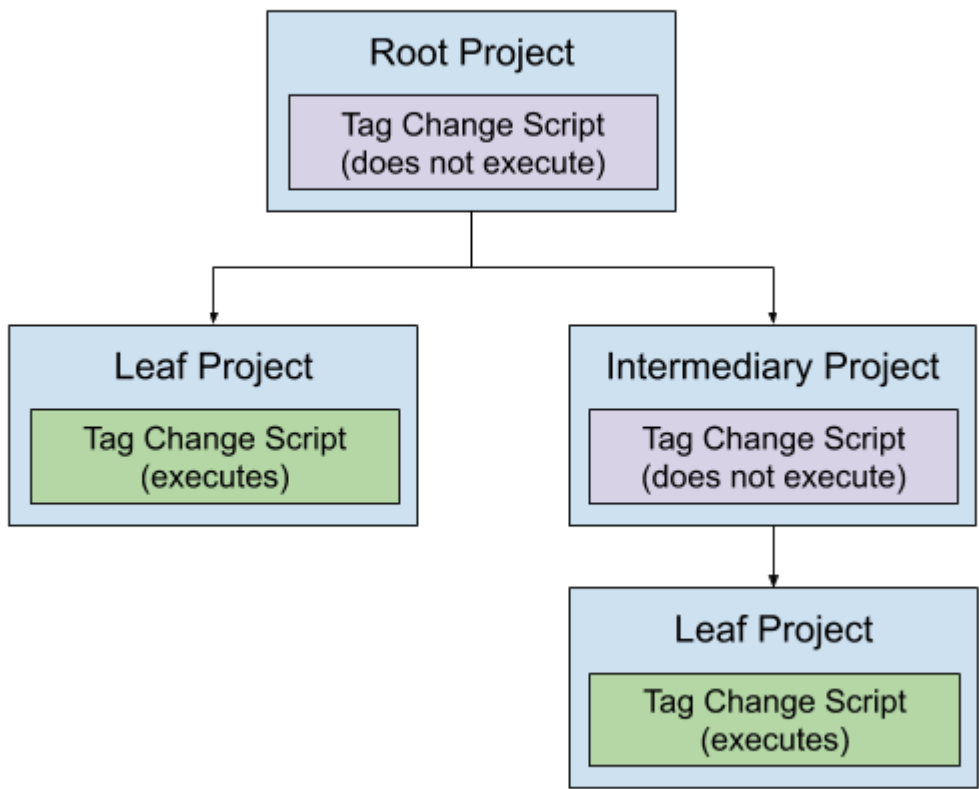
The Inherited Resource  icon is displayed when the resource is grayed out and indicates the resource is inherited and unchanged from the parent project resource. The Inherited Resource Overridden  icon indicates the resource has been overridden and is now editable. Anytime a new

resource is added or an existing resource is changed in the parent project, it will propagate down to the inherited project and will appear grayed out with an Inherited Resource  icon.

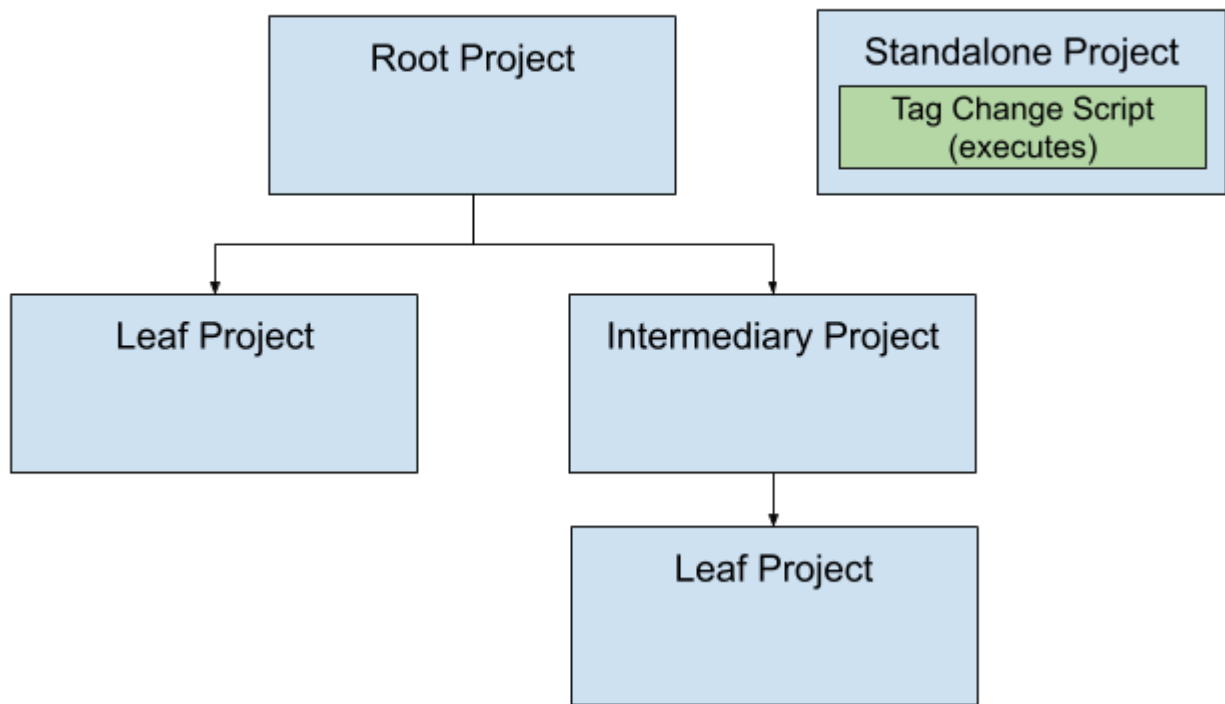
Inheritance and "Runnable" Resources

Some resources in a project "run" or execute in every leaf project (that is, a project that is **not** inherited by any other project) in the inheritance chain. Thus, if multiple projects inherit from the same parent project, then each leaf project will contain runnable resources, potentially resulting in duplicate executions.

The diagram below represents an inheritance hierarchy on a single gateway. A "Root" project contains a Gateway Tag Change script. Two projects inherit from the Root, so they'll inherit the script. In both cases, the inheritance chain leads to leaf projects. In this single gateway, two running instances of the same tag change script exist, meaning there will be duplicate script executions.



In the case of resources that "run", it is highly advised that they exist in a leaf project, or a standalone project (a project that does not participate in inheritance at all). In regards to the diagram above, we could prevent duplicate execution of our Tag Change Script easily by moving the Tag Change Script to a separate, standalone project:



"Runnable" Resources

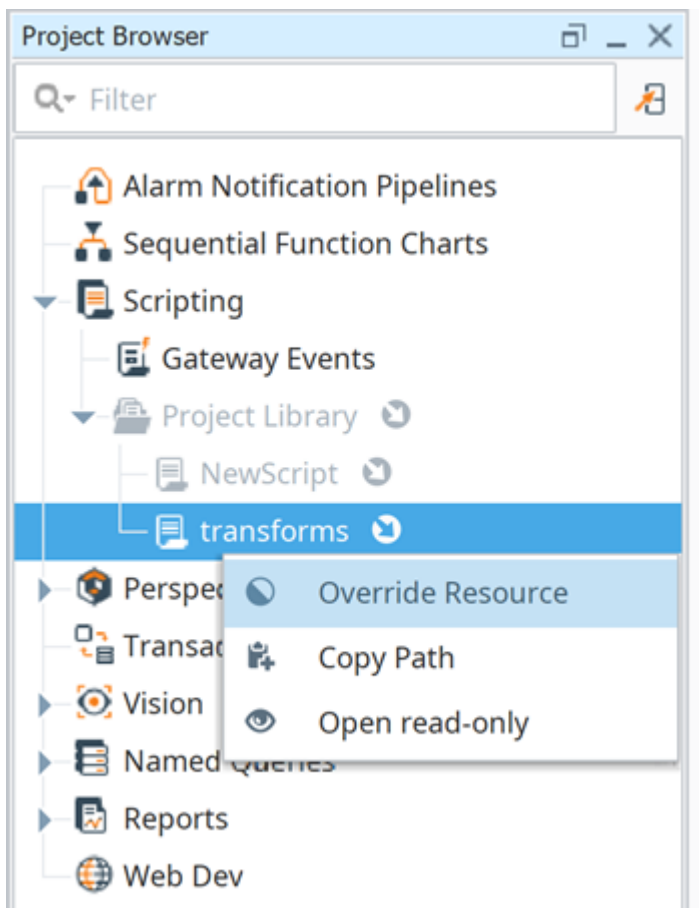
The following resources are considered "runnable":

- Gateway Event Scripts
- Alarm Notification Pipelines
- Sequential Function Charts (SFC)
- Transaction Groups

Overriding Inherited Resources

To edit a resource in an inherited project, you need to override the resource by right-clicking the resource and selecting **Override Resource**. By overriding the inherited resource, the resource is recreated in the inherited project, and any future changes made to the original project resource will not propagate down to the inherited resource.

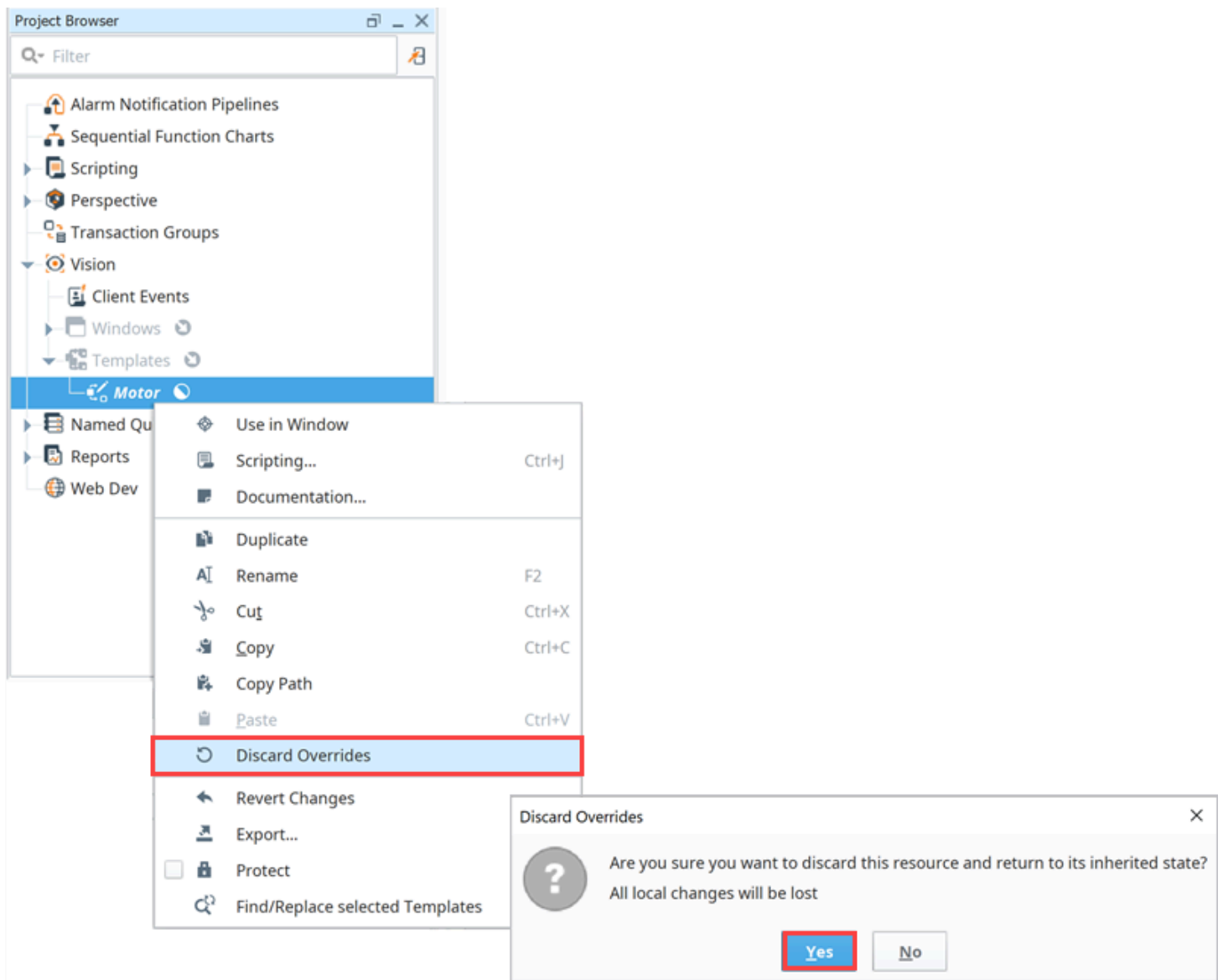
If new resources are added in the parent project, they will automatically propagate down to inherited projects. New resources that are added in the inherited project will initially display grayed out. You will need to override each new resource to edit it.



Discarding Inherited Resource Overrides

Changed in 8.1.26 The Discarding Overrides function was previously represented by selecting a Delete option in the right-click menu. Since this selection results in the resource being grayed out to prevent editing, the function name was updated to Discarding Overrides for clarity.

Changes made to inherited resources that have been overridden can be discarded. Selecting **Discard Overrides** removes the override placed on the inherited resource. The inherited project resource will return to its original state inherited from the parent project (without your edits), and the resource becomes grayed out in the Project Browser with the Inherited Resource icon. To discard the override on an inherited resource, right-click on the resource and select **Discard Overrides**. A dialog box will pop up confirming you want to discard the resource.



Renaming an Inherited Resource

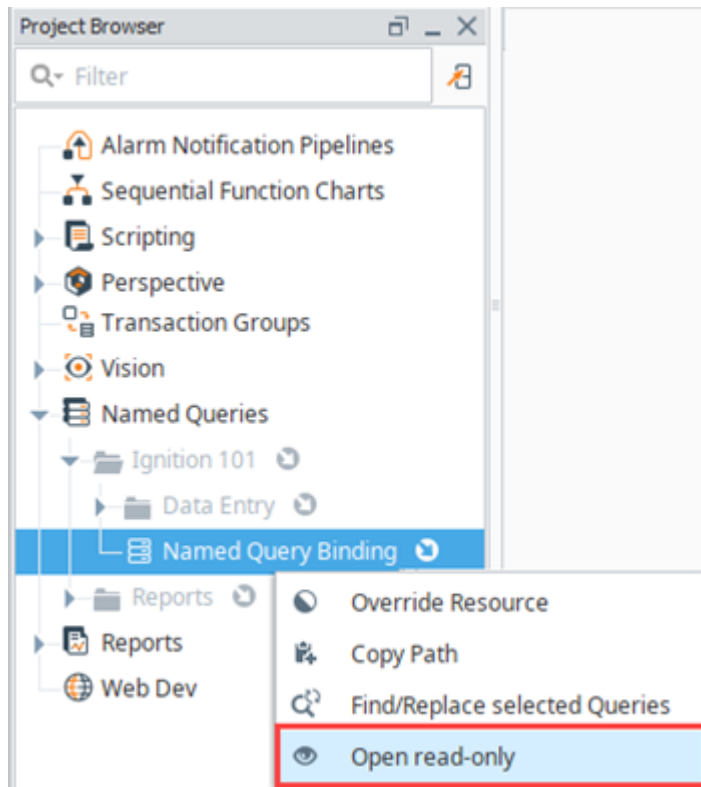
You can easily rename an inherited resource, but beware that when you rename a resource, the inheritable project will propagate the original resource to the inherited project. For example, say you have an inheritable project resource named 'Map_Transform' and you renamed it to 'CA_Map_Transform.' Ignition knows that the original project resource is no longer there, and because the project is flagged as inheritable, it will propagate that original resource to the inherited project. Now you have both the renamed 'CA_Map_Transform' and the original inheritable resource 'Map_Transform.'

Opening Read-only Named Queries

New in 8.1.26 Overriding an inherited Named Query used to be the only way to view the Named Query, even if you did not want to make any changes.

This option is still available (and will allow you to edit the Named Query), but you can now select the **Open read-only** option from the Named Query right-click menu to view the Named Query Settings,

Authoring, and Testing tabs. Since the read-only option does not allow changes, you'll notice the Inherited Resource  icon remains next to the selected Named Query.



Inheritable Project Examples

There are many ways how you might want to configure and organize your inheritable projects. It's whatever works best for your organization and design projects. Here are a couple of common ways to organize your shareable resources.

- You can create one inheritable project that contains many project different resources: scripts, pipelines, views, templates, windows, SFCs, etc. This is one inheritable project containing all your inheritable project resources.
- Another option is to create several inheritable projects. You can have one inheritable project dedicated for each type of resource: one for scripts, one for views, one for templates, one for pipelines, etc.

Project Export

When a **project is exported** from the Designer you can choose to export strictly local resources or all resources (including those inherited). Exporting inherited resources is a great way to create a "flattened" project export, containing all resources used by the project regardless of which project the original resources are located in.

Note that **exporting a project from the Gateway**'s UI will only export a project's local resources, and not contain inherited resources.

Project Templates

When you [launch the Designer](#), you will be presented with the Open/Create Project window. This window lets you hit the ground running almost immediately by populating a few fields, the most important ones being your project Name and Title. You can use the defaults in the remaining fields and change them in the **Config > Project** page later, but don't overlook the **Project Template** field. Ignition provides several project templates for you to choose from to help you quickly get started developing your project in either Perspective or Vision. The templates get you started with a basic navigation structure and let you add more items as your project matures. Additional project templates can be found on the [Ignition Exchange website](#).

NOTE

You must be connected to the Internet in order to see the templates available in the Project Template list.

[← Back](#)

New Project Setup

Project Settings

Project Name

Project Title

Description

Project Template

Parent Project

☐ Inheritable Project ⓘ

Connection Settings

User Source

Default Database

Default Tag Provider

Identity Provider

[Cancel](#)[Create New Project](#)

Perspective Project Templates

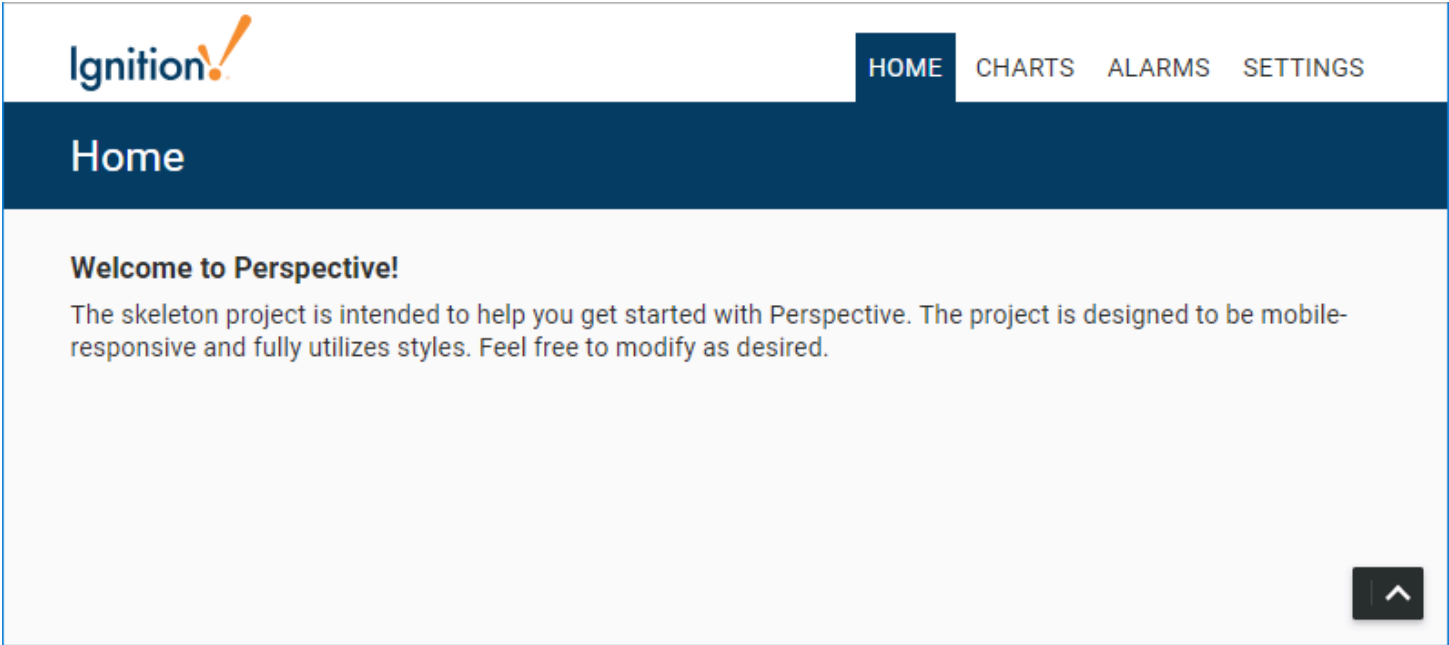
Here are two Perspective Project Templates you can choose from to get you off to a quick start: **Menu Nav** and **Web Nav**.

The Perspective Menu Nav and Web Nav templates contain several pre-defined views: Home, Charts, Alarms, and Settings. These views can easily be edited by selecting the view in the Project Browser and editing its Props to anything you want them to be. You can also go to the [Page Configuration](#) and edit the page configuration settings and docked view properties.

The images below show what the Menu Nav and Web Nav look like in a Perspective Session.

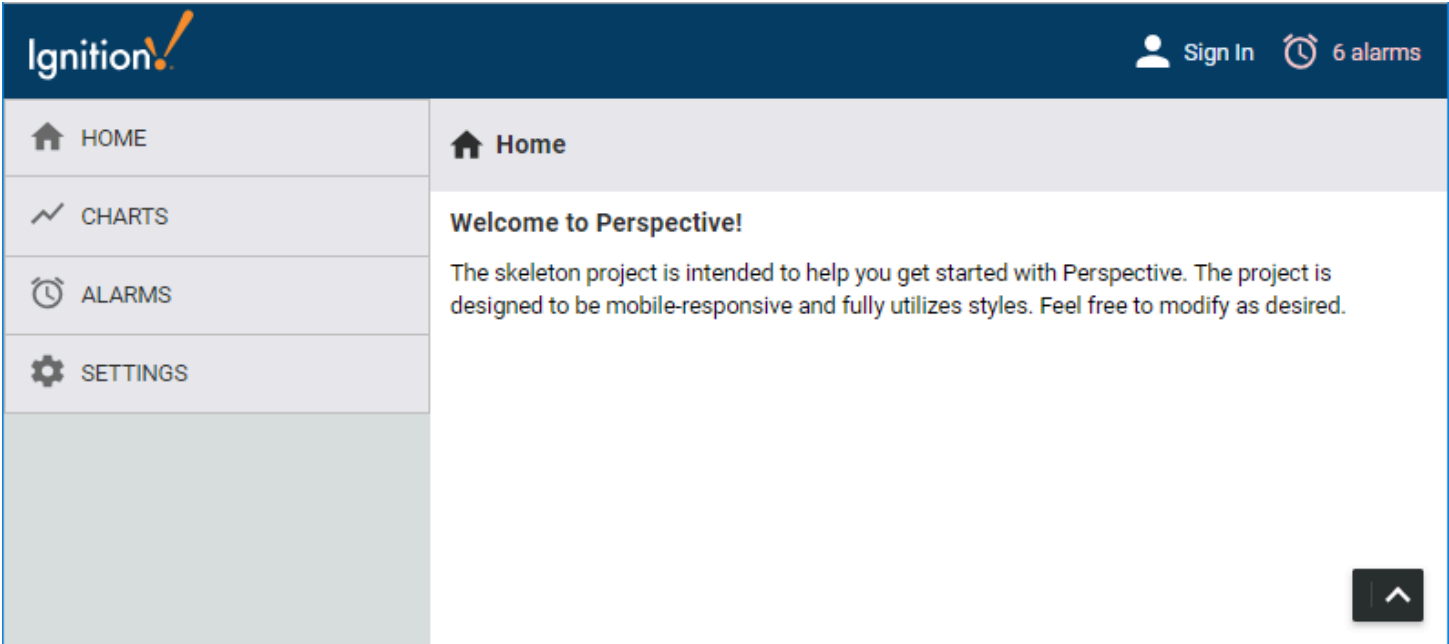
Web Nav

The Web Nav is good for small size project structures where you only have a few main Views. It allows you to navigate the areas of your project using the tabs at the top of the screen. It has a docked view that contains tabs that are always open to do navigation, and the main view which fills the rest of the space. It is a flat structure similar to the what you see on many webpages.



Perspective Menu Nav

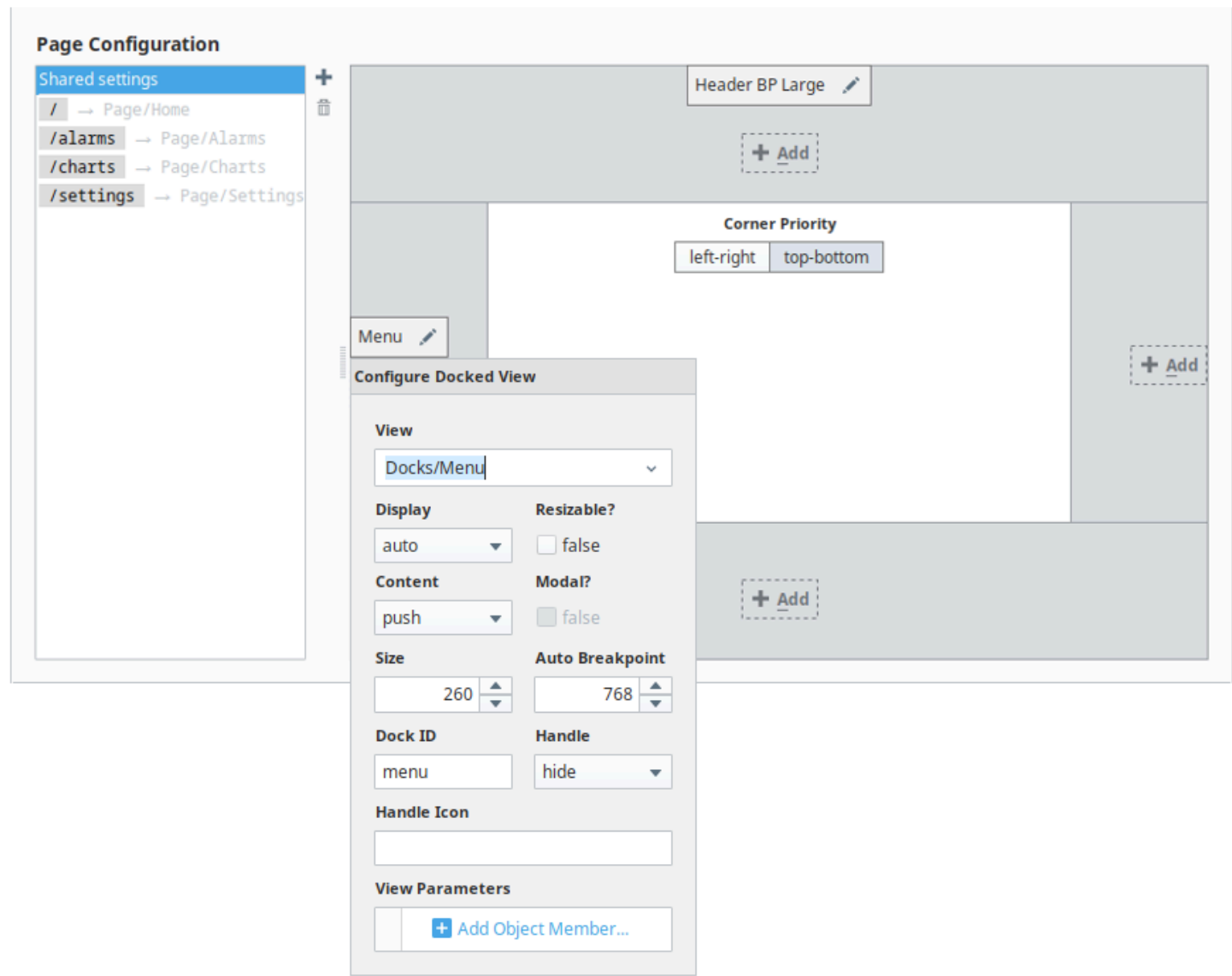
The Menu Nav template is a hierarchical view of groups of information that can be configured to expand submenu branches and menu items and is docked on the left side of the screen. The Menu Nav is good for medium and large project structures because you can expose important information at a glance and allow users to navigate and expand submenus if any exist. The menu automatically hides itself on smaller screens devices.



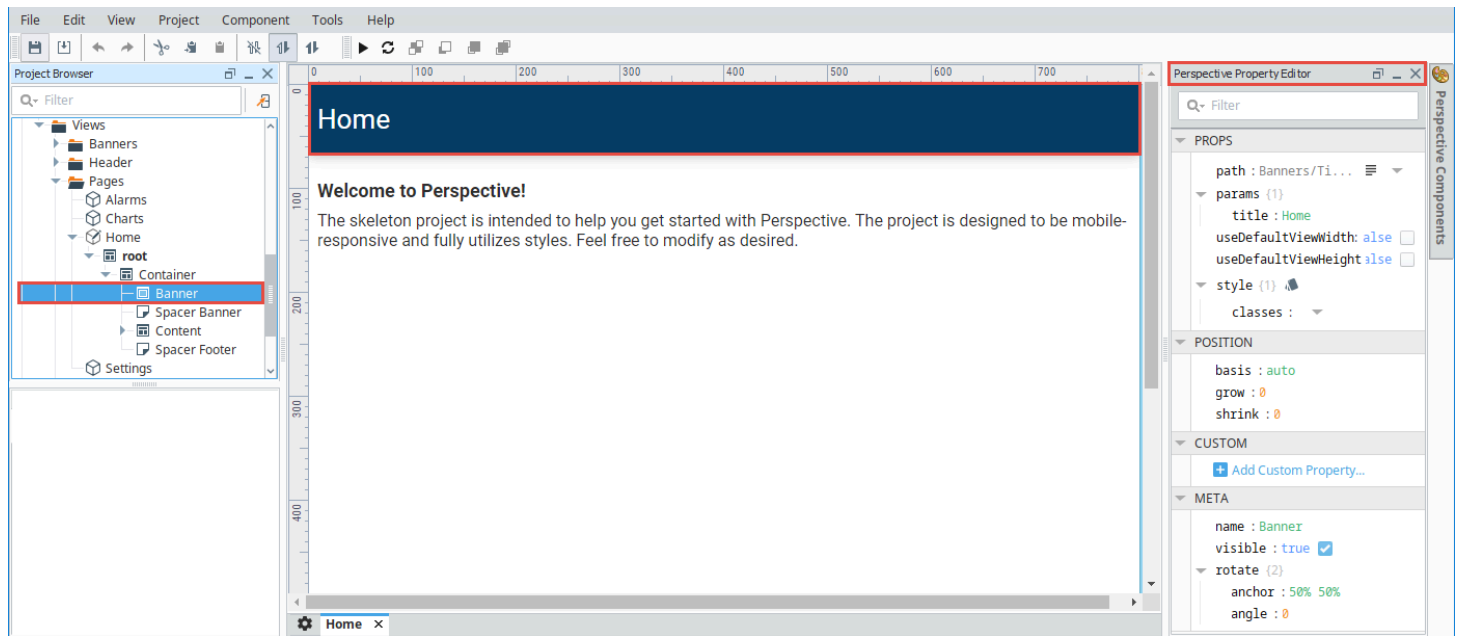
Editing Properties and Page Configuration Settings

To edit the Menu Nav and Web Nav menus, first you have to have pages configured in your project. Once you have pages configured, you can go to the Navigation view in the Project Browser, select the component and change the corresponding component props in the Perspective Property Editor to add, remove, or update the menu items.

Page Configuration Settings



Project Browser and Project Editor

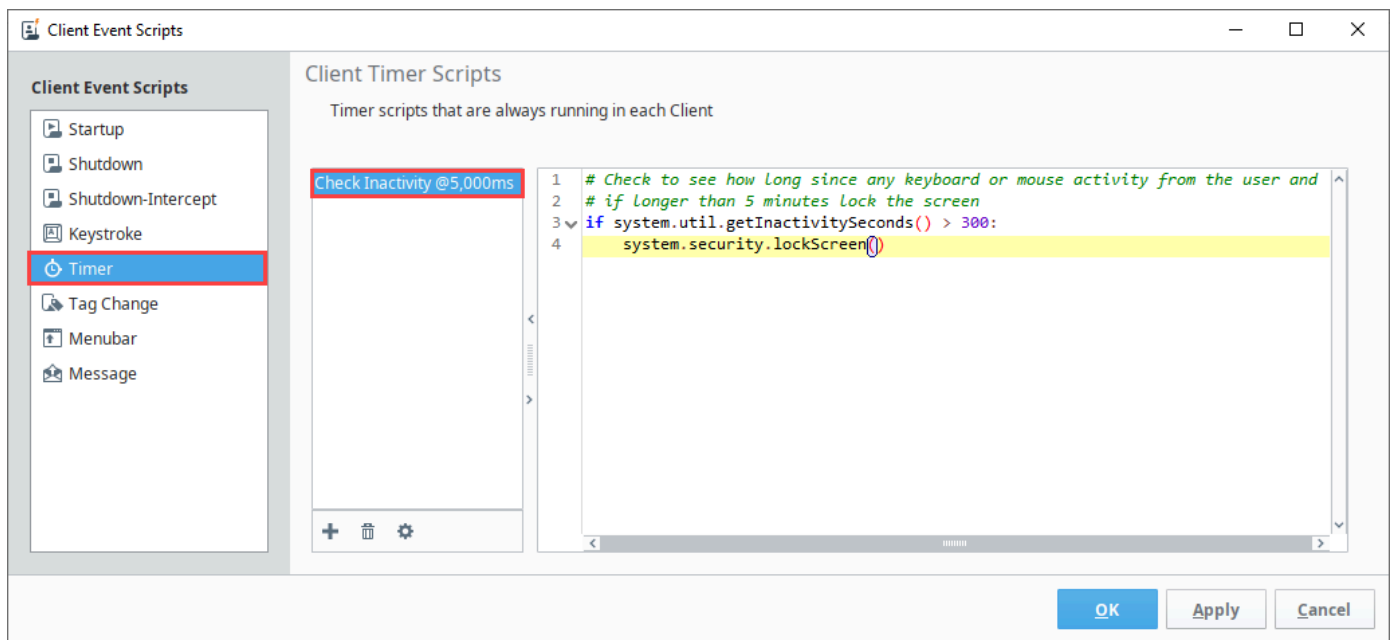


Vision Project Templates

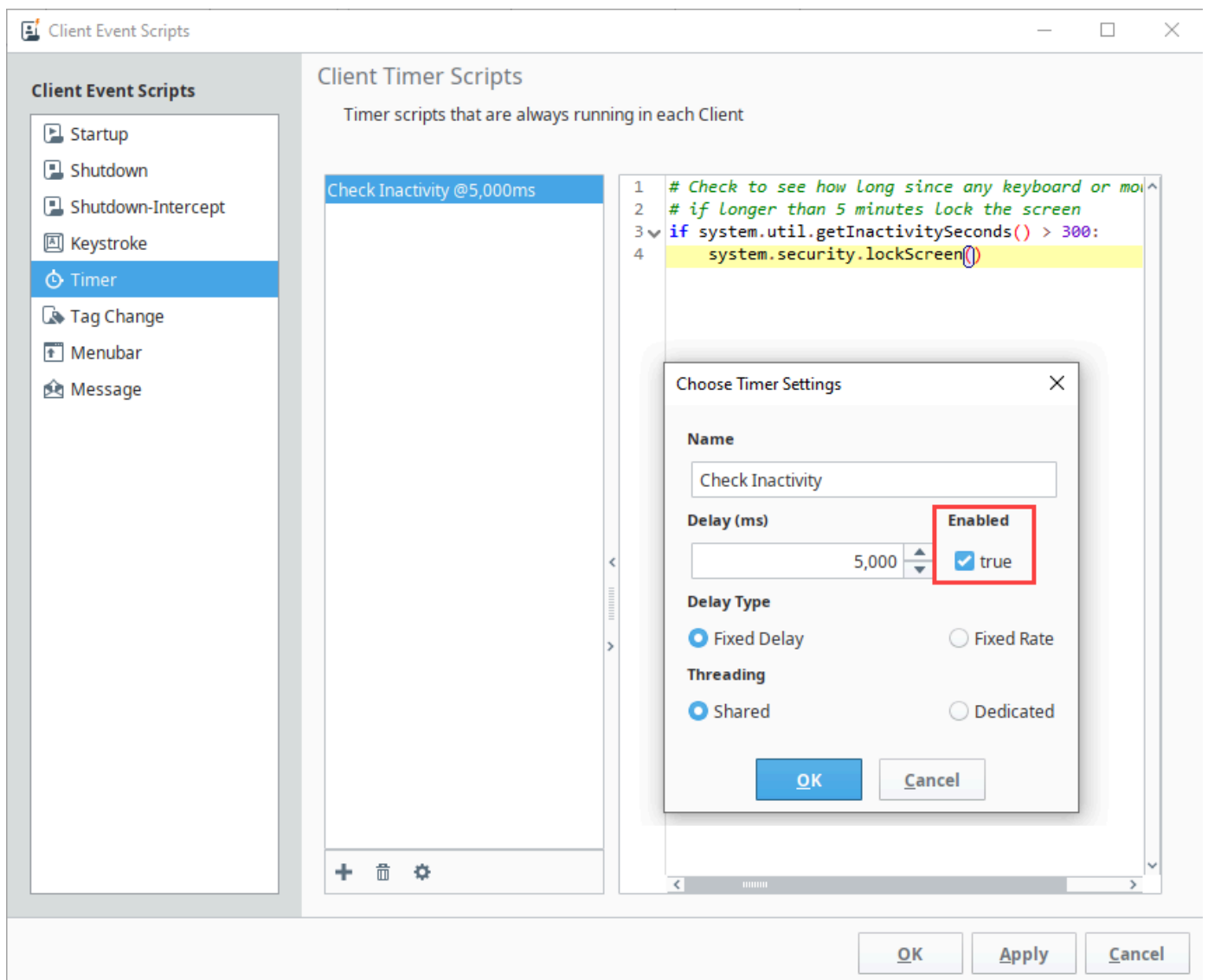
There are three Vision Project Templates to choose from to help kick start your project: **2-Tier Tab Nav**, **Tab Nav**, and **Tree Nav**. The Vision templates, just like the Perspective templates, contain several pre-defined menu objects. These objects can easily be edited by selecting the object in the Project Browser by editing its properties and changing them to anything you want them to be.

The templates also include an automatic screen lock **Client Event Timer** script that checks for inactivity of the client every 5 seconds and locks the screen after 5 minutes of inactivity. This script is enabled by default. Refer to the following steps to disable or delete this script:

1. Launch the project where you would like to disable the lock functionality.
2. Click **Project** on the Designer menu bar and select **Client Events**.
3. Select **Timer**. You'll now see the **Check Inactivity @5,000ms** script listed.



4. If you only want to disable the script, double-click the script name and uncheck the Enabled field. If you no longer want the script, you can select it and then click the Trash  icon to remove it.



5. Save your project to apply changes.

Tab Nav

The Tab Nav is good for small size project structures where you only have a few main windows. It allows you to navigate the areas of your project using the tabs. The Tab Nav project template has a docked window that contains tabs that are always open to do navigation, and the main window which fills the rest of the space.

✓ VTabNav - Alarms

CommandWindowsHelp

Ignition

by Inductive automation

OverviewAlarmsEmpty

Current Time: 04/15/2019 04:33 PM

6 Alarms

Logged In: admin

Lock Screen

Switch User

Logout

⚠ Alarms

☐	Active Time	Display Path	Current State	Priority
☐	4/12/19, 12:22 PM	Turbine Number 200 located at Livermore, CA	Active, Unacknowledged	High
☐	4/12/19, 12:22 PM	Turbine Number 100 located at Folsom, CA	Active, Unacknowledged	High
☐	4/12/19, 12:22 PM	Turbine Number 150 located at Folsom, CA	Active, Unacknowledged	High
☐	4/12/19, 12:22 PM	Turbine Number 300 located at Fresno	Active, Unacknowledged	High
☐	4/12/19, 12:22 PM	F Temp/Alarm	Active, Unacknowledged	Low
☐	4/15/19, 4:31 PM	VFD Motors/VFD Motor 1/Amps/Below Setpoint	Active, Unacknowledged	Low
☐	4/15/19, 4:29 PM	VFD Motors/VFD Motor 1/Amps/Below Setpoint	Cleared, Unacknowledged	Low
☐	4/15/19, 4:30 PM	VFD Motors/VFD Motor 1/Amps/Below Setpoint	Cleared, Unacknowledged	Low
☐	4/15/19, 4:30 PM	VFD Motors/VFD Motor 1/Amps/Below Setpoint	Cleared, Unacknowledged	Low
☐	4/15/19, 4:31 PM	VFD Motors/VFD Motor 1/Amps/Below Setpoint	Cleared, Unacknowledged	Low
☐	4/12/19, 12:22 PM	Turbine Number 400 located at San Diego	Cleared, Acknowledged	High
☐	4/12/19, 12:22 PM	Turbine Number 10 located at North	Cleared, Acknowledged	High
☐	4/12/19, 12:22 PM	Turbine Number 155 located at Folsom, CA	Cleared, Acknowledged	High
☐	4/12/19, 12:22 PM	Test/Boolean Tag/Above Normal	Cleared, Acknowledged	Low

AcknowledgeShelve

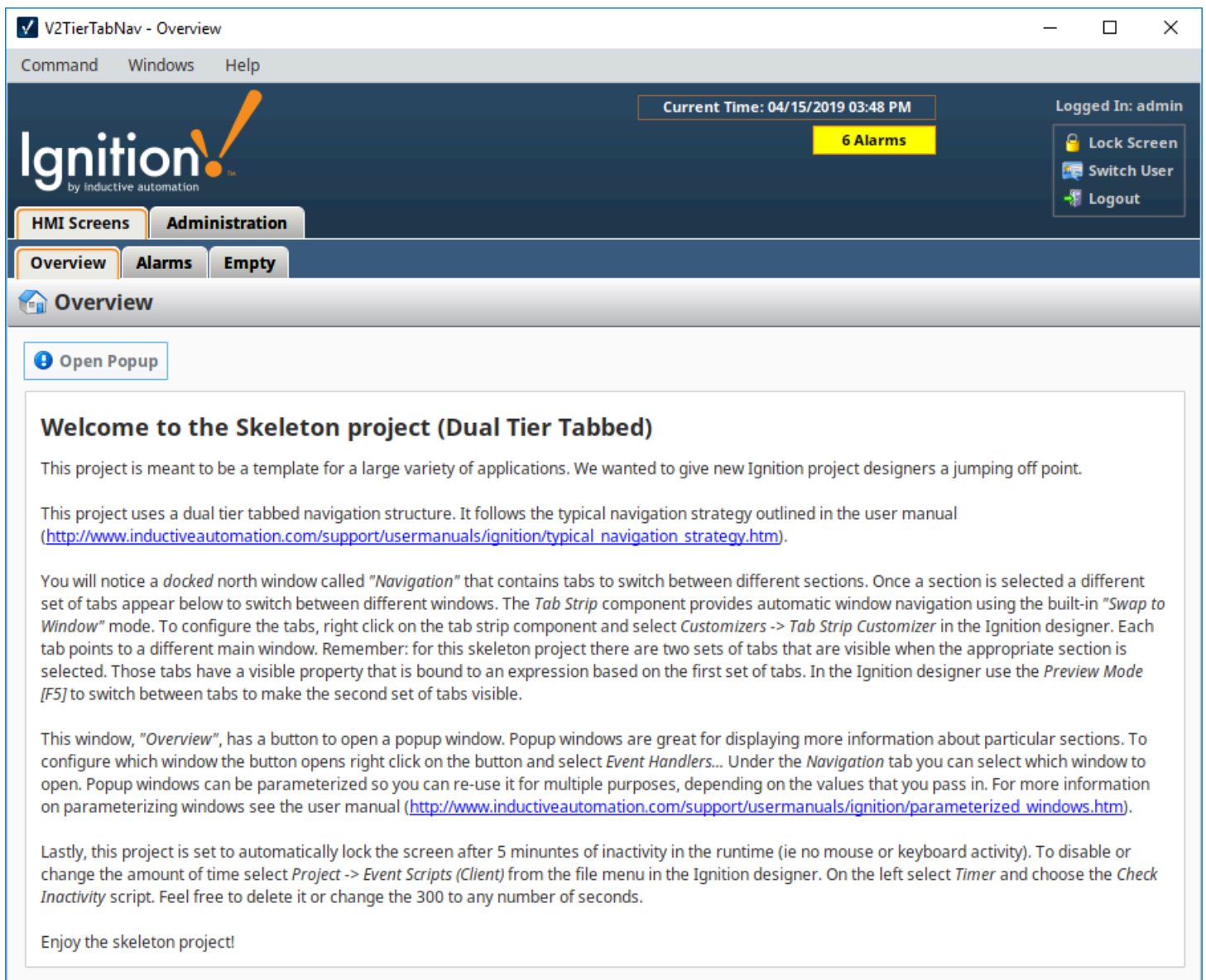
🔍

📄

📅

2-Tier Tab Nav

2-Tier Tab is good for small and regular size project structures where windows are grouped. The Tab Nav project template is similar to the Tab Nav template only it has a second tier of tabs added. It contains a second level of tabs allowing you to navigate around various areas of your project. The 2-Tier Tab Nav project template has a docked window that contains tabs that show and hide based on selection that are always open to do navigation, and the main window which fills the rest of the space.



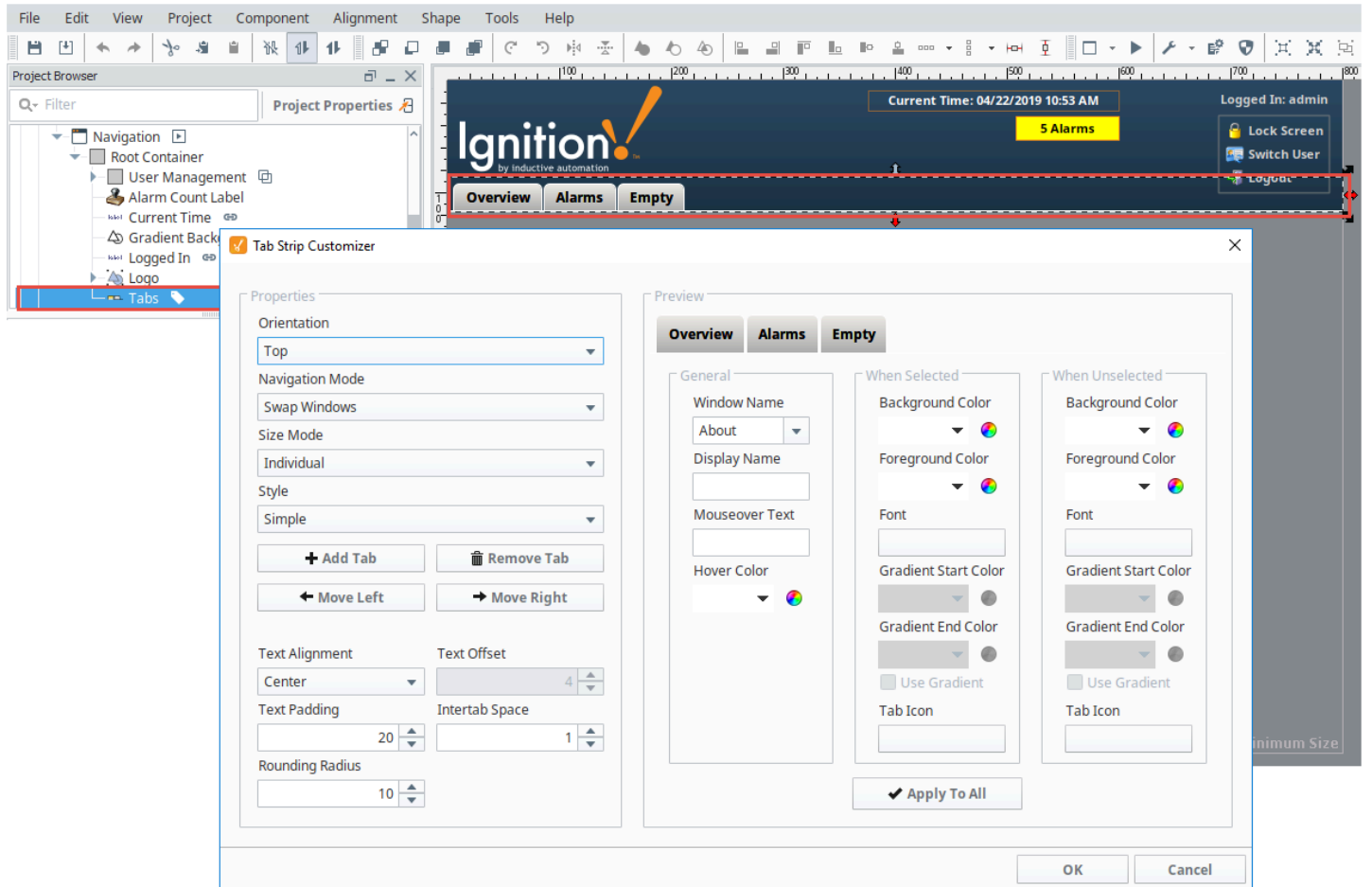
Tree Nav

The Tree Nav project template is a hierarchical view of groups of information that can be configured to expand submenu branches and menu items and is docked on the left side of the screen. It is great for medium and large project structures because you can view the entire project structure at a glance allowing you to navigate to any structure within the tree view. The tree structure uses folders to group main windows, and can be as many levels deep as you need.



Adding Windows to the Navigation

To edit the Tab Nav and Tree Nav menus, you need to edit the properties of the navigation components. You can go to the Navigation window in the Project Browser, select the Tab Strip, and open the Tab Strip Customizer to change the corresponding component props to add, remove, or update the menu items.

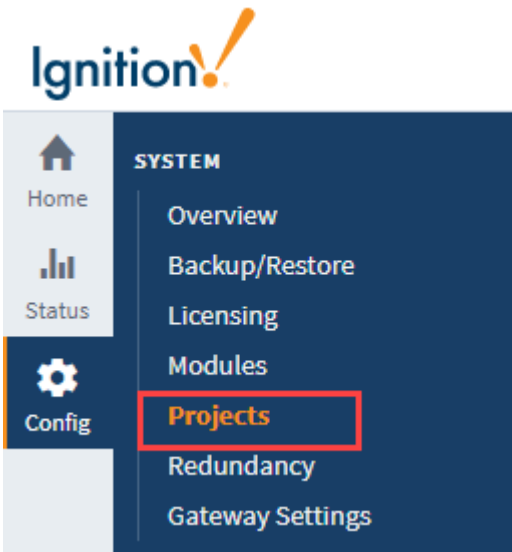


Project Settings

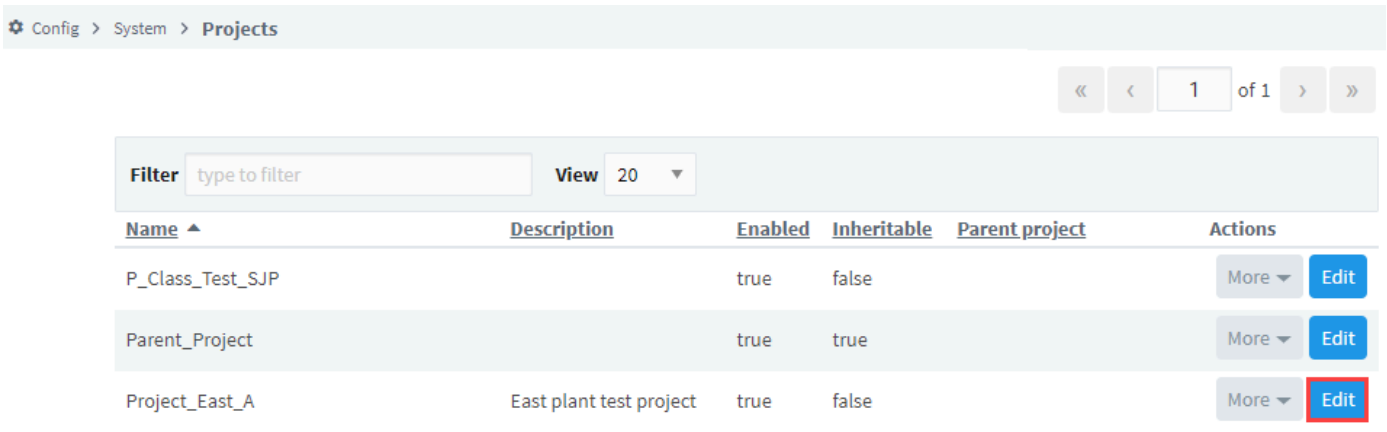
Project Settings

When you create a new project, the Open/Create Project window captures most of the project settings. See [Creating a Project in the Designer](#). If you want to view or edit your project settings once your project is saved:

1. Go to the Config section on the Gateway Webpage and select **System > Projects**.



2. Click on the **Edit** to the right of the project name.



Now the Project Settings page is displayed.

SYSTEM

- Overview
- Backup/Restore
- Licensing
- Modules
- Projects**
- Redundancy
- Gateway Settings

NETWORKING

- Web Server
- Gateway Network
- Email Settings

SECURITY

- Auditing
- Users, Roles
- Service Security
- Identity Providers
- Security Levels
- Security Zones

DATABASES

- Connections
- Drivers
- Store and Forward

ALARMING

- General
- Journal
- Notification
- On-Call Rosters
- Schedules

Project Settings

Name *	Project_East_A Choose a name to identify this project.
Description	East plant test project
Title	 The title for the project. This can contain more characters than the name (space, etc), and will be used to represent the project to users. If empty, the name will be used.
Enabled	☒ A disabled project will not be active on the Gateway, but will remain editable in the Designer.
Inheritable	☐ Inheritable projects are not runnable as a stand-alone project, but are intended to provide shared resources to one or more child projects.
Parent Project	Project_West_Templates

Connections

User Source	default
Default Database	DB
Default Tag Provider	default

Project Settings Table

Project Settings

Property	Description
Name	Name of the project (read only).
Description	Brief description of the project (optional). This description can be viewed on the Open/Create Project screen when you hover over the Information  icon.
Title	Title for the project (optional). This is the name that will be displayed on the launch page of the Gateway and in the runtime Client or Session. There are no restrictions to special characters or spaces. If no title is specified, the project name will be used instead.
Enabled	A disabled project will not be active on the Gateway, but will remain editable in the Designer.
Inheritable	Inheritable projects are not runnable as a stand-alone project, but are intended to provide shared resources to one or more child projects.
Parent Project	Each project can have a parent project, and will inherit all of the resources of that parent project.

Connections

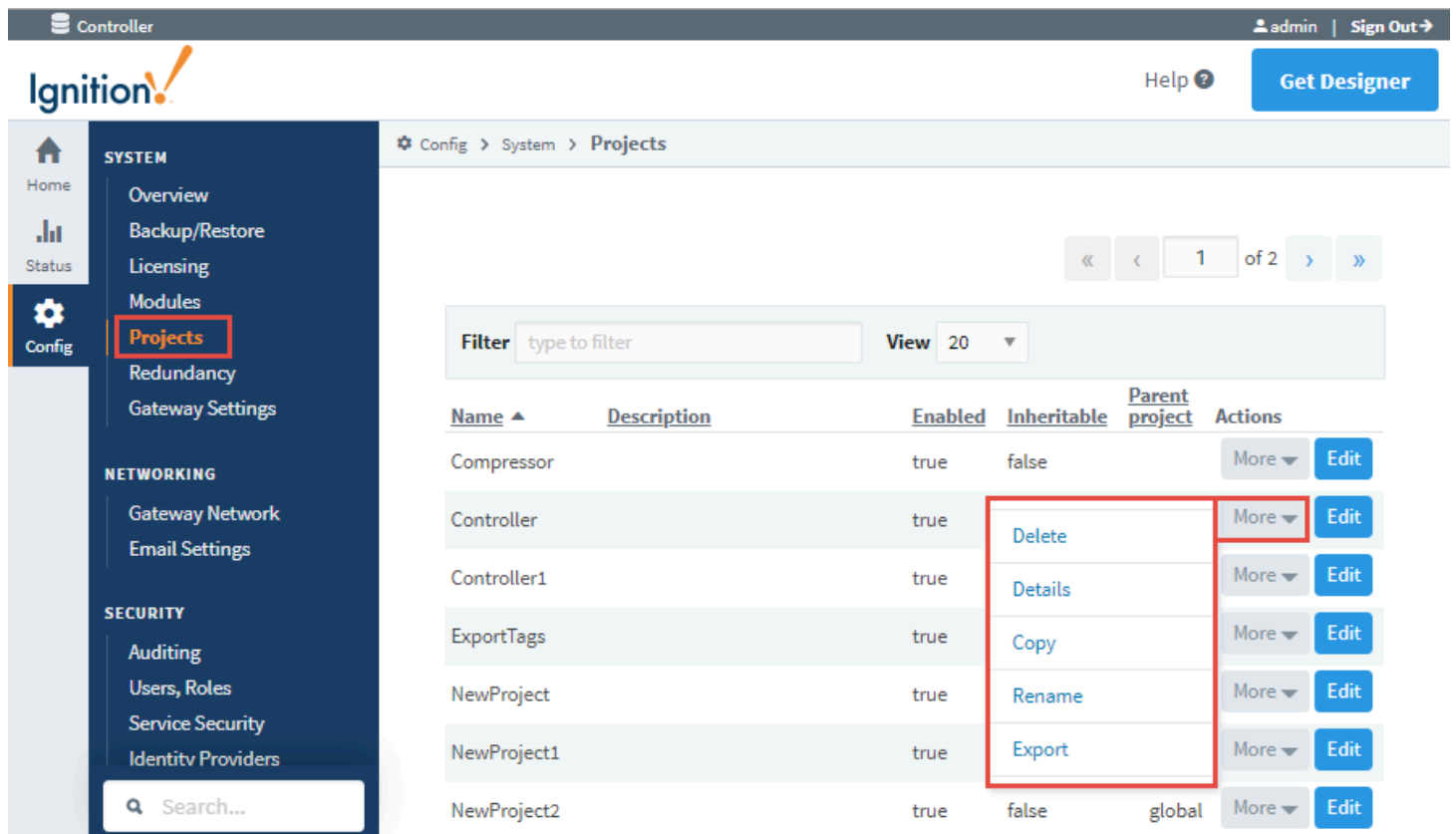
Property	Description
User Source	A group of users with their associated roles. Security policies are defined in terms of these roles.
Default Database	Database to be used for historical data logging, reporting, storing alarm logs, and Tags storage. You can also query existing data and update data in the database.
Default Tag Provider	Identifies a Tag database (a collection of Tags) and a name.

Managing Projects

Once you have a project or two (or twenty) set up, you might want to change some of the base settings. You can manage the projects from the Config section of Gateway by going to **System > Projects**. The Projects window displays all your projects. To the right of the project name, click the **More** button, and here you can Edit, Delete, view Details, Copy, Rename or Export your project.

NOTE

You can manage many of these settings in the Designer. See the [Project Properties](#) page for more information.



The screenshot shows the Ignition Gateway web interface. The top navigation bar includes the Ignition logo, a 'Help' button, and a 'Get Designer' button. The left sidebar contains a 'Config' section with a 'Projects' link highlighted. The main content area shows the 'System > Projects' configuration page. A table lists projects with columns: Name, Description, Enabled, Inheritable, Parent project, and Actions. The 'Controller' project is selected, and its 'More' button is clicked, showing a dropdown menu with options: Delete, Details, Copy, Rename, and Export. The 'Details' option is highlighted.

Name	Description	Enabled	Inheritable	Parent project	Actions
Compressor		true	false		More Edit
Controller		true			More Edit
Controller1		true			More Edit
ExportTags		true			More Edit
NewProject		true			More Edit
NewProject1		true			More Edit
NewProject2		true	false	global	More Edit

Viewing the Details of a Project

To view the project details, go to the Config section of the Gateway webpage, and select **System > Projects**. Find your project, press the **More** button to the right of the project name, and select Details. The Details link on the Project window takes you to the Project details for <Project Name> page where you can choose to view the Project Settings.

Editing a Project

To edit some of the project settings, go to the Config section of Gateway, and then to **System > Projects**. You will see a list of all your projects. Click **Edit** to the right of project name in the list. The

Project - Edit page is displayed. You can now change some of the project settings such as project Description, Title, Enabled, etc. You can also change connections to the User Source, Default Database, and Default Tag Provider.

RECOMMEND CHANGING THE TITLE, NOT THE PROJECT NAME

It is not advisable to change the Project Name after it's been created, instead, change the Title property if you want to change how the project appears. Shortcuts that refer to the project will no longer work if the project name is changed.

Many of these settings can be modified in the Designer too, but it is important to note that you cannot change any of these project settings from the Gateway if the project is currently open in a Designer.

Deleting a Project

Be aware that once you delete a project, it cannot be undone, a deleted project is gone forever (unless it can be recovered from a project export, or a Gateway backup). Always make a [project export](#) or [Gateway Backup](#) before deleting a project. To delete a project, go to the Config section of Gateway, and then to **System > Projects**. You will now see a list of all your projects. To the right of the project name in the list, look for **Delete** and click on it. This deletes your project.

Copying a Project

Copying your project is useful when you need a snapshot of a project before starting major changes, or for creating a starting point for a new project based on an old one. To copy a project, go to the Config section of Gateway, and then to **System > Projects**. You will now see a list of all your projects. To the right of the project name in the list, click **Copy**. This creates a copy of your project.

Renaming a Project

Changing the name of a project is risky. Shortcuts that refer to the project will no longer work. It is advisable to change the Title which is much safer. If you decide to rename a project, go to the Config section of Gateway and then to **System > Projects**. To the right of the project name in the list, click **Rename**. This will open a Rename Project window. Read it carefully, and if you want to proceed, enter a new project name, mark the checkbox acknowledging that the project will shutdown and restart, then click **Save**.

Rename Project

Warning: Changing the name of a project is risky, as shortcuts that refer to this project will no longer work. Changing the Title is safer.

Project Name

Controller

☒ I understand that renaming my project will trigger a project shutdown and restart.

Save

Cancel

i NOTE

Renaming a project triggers a project shutdown and restart.

Exporting a Project

Project Export is a project backup. It takes less time than a Gateway backup and it's smaller. This exports your project as a `.zip` file. Once you have an exported file of your project, you can take it to any other Gateway and merge it in with other projects. Refer to the [Project Export and Import](#) page to learn exactly what is included in a project export.

Project Export and Import



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Making Project Backups

[Watch the video](#)

Project backup and restoring from a project backup is referred to as Project Export and Import. Projects are exported individually, and only include project-specific elements shown in the list below. They **do not** include Gateway level configurations, like database connections, Tag Providers, and tags. The exported file (`.zip`) is used to restore / import a project.

The resources listed below are included in a project export.

- [Alarm Pipelines](#)
- [Named Queries](#)
- [Perspective Properties](#)
- [Perspective Views](#)
- [Project Properties](#)
- [Reports](#)
- [SFCs](#)
- [Transaction Groups](#)
- [Vision Client Tags](#)
- [Vision Windows](#)
- [Vision Templates](#)
- [Client Event Scripts](#)
- [Gateway Event Scripts](#)

There are two primary ways to export and import a project:

- **Gateway Webpage** - exports and imports the entire project.
- **Designer** - exports and imports only those resources that are selected.

This page describes how to create a project export and import a project from an exported file.

Project Export

A Project Export is a little smaller and takes even less time to run than a Gateway backup! Once you have an exported file of your project, you can take it to any other Gateway and merge it in with the other projects. This makes it simple to keep a development server and push your projects after you complete them. The [Enterprise Administration Module](#) can even do this for you. You can perform a project export from two locations, the Gateway Webpage and the Designer. This section describes how to create a project export from the Gateway Webpage and the Designer.

Export a Project from the Gateway

Making an export from the Gateway Webpage exports the entire project to a .zip file. The exported file only includes resources from the project. Notably missing from the project export are any Gateway resources, even if they are presented in the Designer such as Ignition Tags. They need to be exported separately. Refer to [Exporting and Importing Tags](#).

CAUTION

Remember that tags and Gateway level configurations (such as device connections, database connections, tags, etc) are not included in a Project Backup. Those resources are only exported in a [Gateway backup](#).

1. Go to the **Config** tab of the Gateway Webpage, and click on **System > Projects**.
2. The **Projects** screen will be displayed and you can see your existing projects. To the right of project name, click the **More** button and select **Export**. This exports your project as a `.zip` file. The exported file will have the project name, date, and a 4 digit unique number followed by the file extension (i.e., Compressor_2019-03-21_1123.zip).

Ignition! Help ? Get Designer

Config > System > Projects

Filter type to filter View 20

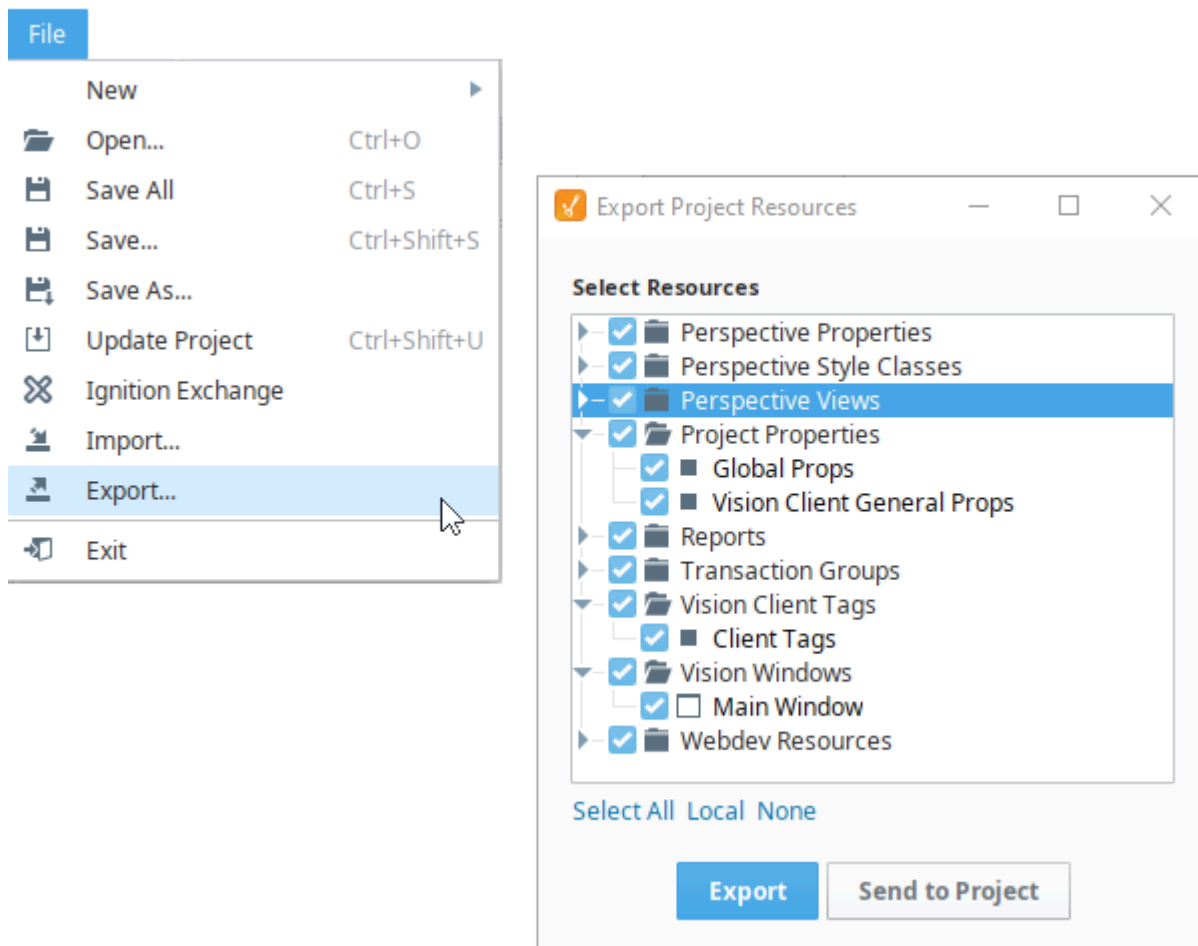
Name ▲	Description	Enabled	Inheritable	Parent project	Actions
Compressor		true			More ▼ Edit
Controller		true			More ▼ Edit
Controller1		true			More ▼ Edit
ExportTags		true			More ▼ Edit
NewProject		true			More ▼ Edit

- By default, the `.zip` file is saved in your web browser's default **Downloads** folder. This export of the project can be imported to any other instance of Ignition that is running the same version or later.

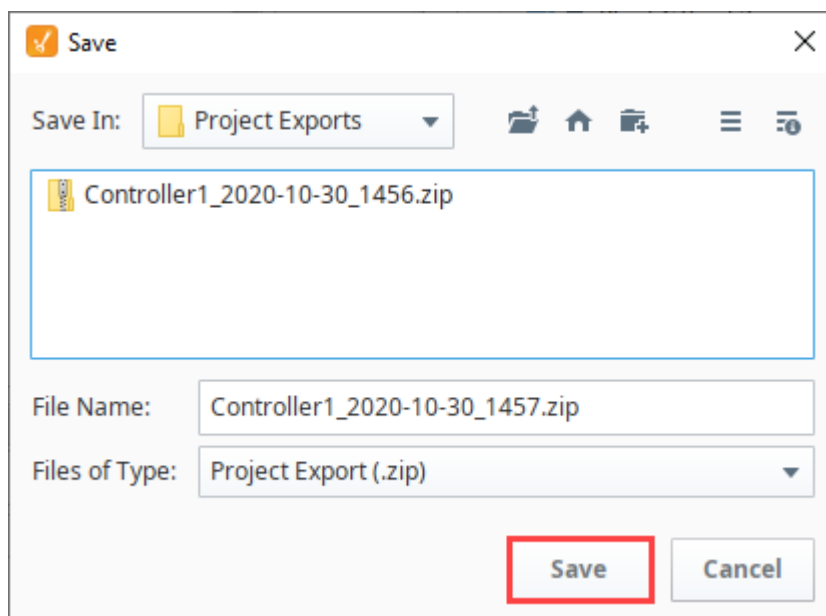
Export a Project from the Designer

When making a project export from the Designer, you get to choose which project resources are added to the export file. The export does not include any Gateway resources. When restoring a project export in the Designer, you also get to choose which project resources are restored into the currently open project from the exported `.zip` file.

- From the Designer, go to the top menubar, click on the **File** menu and select **Export**.
- The Export screen will be displayed and you'll see a list of project resources to export. By default, local project resources are selected. Unselect any resources you don't want to include in the export. When exporting a project, there is a **Send to Project** button that allows you to directly send the project (or resources in a project) to another project on the same gateway. There is a **local** project export option, meaning only local (non-inherited) project resources are selected and will be exported.
- Click **Export**.



4. This opens a Save dialog window. Select a folder and click **Save**.



5. This export of the project can be imported to any other instance of Ignition that is running the same version or later.

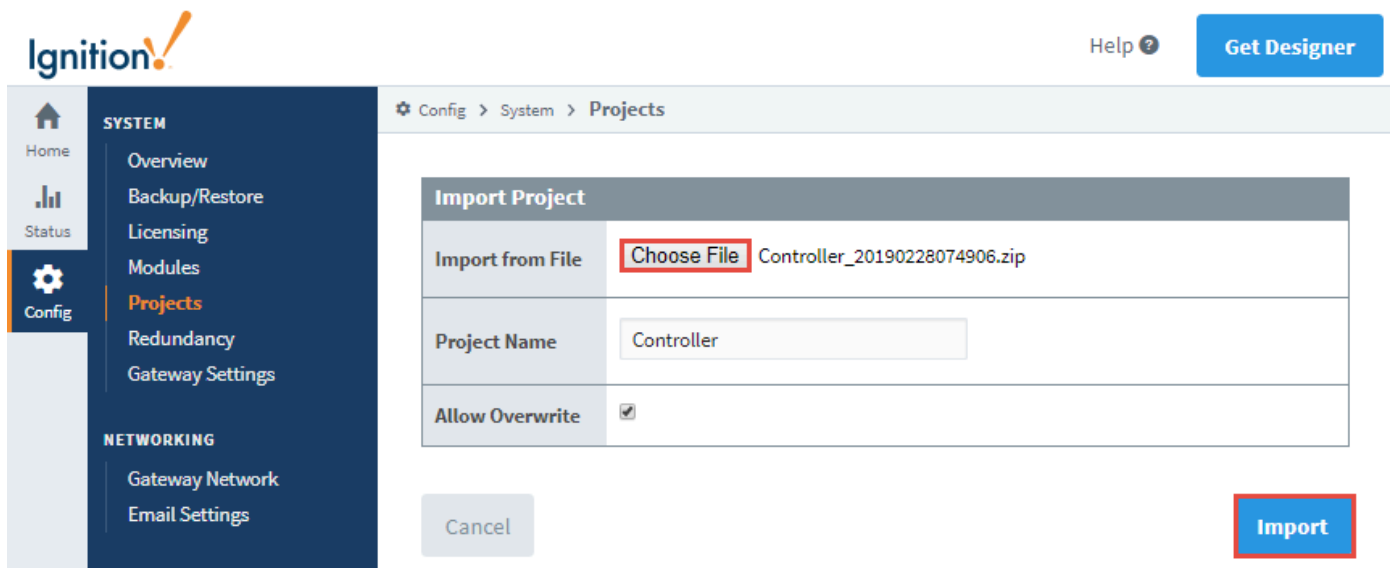
Project Import

When you restore / import a project from an exported file in the Gateway Webpage, it will be merged into your existing Gateway. If there is a naming collision, you have the option of renaming the project or overwriting the project. Project exports can also be restored / imported in the Designer. This will even allow you to select which parts of the project import you want to include and will merge them into the currently open project.

Import a Project from the Gateway Webpage

When restoring a project from the Gateway Webpage, Ignition imports the entire project from an exported file.

1. Go to the **Config** tab of the Gateway Webpage, and click on **System > Projects**.
2. The **Projects** screen will be displayed and you can see your existing projects. At the bottom of the screen, click the **Import project...** link.
3. A second Projects screen will open. Click on **Choose File**, find your exported .zip file from your browser, and then click **Open**.
4. Enter the **Project Name**. If there is already a project with the same name, the **Import button will be grayed out** preventing you from importing the file. The system gives you the option to **Rename** the project you want to import, or **Overwrite** the existing project.
5. Click **Import**.



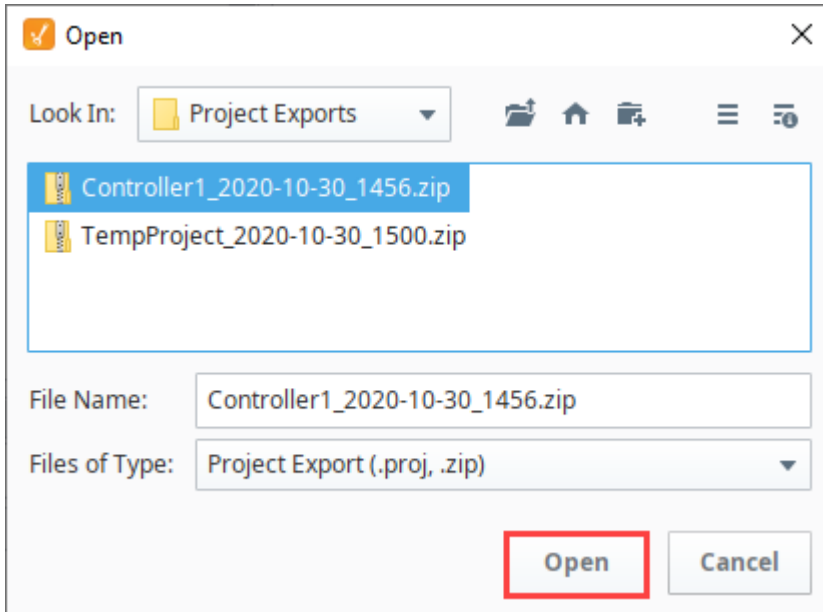
The screenshot shows the Ignition Gateway Webpage interface. On the left is a navigation sidebar with the Ignition logo at the top, followed by 'Home', 'Status', and 'Config' (which is highlighted). Under 'Config', there are two sections: 'SYSTEM' and 'NETWORKING'. The 'SYSTEM' section includes 'Overview', 'Backup/Restore', 'Licensing', 'Modules', 'Projects' (highlighted in orange), 'Redundancy', and 'Gateway Settings'. The 'NETWORKING' section includes 'Gateway Network' and 'Email Settings'. The main content area shows a breadcrumb trail: 'Config > System > Projects'. Below this is the 'Import Project' dialog box. It has three rows: 'Import from File' with a 'Choose File' button (highlighted with a red box) and the filename 'Controller_20190228074906.zip'; 'Project Name' with a text input field containing 'Controller'; and 'Allow Overwrite' with a checked checkbox. At the bottom of the dialog are two buttons: 'Cancel' and 'Import' (highlighted with a red box). In the top right corner of the webpage, there is a 'Help' link with a question mark icon and a blue 'Get Designer' button.

6. If you are importing a new project, you will see your new project added to the list along with the other projects.

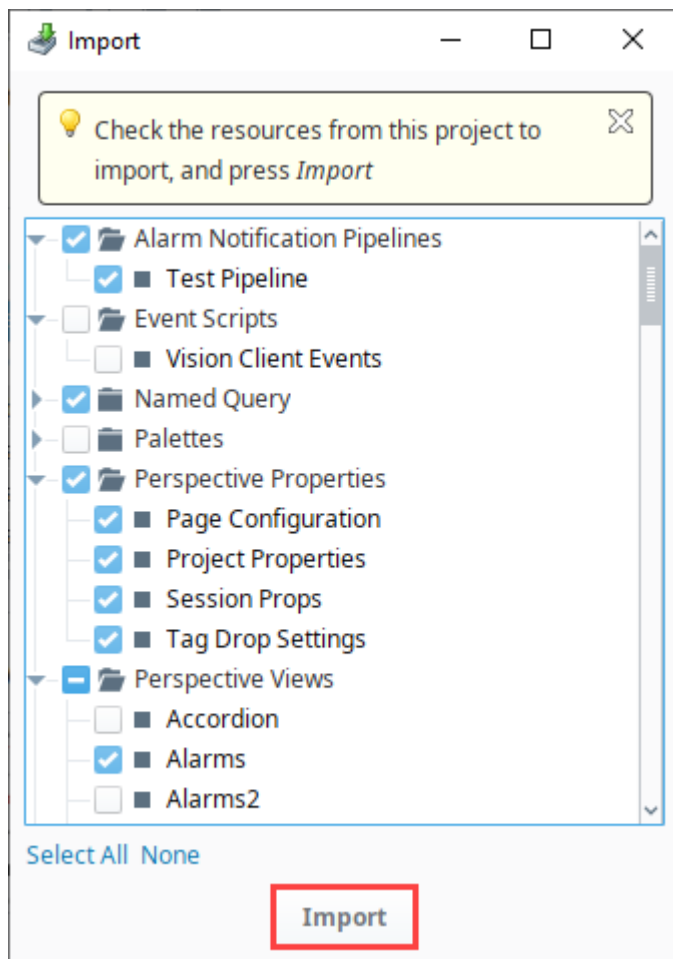
Import a Project from the Designer

When restoring a project from the Designer, you can select the entire project or parts of the project, and merge them into the one you are currently working on. Ignition will let you choose which resources to import.

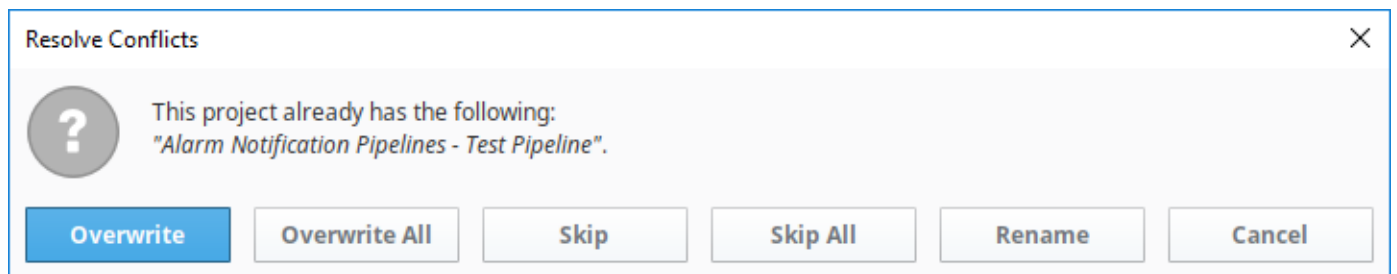
1. In Designer, select **File > Import**.
2. The dialog screen will open, select the project export file (.zip) from the default folder, and click **Open**.



3. By default, all resources are selected. Unselect the resources from the project that you do not want to import. Click the **Import** button.



4. If there are any conflicts when importing your project resources, a dialog box will appear and ask you to either **Overwrite**, **Overwrite All**, **Skip**, **Skip All**, **Rename** the affected items, or **Cancel**. Once all conflicts are resolved, **Save** your project.



Designer



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The Designer Launcher

[Watch the video](#)

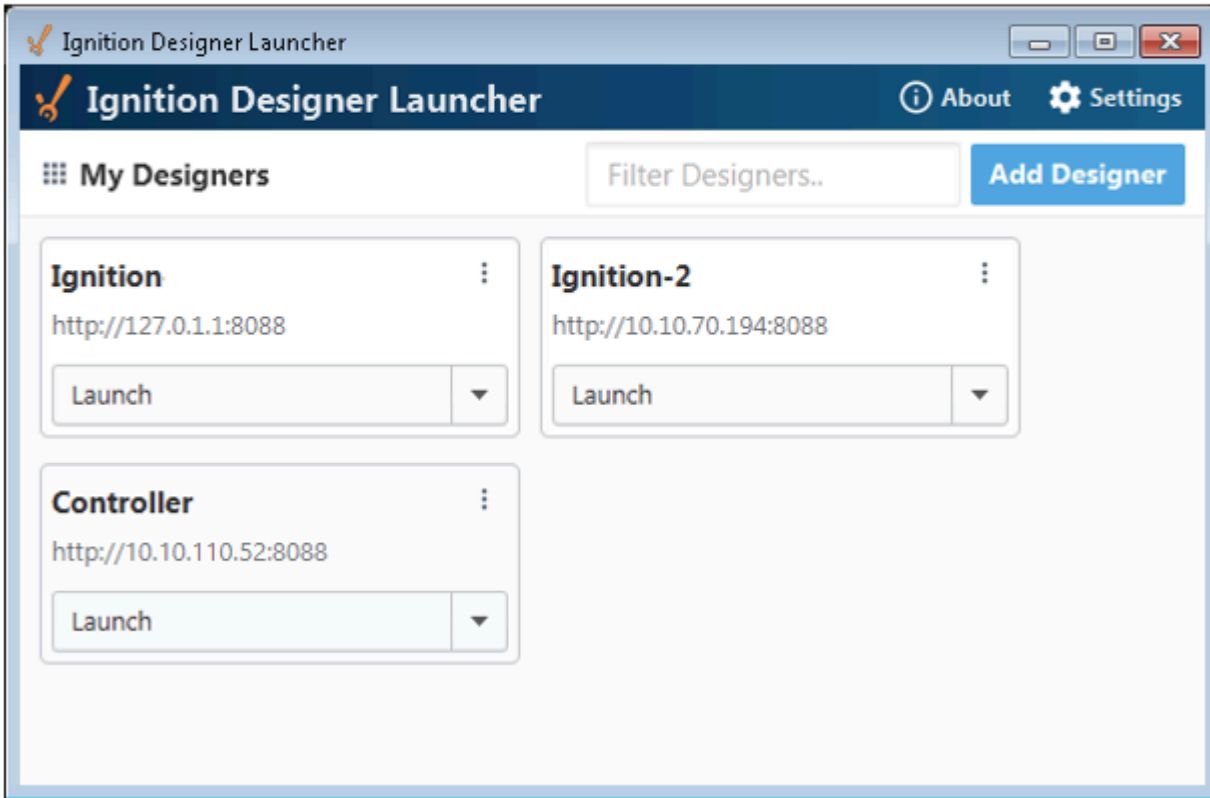
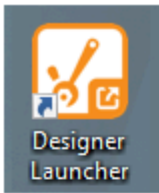
The Ignition Designer is where the majority of configuration and design work is done. The Designer uses web-launch technology to open and edit your projects. This is how you can configure your **Perspective** and **Vision** projects.

The Designer provides all the firepower to bring your projects to life. It uses a drag-and-drop configuration making screen development quick and intuitive. You can create user interfaces by dragging **Perspective components** onto a view, **Vision components** onto a window, and Tags onto your components to instantly bind data to tables, charts, and graphs. You can set up tags and **Transaction Groups** to log data to your databases. You can set up **Reports** to generate and save data however you'd like. The Designer saves all your projects to the Gateway so everything is controlled in one place.

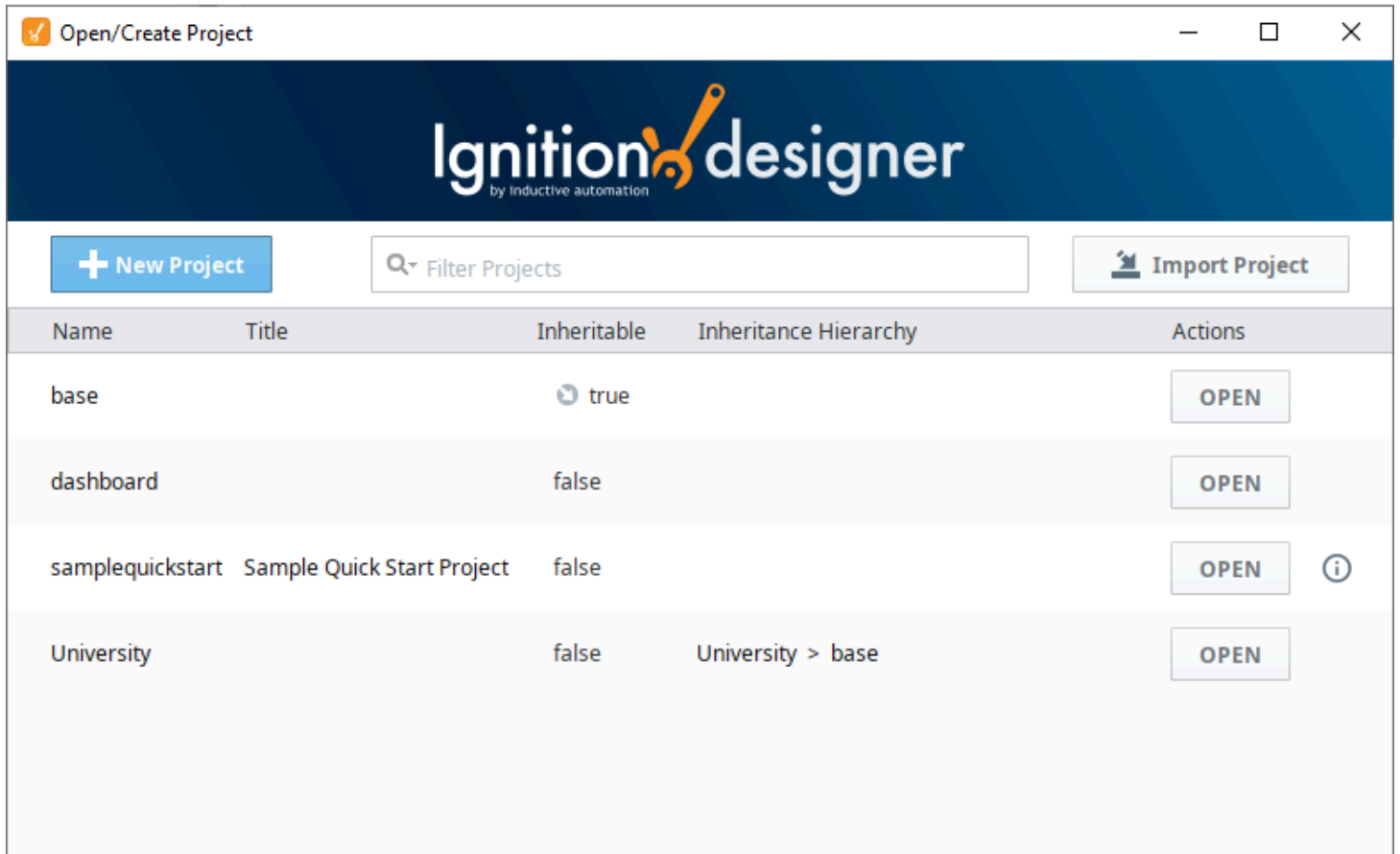
This page provides some good information about the Designer, Designer workspace, Tools, and how to create a project.

Opening the Designer

Opening the Designer requires running the **Designer Launcher**. Once the Designer Launcher is installed and configured, you'll have all your projects at your fingertips. If you created a desktop shortcut for the Designer Launcher at install, simply click to open it and select a Designer to open. From there you can create a new project, import a project, or open an existing project.



If you have a Designer that has projects that you work on regularly, you can create a shortcut to that Designer and keep it on your desktop. When you click on your shortcut, it opens the Designer, then click on the project you want to edit. Now you can hit the ground running designing your project!



Refer to the [Designer Launcher](#) page for downloading, installing, and configuring the Designer Launcher.

Creating a Project

The first step in working with a project is creating one. Once you launch the Designer, the Open/Create Project window is displayed where you will see any existing projects and the option to create a new project.

1. After opening the Designer, click on **Create a New Project** button. The following window will be displayed.

Open/Create Project

Ignition designer
by inductive automation

← Back

New Project Setup

Project Settings

Project Name

Project Title

Description

Project Template

Parent Project

☐ Inheritable Project ⓘ

Connection Settings

User Source

default

Default Database

Default Tag Provider

default

Identity Provider

default

Cancel

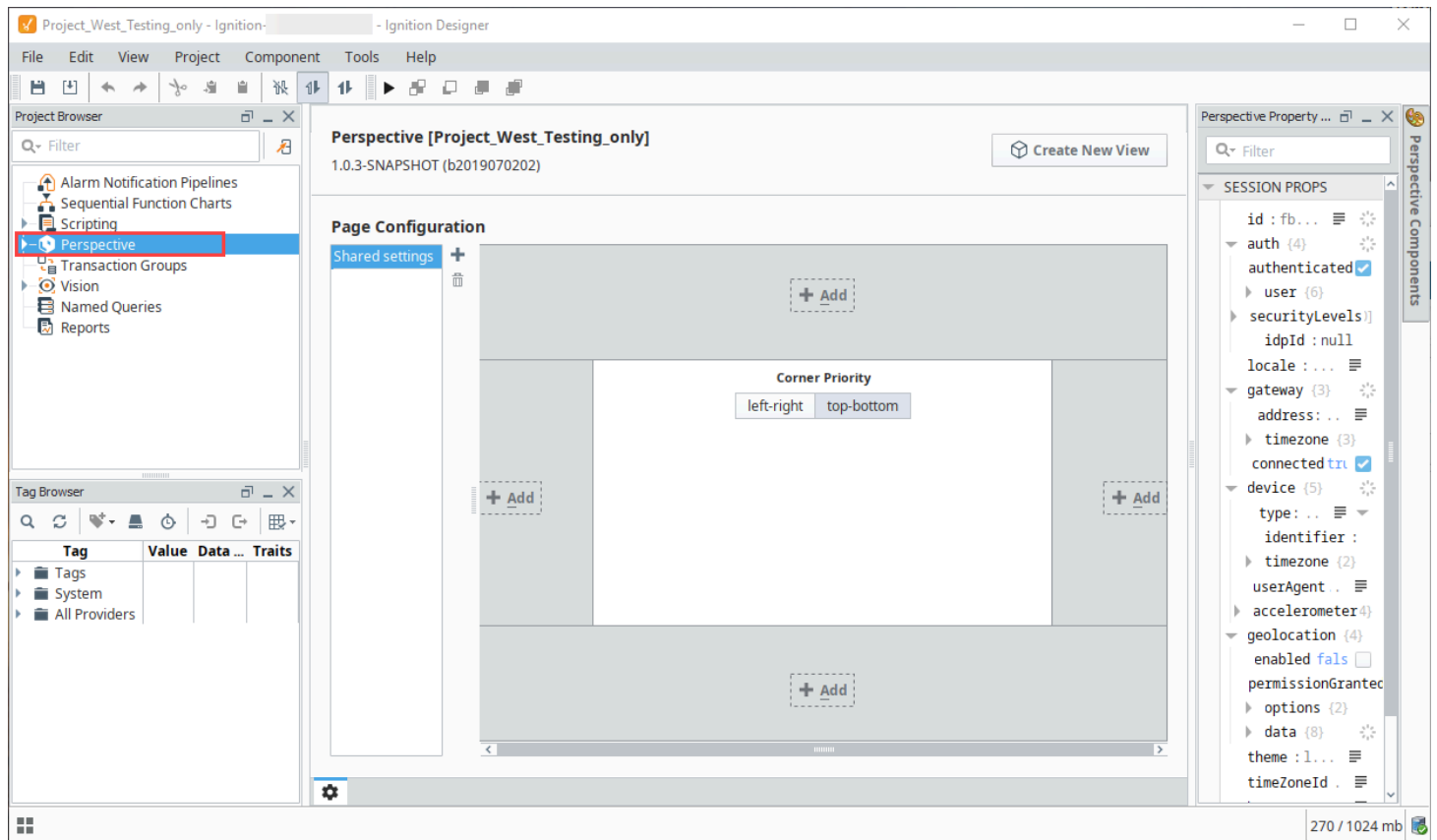
Create New Project

2. Enter the **Project Name** (required) and any other configuration settings you need for your project. Most settings are optional. Refer to the [Project Creation Settings](#) table below for a description of each property.

3. Click on **Create New Project**.

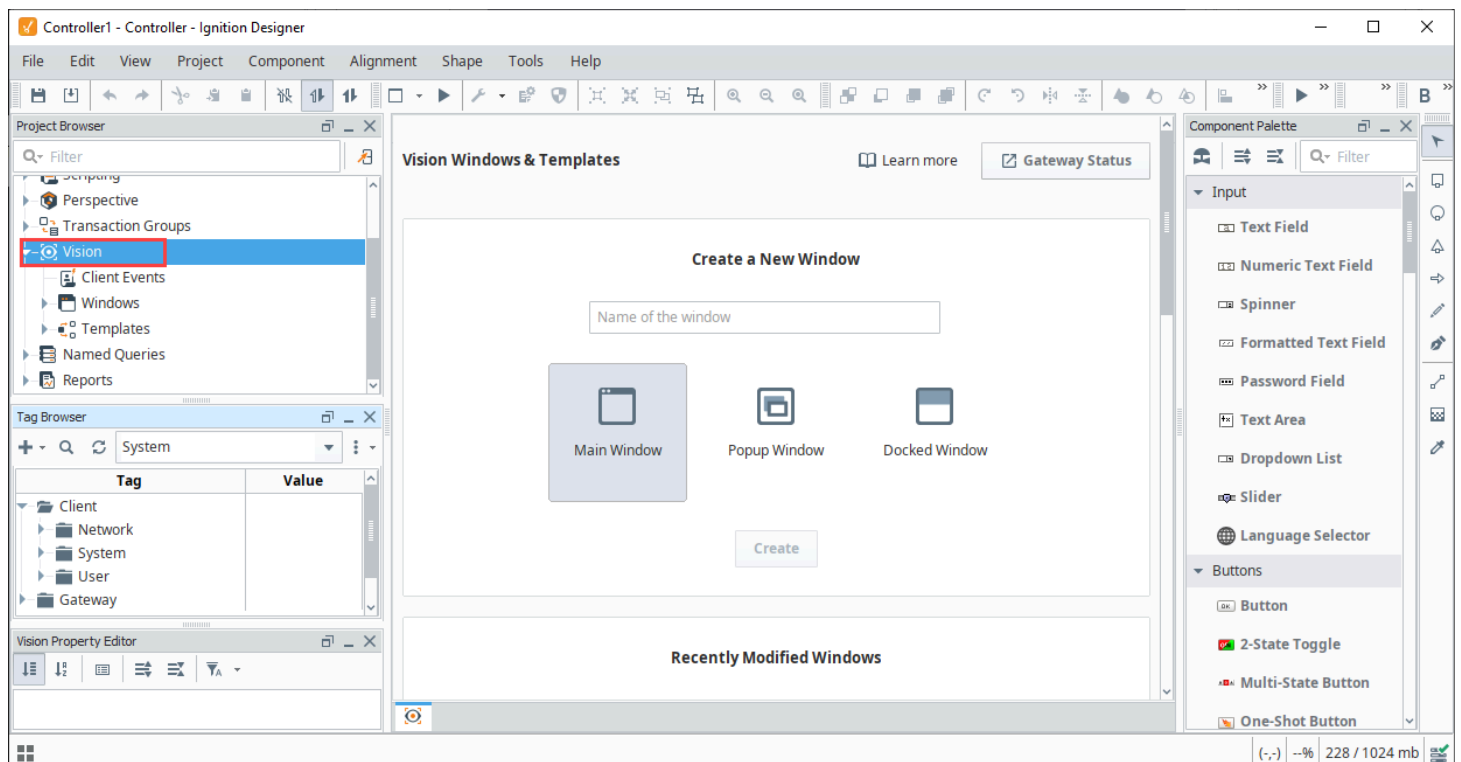
New Perspective Project

If you have the Perspective Module installed, your project will open on the **Perspective Configuration** page after the project is created. From here, you can begin designing your Perspective project.



New Vision Project

To design your project in Vision, expand the **Vision** module in the Project Browser. The **Vision Getting Started** window will open, allowing you to create windows, add components, and create Client Tags.



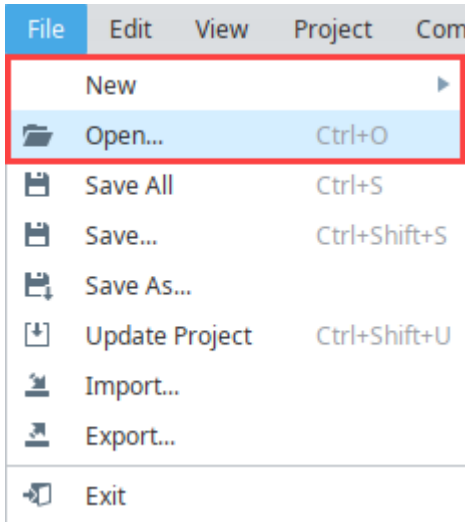
Project Creation Settings

The table below contains descriptions for available settings when creating a new project in the Designer.

Property	Description
Project Name	The Project Name can only consist of alphanumeric characters and the ' _ ' (underscore) character. Spaces and other special characters are not supported. Note: It is not advisable to change the Project Name after it's been created, instead, change the Title property.
Project Title	This is the name that will be displayed on the launch page of the Gateway and in the runtime Client or Session, (optional) There are no restrictions on using special characters or spaces. If you do not specify a title, the project name will be displayed on the Gateway launch page and in the runtime.
Description	Enter a description of the project (optional). Once a project is created, this description can be viewed on the Open/Create Project screen when you hover over the Information  icon.
Project Template	Select a Project Template (optional). There are several pre-built project templates focused on navigation that support either Perspective or Vision. Click the dropdown to see all the available options.
Parent Project	A project may have a parent project, and will inherit all of the resources of that parent project, (optional). Click the dropdown list to see all the available options.
Inheritable Project	Inheritable projects are not runnable as a stand-alone project, but are intended to provide shared resources to one or more child projects.
User Source	Determines the User Source associated with this project (when using the Classic authentication strategy).
Default Database	Select a Default Database (optional). Any queries to the database will use this database connection unless explicitly specified otherwise.
Default Tag Provider	Select a default Tag Provider (optional). If left blank, bindings and references to tags will always need to include the tag provider
Identity Provider	Determines the Identity Provider associated with this project (when using the Identity Provider authentication strategy).

Open or Create a Project from within the Designer

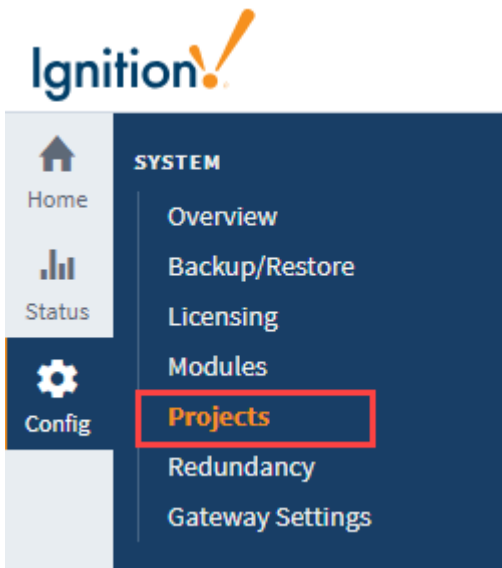
To create a new project or open a different project from within the Designer, use the **File > Open** menu in the top menubar.



The Open/Create Project screen will be displayed. You can choose from existing projects or create a new project.

Updating Project Settings

Project settings such as the title, description, connections, and inheritance are set through the Gateway Webpage **Config** Tab, under **System > Projects**. For more information, see [Projects](#).



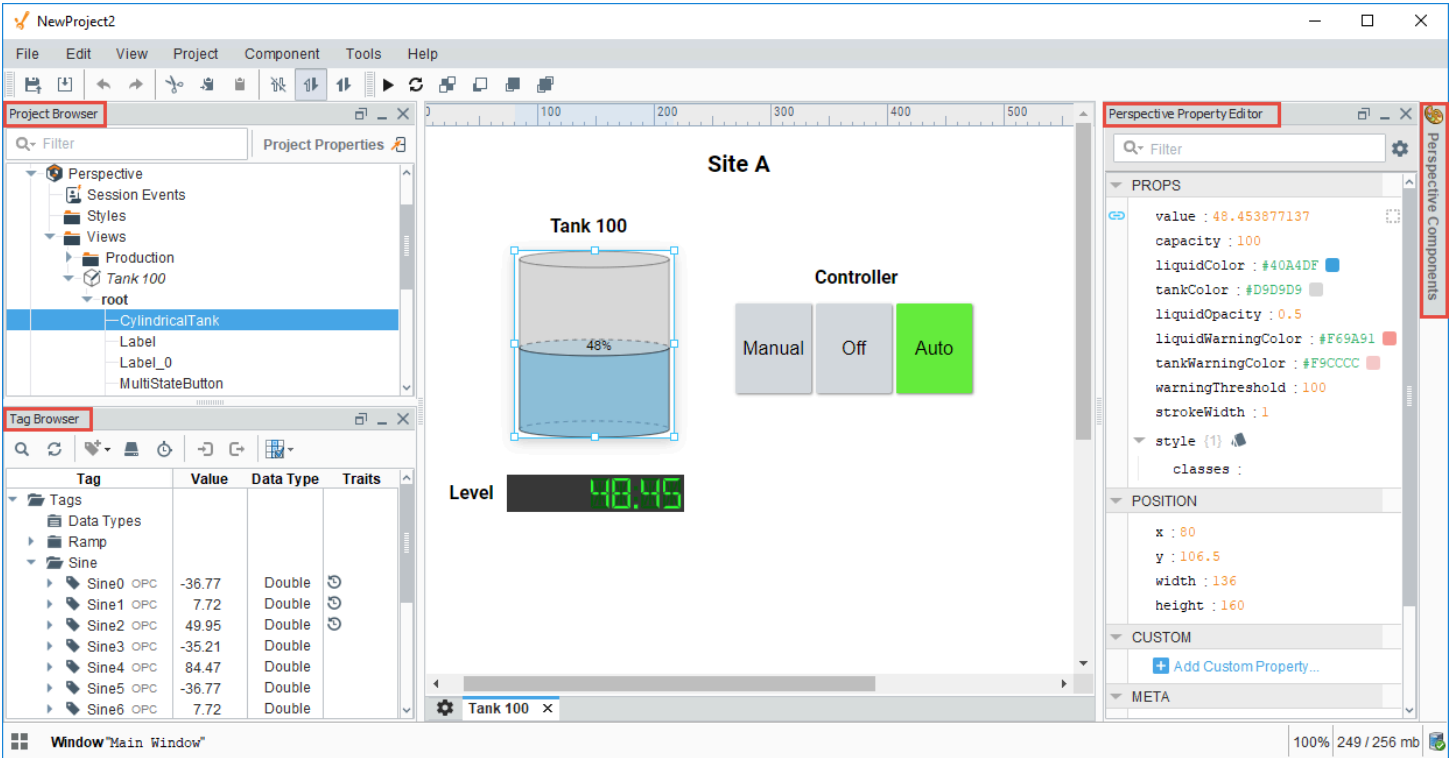
Designer's Workspace

The Designer workspace is centrally located and organized by panels. Some of the panels include a Project Browser, Tag Browser, Component Palette, and Property Editor. These panels can change

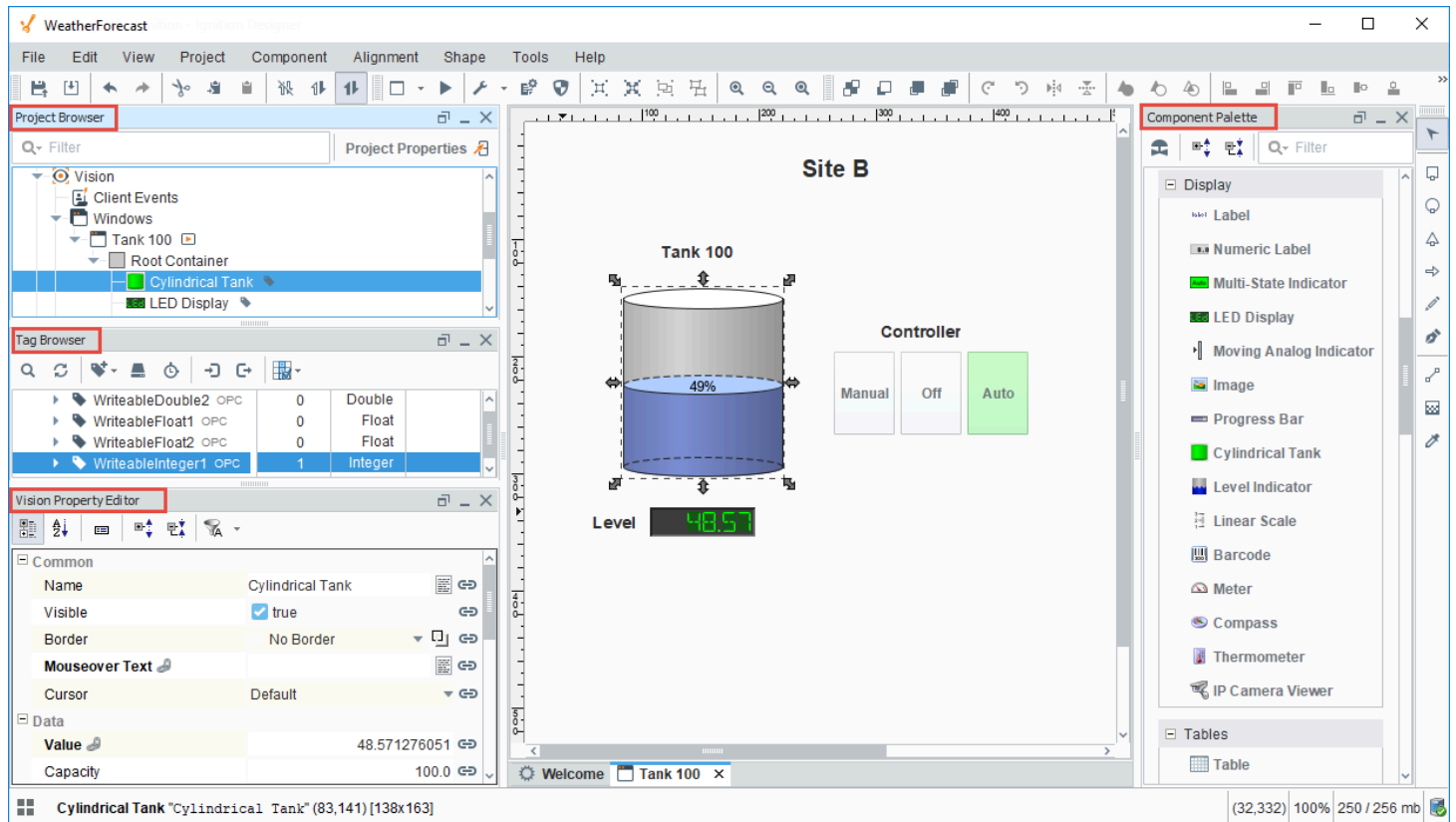
depending on the type of resource you are currently editing. For example, if you are editing a Perspective view or Vision window, the Designer workspace has Component Palette and Property Editor panels. If you're editing an Alarm Notification Pipeline, your Designer workspace will be the Pipeline Block Editor. If you're editing a Report, your Designer workspace will be the Report Designer. Each type of workspace has panels that are only valid when that workspace is active.

Here are two images showing the Perspective Designer workspace and Vision Designer workspace, and an example displaying the same components. At a glance, they look very similar, but there are some differences, including each having their own Component Palettes. To learn more, refer to the [Perspective Designer Interface](#) and [Vision Designer Interface](#) pages.

Perspective Designer's Workspace



Vision Designer's Workspace



Designer Tools

The Designer has a host of tools to help you accelerate building, testing, and deploying your project. Let's talk about a few here.

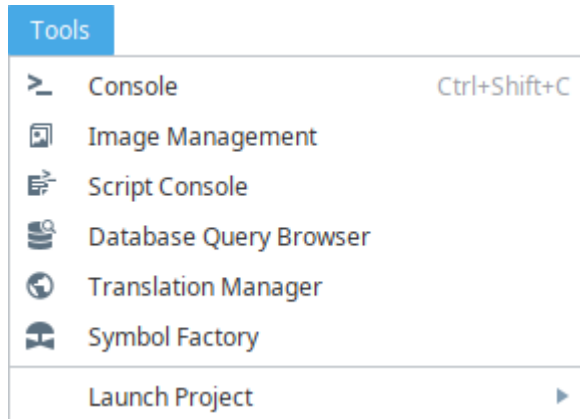
Tools Menu

In addition to all the panels available in the Designer workspace, there is also a **Tools menu** to help you create your projects.

- Console - The **Output Console** is the script-writer's best friend, and most frequently used to test and debug Python scripts in Ignition.
- Image Management - The **Image Management Tool** manages and stores images used for your projects.
- Script Console - The **Script Console** is used to test and debug Python scripts.
- Database Query Browser - The **Database Query Browser** is a very convenient tool that lets you make simple selects and edits in a database table, and interact with all of the databases that Ignition is connected to (i.e., running queries, browsing tables and schemas). It is very common

during the course of project design to inspect the database directly, or to experiment with a SQL query to get it just right.

- Translation Manager - Opens up the **Translation Manager** panel, and allows you to configure language translations. See also: **Localization and Languages**.
- Symbol Factory - The **Symbol Factory** contains a variety of high quality vector graphics symbols that can bring your projects to life.



Status Bar

The Status Bar at the bottom of the Designer workspace allows you to view and adjust certain Designer settings.



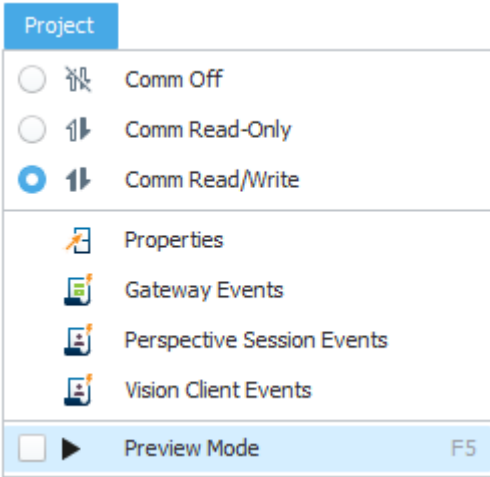
- Panel Chooser - Clicking the Panel Chooser icon  opens a menu that allows you to open and close Designer panels, as well as to reset all panels to their default positions.
- Current Window - Displays the name of the currently open Window. (Vision only)
- Mouse Coordinates - Displays the coordinates of your mouse relative to the open Window. (Vision only)
- Zoom Level - Changes the zoom level. You can adjust the zoom level between a minimum of 25% and a maximum of 500%.
- Memory Usage - Displays your used/maximum available memory. You can change the maximum in the server configuration.
- Gateway Connection - This icon  shows the current status of your Gateway connection. Clicking on the icon opens the connected Gateway in a browser.

Previewing the Project

The Designer provides the capability to preview, test, and interact with the screens and functionality before you deploy your project. The Designer workspace operates in two distinct modes: Design mode and Preview mode. Designers can easily switch between these modes to make sure their project is working as expected during the course of development by simply clicking Preview Mode ► icon from the top menubar, or clicking **Project** also from the top menubar, and selecting **Preview Mode**.

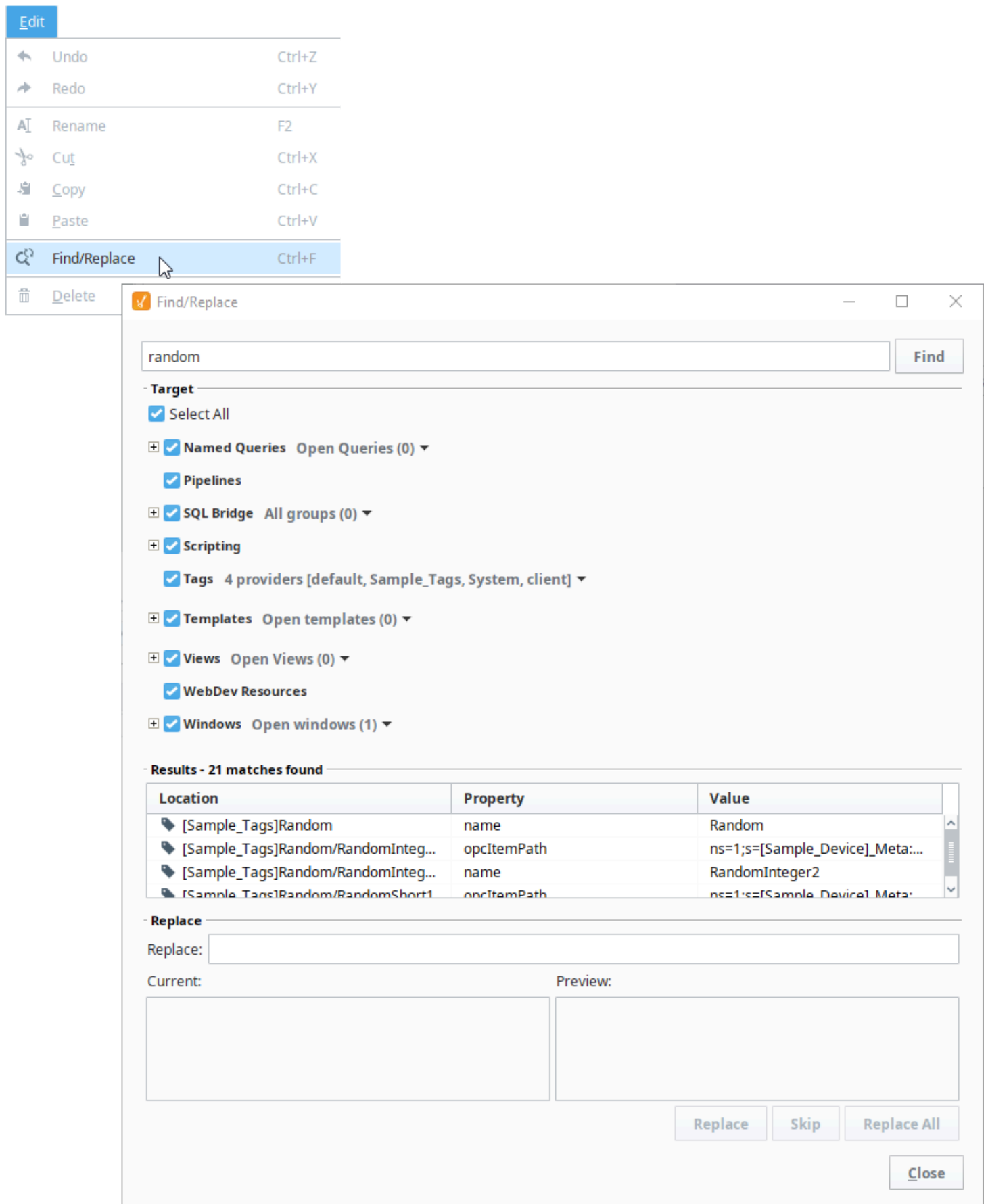
NOTE

The **Preview Mode** ► icon toggles to be a **Design Mode** ■ icon when it is pressed.



Find and Replace

The **Find and Replace** is a handy tool in the Designer workspace. You can search your entire project for specific components, properties, and scripts. You can even use the replace command to make mass changes expeditiously to a project with very little effort.



Keyboard Shortcuts

There are a lot of ways to speed up your development once you are familiar with how Ignition works. There are many **keyboard shortcuts** in Designer that are listed throughout the Designer interface alongside menu options.

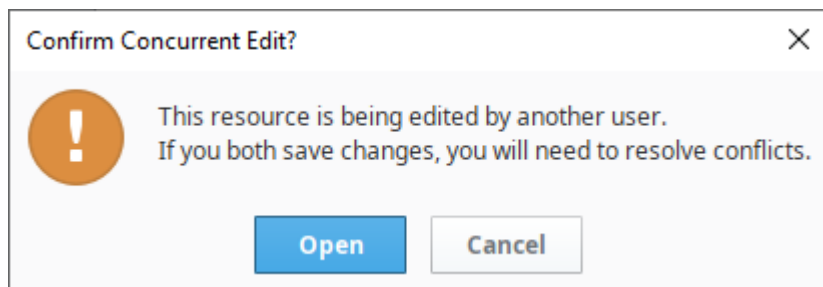
Concurrent Editing and Conflict Resolution

The Ignition Designer uses a lock-free strategy for handling concurrent editing. Multiple people can work together and make changes to a project at the same time. An unlimited number of Designers can be open concurrently, and modifying any resource in the Designer doesn't lock it. The Designer keeps track of the resources that are being edited, and any conflicting edits will be resolved at the time the project is saved. The developer who creates a saving conflict will be prompted to resolve the conflict by choosing whether to use their own changes, accept the other designer's changes, or cancel their save and figure out what to do in another way.

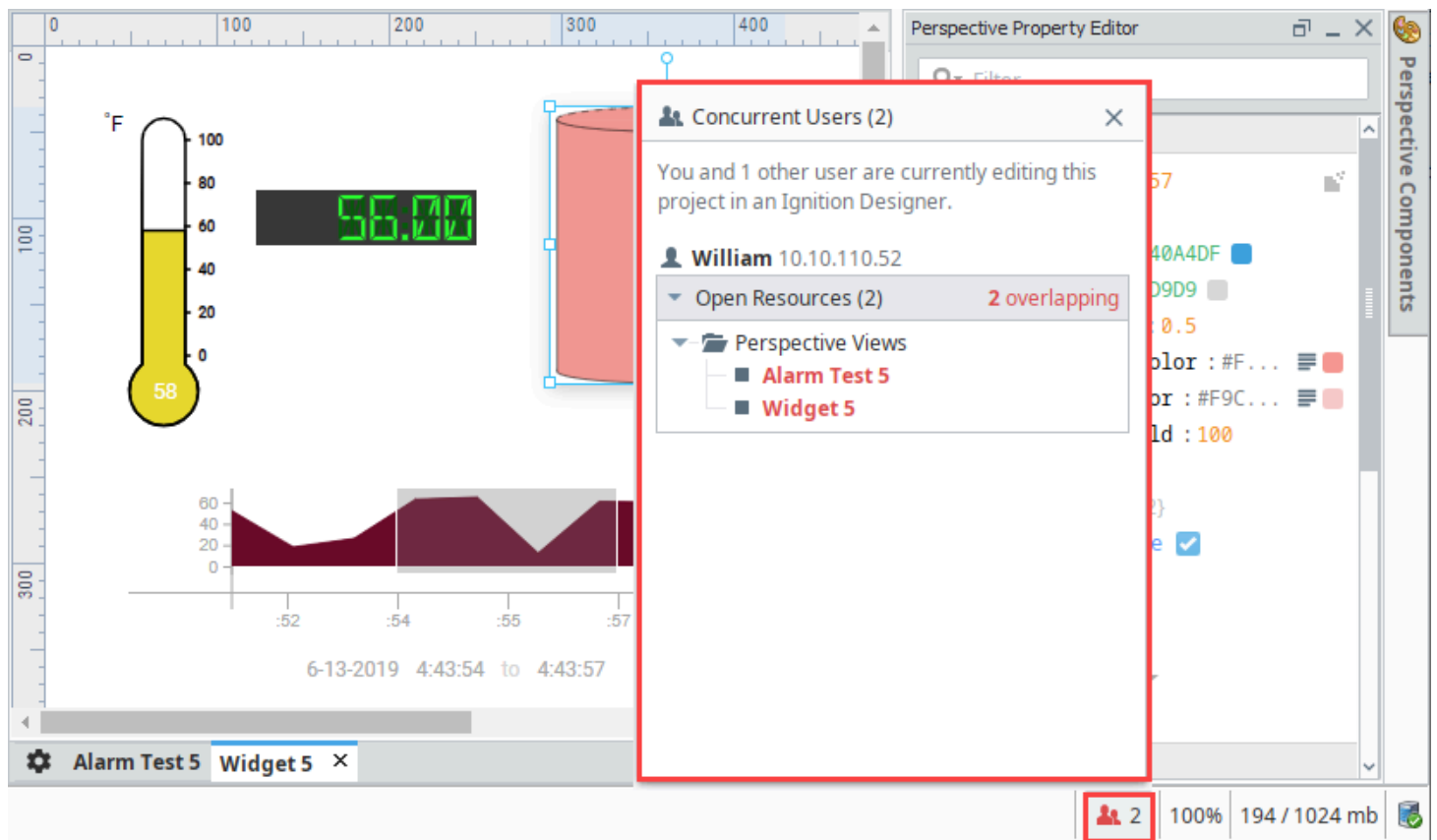
Concurrent Users UI

The Concurrent User Interface allows users to see which project resources are open in other Designer instances, the names of the users that have them open, and when a project update is available. The UI is located in the lower right corner of the Designer.

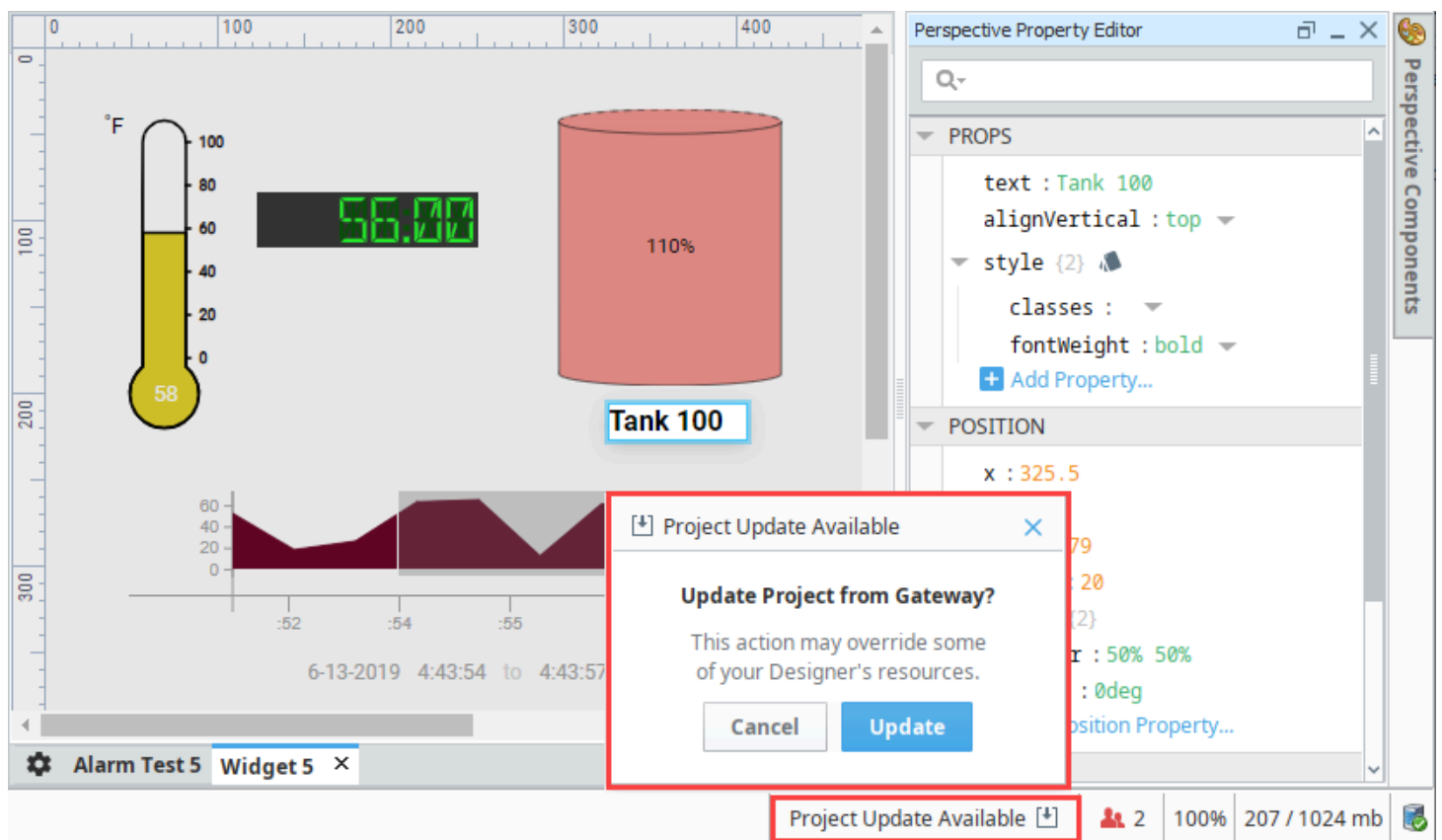
If you open a resource that is already open in another Designer, you will be greeted with a new popup confirming that you want to proceed.



The UI makes use of the color red to denote when there are conflicts with the changes in another Designer instance, or if their users are saving on overlapping resources (multiple users are making changes and saving while the same resource is open).

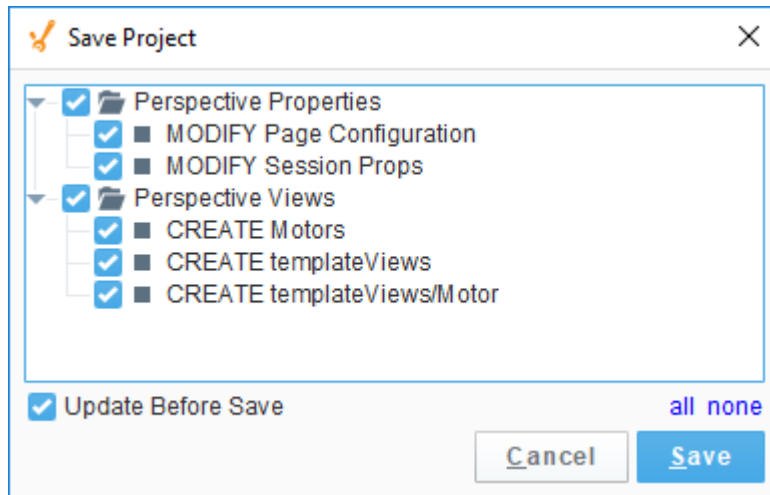


If the user in the other Designer instance saves their project, the UI will display that a project update is available. Click on **Project Update Available** to either update or cancel the project update.



Conflict Resolution

When you're ready to save your project, go to the Menubar and select **File > Save**. When the Save Project dialog pops up, select the items you want to save and click the **Save** button.



If there are any conflicts, the Designer will ask you to update your project and the conflict resolution screen will open automatically. You will see a thumbnail image of both screens and the .json code showing the conflict. To resolve the conflict, you will be given a choice; accept your changes, accept the other developer's changes, or cancel the save and contact the other developer. Buttons are provided at the top and bottom of the screen for you to enter how you want to resolve the conflict.

The Resource Tree displays the conflicts and the resolutions. The selected conflict will be highlighted in blue. The image below shows changes were made to the Thermometer. The line number and the code are highlighted at the bottom so you can quickly identify the conflict. Once the conflict is resolved, a checkmark will appear in the Resolution column next to the conflict and how it was resolved. You'll notice that there is second conflict. To resolve the conflict, select it in the Resource Tree or click the arrow to navigate to the next conflict.

Resolve resource conflicts (2)

Resources that you have changed have also been changed remotely. Review each changed resource and resolve the conflict.

Resource	Resolution
Perspective Views	
Tower Template	✓ This Designer
ViewX	Undecided

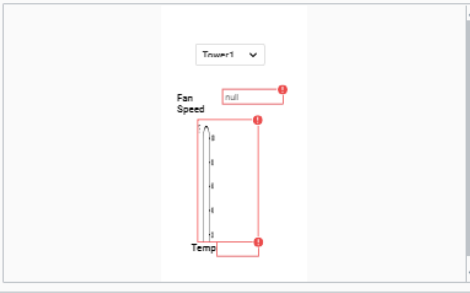
Tower Template 2 files

This Designer Gateway

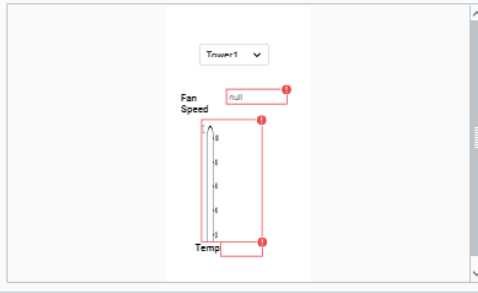
1 OF 2

thumbnail.png

This Designer



Gateway



view.json

This Designer

```

70      }
71    },
72  },
73  "props": {
74    "unit": "F",
75    "valueFontColor": "#FFFFFF00"
76  },
77  "type": "ia.display.thermometer"
78  },
79  {
80    "meta": {
81      "hasDelegate": true,
82      "name": "Dropdown"
83    }

```

Gateway

```

70      }
71    },
72  },
73  "props": {
74    "valueFontColor": "#FFFFFF00"
75  },
76  "type": "ia.display.thermometer"
77  },
78  {
79    "meta": {
80      "hasDelegate": true,
81      "name": "Dropdown"
82    },
83    "position": {

```

1 change

Use all from:

This Designer

Gateway

Cancel

Apply

General Designer Interface



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The Designer User Interface

[Watch the video](#)

Designer Spaces

The Designer has a lot of panels and menus that allow you to build out a project tailored to your needs. However, while some of these like the File Menu are shared throughout the Designer, some of the panels and menu options are specific to certain objects and will typically only be displayed when an object of that type is selected. For example, when editing a Vision Window, the Designer has the Property Editor and Component Palette panels, but when editing an Alarm Pipeline, the Pipeline Blocks and Pipeline Block Editor panels are displayed instead. This creates different Designer Spaces that are used for different areas of a project.

There are many dockable and draggable panels that surround the workspace, as well as the familiar menu bars and toolbars. The dockable panels can be rearranged as you wish and will snap into place as you move them around the screen. Each workspace remembers its layout, which is the docking arrangement of the panels around it.

Docking System

The Designer's docking system provides a very flexible user interface, allowing you to customize the layout as you wish. To re-arrange the dockable panels, simply drag on their title bars. As you are dragging the panel, it will try to snap into place and show you a highlighted border. Use the highlighted border that appears to gauge where the panel will be moved to. Hold the CTRL key as you drag these panels to keep them from snapping into place. You can also drag these panels outside of the designer or onto a second monitor.

Dockable panels can be in one of four modes:

- ***Docked** - The panel is visible, and located somewhere around the perimeter of the workspace. If two panels are docked in the same location, a tab strip will appear to switch between the two panels.

- **Floating** - A panel can be dragged outside of the workspace perimeter to be floated. The panel can now be positioned anywhere on your desktop.
- **Pinned** - Pinning a panel makes it minimize to one of the four sides of the Designer, represented by a small tab. Hover over the tab to use the panel.
- **Hidden** - A hidden panel is not shown. You can open it again by selecting it in the **View > Panels** menu.

Toolbars can also be rearranged and floated to your liking. Simply drag on the "textured" left edge of the toolbar. If you have re-arranged your panels into a layout that you don't like, you can quickly revert back to the default by selecting the **View > Reset Panels** option from the menu bar.

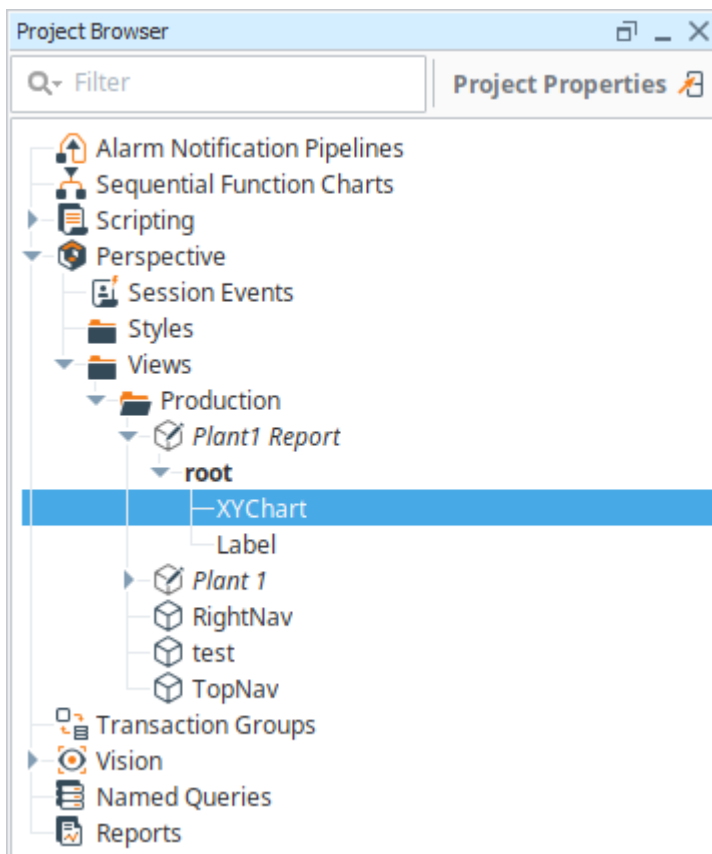


TIP

Your docking preferences are stored under `%USER_HOME%/.ignition/*.layout`. If you really want to reset your preferences, remove these files and restart the Designer.

Project Browser

The **Project Browser** panel allows you to view the different Designer Spaces, and their component hierarchies at a glance. By clicking **Project Properties**  icon you can view or change many of the properties settings in your project. You can expand the folders and navigate down through each folder to see elements of your project such as windows, views, containers, and components. The Project Browser shows the entire tree structure from the project level folder down to the component level. You can navigate within your project in two ways, by selecting nodes in the Project Browser tree or directly clicking on an element like a component in the project workspace. Regardless of how you select an element, properties for that element are displayed in the Property Editor.



Project Resources

All projects have resources, such as Vision Windows, Vision Templates, Perspective Views, project scripts, reports, and named queries. Project resources can be inherited from one project to another. For more information, see [Project Inheritance](#).

Naming Conventions

Project resource names cannot be blank. They must start with a letter, a numeral, or an underscore. The following characters are reserved and cannot be used in names for project resources:

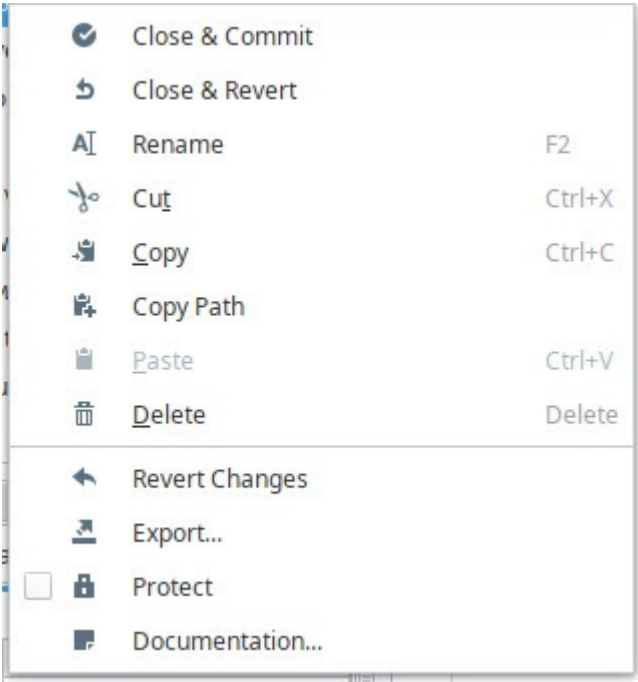
- < (less than)
- > (greater than)
- :
- " (double quote)
- / (forward slash)
- \ (backslash)
- | (vertical bar or pipe)
- ? (question mark)
- *

In addition, the following names cannot be used as project resource names:

CON, PRN, AUX, and NUL
COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, and COM9
LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, and LPT9

Right-Click Menu

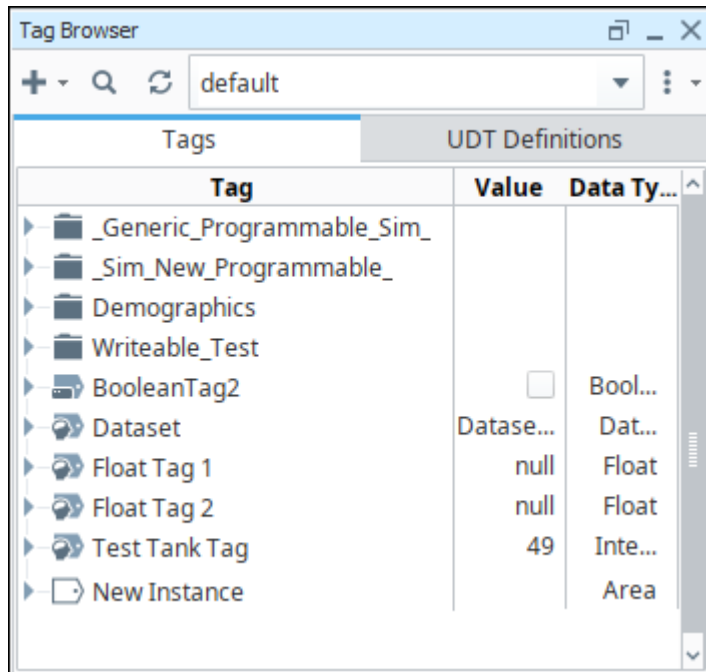
The Project Browser basic functionality is similar to many applications that run on your PC. When you right-click on a project resource in the Project Browser, several options are available like Copy, Paste, and Delete. The presence of certain options will change depending on the type of project resource you are currently editing. For example, **inherited project resources** have additional menu options that are only visible in inherited projects. The table below lists and describes common right-click menu options:



Function	Description
Close & Commit	Saves the updates made to the project resource and closes it.
Close & Revert	Reverts the project resource to its last saved state. Reverting an unsaved resource is the same as deleting it.
Configure View Permissions	View permissions determine whether or not a user has access to load the view.
Configure Events	Configures an event or action on a component.
Rename	Change the name of the current selection to a new name.
Cut	Cuts the current selection into the clipboard.
Copy	Copies the current selection into the clipboard.
Copy Path	Copies the path of the current selection into the clipboard.
Paste	Pastes the contents in the clipboard to the selected content.
Delete	Deletes the current selection.
Revert Changes	Reverting a modified resource will revert it back to its last saved state, assuming it's been saved before. Reverting new resources deletes them.
Export	Exports resources from the project.
Protect	Protects the Project Resource. For more information, see Protecting Project Resources .
Documentation...	New in 8.1.19 Opens a popup window where you can add notes to the project resource to share its purpose and any necessary information for interaction. Previously, documentation notes were only available on Vision Windows, Vision Templates, and Transaction Groups.

Tag Browser

The **Tag Browser** panel, located on the left side of the Designer workspace under the Project Browser, allows you to browse Tags in the Designer and OPC servers. Tags can be created, edited, displayed, exported, and imported directly from the Tag Browser. See [Tag Browser](#) for more detailed information.



Menubar

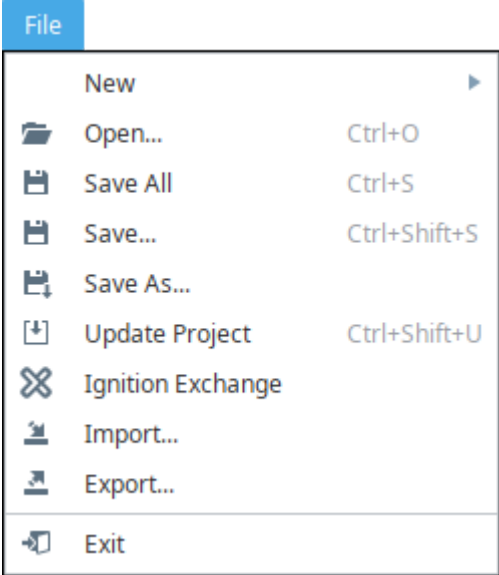
This section addresses only the functionality that the Designer menubar shares between both the Perspective and Vision modules.

For information on the menubar tabs unique to the Vision module, see [Vision Designer Interface](#).

For information on the menubar tabs unique to the Perspective module, see [Perspective Designer Interface](#).

File Menu

The **File Menu** contains most of your basic options related to saving, similar to many other software applications on your PC.



Function	Description
New	The New menu option allows you to create a new Object. That Object could be a new window, a new template, or even a new project. It can vary depending on what modules you have installed, also providing the ability to make new transaction groups, reports, Sequential Function Charts, and more.
Open	Allows you to Open a previously created project.
Save All	Saves all project changes, but are not pushed out to the client.
Save	Save brings up a popup menu where you can choose what to save.
Save As	Saves the current project as a new project.
Update Project	Merges any changes from the Gateway to the project, if for example there were multiple people working on the same project.
Ignition Exchange	Provides access to resources, templates, and tools that can be shared with various other industries and used in your own Ignition projects.
Import	Allows you to import or export specific resources into or out of the project such as Tags, scripts, and templates, to name a few.
Export	Exports globally scoped resources, such as Alarm Pipelines.
Exit	Exits the project and allows you to save project changes.

Project Menu



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About Communications Modes

[Watch the video](#)

Communication between the Designer and the Gateway is controlled from the Project Menu. The Designer offers three data communication modes for your projects: **Comm Off**, **Comm Read-Only**, or **Comm Read/Write**. Comm Read-Only is the default mode which does not allow writing from the Designer to Tag or Database sources.

Project

☐		Comm Off	
☐		Comm Read-Only	
☒		Comm Read/Write	
	Project Properties		
	Gateway Events		
	Session Events		
	Client Events		
☐		Preview Mode	F5
		Preview Language	

Function	Description
Comm Off, Comm Read-Only, Comm Read/Write	Changes the communication mode for this designer session. See Comm Mode for more details. Note: These settings do not affect the execution of a project's Transaction Groups because Transaction Groups execute on the Gateway, not in the Designer
Properties	Opens up the Project Properties window, allowing project settings to be changed. See also: Project Properties
Event Scripts	Opens up the appropriate event script window, either client, session, or Gateway. These can also be accessed from the Project Browser. See also: Client Event Scripts and Gateway Event Scripts.
Preview Mode	Puts the Designer into Preview Mode, allowing you to interact with it like a client. See also: Previewing the Project.
Preview Language	Determines the language that the Designer will revert to when in Preview Mode. See also Localization and Languages and Localization in Vision.

Comm Mode

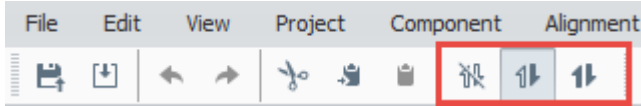
The Designer, and Vision Clients, have a communication mode ("comm mode") that determines if the Designer/Client is able to read and write to tags and databases. The comm mode is determined per Designer/Client instance, and changing the comm mode in one running instance will not impact any other running instance's comm mode setting. The comm mode can be set to the following:

- **Comm Off:** In this mode all database query traffic and Tag subscriptions and writes are blocked. This can be useful to temporarily disable polling component bindings.
- **Comm Read-Only:** Tag subscriptions and SELECT queries work, but Tag writes and UPDATE/INSERT/DELETE queries requested by the Designer/Client are ignored by the Gateway.
- **Comm Read/Write:** The Designer/Client can write to tags. In addition UPDATE/INSERT/DELETE queries requested by the Designer/Client will be processed by the Gateway.

In addition to changing the comm mode from the Project Menu, it can be changed in the following ways.

Setting the Comm Mode from the Main Toolbar

If the Main Toolbar is enabled, go to Project, and you'll see a corresponding button for each Comm Mode. The currently selected Comm Mode will have its button highlighted in gray.



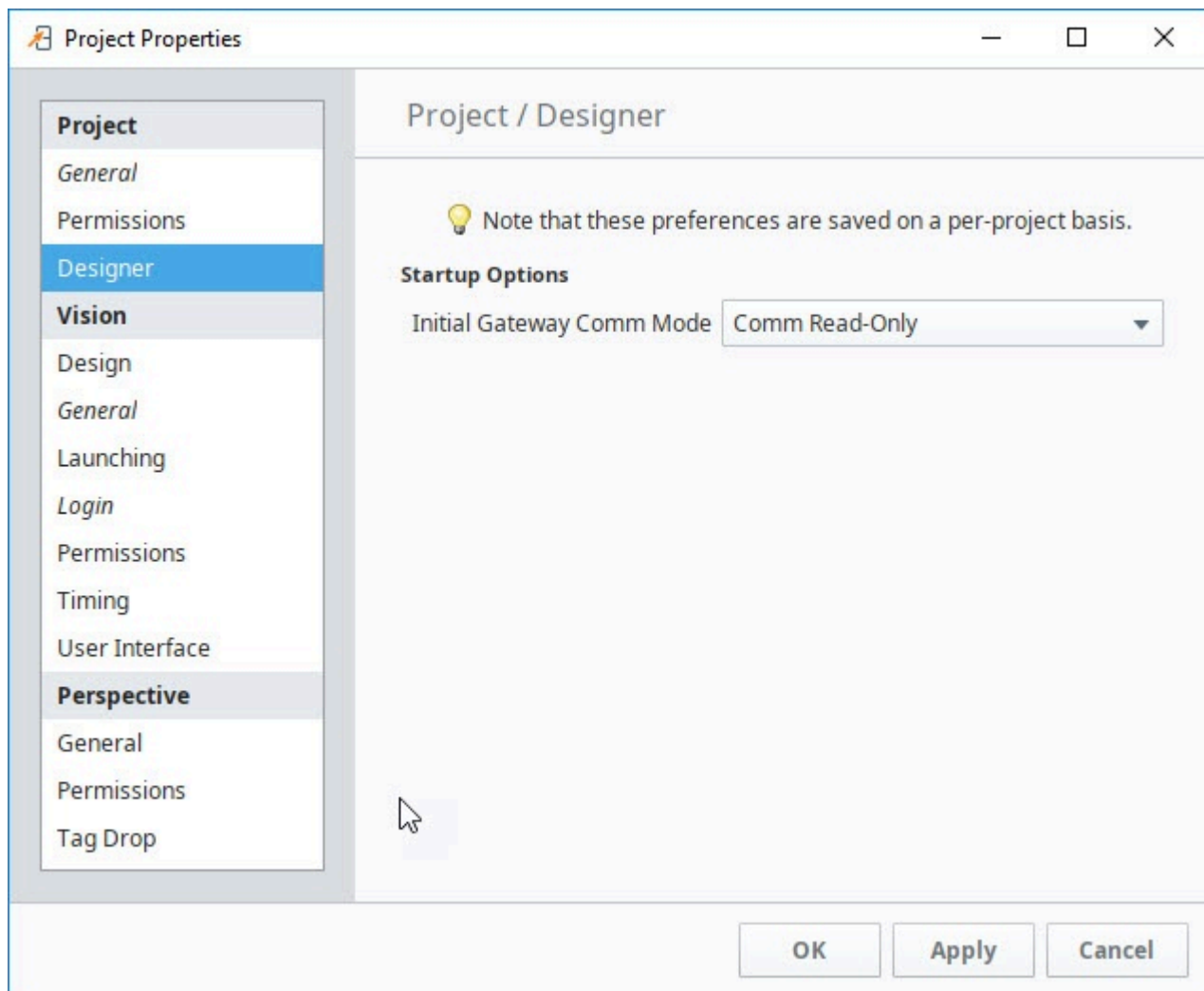
Setting the Comm Mode from the Project Properties Window

This will set the default Comm Mode that the Designer starts up in for the current project.

1. In the Designer, either double-click on the **Project > Properties** node in **Project Browser**, or click on the **Project > Properties** command on the top menu. The **Project Properties** window is displayed.
2. Go to **Project > Designer**.
3. Under **Startup Options**, for the **Initial Gateway Comm Mode**, choose from the dropdown **Comm Off**, **Comm Ready-only**, or **Comm Read/Write**.

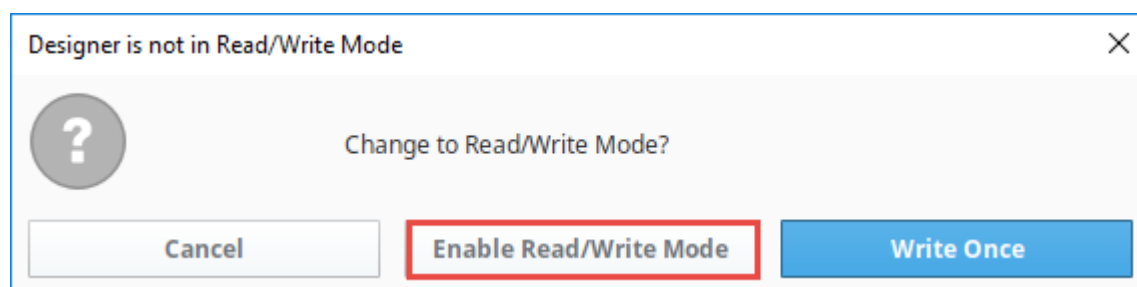
NOTE

These property settings are saved on a per-project basis.



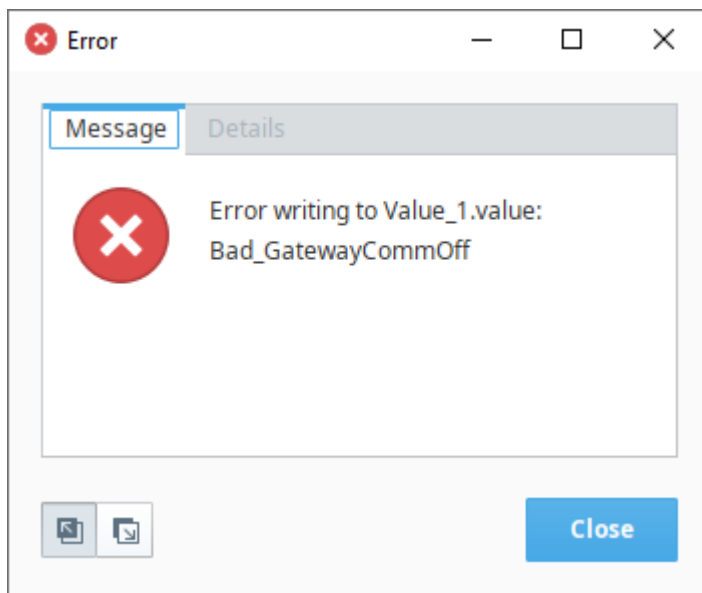
Communication Error Message

If a user is attempting to write to a project in the Designer or from a Client, and the Comm Mode is not enabled for Read/Write, a dialog box will popup stating the Designer is not in Read/Write Mode.



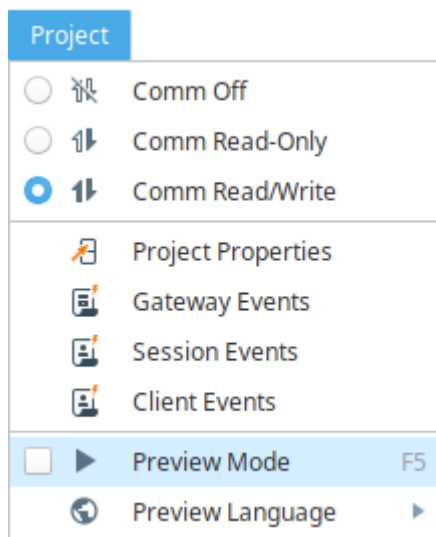
If your Tag is not being written too, there are a couple places to check:

- From Main Toolbar go to **Project**, and make sure the Comm Mode is set to Read/Write.
- If Comm Read/Write is checked, you may have a Client Event Script enabled that could be preventing you from writing to a project or a Tag, as shown in the error message example below. You may need to edit your Client Event Script.



Previewing the Project

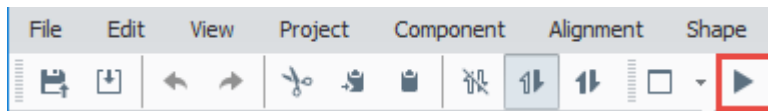
Many times, it is useful to test the components on the screen to ensure that certain bindings or scripts are working the way that was intended. The Designer can go into **Preview Mode** that will allow you to interact with the currently opened window as though you were working in a client. This means that instead of clicking between components and seeing their properties, you will be able to interact directly with the components such as clicking on a button to execute its script, or entering a value into a text field to update a Tag value.



Preview Mode

The window workspace operates in two distinct modes: Design Mode and Preview Mode. There are three different ways you can switch between Design and Preview Mode:

- One of the easiest ways is from the Main Toolbar using the **Preview** ► icon or the **Design** ■ icon to switch between modes.



- From the Main Toolbar using the **Project > Preview Mode** menu item.
- Using the **F5** key to toggle between the two modes.

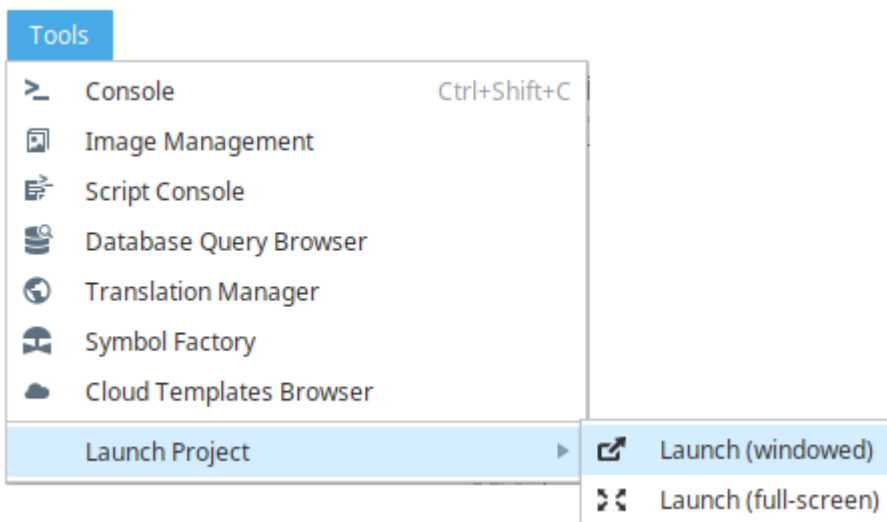
In Design Mode, your mouse is used to manipulate components in a window. You can select, drag, and resize them. You can alter data bindings and event script configuration. Data bindings are active in Design mode, but event handlers are not.

In Preview Mode, you are interacting with a "live" version of the window. Property bindings and event handlers will run, just like in the Client.

NOTE

Some of Ignition's functionality will not work in Preview Mode, for example, the retarget and openWindowInstance scripting functions must be tested in a Client.

Preview Mode is useful for a quick check of the operation of a window, but it becomes cumbersome when trying to test a whole project. For that, we recommend having a launched Client up as well, and doing testing in the true Client. You can quickly launch a client in one of the following two launch modes via the **Tools > Launch Project** menu.



Tools Menu

The **Tools Menu** provides some tools to help you when creating projects.

Tools		
	Console	Ctrl+Shift+C
	Image Management	
	Script Console	
	Database Query Browser	
	Translation Manager	
	Symbol Factory	
	Cloud Templates Browser	
Launch Project 		

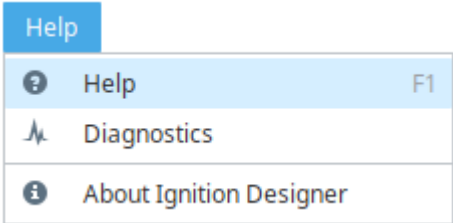
Each of the tools are described here.

Function	Description
Console	The Output Console is a dockable panel prints system messages that are coming from the designer. This can vary from simple info messages that show when things are loaded, to error messages when something goes wrong. The Console is also used frequently to test and debug Python scripts, as print statements on components that are run in the designer are printed here.
Image Management	The Image Manager is available from the Tools > Image Management menu. This tool is a drag-and-drop browser that helps manage the images that are stored on the Gateway. It is important to realize that these images are shared across all projects: they are not stored inside a project itself. Use the Image Management tool to do common tasks like uploading new images and creating folders. You can drag images and folders from your computer's desktop or hard drive into this window to easily upload new images to the Gateway. You can also get to this tool by putting an Component Palette > Display > Image component on a window, and clicking the browse button on the image's Image Path property. See Images and SVGs in Vision and Images and Icons in Perspective.
Script Console	Opens up the Script Console. window. This is where you can test scripts out.
Database Query Browser	Opens up the Database Query Browser panel, which allows you to run SQL queries against your database connections.
Translation Manager	Opens up the Translation Manager panel, which allows you to configure translations. See Localization and Languages.
Symbol Factory	If you have the Symbol Factory module installed, you'll be able to open the Symbol Factory browser under the Tools menu in the Designer. You can browse through the symbols or use the convenient search function to find the symbol you need. Once you find a symbol, you can drag-and-drop it into a window. Each symbol is dropped as a shape group. You will be able to un-group it or double-click into the group just as if you had drawn the symbol yourself using fundamental shapes. This means that you can alter the shape if you

Function	Description
	need to, or bind any colors inside the shape to a Tag to make the shape dynamic.
Launch Project	Allows you to launch the project directly from the Designer.

Help Menu

The **Help Menu** provides online assistance when looking for information or troubleshooting an issue.



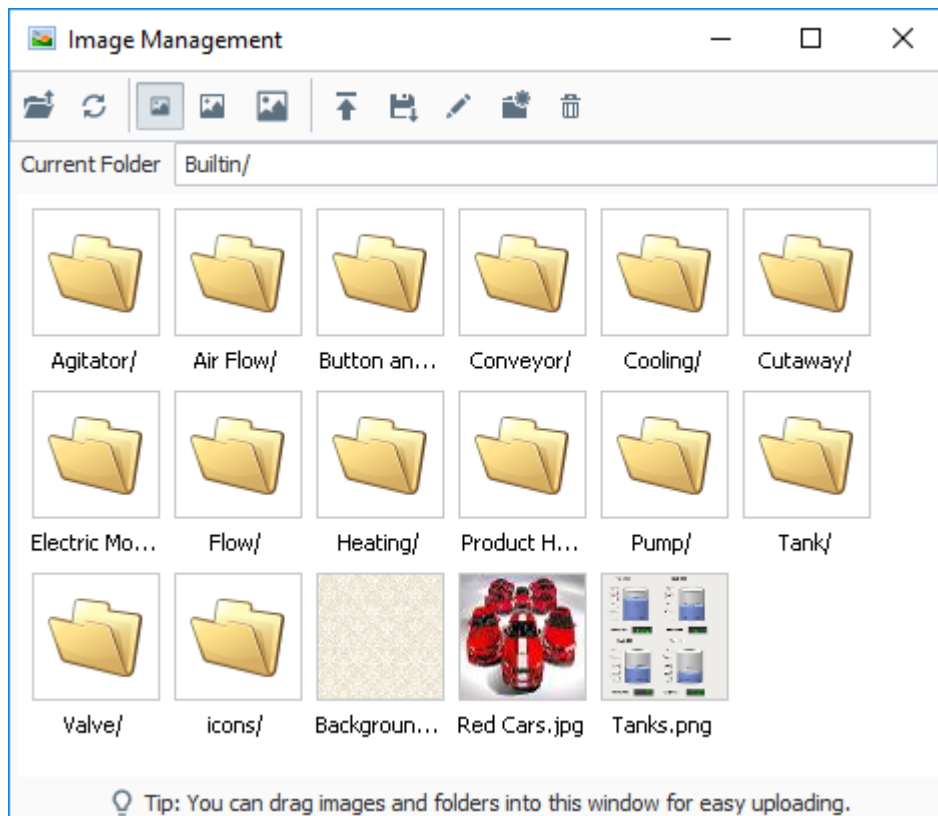
Function	Description
Help	Opens up your web browser and takes you to this User Manual for quick reference.
Diagnostics	The Help menu in the Designer and the Vision Client has a Diagnostics window that contains a number of tabs each providing a useful troubleshooting feature. You can right-click on any of the tabs to show or hide the other tabs. For more information on these tabs and the troubleshooting features, go to Designer Diagnostics .
About Ignition Designer	Provides information about the Designer such as the versions of the modules, Java version, and Gateway IP Address that the Designer is using.

Designer Tools

The Designer comes with many tools that allow you to manage and test various resources within a project. Each of the tools have their own interface and are accessed within the Tools menu on the menu bar of the Designer.

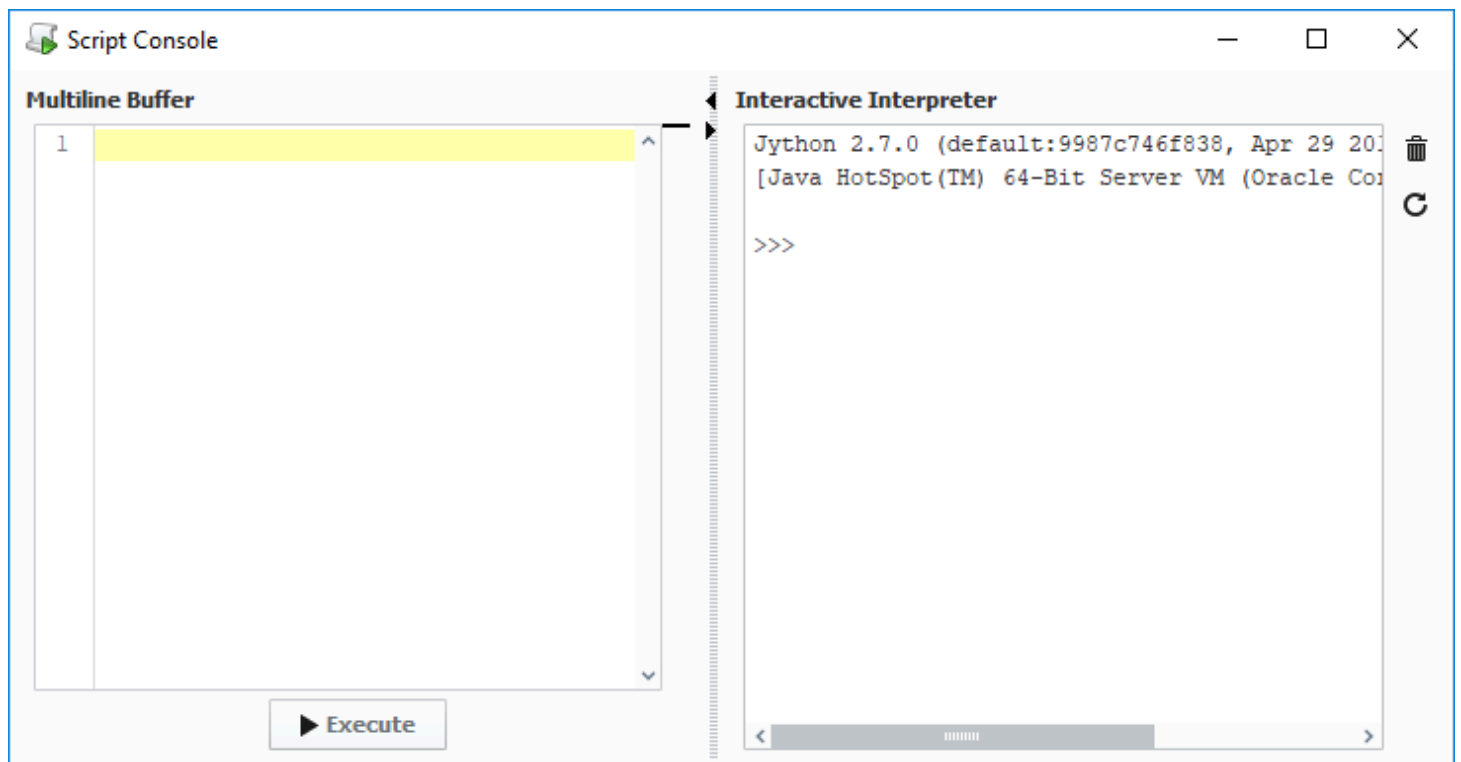
Image Management Tool

The **Image Management Tool** allows you to manage the images that are stored within the Ignition Gateway. The path to the images can be copied out and pasted into a component's property that is expecting an image path.



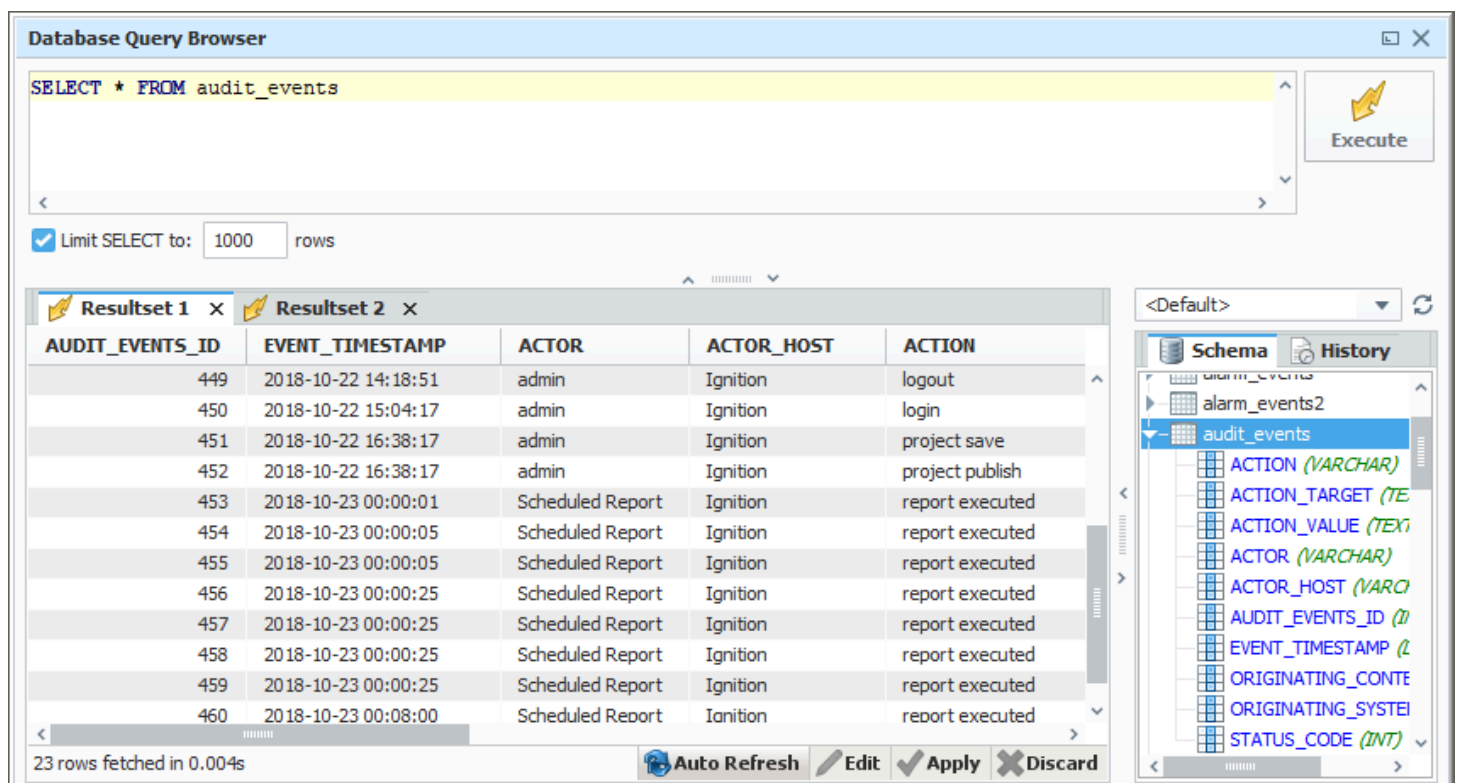
Script Console

The **Script Console** allows you to test out code snippets, printing the results out in the panel on the right.



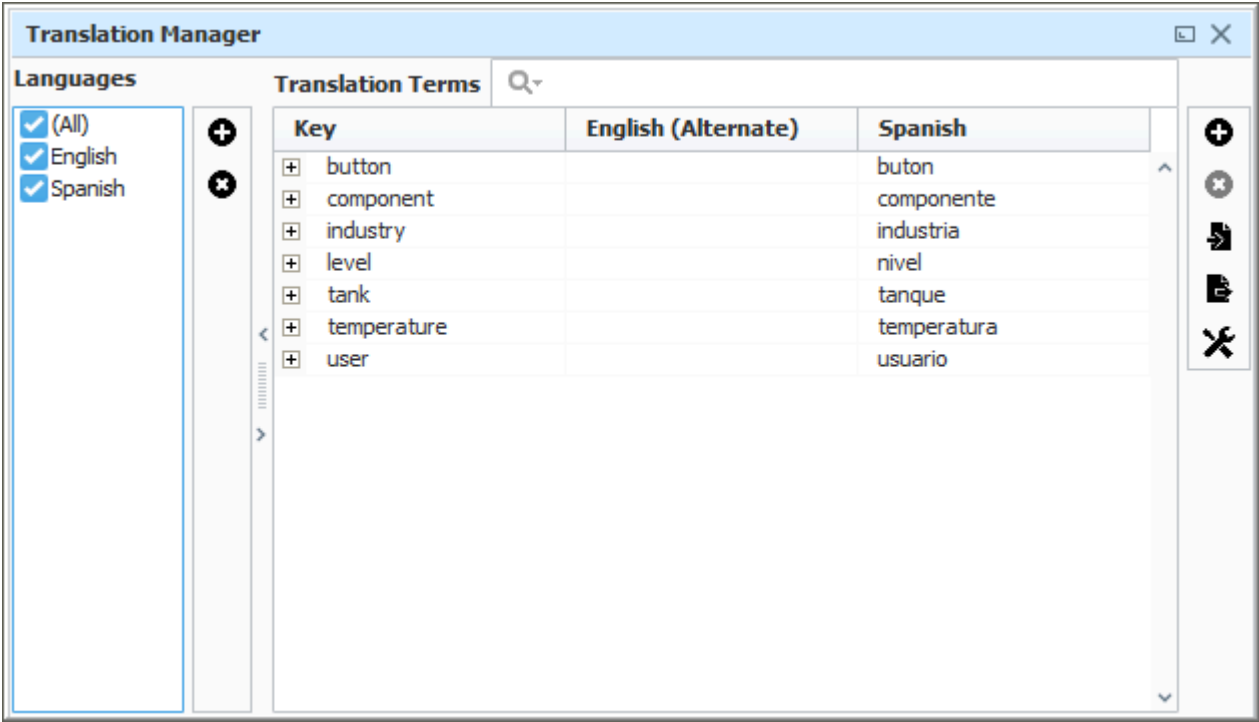
Database Query Browser

The **Database Query Browser** is like the Script Console, but for SQL and databases. Here, you can test out queries to ensure you are returning the correct data from your database.



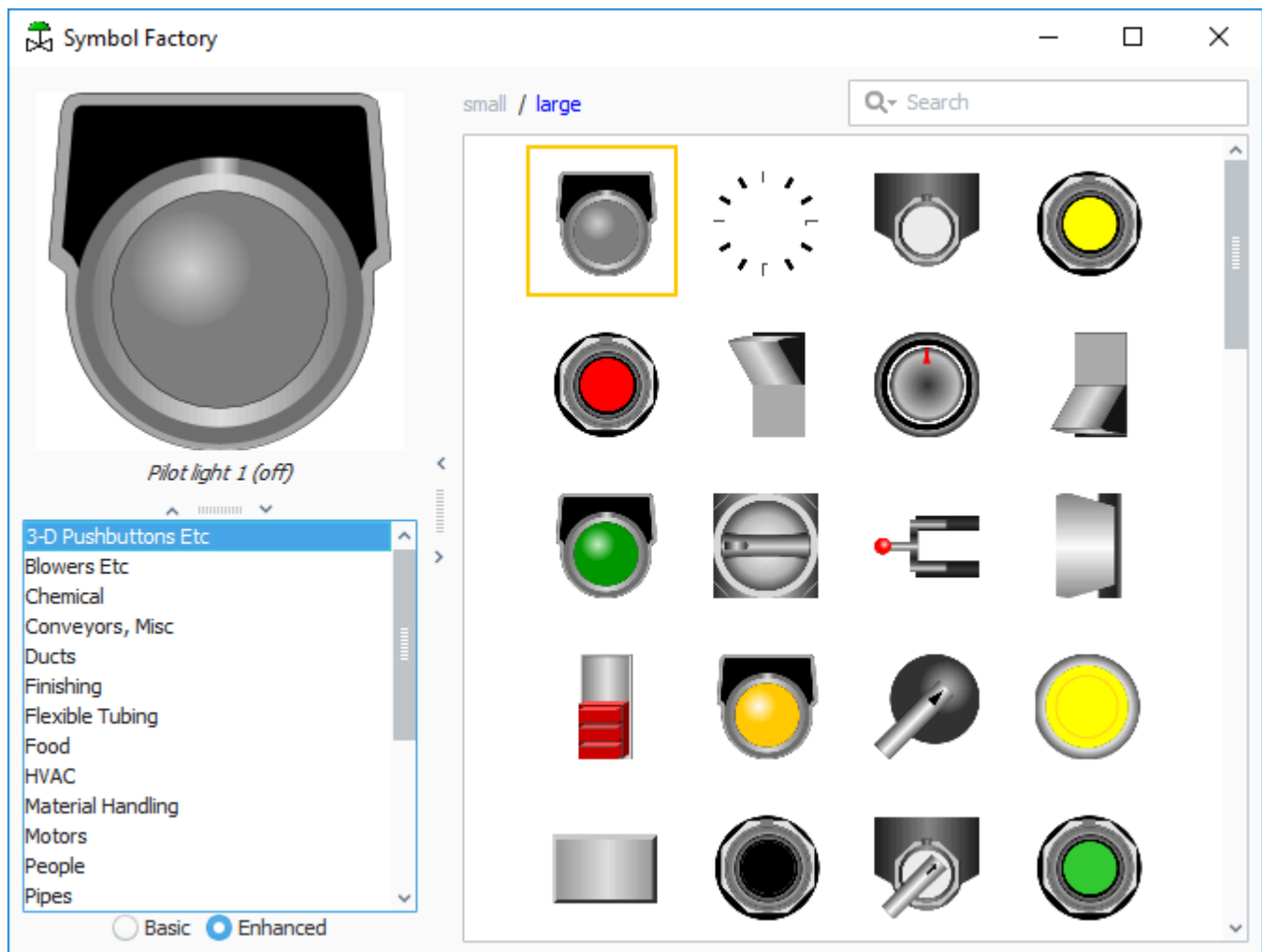
Translation Manager

The **Translation Manager** allows you to add, edit, and remove translation mappings to your system. Works in conjunction with the **Localization system**.



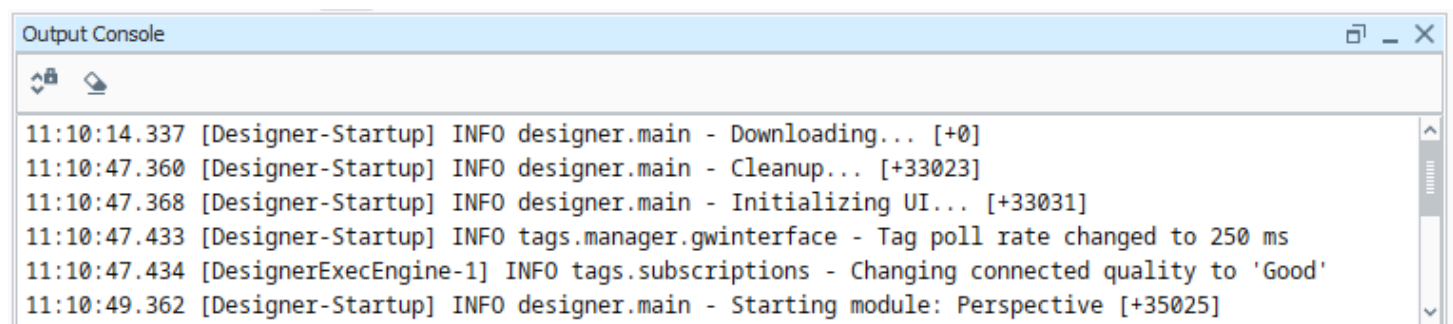
Symbol Factory

Symbol Factory module is a unique designer tool included with Vision or Perspective.



Output Console

The **Output Console** prints system messages coming from the Designer from simple info messages to error messages. The Console is also frequently used to test and debug Python scripts as print statements on components that are run in the Designer.



Keyboard Layouts

New in 8.1.28

The **Keyboard Layouts** editor adds the ability to define custom keyboard layouts, which are then applied on Vision's touchscreen keyboard. Although with this tool keyboard layouts are completely customizable, you can quickly switch between a few preloaded language options to display French, Spanish, Italian, German, or two variations of an English keyboard. This tool is not available in Perspective.

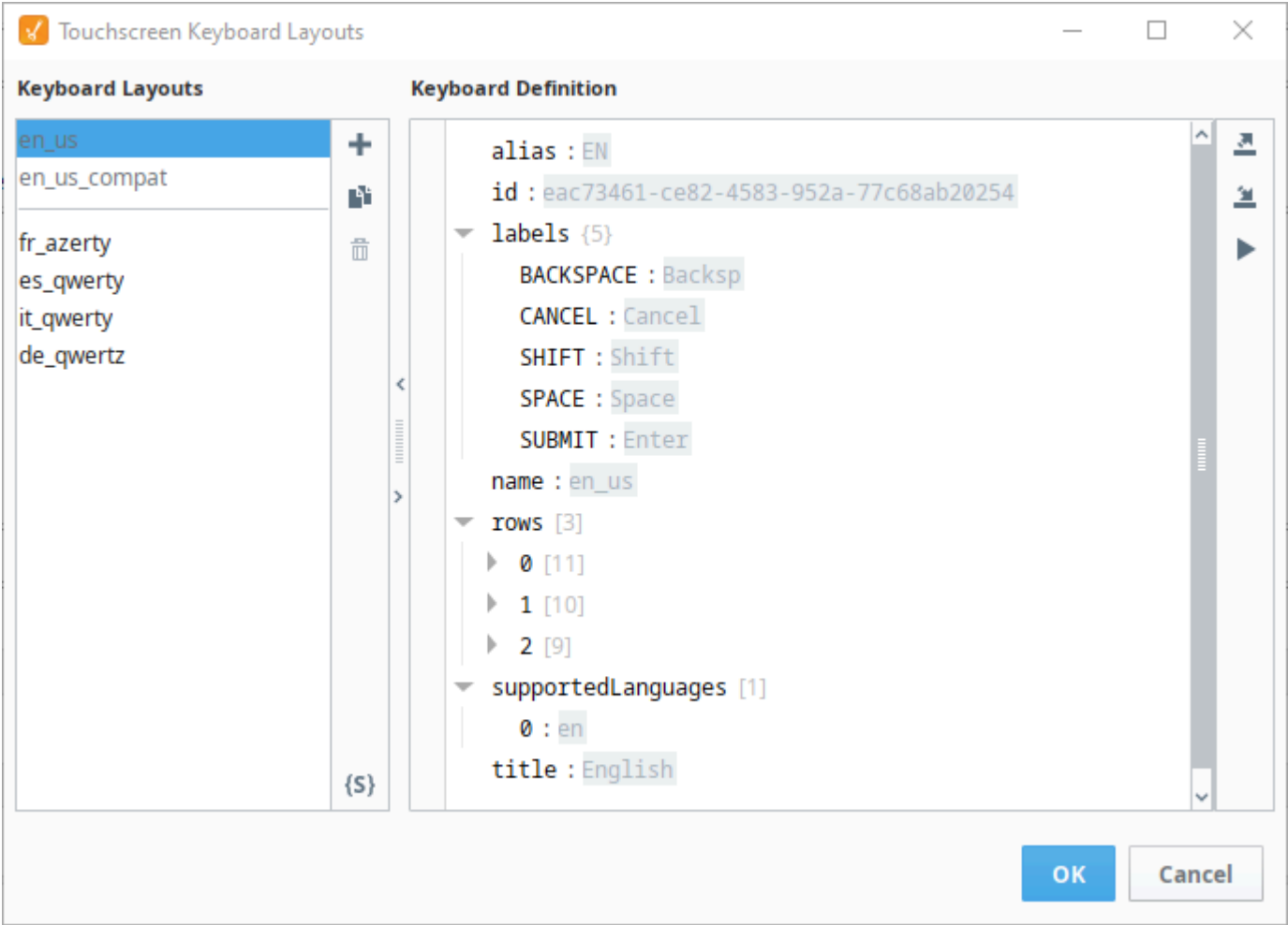


Image Management Tool



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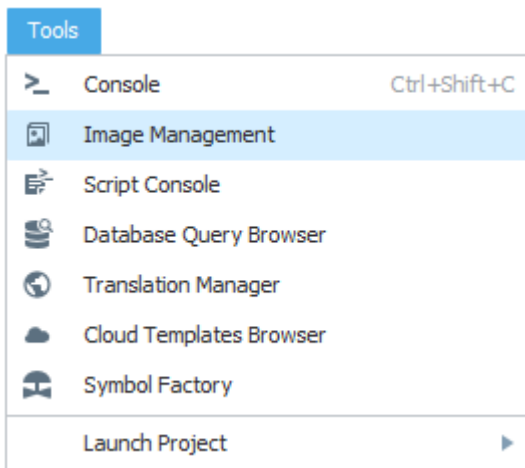
Images (png, jpg, gif)

[Watch the video](#)

Images such as PNGs, JPGs, GIFs, and SVGs can be uploaded to the Image Management Tool and used inside of windows in Ignition. Once uploaded, these images may be used on windows and in templates. The Image Management tool, available from the Tools > Image Management, provides an interface to upload, download, or select images.

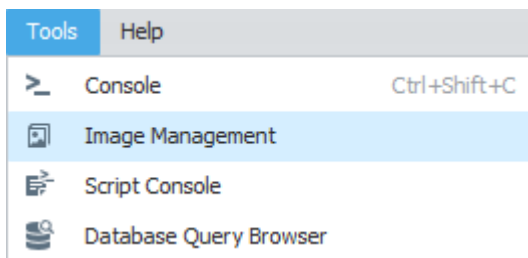
NOTE

The Image Management tool does not support bitmap files.



Uploading an Image to the Image Management Tool

There are two ways to upload an image into the Image Management tool. Both ways involve having the Image Management tool open. At the top of the Designer in the Menu Bar, select **Tools > Image Management**.

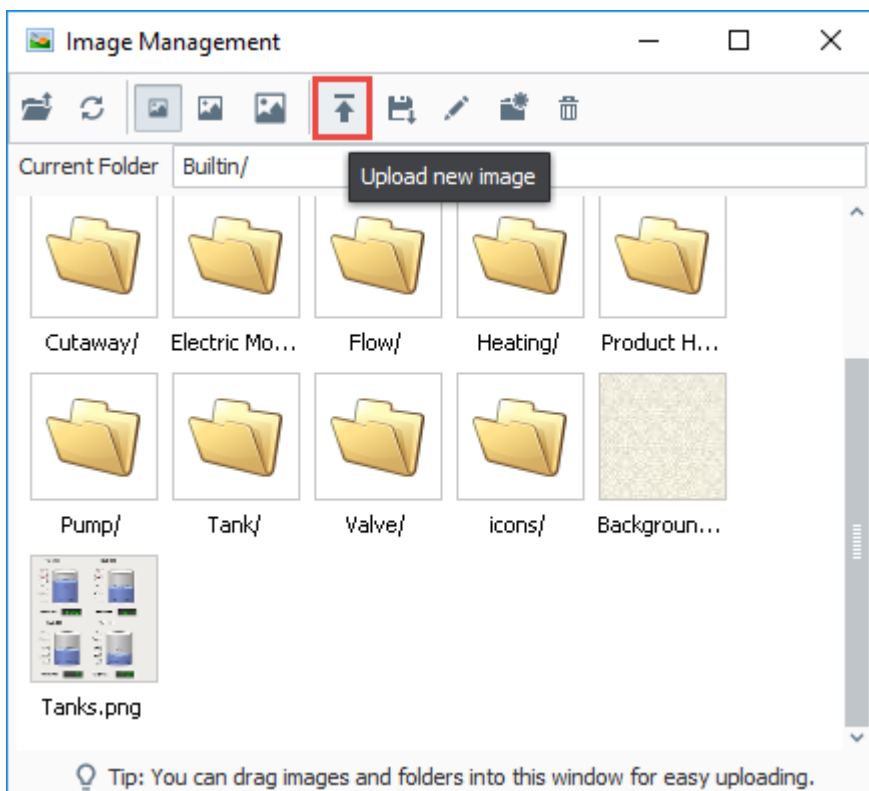


Upload on Drag and Drop

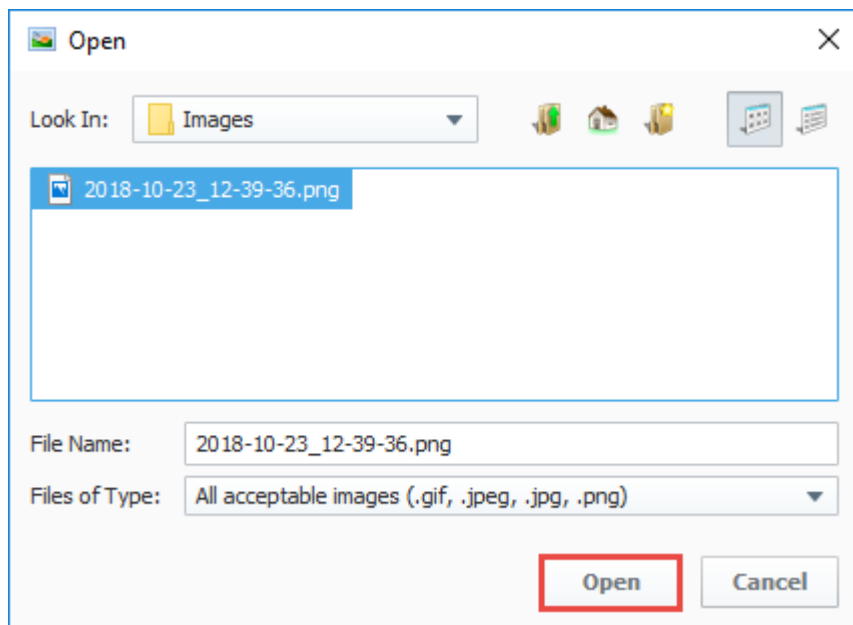
Images can simply be dragged and dropped from the local file system into the **Image Management** window.

Manual Upload

Alternatively, the Image Management window has an Upload button to pass images in. Locate the directory you wish to upload the image. You may use the root folder, or create a new folder to keep your images organized. When ready, click on the **Upload Image** button.



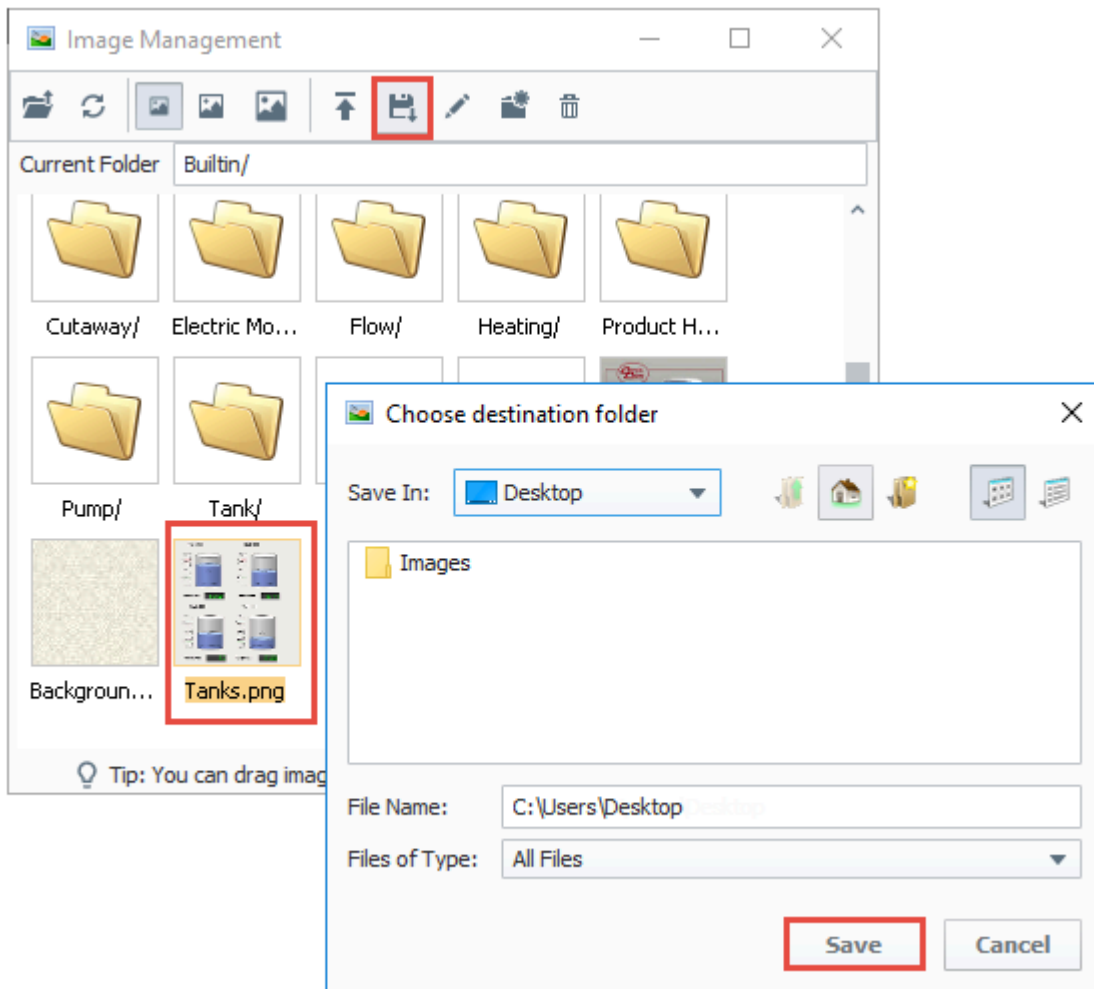
An **Open** dialog window will appear. Simply find your image on the local system, and click **Open** to upload the selected image.



Downloading Images from the Image Management Tool

Single images, as well as entire directories, may be downloaded from the Image Management tool. This is useful when migrating a project to another Gateway.

Image downloads can be taken from either the **Image Management** or **Image Browser** windows. If at least one folder or image is selected, the **Save**  icon will become enabled. Click the **Save** icon, pick a local directory to save the images to, and click the **Save** icon again. All images and subfolders in the selected folder will be copied to the selected directory.



Exporting and Importing Images in Projects

Uploading an image involves storing the file in the Gateway's internal database. This means that project exports do not contain any referenced images.

When exporting a project for use in another Gateway, it is recommended to also export any images that the project uses, and upload them into the new Gateway at the same directory.

Script Console



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Scripting Console

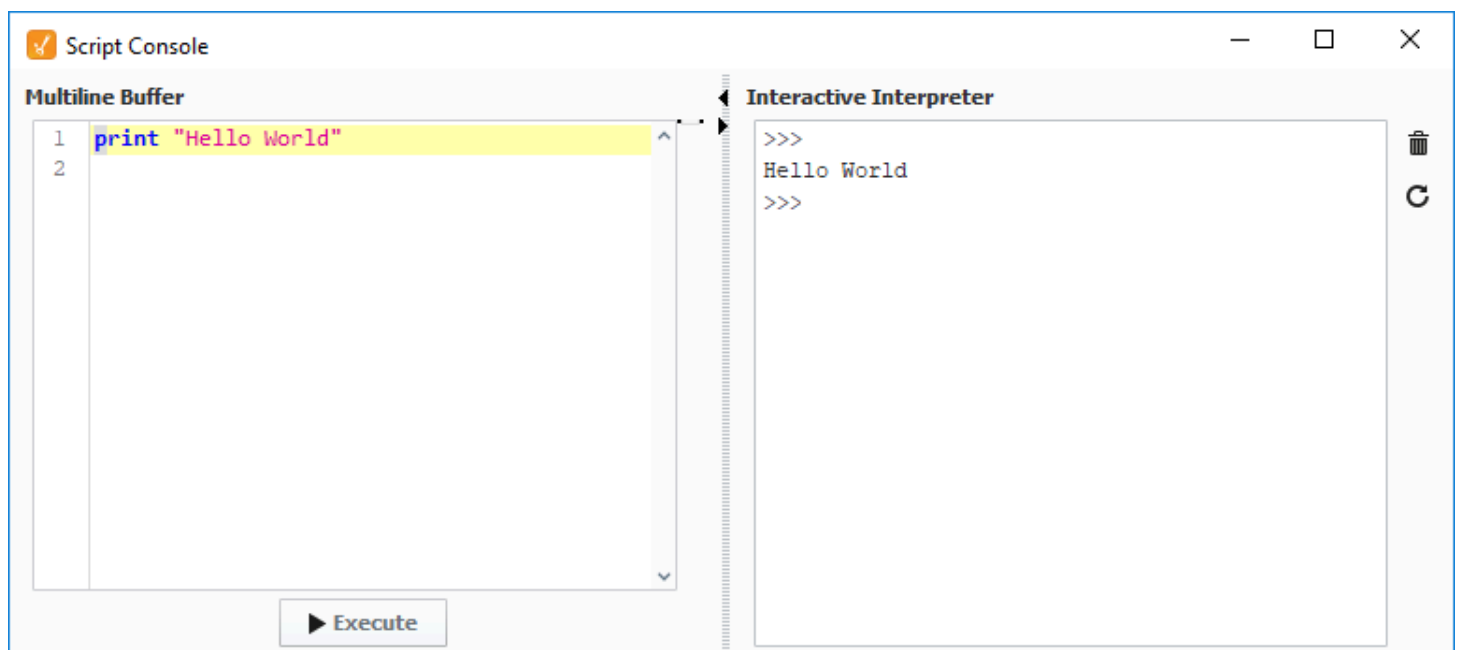
[Watch the video](#)

The Script Console is a live Python terminal that is only accessible in the Designer. It is a great way to very quickly test a script as it does not rest on a scripting event or specific component. The Script Console can be opened via the **Tools > Script Console** menu. It consists of two parts: a **Multiline Buffer**, and an **Interactive Interpreter**. Code can be typed into both sides.

Due to how [scope](#) works, the Script Console can not interact with components on a window, but it can call Project and Shared scripts. If a Project or Shared script was recently added, then the console will need to be reset before it can be called. This can be accomplished by clicking on the **Reset**  icon in the upper right.

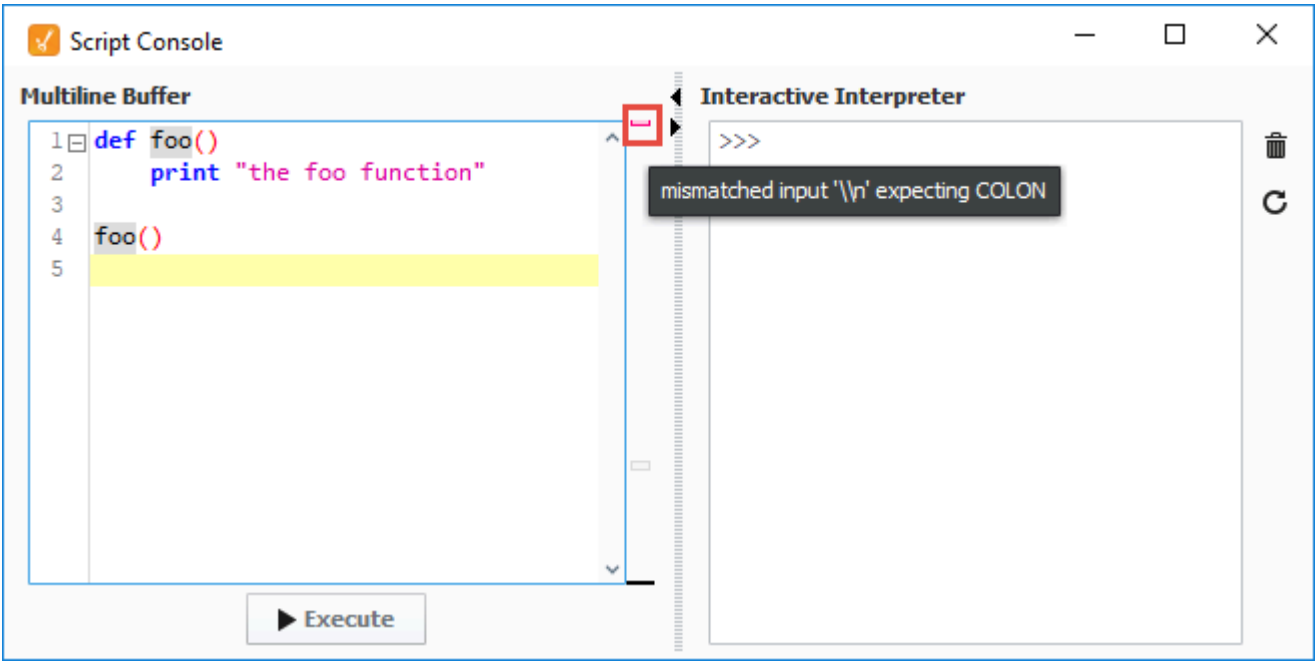
NOTE

Gateway-scoped information will not appear in either the Script Console or [Output Console](#). Instead, the output will be sent to the wrapper.log file. Alternatively, [system.util.getLogger](#) will send messages to the Gateway Console, and is a preferred method of troubleshooting Gateway scoped scripts.



Features

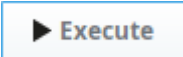
There are several icons and user interface elements located on the Script Console window. The image below highlights a syntax error.



A reference of the icons and descriptions are found in the table below:

Icon	Name	Description
	Clear	Clears the text from the Interactive Interpreter.
	Reset	Clears and resets the text, and deletes all user defined objects (variables and functions) from the Interactive Interpreter.
	Expand/Collapse	Expands / Collapses Multiline Buffer and Interactive Interpreter.
	Syntax Error Highlight	Shows up next to a line in the Multiline Buffer identifying an error. Hover over the Error Symbol to see information on the exception.

Multiline Buffer

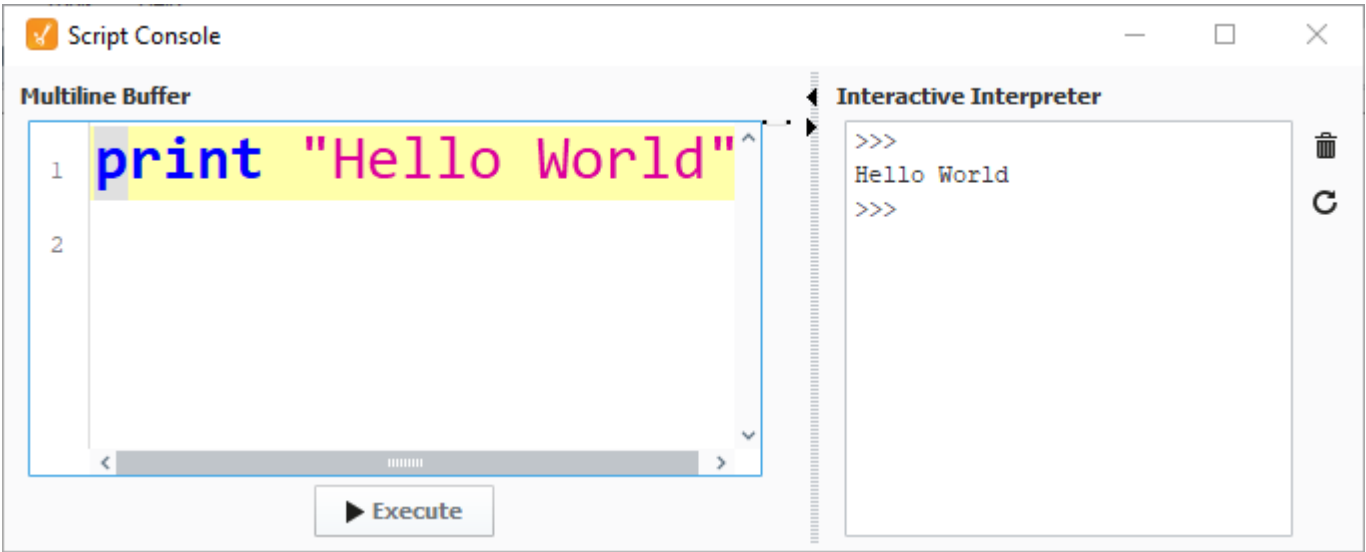
The Multiline Buffer, located on the left side of the Script Console, allows for multiple lines of code to be entered and then executed by clicking on the **Execute**  button. All **print** statements

will output to the Interactive Interpreter. It also supports code folding for function definitions and comments.

When executing a script in the console, the **Execute** button will change to an **Interrupt** button. Developers can press the **Interrupt** button to interrupt / stop a script from executing when testing code with a lot of data, or when the script inadvertently gets stuck in an infinite loop.

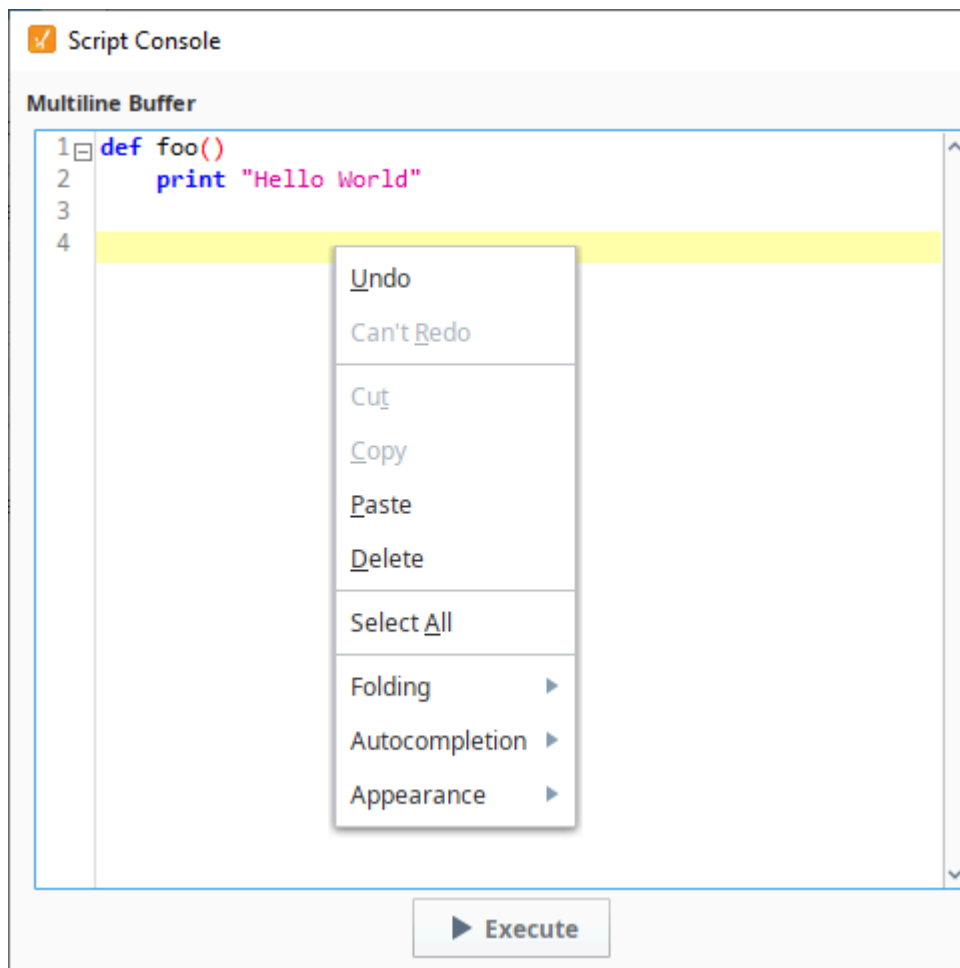
Font Size Adjustment

Font size in the Multiline Buffer can be adjusted by holding **Ctrl** and scrolling the mouse wheel.



Right-Click Menu

Right-clicking on the Multiline Buffer opens a menu. The menu options are described in the table below.



Main Menu Options

Name	Description
Undo	Undoes the last action.
Redo	Gets rid of the last undo action.
Cut	Cuts the selected text.
Copy	Copies the selected text.
Paste	Pastes the selected text.
Delete	Deletes the selected text.
Select All	Selects all text in the window.

Folding

Name	Description
Toggle Current Fold	Expand or collapse the fold where the text cursor is located.
Collapse All Comments	Collapse all instances of multi-line comments. Only contiguous comments are collapsible.
Collapse All Folds	Collapse all expanded folds.
Expand All Folds	Expand all collapsed folds.

Autocompletion

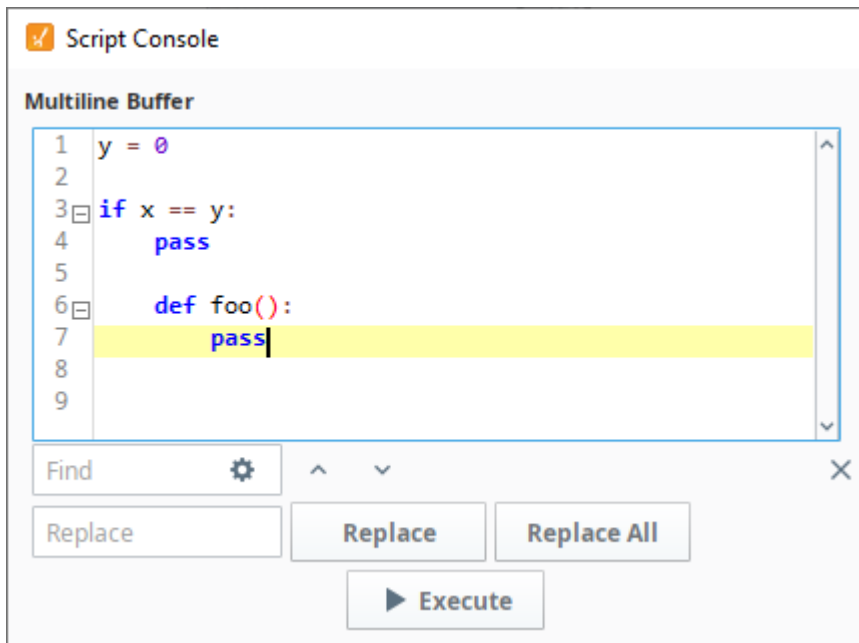
Name	Description
Automatic Activation	Determines access to the Autocompletion window. If set, the window will automatically appear after a second of inactivity occurs when "system." has been typed. If not set, the window can still be accessed manually by pushing Ctrl+Space .
Description Window	Shows or hides the Description pane in the Autocompletion window.
Parameter Assistance	Enables parameter assistance for known function arguments.

Appearance

Name	Description
Whitespace	Paints an arrow character in whitespace sections (tabs and spaces) for each line.
Tab Lines	Paints lines at the indentation level of each tab stop.

Find/Replace

Pressing **Ctrl+R** while the text cursor is in the Multiline Buffer opens a Find and Replace window. This will search for instances of text throughout the Multiline Buffer, and allows the user to replace all or some instances with new text.



Keyboard Shortcuts

The following shortcuts apply only to the Multiline Buffer.

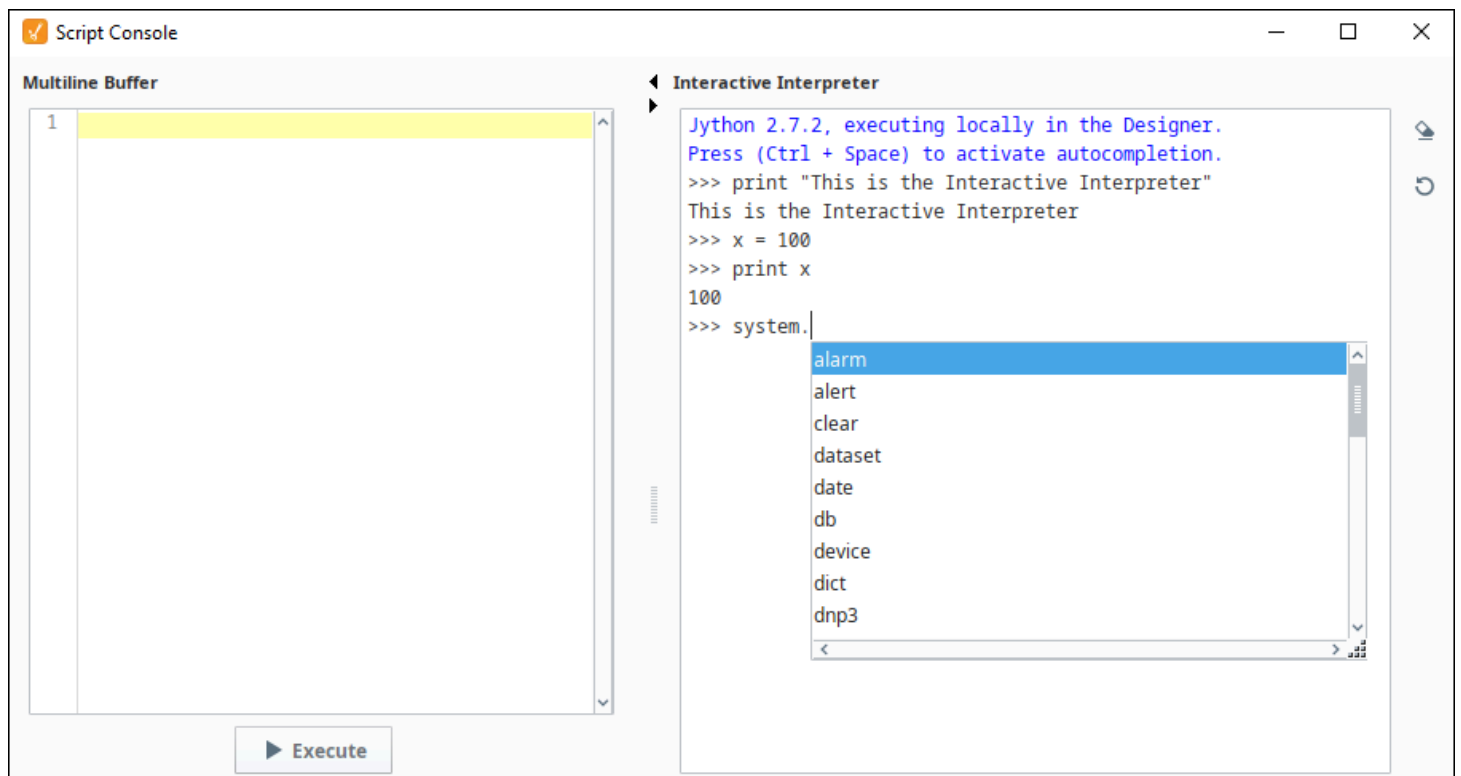
Key(s)	Description
Ctrl + </> (on the number pad)	Collapse all folds.
Ctrl + <*> (on the number pad)	Expand all folds.
Ctrl + <-> (on the number pad)	Collapse the fold on the same line as the text cursor.
Ctrl + <+> (on the number pad)	Expand the fold on the same line as the text cursor.
Ctrl + <Space>	Open Autocompletion window. By default, the window will automatically open once " system. " has been typed.
Ctrl + <R>	Open Find/Replace window.
Ctrl + <Mouse Wheel Scroll>	Increase and decrease the font size.
Ctrl + <Enter>	Executes the script in the script editor.

Interactive Interpreter

The Interactive Interpreter is located on the right side of the Script Console, and allows you to run a single line of code at a time. Code is executed from the Interactive Interpreter by pressing the **Enter** key. Print statements from both sides of the Script Console will appear in the Interactive Interpreter.

The Autocompletion window, available in the Interactive Interpreter, has access to the current working environment so items such as Project and Shared scripts will automatically appear. They can also be typed in manually.

New in 8.1.33 When first opened or refreshed, the Interactive Interpreter default header text has displayed the Jython version. Now, it also includes a reminder that the code executes in the local Designer scope (no access to Gateway methods), and instructions for how to trigger the autocomplete hint popup using the the Ctrl + Space keys.



Keyboard Shortcuts

The following shortcuts apply only to the Interactive Interpreter

Key(s)	Description
Ctrl + <L>	Clear the Interactive Interpreter. Functionally the same as clicking the Clear button.
Ctrl + <R>	Reset the Interactive Interpreter. Functionally the same as clicking the Reset button.
Up arrow	Cycle backward through command history.
Down arrow	Cycle forward through command history.
Ctrl + <C>	Keyboard interrupt.
Ctrl + <Space>	Open Autocompletion window. By default, the window will automatically open once an " object ." has been typed such as "system" or "project," and a Project script has already been defined.
Ctrl + <A>	Move the text cursor to the start of the line. Similar to pressing the Home key.

Database Query Browser

The Database Query Browser Panel

The **Database Query Browser** is a very convenient tool that lets you query any database connected to Ignition, and interact with tables. Because Ignition is so heavily integrated with databases, it is very common in the course of project design the need to inspect the database directly, or to experiment with a SQL query to get it just right.

The Database Query Browser is found in the tools menu and has a few basic parts to it. The first is the query text field at the top of the window where a query can be written and then executed against the selected database connection. This can accept any type of query, but if the query would update the database, the Designer needs to have its Gateway **Communication Mode** set to read/write first. The database connection that the query is executed against can be chosen from the dropdown, below the Execute button. The Result Data space below the query field is where the results of the executed query will appear. If a SELECT query was run, then the table data will be shown. If an UPDATE, INSERT, or DELETE query was run, then the number of rows affected will be displayed instead. Finally, the Table List on the right-hand side of the window will display all of the tables in the specified database connection. The tables can be expanded to show the columns and their data types for that table to assist in writing queries. Additionally, when a table is double-clicked, the query will automatically be populated with a **SELECT * FROM** for that table.

The screenshot shows the Database Query Browser window. At the top, the query text field contains `SELECT * FROM alarm_event_data`. Below the query field, the Query Type is set to "Auto (Select)" and the "Limit SELECT to:" checkbox is checked, with a value of 1000 rows. The Execute button is visible on the right. The Resultset 1 table displays 15 rows of data. The table list on the right shows the schema structure.

id	propname	dtype	intvalue	floatvalue	strvalue
2	eventValue	0	0	NULL	NULL
5	eventValue	1	NULL	9.007	NULL
6	eventValue	1	NULL	-9.993	NULL
7	eventValue	1	NULL	9.013	NULL
8	eventValue	1	NULL	-9.986	NULL
9	eventValue	1	NULL	9.019	NULL
10	eventValue	1	NULL	-9.981	NULL
11	eventValue	1	NULL	9.026	NULL
12	eventValue	1	NULL	-9.974	NULL
13	eventValue	1	NULL	9.031	NULL
14	eventValue	1	NULL	-9.969	NULL
16	eventValue	1	NULL	9.036	NULL
17	eventValue	1	NULL	-9.963	NULL
19	eventValue	1	NULL	9.042	NULL
20	eventValue	1	NULL	-9.958	NULL

15 row(s) fetched in 79 ms

Auto Refresh Edit Apply Discard

Schema History

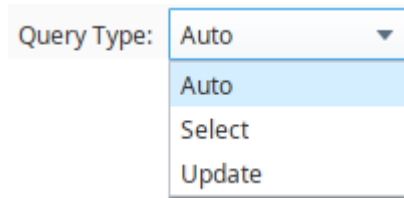
- AUDIT_EVENTS
- alarm_event_data
- alarm_events
- sqlt_data_1_2023_08
- sqlth_annotations
- sqlth_drv
- sqlth_partitions
- sqlth_sce
- sqlth_scinfo
- sqlth_te
- tank

Features of the Query Browser

The Database Query Browser has a few features that can help manage and build any SQL query.

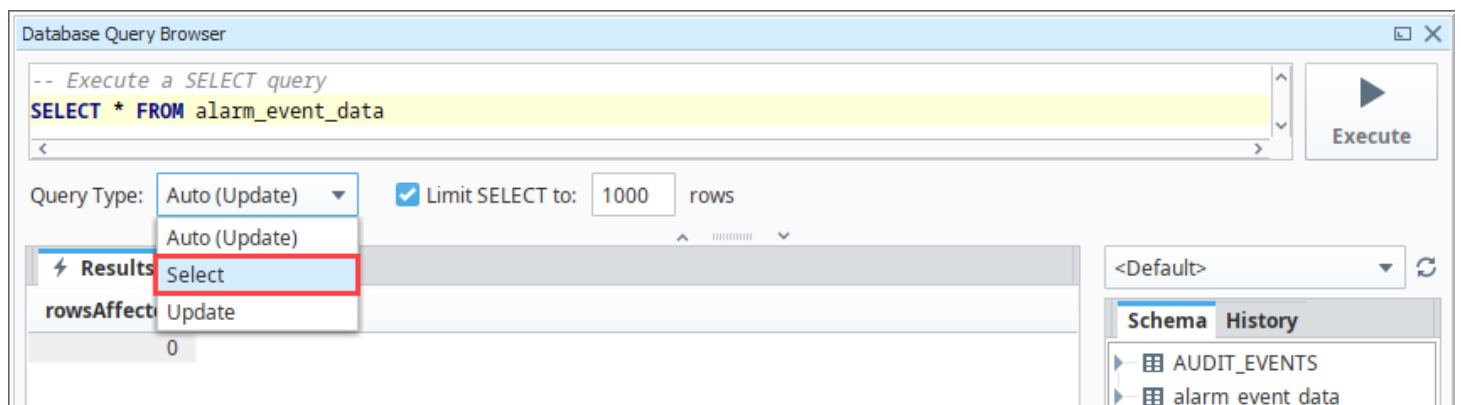
Query Type

New in 8.1.32



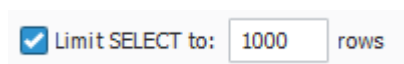
The Query Type field displays the mode that is used when a query is executed. By default, this field will show Auto, which will change to reflect the query type mode as a query is entered to show either Auto (Select) or Auto (Update). This allows confirmation that the correct mode is used when executing the query. If the auto-detected mode is incorrect, the drop down includes Select and Update to set the mode type.

For example, since the check for the query string will assume an update is being run if it doesn't detect SELECT text at the beginning of a query, you may want to use the Query Type dropdown to choose Select as the mode option to confirm the query will execute correctly.



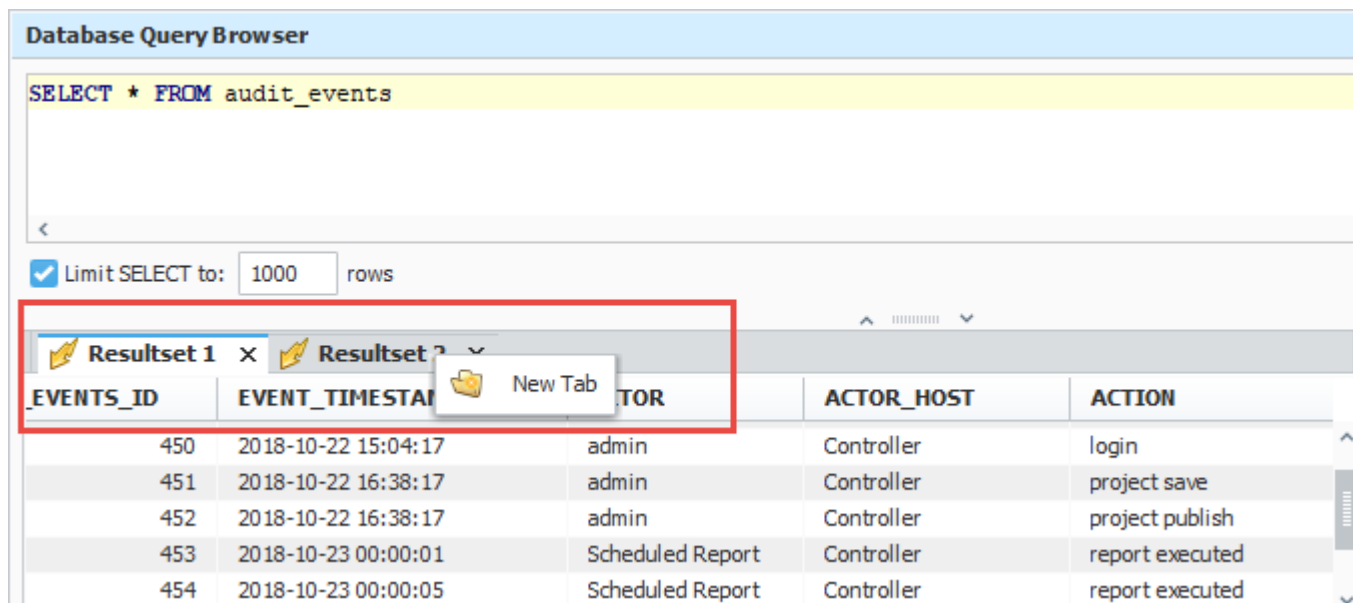
Select Limit

By default, any SELECT statement is limited to 1000 rows. This is to help the queries return quickly, however, it may not always be wanted. This can be turned off or adjusted by either clicking the checkbox or manipulating the row number located underneath the Query Area on the left. It is recommended to leave this on unless you know the result set size. It's better to use a count query than to return all results to see the result count. IE: `SELECT COUNT(*) FROM table...`



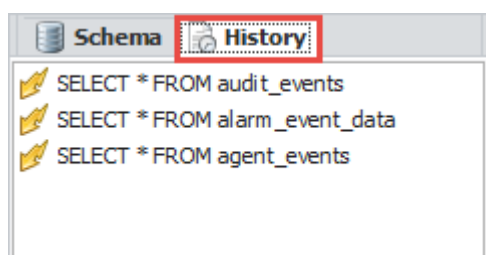
Multiple Resultsets

The Query Browser allows you to make multiple tabs of results, so that multiple queries can be run and their results compared to each other. Simply right click on the **Resultset** area and select **New Tab**. Your queries will be saved for each tab.



Query History

At the top of the Table List, there is a second tab labeled **History**. This will switch the Table List to instead show the history of queries run in the query browser. Double clicking one of the entries will push the query into the Query Area (for the selected tab). This allows you see what queries have been run previously to help you tweak your current query.



Auto Refresh

The Query Browser also lets you monitor a database table for changes by using the **Auto Refresh** button. This is often convenient when designing Transaction Groups. As the group runs, you can view the table that it is targeting with Auto Refresh turned ON to watch how the group is altering the table. Simply click the Auto Refresh button at the bottom of the Query Browser to periodically rerun the query in the Query Area. Make sure to include an ORDER BY clause so your results show up in the order you want.

Editing the Table in the GUI

In addition to editing the table data using INSERT, UPDATE, and DELETE statements, the data can also be edited within the Result Data. Simply click the Edit button at the bottom of the Query Browser window.



! INFO

Editing in this way requires that the data be obtained from a single table. The table must also contain a primary key.

Once the Edit button is clicked, the values in the table can be edited by double clicking on the value and entering a new one.

Database Query Browser

`SELECT * FROM machines`

☒ Limit SELECT to: 1000 rows

Resultset 1

id	machine_name	area_number
1	Conveyor	1
2	Press	2
3	Tank	1
4	Packer	3
5	Loader	3
6	Oven 1	3
7	Oven 2	2
9	Mixer	3
10	Cold Storage	2
12	Chopper	1

10 rows fetched in 0.006s

Auto Refresh Edit Apply Discard

Schema History

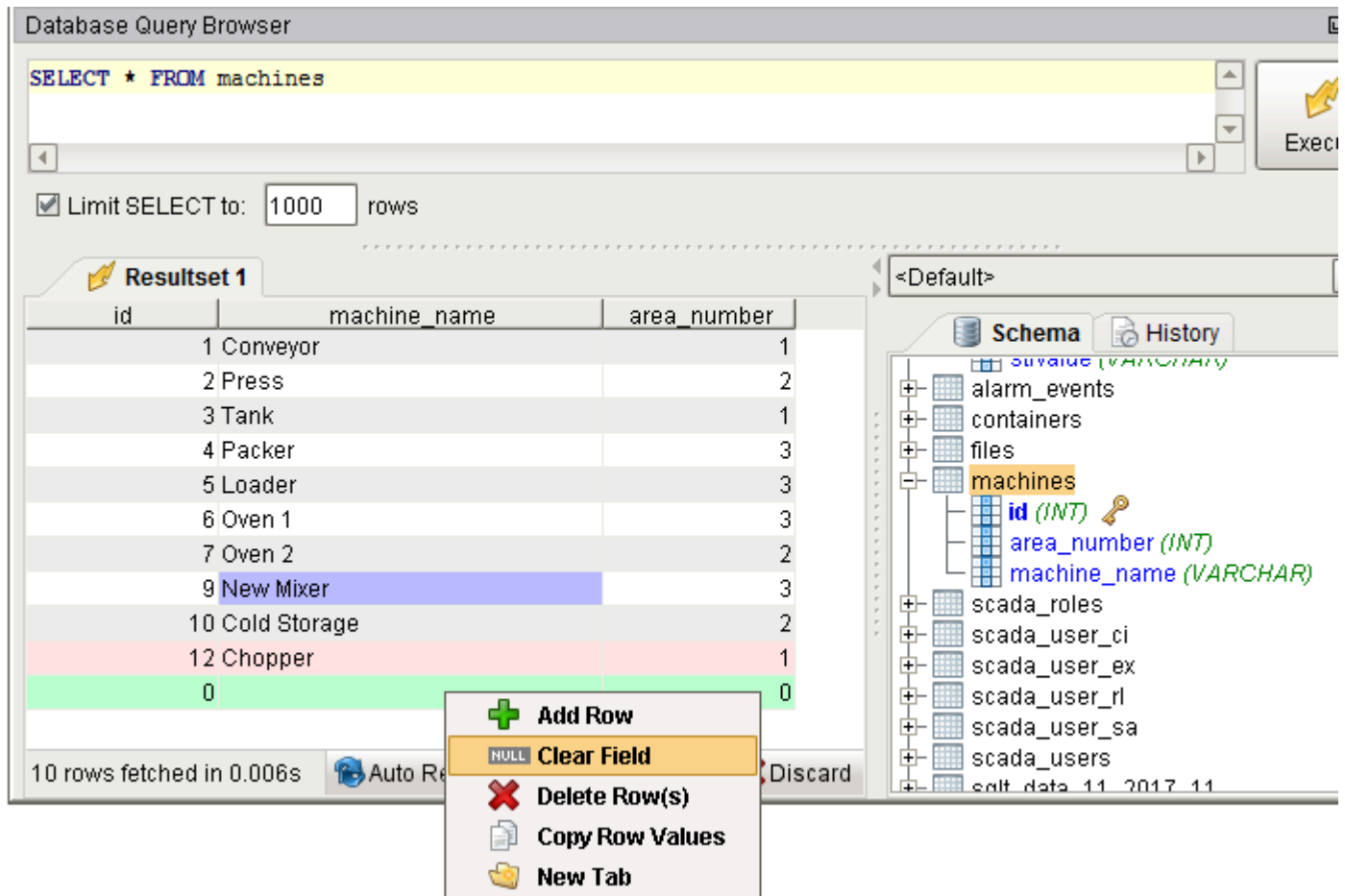
- alarm_events
- containers
- files
- machines**
 - id (INT) (Primary Key)
 - area_number (INT)
 - machine_name (VARCHAR)
- scada_roles
- scada_user_ci
- scada_user_ex
- scada_user_rl
- scada_user_sa
- scada_users
- scit_data_11_2017_11

Right-clicking on a row also provides a few options:

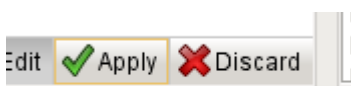
- **Add Row:** Will add a new row to the table for data to be entered into.
- **Clear Field:** Will clear out the value in the selected cell so that it will be NULL. This is different than simply deleting the value out and leaving it empty.
- **Delete Row(s):** Will delete the selected row or rows from the table.

- **Copy Row Values:** Will copy the row values in a comma separated form to the clipboard.
- **New Tab:** Will Create a new Resultset tab for a new query to be run in.

When editing values, cells will highlight depending on what is being done to them. Green cells are new, and typically indicate a new row was added. Red cells are marked for deletion, and will be deleted when the changes are confirmed. Blue cells are cells that have had values changed during editing.



After making edits to the table data, the changes then either need to be applied or discarded. This gives you the opportunity to revert the table to the way it was before the current edit session, or apply the changes and rewrite the table appropriately. Simply click the corresponding button at the bottom of the Query Browser next to the Edit button. Make sure your Gateway **Communication Mode** is set to Read/Write before Applying your changes.



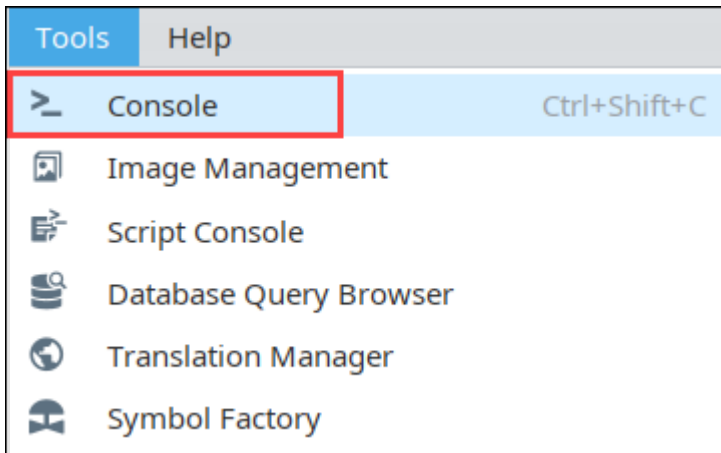
i NOTE

New in 8.1.25 Copied values from the Database Query Browser will paste in an RFC 2339 compatible local datetime format. Additionally, using the shift key while copying will copy the

values in a tab-separated format ideal for pasting into spreadsheet tools such as Microsoft Excel.

Output Console

The Output Console is a dockable panel that you can open via Tools > Script Console menu or the Ctrl-Shift-C keyboard shortcut. The Output Console prints system messages that are coming from the Designer. This can vary from simple info messages that show when things are loaded, to error messages when something goes wrong. The Console is also frequently used to test and debug Python scripts, as print statements on components that are run in the Designer are printed here.



For example, by using the **print** function in your script, you can observe the inner workings of your script as it executes. If you executed the following script:

```
# A Python script that demonstrates the print statement.

print "Print me first"
x=10
z=2
print x, y, x/y

#Result looks like this:
#Print me first
#10 2 5
```

NOTE

Gateway-scoped information will not appear in either the Output Console or [Script Console](#). Instead, the output will be sent to the [wrapper.log file](#). Alternatively, [system.util.getLogger\(\)](#) will send messages to the Gateway Console, and is a preferred method of troubleshooting Gateway scoped scripts.

INFO

New in 8.1.24 You can use certain options, such as copying, in the Edit Menubar at the top of the Designer window.

The Output Console is most frequently used to test and debug Python scripts on components in Ignition. By using the **print** keyword in your script, you can observe the inner workings of your script as it executes. For example, if you executed the following script:

Python - Using the Output Console to Test and Debug Python Scripts

```
# A function that intercepts tag writes, printing out the previous value first.
def writeToTag(path, value):
    prevValue = system.tag.getTagValue(path)
    print "Writing value '%s' to %s, was previously '%s'" % (value, path,
prevValue)
    system.tag.writeToTag(path, value)

writeToTag("Compressor/HOA", 2)
```

It would print the following to the console:

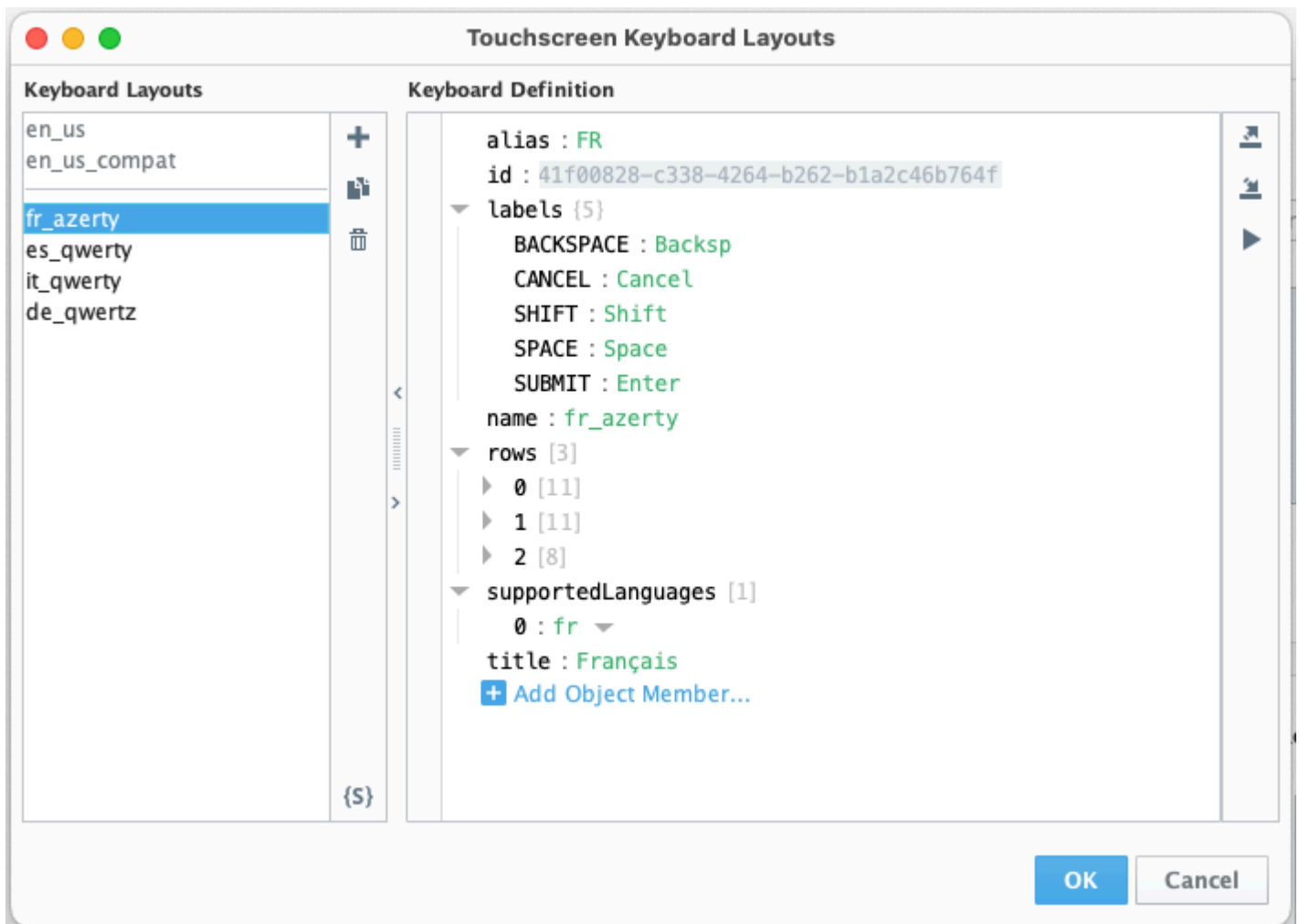
Writing value '2' to Compressor/HOA, was previously '0'

NOTE

The Output Console is also available in the Vision Client from **Help > Diagnostics** and selecting the **Console** tab.

Keyboard Layouts

Keyboard layouts can be added, removed, and customized with the Keyboard Layout editor, which is available in the Tools menu of the Designer Vision workspace. The Keyboard Layouts editor allows you to create, modify, and import/export custom keyboard layouts across your entire Gateway. Keyboards are all configured with a common JSON structure and stored directly in the IDB so that they are shared across all projects.



Each layout can be associated with any number of locales by a language tag. When an end user invokes the touchscreen keyboard, Ignition will attempt to find a keyboard with support for their specific locale, falling back to the English layout if no more appropriate keyboard is found. However, there are a few more ways to assign what keyboard layouts appear. Keyboards can be set individually on touchscreen enabled components using the Touchscreen Keyboard Layout property. Keyboard layouts can also be switched in real time by operators if the keyboard layout includes a language selection key. Furthermore, keyboard layouts can be explicitly requested with the `system.gui.showTouchscreenKeyboard` function.

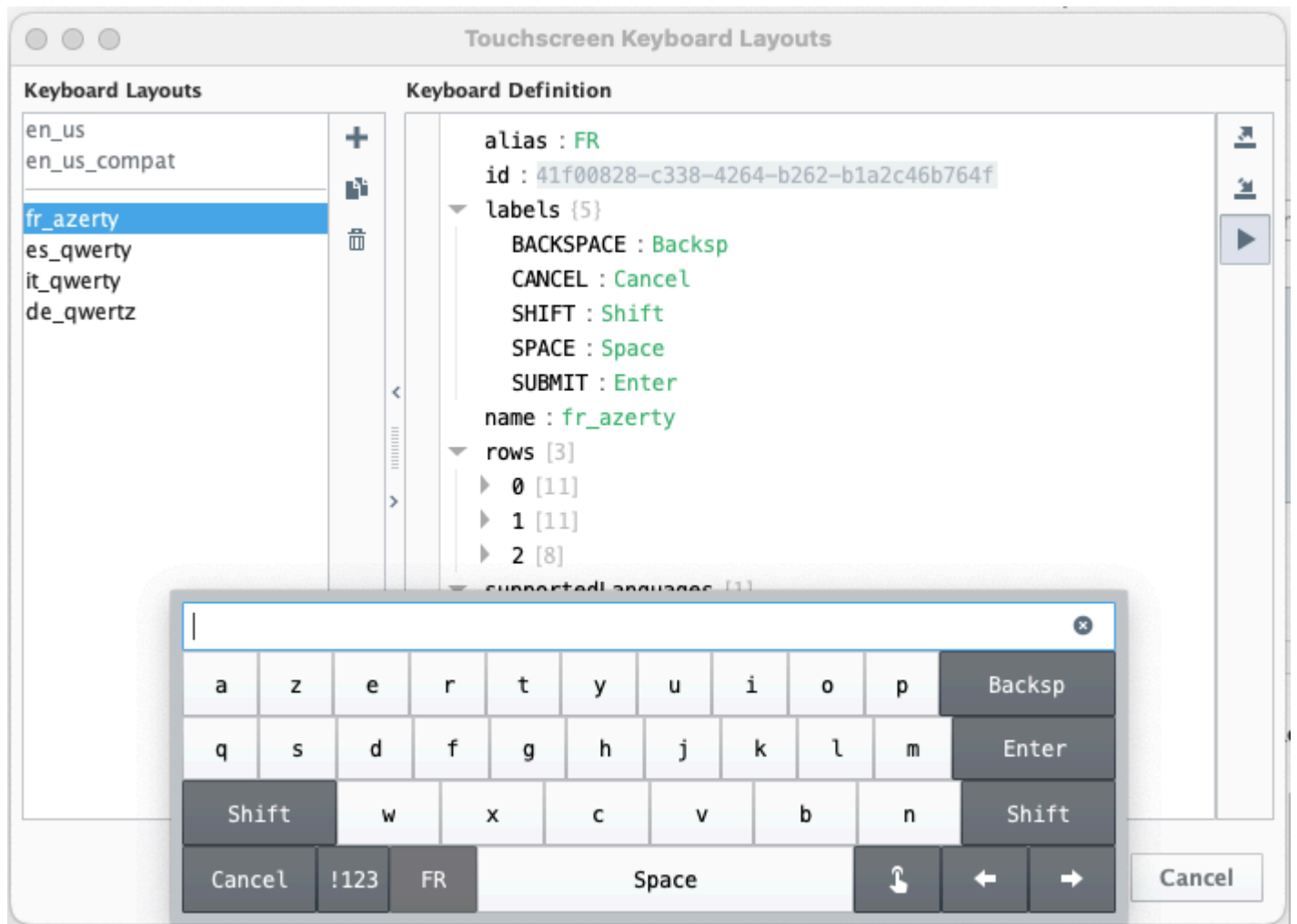
Keyboard Layout Editor

Access the Keyboard Layout Editor in the Designer Vision workspace by selecting **Tools > Keyboard Layouts**. There will already be six keyboard layouts prepopulated under Keyboard Layouts when you first open the editor. The default keyboard layouts are designed to make the best use of screen space and be mobile-friendly. Any created custom keyboard layouts will also be listed here during configuration and after saving. The following keyboard layouts are included by default:

- English (Modern) - A legacy layout utilizing a traditional looking English keyboard.
- English (Compatibility) - A revamped layout of the legacy keyboard with a design geared more toward mobile use.
- Spanish
- French
- German
- Italian

The international keyboards are included to assist in quicker implementation as needed. If your system does not use these keyboards, they can be deleted in the editor using the **Remove**  icon. The **Add**  icon is used to create any new keyboard layouts that may be required. There are no significant restrictions placed on the number or location of keys. Additionally, if you don't want to build a keyboard layout from scratch, you can duplicate an existing keyboard configuration as a starting point for a new custom keyboard. To do this, select the keyboard you want to duplicate, then select the **Duplicate**  icon. At the bottom of the Keyboard Layouts section is an **Export Schema**  icon. Use this to export a JSON schema of the selected keyboard layout for use in external JSON editors to create new keyboard layouts.

On the right side of the editor is the Keyboard Definition section. Defining the properties listed within will establish how your keyboard layout will be configured. The Keyboard Definition area also includes **Import**  and **Export**  icons to import and export keyboard layouts. Imported keyboard layouts must be JSON files. The Keyboard Definition also includes a **Preview**  icon to display an instant, live preview in the Designer of the currently selected keyboard layout.



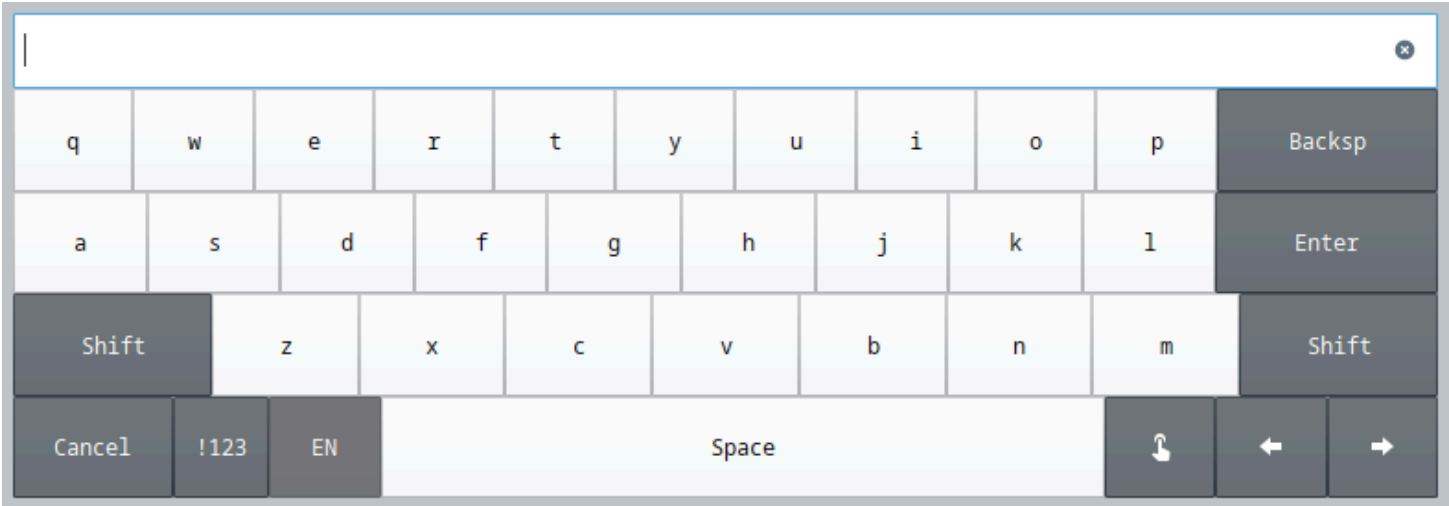
Keyboard Definition Properties

Property	Description
alias	The 2-3 character string that appears on the keyboard language selector key to identify this keyboard.
id	The fixed UUID for the keyboard layout. These are randomly generated and automatically updated to track layouts as they are updated on the Gateway.
labels	Localized strings to change the text on various system keys, such as backspace, shift, and cancel.
name	The name of the keyboard.
rows	The designation of character keys on the keyboard sorted by row. Each character within a row can have uppercase and lowercase fields, along with the ability to add accent options for both fields. For example, row 0 character 2 on the EN keyboard is the letter "e". The uppercase and lowercase selections for "e" include an accents dropdown that contains either the uppercase or lowercase "ê", "é", "è", "ë", "è" accent options. Row designation can be structured in any of the following three ways: • A string literal member of the enum "BACKSPACE", "SUBMIT", "SHIFT", "CANCEL", "CAPSLOCK", "NUMERIC_LAYOUT" will create a system key at that location. • A simple key can be created with an object with at least one member lowercase: <code>{ "lowercase": "a" }</code>. Add an uppercase key to define an alternate form to use when the shift or caps lock keys are active or more complex keys can be defined with a full object pattern: <code>{ "lowercase": { "character": "e", "accents": ["ê", "é", "è", "ë", "è"] }, "uppercase": { "character": "E", "accents": ["Ê", "É", "È", "Ë", "È"] } }</code>. • An alias, allowing the typed character to be different than the label for the key: <code>{ "character": "\t", "alias": "Tab" }</code>

Property	Description
	Touchscreen Keyboard Layouts Keyboard Layouts en_us en_us_compat fr_azerty es_qwerty it_qwerty de_qwertz Keyboard Definition name : en_us rows [3] 0 [11] 0 {2} lowercase : q uppercase : Q 1 {2} lowercase : w uppercase : W 2 {2} lowercase {2} character : e accents [5] 0 : é 1 : ê 2 : ë 3 : ü 4 : ù uppercase {2} character : E accents [5] 3 {2} 4 {2} OK Cancel
supported languages	An array of IETF language tags representing the languages this keyboard language supports. This includes a title field to enter the string that is presented to the user when selecting this keyboard to use. For example, if your language tag was en, your title would be English.

Default Keyboard Layouts

The default keyboard layouts include standard Backspace, Enter, and Shift keys in addition to system keys that switch language selection, toggle layouts between alphabetic and numeric/symbol displays, highlight accent keys, and navigate forward or backward through the preview text field.



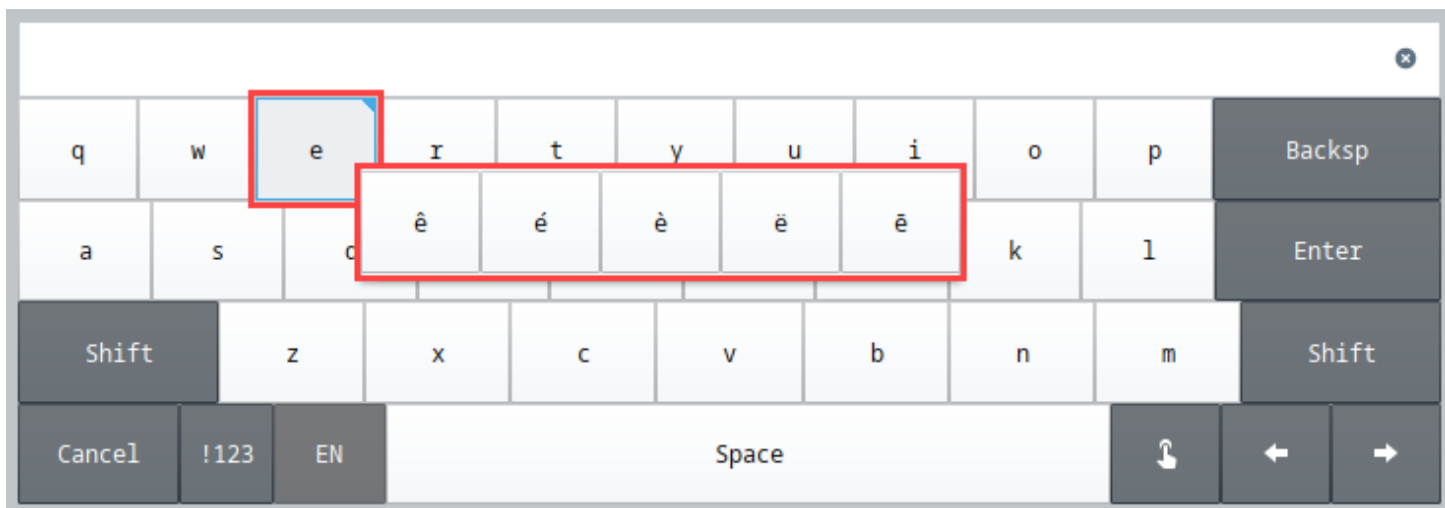
Additionally, there is a clear all  icon at the end of the preview text field to make it easier to remove all existing text in the field.

NOTE

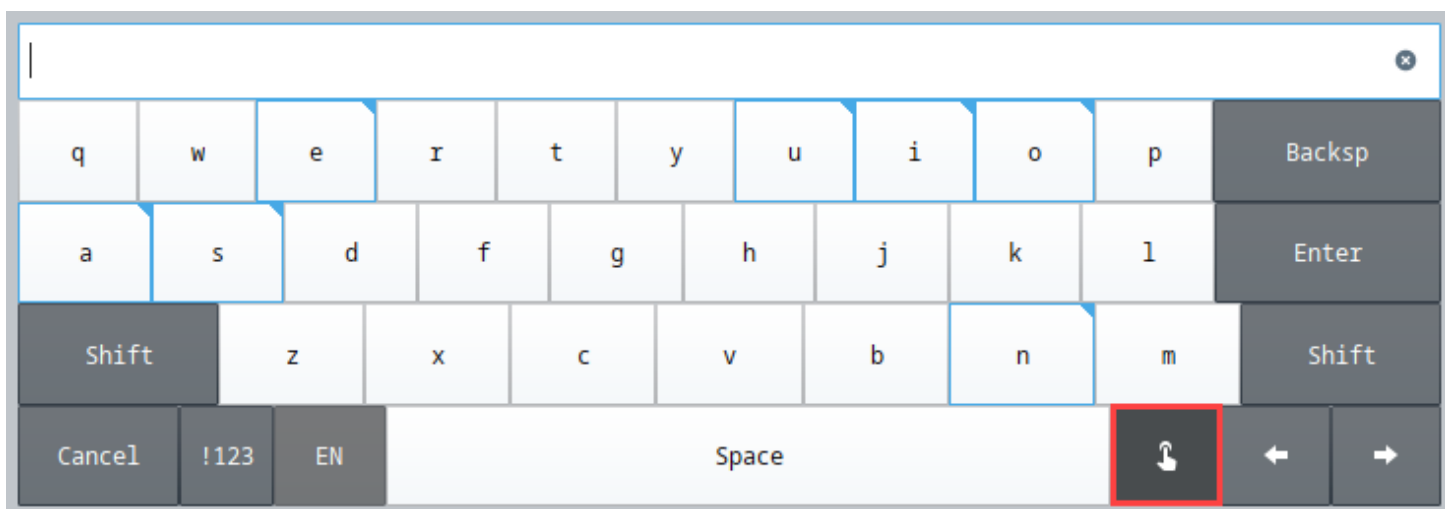
For easy navigation within the text body, use the Shift and Arrow Keys to jump to the start or end of the current text. The arrow keys can be held to repeatedly navigate within the text field. Similarly, the backspace key can be held down to remove multiple characters at a time.

Using the Long Press Feature

Long press on any key with accent characters defined and a pop up window will open allowing you to enter any alternate variations of that key.



Another option to access accent keys is to touch the Finger Push  key at the lower right of the keyboard. When this is selected, all keys with accent options will be highlighted in blue and a single touch will invoke the accents pop up.



NOTE

If even greater configuration of the long press feature is required, the long press delay time can be adjusted using the `ignition.touchscreen.longPressDelay` system property.

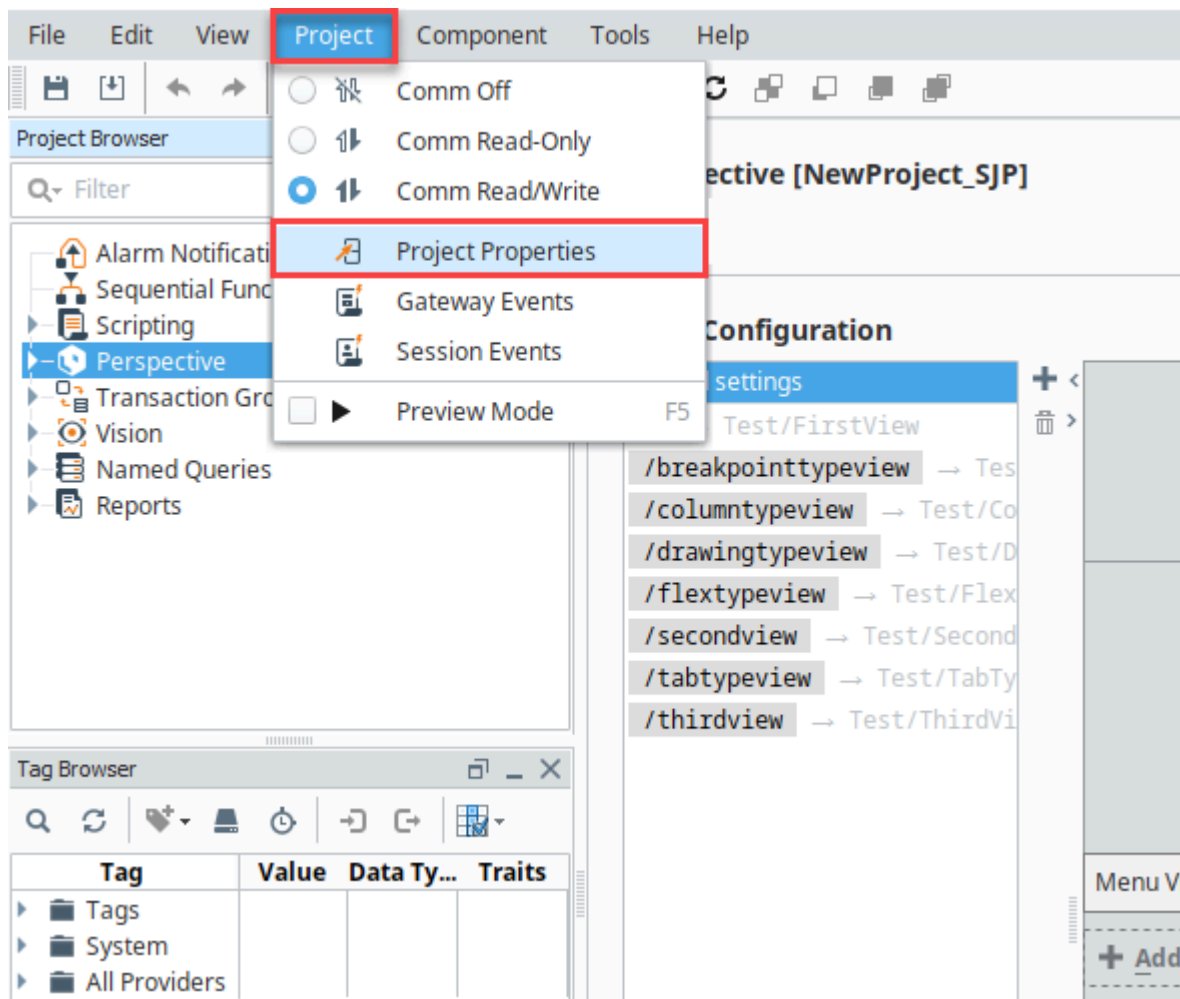
Project Properties

There are a number of properties you can set for your projects within the Designer, Vision Clients, and Perspective Sessions. For example, there are properties for setting the touchscreen mode, customizing a client's auto-login, or configuring how the clients receive updates.

The property settings on the Project Property window apply to the whole project. This page identifies and describes all the available project properties.

Accessing Project Properties

In the Designer, click on Project tab on the menu bar at the top of the Designer, then select **Project Properties**.



The Project Properties screen is displayed. Project Properties span several functional areas each containing settings applicable to that area.

Project General Properties

A project's General properties apply to the project as a whole, across all module functionality. For a new project, there are many default settings that you can use. For example, there are default settings for the Tag provider, database, initial comm mode, window editing, and Client launching.

When properties in a section have been updated but not saved yet, the section heading will change to italicized text.

The screenshot shows the 'Project Properties' dialog box with the 'General' tab selected. The left sidebar lists the following categories and sub-items:

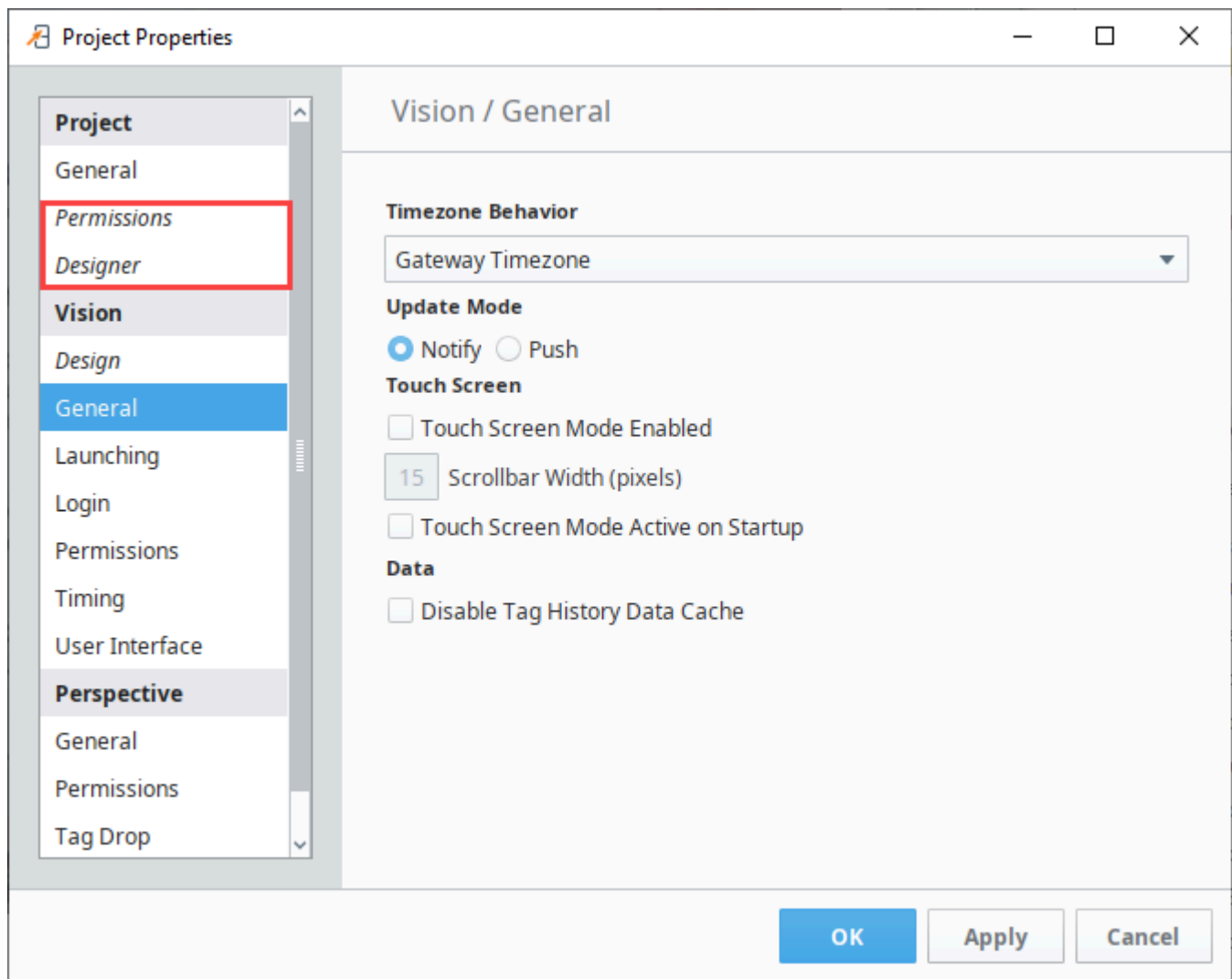
- Project**
 - General (selected)
 - Permissions
 - Designer
- Vision**
 - Design
 - General
 - Launching
 - Login
 - Permissions
 - Timing
 - User Interface
- Perspective**
 - General
 - Permissions
 - Tag Drop
 - Inactivity

The main area displays settings for 'Project / General' (italicized heading):

- Tag Settings**
 - Default Provider: default (dropdown with refresh icon)
 - Client Poll Rate: 250 (spinner)
- Database Settings**
 - Default Database: MSSQL (dropdown with refresh icon)
- Security Settings**
 - Identity Provider: Okta_2018 (dropdown with refresh icon)
 - ☐ Always ask the IdP to re-authenticate users by default
 - User Source: opcua-module (dropdown with refresh icon)
 - Required Client Roles: (empty field with green checkmark icon)
- Auditing Settings**
 - ☐ Enable Auditing
 - Audit Profile: Select one... (dropdown with refresh icon)

At the bottom are buttons for OK, Apply, and Cancel.

When properties in a section have been updated but not saved yet, the section heading will change to italicized text. In the following example, changes have been made in the the Perspective General and Permissions properties but they have not been saved or applied yet.



i NOTE

There are a few properties of a project, such as its name, description, and title that are not available from the Designer and you need to set them in the Gateway. To do so, go to the [Gateway](#), under the **Config > Projects** section, click on the **edit** link next to the project. You cannot edit these settings while the project is open in the Designer.

Default Database and Default Tag Provider

Under **Project > General** is where you set the project's Default Database and its Default Tag Provider. It is important to understand how to use defaults effectively for proper project design.

Wherever you use a database connection or a Tag in a project, you are always given the option to use the project's default, or an explicitly named connection or provider. If your project is like most typical projects, it primarily uses a single database and a single Tag provider. By consistently using the default option, you make your project more resilient to change.

For example, suppose you have a project, and it has a database connection named `Production_DB`. Now you want to adapt the project to a new, similar plant, while leaving the existing project intact. You

copy the project and create a new database connection, named `New_DB`. If your project consistently used its default database connection, the switchover will be as simple as changing the copied project's default database. However, if you used the explicit `Production_DB` connection in your groups and screens, you will need to laboriously switch the bindings over to `New_DB`.

General Properties

Tag Settings

Property	Description
Default Provider	The Tag provider chosen here will act as the project's default Tag provider.
Client Poll Rate	The Client poll rate (in milliseconds) is the rate at which a Vision Client or Ignition Designer polls the Gateway for updates to its subscribed Tags.

Database Settings

Property	Description
Default Database	This is the default database connection to use for this project. To use the default database connection, use the special <code><default></code> connection, or in scripting, the empty-string connection <code>""</code> .

Security Settings

Property	Description
Identity Provider	The default Identity Provider (IdP) for this project. Choose from a dropdown list of IdPs. You can also choose <code><None></code> if the project already had an IdP but you want to remove it. Note: If your Identify Provider was set in an Ignition version prior to 8.0.6, this property may be located in Project Properties > Perspective General instead.
Always ask the IdP to re-authenticate users by default	When enabled, authenticated uses will always need to re-enter their credentials on login. When false, if a user is already authenticated, then they will not be required to re-type their credentials when an action in the session triggers a login (such as a call to system.perspective.login). Note: Allowing re-authentication is entirely determined by the Identity Provider. This setting simply makes the Gateway send the re-authentication request. Consult your Identity Provider's documentation for information on re-authentication support.
Automatically redirect users to the IdP if authentication is required	New in 8.1.8 If enabled, users will be automatically redirected to the IdP for authentication if the user is not yet authenticated and authentication is required. If disabled, users will be shown a "speed bump" page, with a message explaining how authentication is required and a button allowing the user to redirect to the IdP for authentication. Note: This setting only applies to Perspective Sessions.
User Source	Choose the User Source that governs this project's security: specifically, which group of users (User Sources) is allowed to log into the client. The User Sources are all defined in Gateway's Config section under the Security > User, Roles page. Note: This is for Vision projects only.
Required Client Roles	This property is for Client logins, and determines what role(s) a user must have before they can log into the Client. You can optionally specify a list of roles that are required for a user to log into this project. Use commas to separate the roles. Users must have at least one of the

Property	Description
	roles in order to log in. If no roles are specified, the user only needs to correctly authenticate with the User Source in order to log in. To define the roles, go to the Gateway's Config section under the Security > User, Roles page. Click the manage users link, and then go to the Roles tab. See also Security .

Audit Settings

Property	Description
Enable Auditing	If auditing is enabled, audit events that relate to this project will be stored in the chosen audit profile.
Audit Profile	The audit profile stores the audit events when auditing is enabled.

Permissions Properties

When opening the project in the Designer, these properties determine which roles are required when making certain changes to the project. More details can be found on the [Project Security in Designer and Gateway](#) page.

Required Designer Roles	Description
View	Users must have at least one of these roles to view the project in the Designer.
Save	Users must have at least one of these roles to save the project.
Delete	Users must have at least one of these roles to delete the project.
Protected Resources	Users must have at least one of these roles to access protected resources.

Project Properties

Project / Permissions

Project

- General
- Permissions**
- Designer
- Vision**
- Design
- General
- Launching
- Login
- Permissions
- Timing
- User Interface
- Perspective**

Required Designer Roles

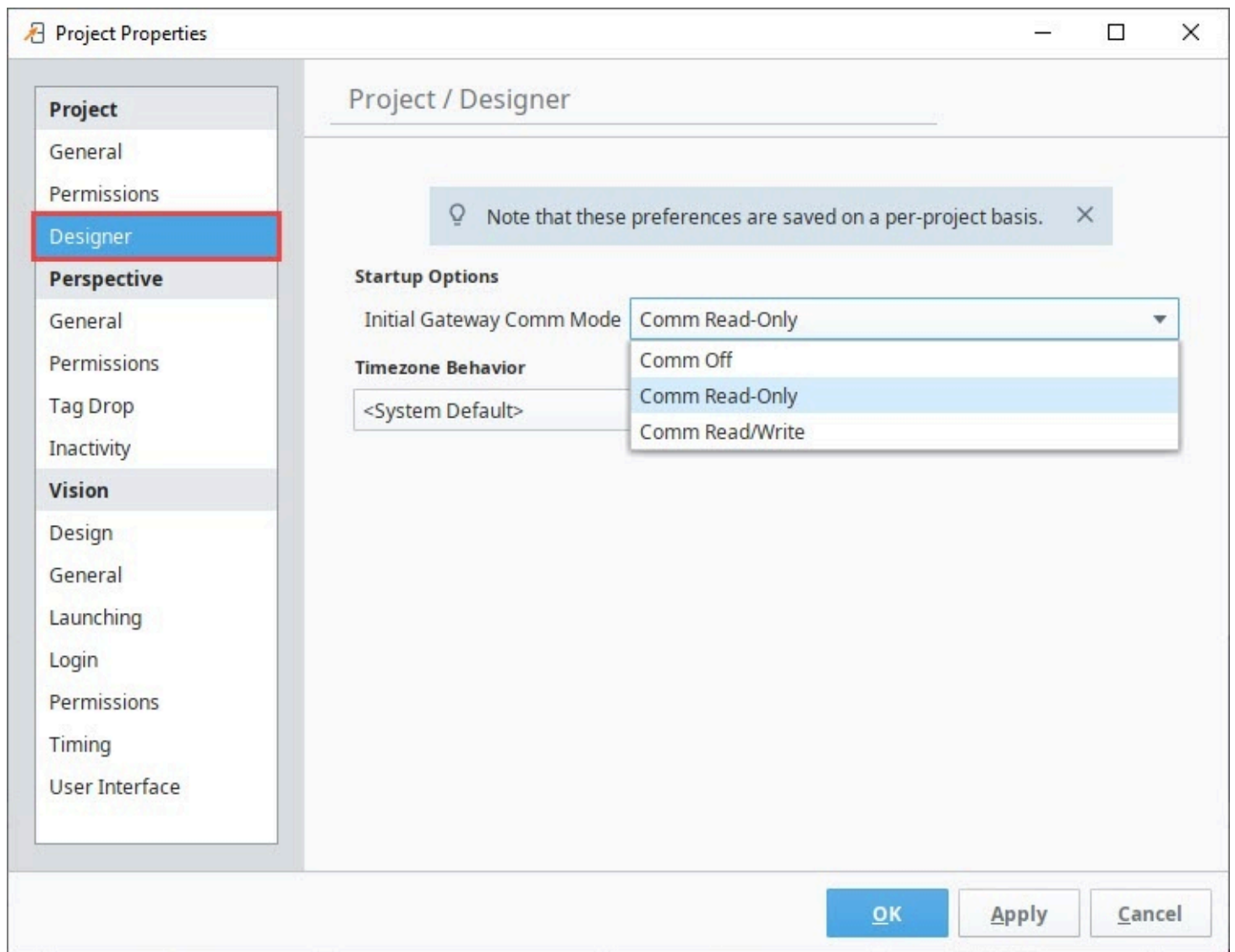
View		✓
Save		✓
Delete		✓
Protect Resources		✓

OK Apply Cancel

Designer Properties

These preferences are saved on a per-project basis.

Startup Options	Description
Initial Gateway Comm Mode	The Designer starts up in the default Comm Read-Only mode. The property allows you to change the mode the Designer starts in when viewing the project. The options are: Comm Off, Comm Ready-Only, Comm Read/Write. • Comm Off: In this mode, all database query traffic and Tag subscriptions and writes are blocked. • Comm Read-Only: Tag subscriptions and SELECT queries work, but Tag writes and UPDATE/INSERT/DELETE queries are blocked. • Comm Read/Write: The Designer may freely request Tag and database values from the Gateway, as well as write or change these values. For more information, see the Communication Modes page.
Timezone Behavior	New in 8.1.22 Sets the timezone of the Designer. This takes precedence over Vision's Client Timezone setting If Vision is installed and applies only to the Designer.



Vision Project Properties

There are many project properties that apply specifically to Vision Clients. You can find more information at [Vision Project Properties](#).

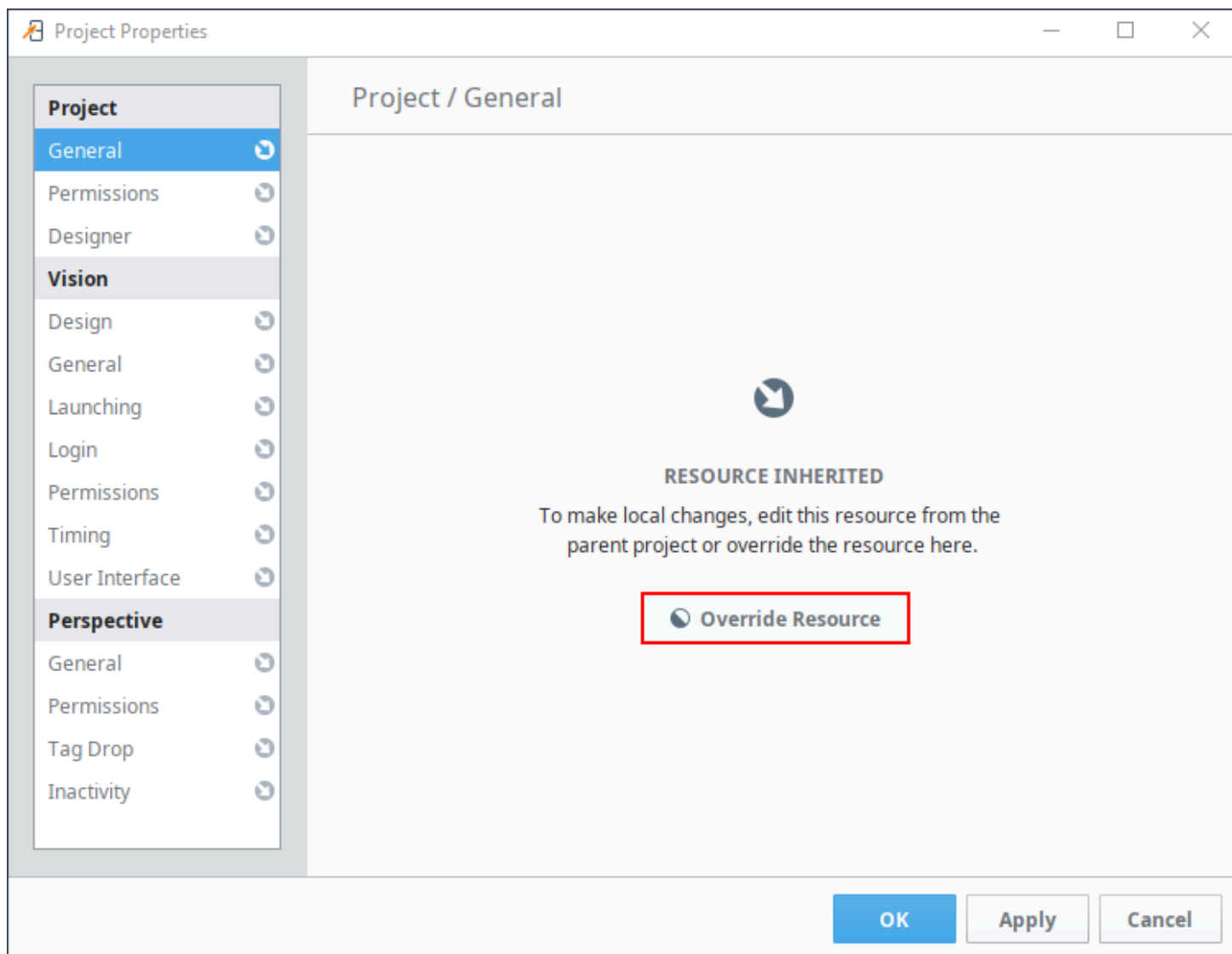
Perspective Properties

There are many project properties that apply specifically to Perspective Sessions. You can find more information at [Perspective Project Properties](#).

Property Inheritance

Project properties can be inherited from parent projects. You can find more information at [Project Inheritance](#).

New in 8.1.2 Inheriting Project Properties results in a **Resource Inherited** overlay on the section. The **Override Resource** button can be used to make changes locally:



While a resource is overridden, the **Discard Overrides** button can be used to clear overrides for the current section.

Project Properties

Project

General

Permissions

Designer

Vision

Design

General

Launching

Login

Permissions

Timing

User Interface

Perspective

General

Permissions

Tag Drop

Inactivity

Project / General

Discard Overrides

Tag Settings

Default Provider

<None>

Client Poll Rate

250

Database Settings

Default Database

<None>

Security Settings

Identity Provider

<None>

☐ Always ask the IdP to re-authenticate users by default

User Source

Select one...

Required Client Roles

Auditing Settings

☐ Enable Auditing

Audit Profile

Select one...

OK

Apply

Cancel

Find and Replace

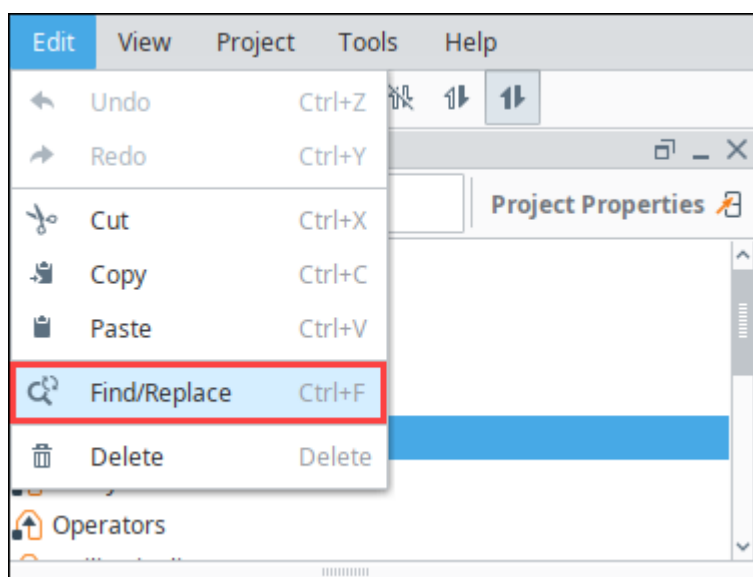


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Using Find and Replace

[Watch the video](#)

The Find/Replace tool in the Edit menu of the Designer allows you to search your entire project for specific components, properties, scripts, Transaction Groups, and Tags. You can then use the replace feature to make mass changes to a project with the click of a button.



Search Options

In the Target section, the Find/Replace tool has options for searching through many different parts of a project.

- Named Queries (Added in 8.1.3)
- Pipelines
- SQL Bridge Transaction Groups
- Scripting
- Tags
- Templates (Vision)
- Views (Perspective)
- Windows (Vision)
- WebDev Resources (Added in 8.1.1)

☒ Find/Replace

Target

☒ Select All

☐ ☒ **Named Query...** **Open Queries (0)** ▾

☒ Query Body
 ☒ Paramet...

☒ **Pipelines**

☐ ☒ **SQL Bridge** **All groups (0)** ▾

☒ Group Settin...
 ☒ It...

☐ ☒ **Scripting**

☒ Client Event Scri...
 ☒ Gateway Event Scri...
 ☒ Project Library

☒ **Tags** **Default** ▾

☐ ☒ **Templates** **Open templates (0)** ▾

☒ Component Properti...
 ☒ Property Bindings
 ☒ Scrip...
 ☒ Securi...
 ☒ Custom Metho...

☐ ☒ **Views** **Open Views (1)** ▾

☒ Properti...
 ☒ Bindings
 ☒ Actions
 ☒ Scrip...

☒ **WebDev Resourc...**

☐ ☒ **Windows** **Open windows (0)** ▾

☒ Component Properti...
 ☒ Property Bindings
 ☒ Scrip...
 ☒ Securi...
 ☒ Custom Metho...

Results

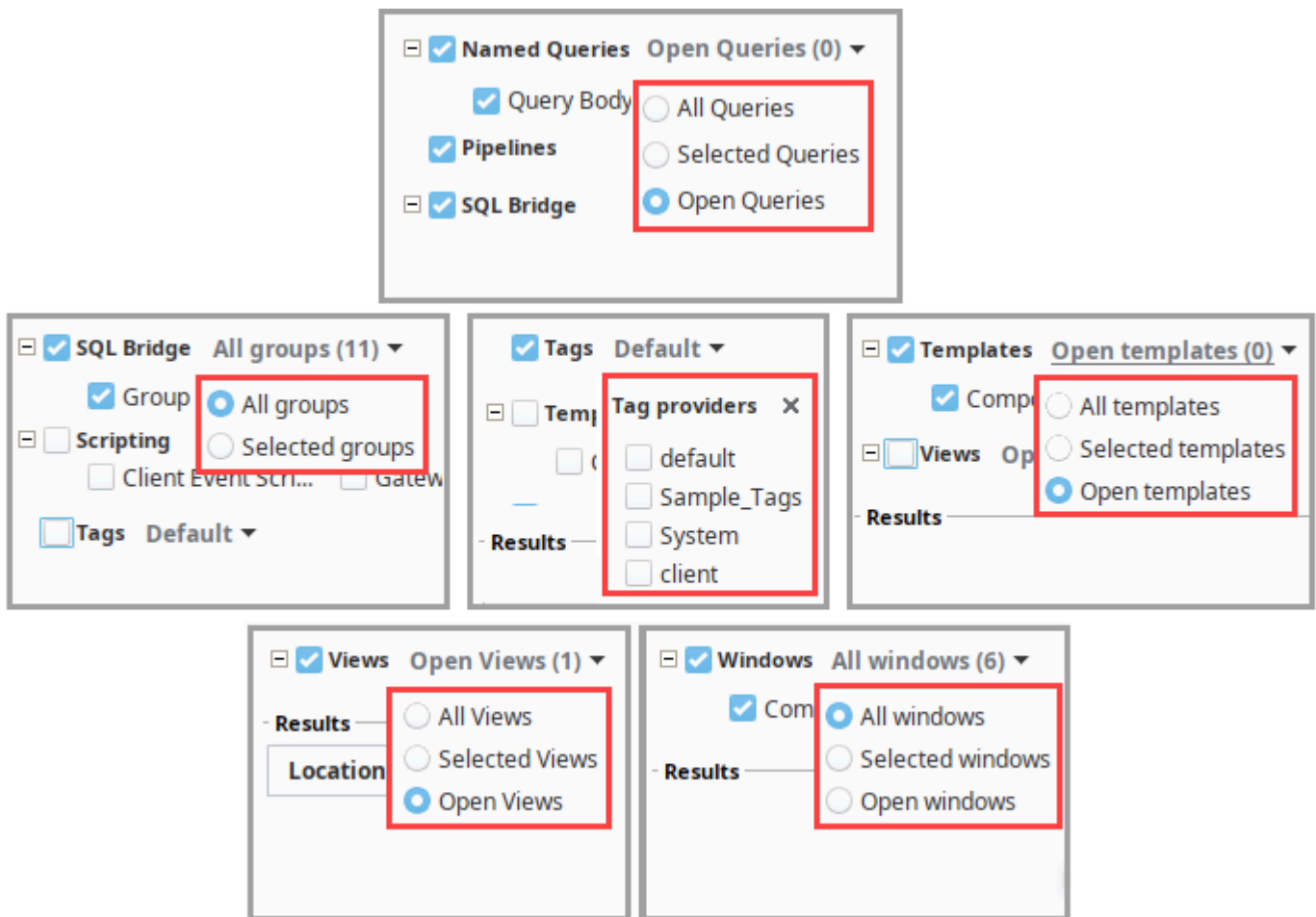
Location	Property	Value
----------	----------	-------

Replace

Replace:

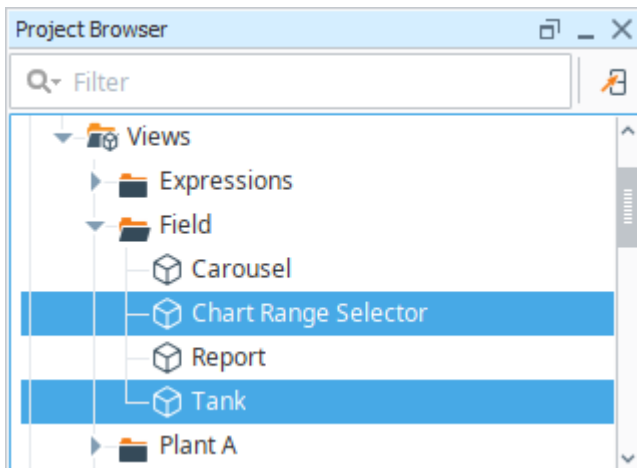
Current:
 Preview:

You can narrow down your search by selecting and deselecting categories you include in the search. The SQL Bridge, Tags, Templates, Views, Named Queries, and Windows options also have dropdown options to customize your search.

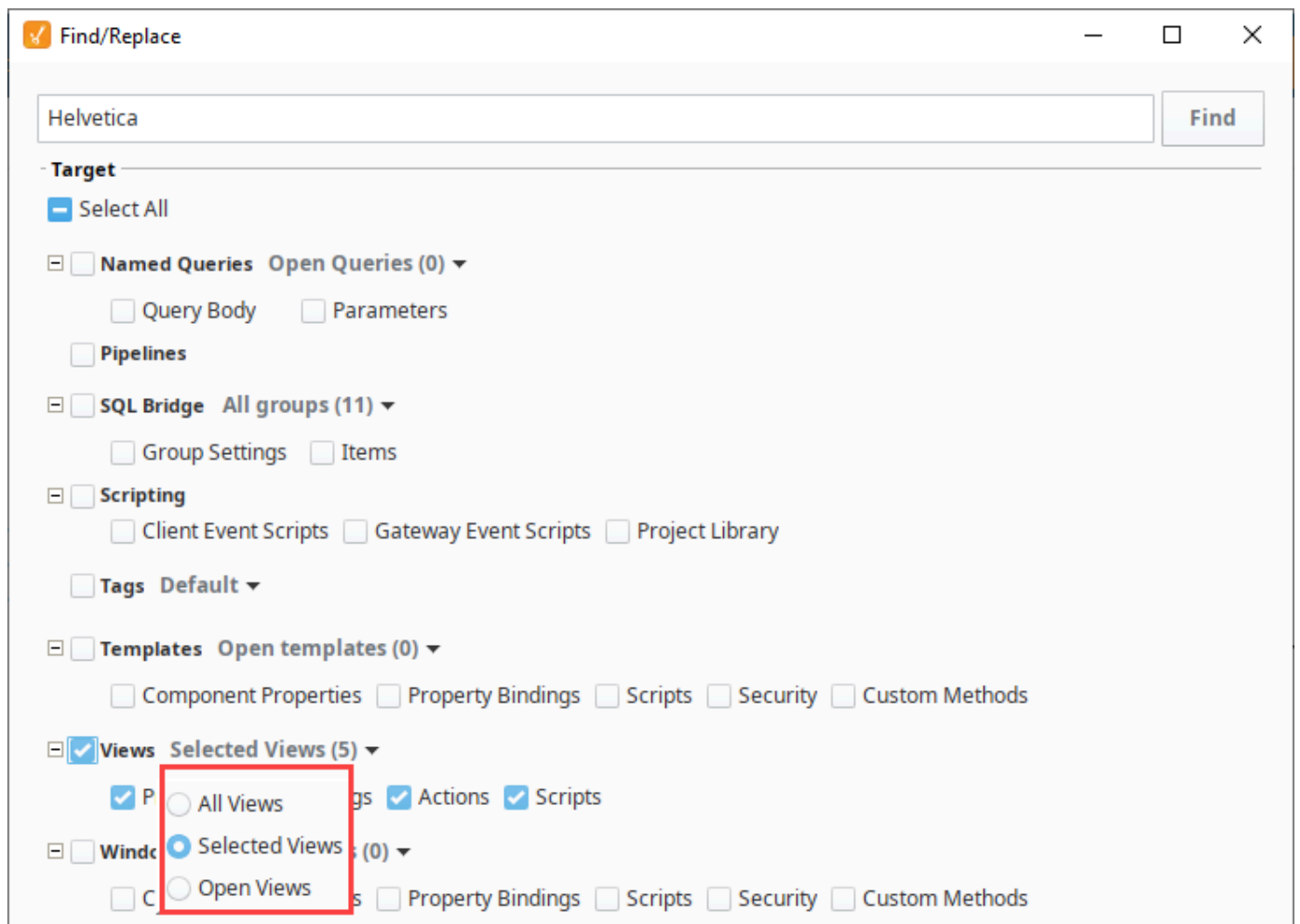


For example, if you want to search only a couple Views, do the following:

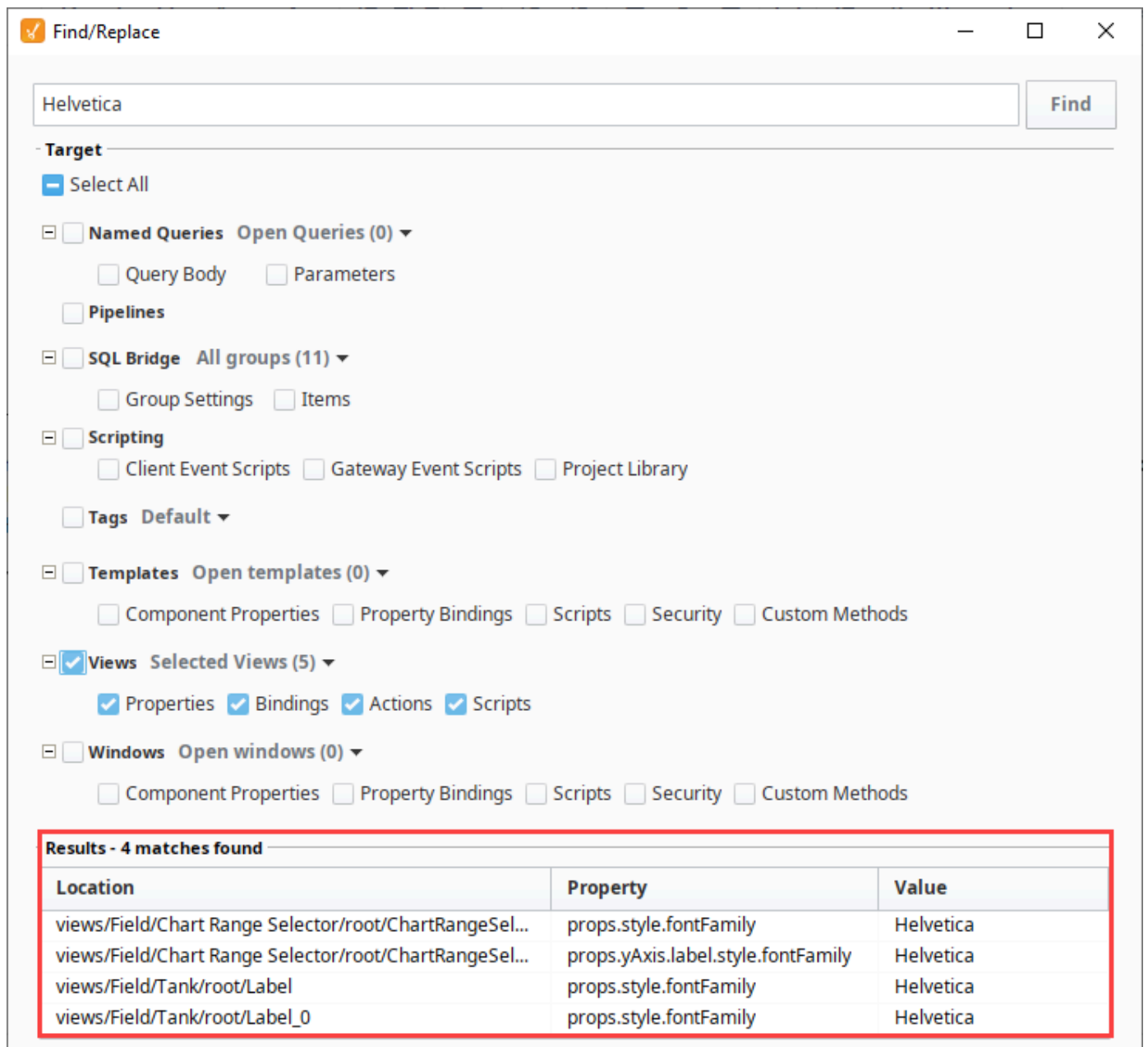
1. In the Project Browser, use **Ctrl-Click** to select the views you want to search.



2. In the Designer toolbar, go to **Edit > Find/Replace** or use the shortcut **Ctrl-F**. The Find/Replace window is displayed.
3. De-select all options by unchecking **Select All**.
4. In Views, click on the expand arrow and choose the **Selected Views** option.



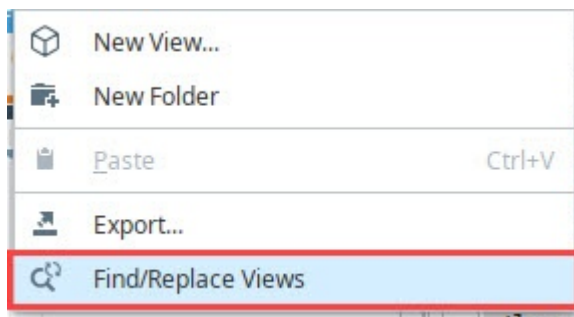
5. Enter the property, action, script, or such that you want to search for. In this example, we searched for property value **Helvetica**.
6. Click **Find**.
7. The search results are displayed in the **Results** box.



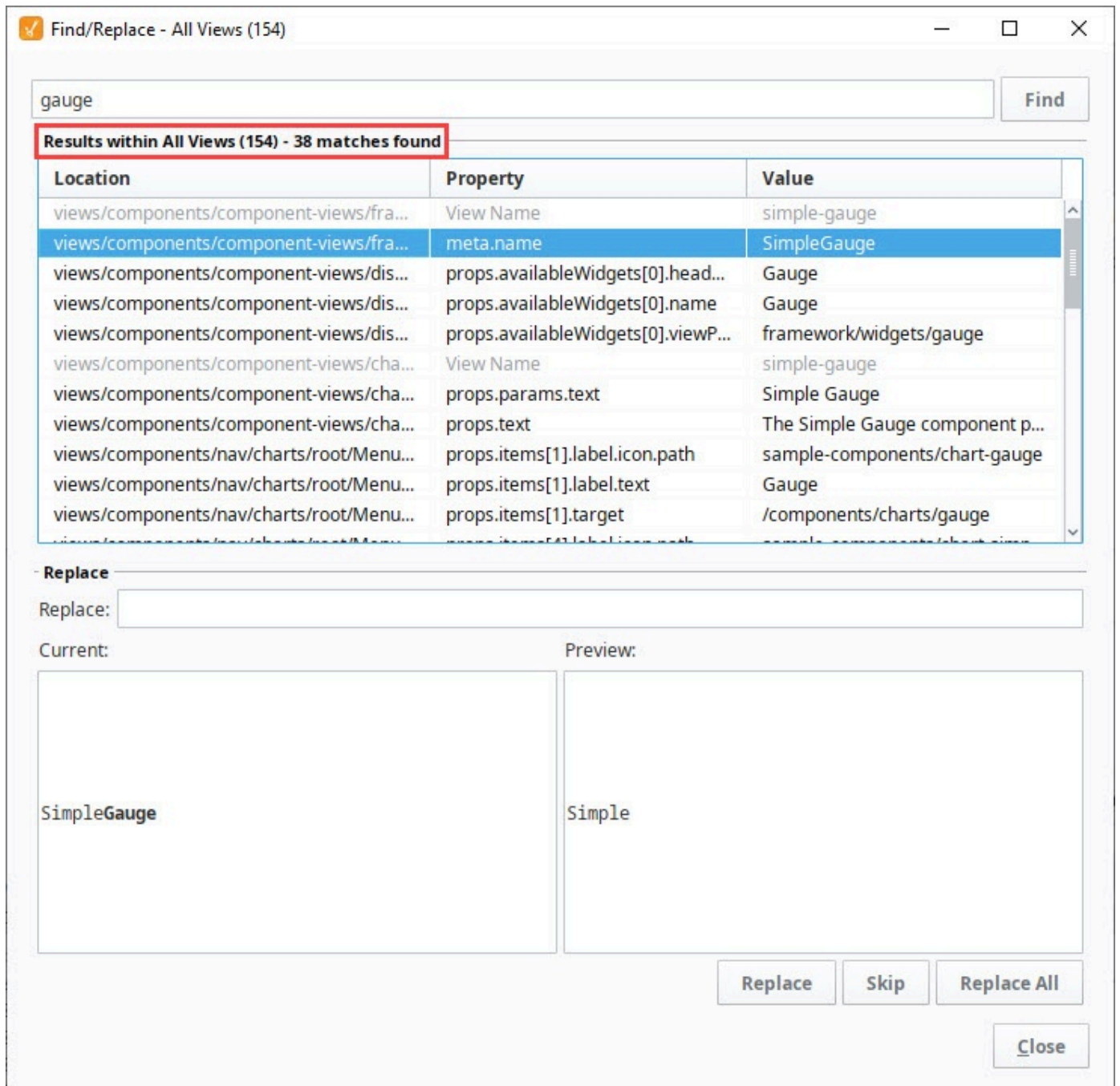
Contextual Find and Replace

New in 8.1.18 Starting in 8.1.18, you can right-click on a node to Find/Replace within all Windows, Templates, Views, Transaction Groups, Named Queries, Scripts, and/or selected folders in that node. This bypasses the need to narrow your search criteria with the Search Options detailed in the previous section. For example, to search for all instances of a "Gauge" within all Perspective Views, follow these steps:

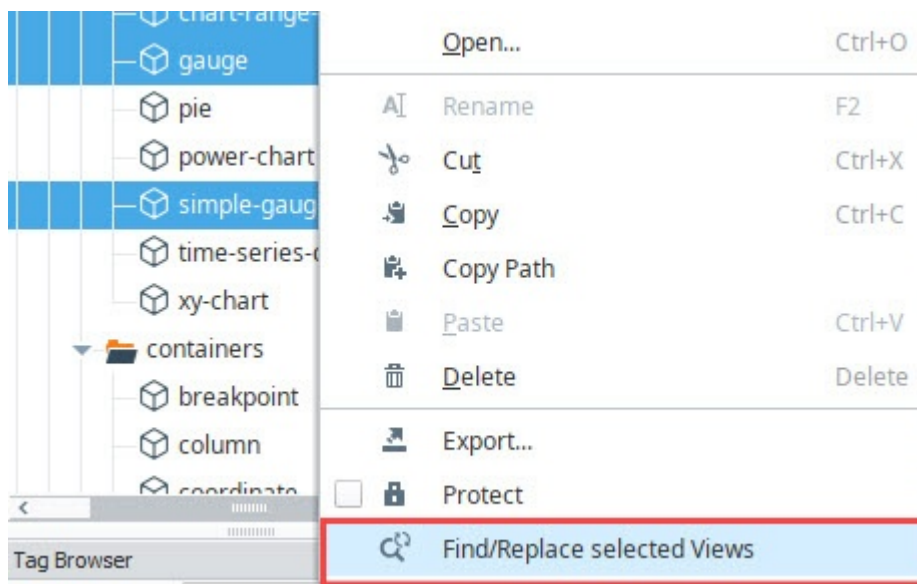
1. In the Project Brower, right-click on **Views** and select **Find/Replace Views**.



2. This will open the Find/Replace window. Type "gauge" in the search bar and click **Find**.
3. The results displayed will be all instances of "gauge" within the Views node:



To limit your search within selected views, you may select specific views or folders within the Project Browser. Right-click on any of the selected views and select **Find/Replace selected Views**.



Wildcards

To customize your search further, you can use the wildcard characters * and ?.

Use an asterisk (*) to indicate that any character(s) could be where the asterisk is. For example, to search for Tags that start with the word "Motor" enter "Motor*". This would return Motor 1, Motor2, Motor_East3, and so forth.

Use a question mark (?) to indicate any single character could be where the question mark is. For example, to search for "Valve1Status" through "Valve9Status", you could enter "Valve?Status". Note that this would not return something like Valve44Status because that is more than one character where the wildcard is.

Using Find and Replace

1. In the Designer toolbar, go to **Edit > Find/Replace** or use the shortcut **Ctrl-F**. The **Find/Replace** window is displayed.
2. Enter what you're searching for in the textbox at the top to search through your project.
3. Click the **Find** button at the top right to execute the search. All matching items appear in the **Results** section. Double-click on an item in the Results table to bring that item into editing focus in the Designer.
4. To replace a value, select an entry in the Results section and you'll see the Value of that entry in the **Current** box of the **Replace** section.
5. Enter the text you want to use as a replacement in the **Replace** textbox and a preview of the new value is shown in the **Preview** box.

6. Click the **Replace** button to execute the replace. This will move your selection down in the Results table so that you can rapidly execute multiple replacements. If you're satisfied and you'd like to make the identical replacement to many items, select them all in the Results table and click the **Replace All** button.
7. Close the Find and Replace window.

 NOTE

The actual replacement on some resources may not take effect until the Find and Replace window is closed.

Windows, Linux, and Mac Keyboard Shortcuts

Using Keyboard Shortcuts in the Designer

You can interact with screens and more by using some of the popular keyboard shortcuts in the Designer.

Action	Windows/Linux Keystrokes	MacOS Keystrokes
Nudge Moves selected component(s) in the direction of the arrow key by the default nudge distance.	←, ↑, →, ↓	←, ↑, →, ↓
Alt-Nudge Same as Nudge, but uses the “alt-nudge” distance.	Alt + ←, Alt + ↑, Alt + →, Alt + ↓	Option + ←, Option + ↑, Option + →, Option + ↓
Resize Right Moves the right edge of the component left or right. Add Alt to use the alt-nudge distance.	Shift + ←, Shift + →	Shift + ←, Shift + →
Resize Bottom Moves the bottom edge of the component to top or bottom.	Shift + ↑, Shift + ↓	Shift + ↑, Shift + ↓
Resize Left Moves the left edge of the component left or right.	Ctrl + Shift + ←, Ctrl + Shift + →	Control + Shift + ←, Control + Shift + →
Resize Top Moves the top edge of the component to top or bottom.	Ctrl + Shift + ↑, Ctrl + Shift + ↓	Control + Shift + ↑, Control + Shift + ↓
Move Forward (Vision only) Moves the selected components(s) forward in the Z-order	PgUp	Fn + ↑
Move Backward (Vision only) Moves the selected component(s) backwards in the Z-order	PgDn	Fn + ↓
Move to Front (Vision only) Moves the selected component(s) to the front of the Z-order	Home	Fn + ←
Move to Back (Vision only) Moves the selected component(s) to the back of the	End	Fn + →

Action	Windows/Linux Keystrokes	MacOS Keystrokes
Z-order		
Group Components (Vision only) Groups the selected components together.	Alt + G	Option + G
Ungroup Components (Vision only) Ungroups the selected group of components.	Alt + U	Option + U
Align Top (Vision only) Aligns the selected components to the topmost component's position.	Alt + T	Option + T
Align Bottom (Vision only) Aligns the selected components to the bottommost component's position.	Alt + B	Option + B
Align Vertically (Vision only) Centers the selected components vertically within their bounds.	Alt + V	Option + V
Align Horizontally (Vision only) Centers the selected components horizontally within their bounds.	Alt + H	Option + H
Copy-Move Copies the component when holding Ctrl while doing a mousemove.	Ctrl + drag a component	Click and hold on a component + Control + drag
Orthogonal-Move Restricts to only moving straight up, down, left, or right when holding Shift while doing a mousemove.	Shift + drag a component	Shift + drag a component
Selection-Move Drags the components that are currently selected without having to press the mouse button down on the component first.	Hold Alt + drag a component	Hold Option + drag a component

Action	Windows/Linux Keystrokes	MacOS Keystrokes
Copy-Axis-Move Combines copy move with axis move.	Hold Ctrl + Alt + drag a component	Click and hold on a component + Control + Option + drag
Proportional Resize Resizes a component while maintaining its aspect ratio.	Hold Ctrl + resize a component	Click and hold on a component + Control + resize
On-Center Resize Resizes the selection using the center as the anchor point.	Hold Shift+ resize a component	Hold Shift + resize a component
Select All (Vision only) Selects all components that are siblings of the selected component.	Ctrl + A	Command + A
Select Same Type (Vision only) Selects all components that are siblings of the selected component and the same component type.	Ctrl + Shift + A	Command + Shift + A
Select Same Type in Window (Vision only) Selects all components in a window that are the same type as the selected component.	Ctrl + Alt + Shift + A	Command + Option + Shift + A
Layout (Vision only) Opens the Layout Constraints window to let you specify layout for the component(s).	Ctrl + L	Command + L
Size & Position (Vision only) Opens Size & Position to let you specify exact size and position for selected component or window.	Ctrl + P	Command + P
Customizer (Vision only) Opens the Custom Properties window to let you configure complex component properties.	Ctrl + U	Control + U

Action	Windows/Linux Keystrokes	MacOS Keystrokes
Customizer 2 (Vision only) Some components have a secondary customizer. This command will open that customizer, if available.	Ctrl + 2	Control + 2
Jython Opens Event Configuration page (Perspective) or the Component Scripting page (Vision) to let you configure actions for component or window.	Ctrl + J	Command + J
Script Configuration Opens the Script Configuration for the View or Component selected. (Perspective Only)	Ctrl + K	Command + K
Security (Vision only) Opens Security Settings to let you set security for Component(s) or window.	Ctrl + E	Command + E
Save Saves the project.	Ctrl + S	Command + S
Open Opens the Open/Create Project to let you select a different project.	Ctrl + O	Command + O
Undo Undoes the last action.	Ctrl + Z	Command + Z
Redo Gets rid of the last undo action.	Ctrl + Y	Command + Y
Copy Copies selected component(s) or window.	Ctrl + C	Command + C
Duplicate Duplicates selected component(s) or window.	Ctrl + D	Command + D

Action	Windows/Linux Keystrokes	MacOS Keystrokes
Cut Cuts selected component(s) or window.	Ctrl + X	Command + X
Paste Pastes selected component(s) or window in clipboard. Pasted component(s) wait for position before pasting.	Ctrl + V	Command + V
Immediately Paste (Vision only) Places pasted component(s) at the same location where they were copied/cut.	Ctrl + I	Command + I
Comment/Uncomment Lines of Code Quickly comment or uncomment lines of a script or query in Designer.	Ctrl + /	Command + /
Cancel Cancels a pending paste operation, deselects the current row of a table, cancels dragging components onto window.	Esc	Esc
Find/Replace Opens Find/Replace to let you Search and replace the project based on string, pattern, or regex.	Ctrl + F	Command + F
Delete Deletes the current selection.	Delete	Delete
Snap to Grid (Vision only) Toggles whether or not moving and resizing components snaps to the grid.	Ctrl + G	Command + G
Snap to Guides (Vision only) Toggles whether or not moving and resizing components snaps to guides.	Ctrl + Shift + G	Command + Shift + G

Action	Windows/Linux Keystrokes	MacOS Keystrokes
Console Opens the Output Console .	Ctrl + Shift + C	Command + Shift + C
Help Launches the Ignition User Manual in a web browser.	F1	Fn + F1
Rename Renames the selected item (Tag, window, transaction group, component, and so on).	F2	Fn + F2
Preview Mode Toggles preview/design mode.	F5	Fn + F5
Launch Client/Session (Perspective and Vision only) When in the Vision workspace, launches a Vision Client in windowed mode. While in the Perspective workspace, launches a Perspective Session in windowed mode.	F10	Fn + F10
Launch Full Screen Client (Perspective and Vision only) While in the Vision workspace, launches a Vision Client in full screen mode. While in the Perspective workspace, launches a Perspective Session in full screen mode.	F11	Fn + F11
Update Project Updates project to server. Receives concurrent edits from other Designers.	Ctrl + Shift + U	Command + Shift + U
Zoom Zooms in/out in the Designer.	Ctrl + Mousewheel	Control + Mousewheel
Touch Selection (Vision only) Draws a line while dragging. Every component in the path of the line will be selected when letting go	Alt + Left Click and Drag	Option + Left Click and Drag

Action	Windows/Linux Keystrokes	MacOS Keystrokes
of the mouse button. To activate, a container must first be selected		
Select Through (Perspective and Vision only) Click on a component that is beneath another component. You can do this multiple times if there are several layers of components.	Alt + Click	Option + Click
Code Folding/Unfolding Select a line of code, and this command will collapse the selection. Press again while the folded code is selected, and the code will unfold. The Script Console has a separate command for code folding.	Ctrl + .	Command + .
Select Through (Perspective only) New in 8.1.26 Click on a component that is beneath another component. You can do this multiple times if there are several layers of components.	Ctrl + Shift + Click	Command + Shift + Click
Deep Selection (Perspective only) New in 8.1.26 Selects into a container and components within.	Alt + Shift + Click	Option + Shift + Click

Saving Projects

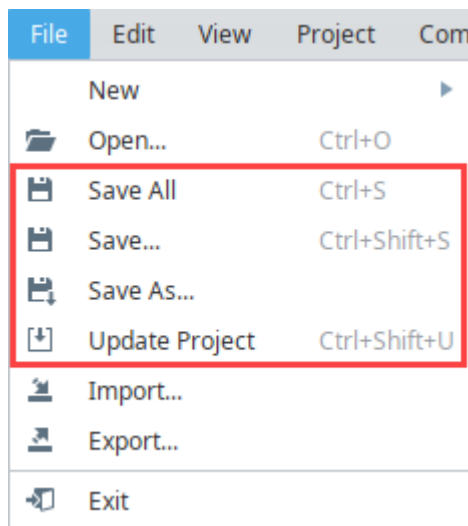
Once you created the Windows, Templates, Tags, Views, and anything else that goes into your project, you need to save your work. Saving your progress means pushing the changes from your Designer into the Gateway. If you are saving viewable resources like Vision Windows or Perspective Views, saving the changes means telling all of the clients or sessions that they can use the new updates to your project.

When you save, it's possible to save individual resources on a project as they are finished instead of saving the entire project. This is particularly helpful if you want to get resource updates to users quickly, or parts of a project into production sooner rather than waiting for the entire project to be completed

You also have options on how to perform Client and Session updates. You can choose between notifying the operator of an available update, or automatically pushing updates as soon as it is saved, making it transparent to the operator. This page assumes you are using the default Notify mode, see [Client Update Modes](#) or [Session Project Updates](#) for more information.

Saving a Project

The project save options are all located in the Designer under the **File** menu.



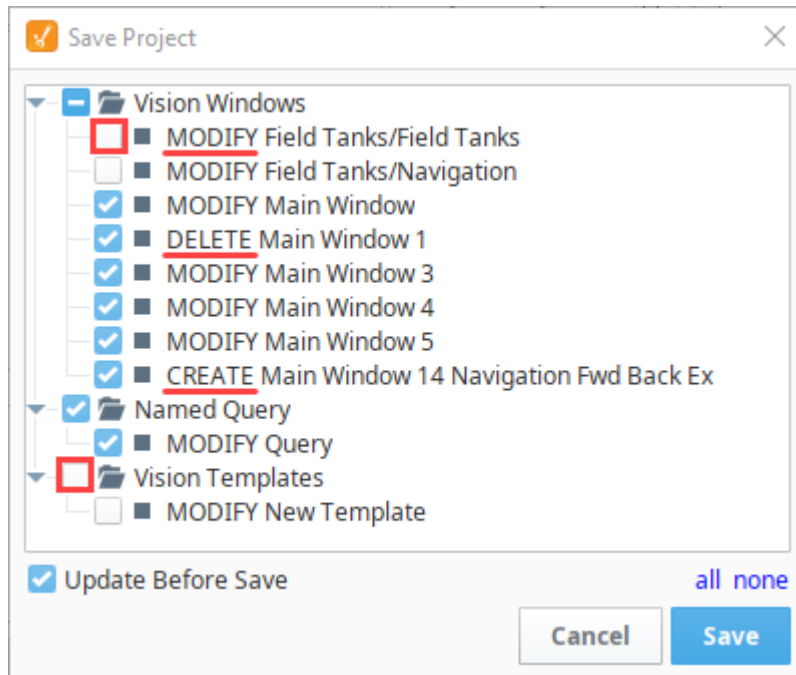
Save All

Save All  option saves the entire project. The project will be saved immediately, unless there are any conflicts due to concurrent editing. If there are conflicts, the Resolve Conflicts screen will open automatically. Once you've resolved the conflicts, the Designer saves the project.

Save...

The **Save...**  option displays a list of all items that have been created, modified, or deleted since the last save. On this list you can save (or not save) individual resources on a project rather than of saving the entire project.

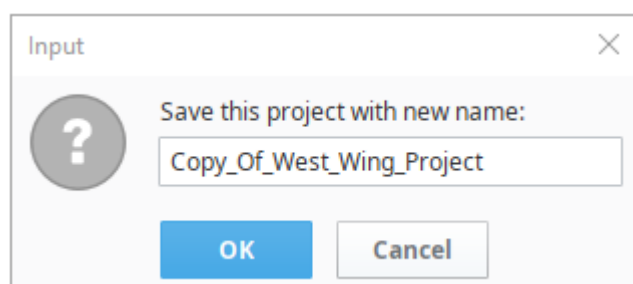
- To deselect all items, click **none** in the lower right corner.
- To select all items, click **all** in the lower right corner.
- To select or deselect individual items, click on the Checkbox ☒ icon next to the item.



The **Update Before Save** selection performs the same function as the **File > Update Project** option, making sure the local version of the project in the Designer is up to date with any changes committed by other Designers since the last project update. It is selected by default.

Save As

The **Save As**  option enables you to save your open project with a different name. When you choose **File > Save as**, the Designer will display an Input window. It will append "Copy_Of_" to the beginning of the current project name. However, you can enter a different name in this Input window. Click **OK** to save the project with a new name.

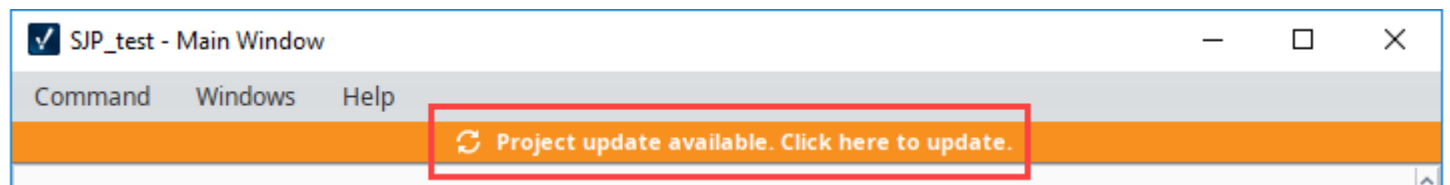


Update Project

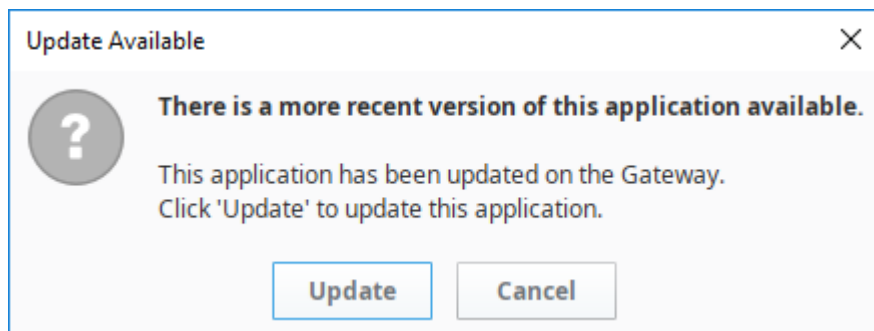
The **Update Project**  option pulls in any changes (saves by other people) that have happened since you opened the project or last updated it. If there are any conflicts due to concurrent editing, the Designer Resolve Conflicts screen will open automatically. Once you resolve the conflicts, the Designer updates the project.

Project Updates in a Vision Client

Depending on how Clients are set up to receive project updates, operators may be notified with a banner stating that a project update is available. For more information, see [Client Update Modes](#).

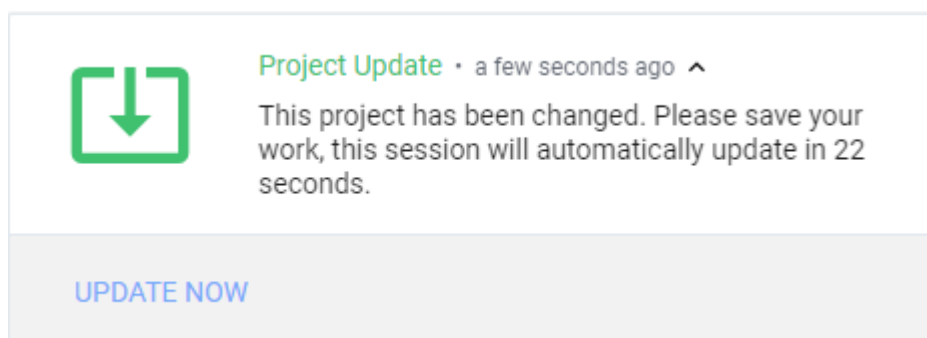


When the operator clicks on the banner, a confirmation window appears. The operator can choose to update or cancel and keep working in the previous version of the client.



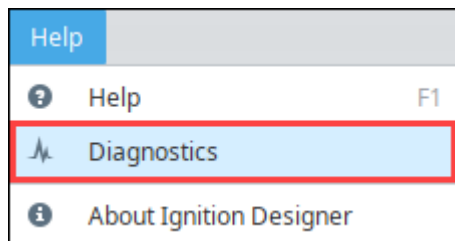
Project Updates in a Perspective Session

If you have a Perspective Session open and a change was made in the Designer that was saved, one of two things may happen. Either the project will silently update, or an Update Notification window will appear in the session. Your session will automatically update in 30 seconds or you can click **Update Now**. For more information, see [Session Project Updates](#).



Designer Diagnostics

The Help menu in the Designer has a Diagnostics  option, which displays the Diagnostics window with tabs for six different troubleshooting features.



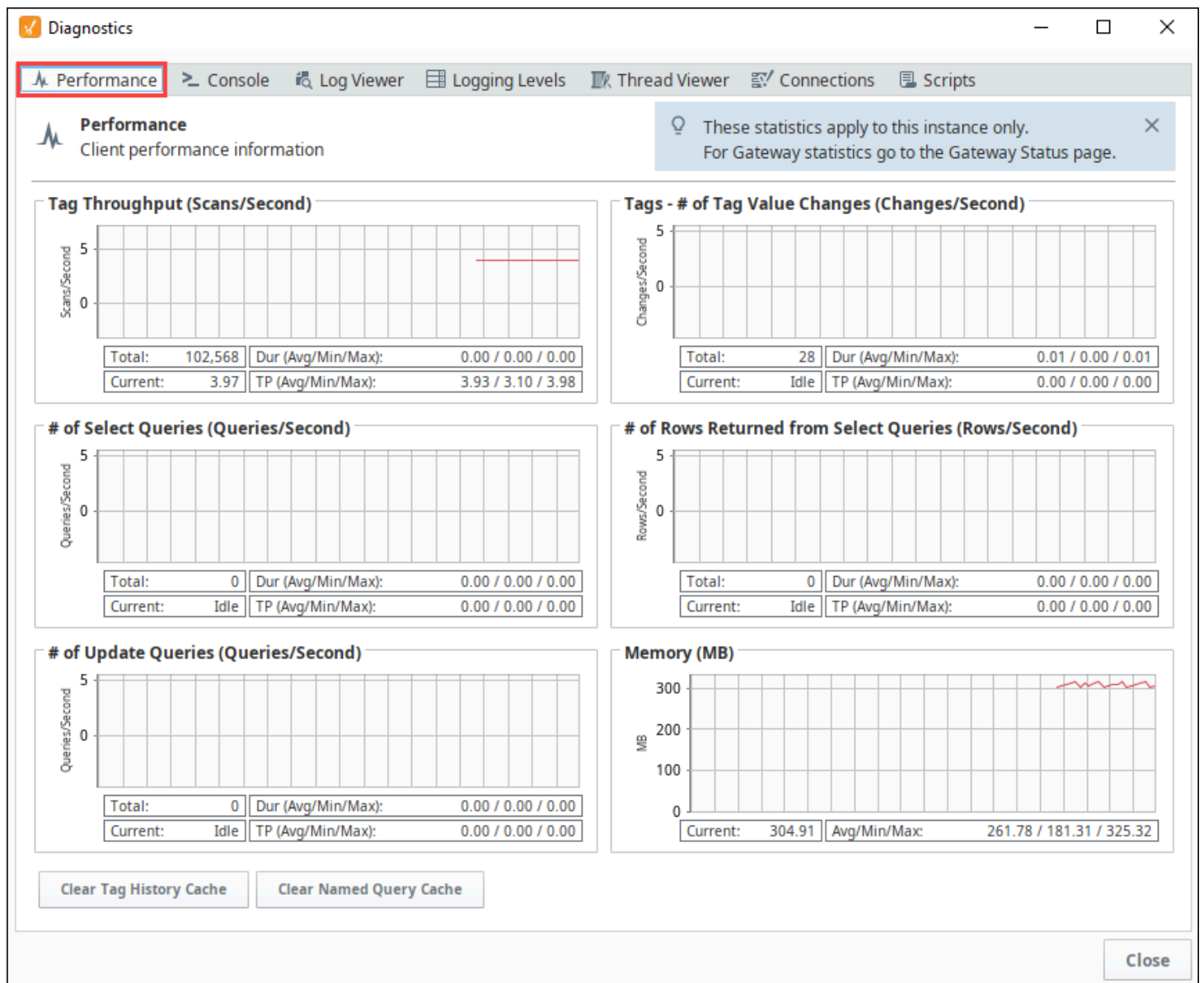
NOTE

The information accessed through Designer Diagnostics is specific to the client runtime or the session. For Gateway statistics, see [Diagnostics - Logs](#).

Performance Tab

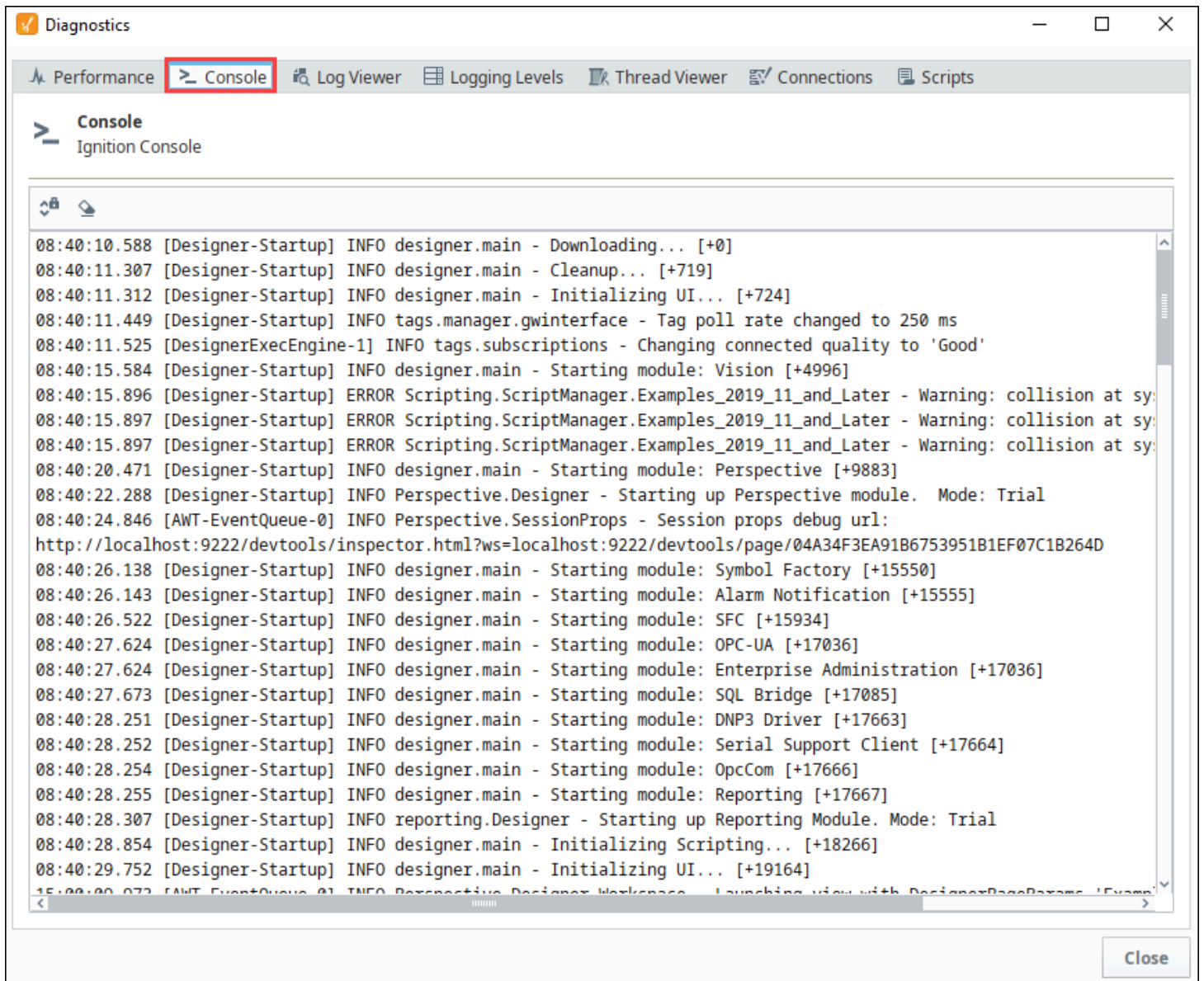
The Performance tab displays six realtime charts, each showing an aspect of the current client's performance. These charts can be very useful to help troubleshoot performance issues, especially slow queries.

- **Tag Throughput (Scans/Second)** - Displays the Tag throughput in scans per second.
- **Tags - # of Tag Value Changes (Changes/Second)** - Displays the number of Tag changes in changes per second.
- **Select Queries (Queries/Second)** - One of the most common causes of query slowdown is simply running too many queries too frequently, and the # of Select Queries (Queries/Second) chart can help identify when this is occurring.
- **Rows Returned from Select Queries (Rows/Second)** - Displays the number of rows returned from selected queries in rows per second.
- **Update Queries (Queries/Second)** - Displays the number of update queries in queries per second.
- **Memory (MB)** - Displays the client's memory usage in megabytes. This will almost always be a saw tooth pattern since memory is used, discarded, and re-acquired on a regular basis.



Console Tab

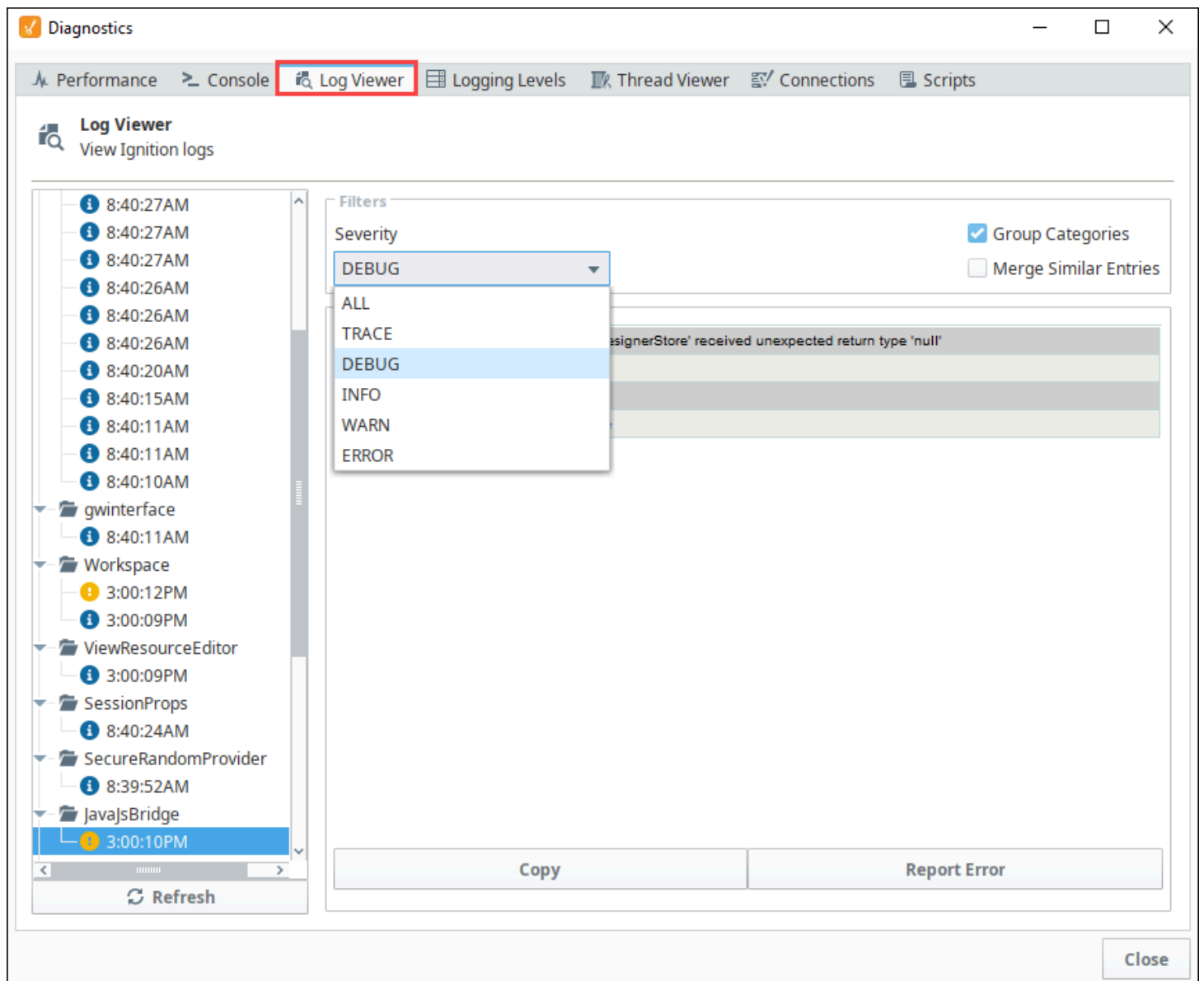
The Console tab displays the Ignition Console. This console displays messages that are generated by the entity that the console was launched from, such as the Designer. Any print statements or errors in your scripts will show up here (except Gateway scope scripts).



Log Viewer

The Log Viewer tab displays the logged events for the current entity, such as the Designer. Whenever messages occur in the console, they are logged and displayed in this tab. Each message has a logging level associated with it. This is a good place to go when troubleshooting an issue, as any errors shown here may illuminate the cause of the problem.

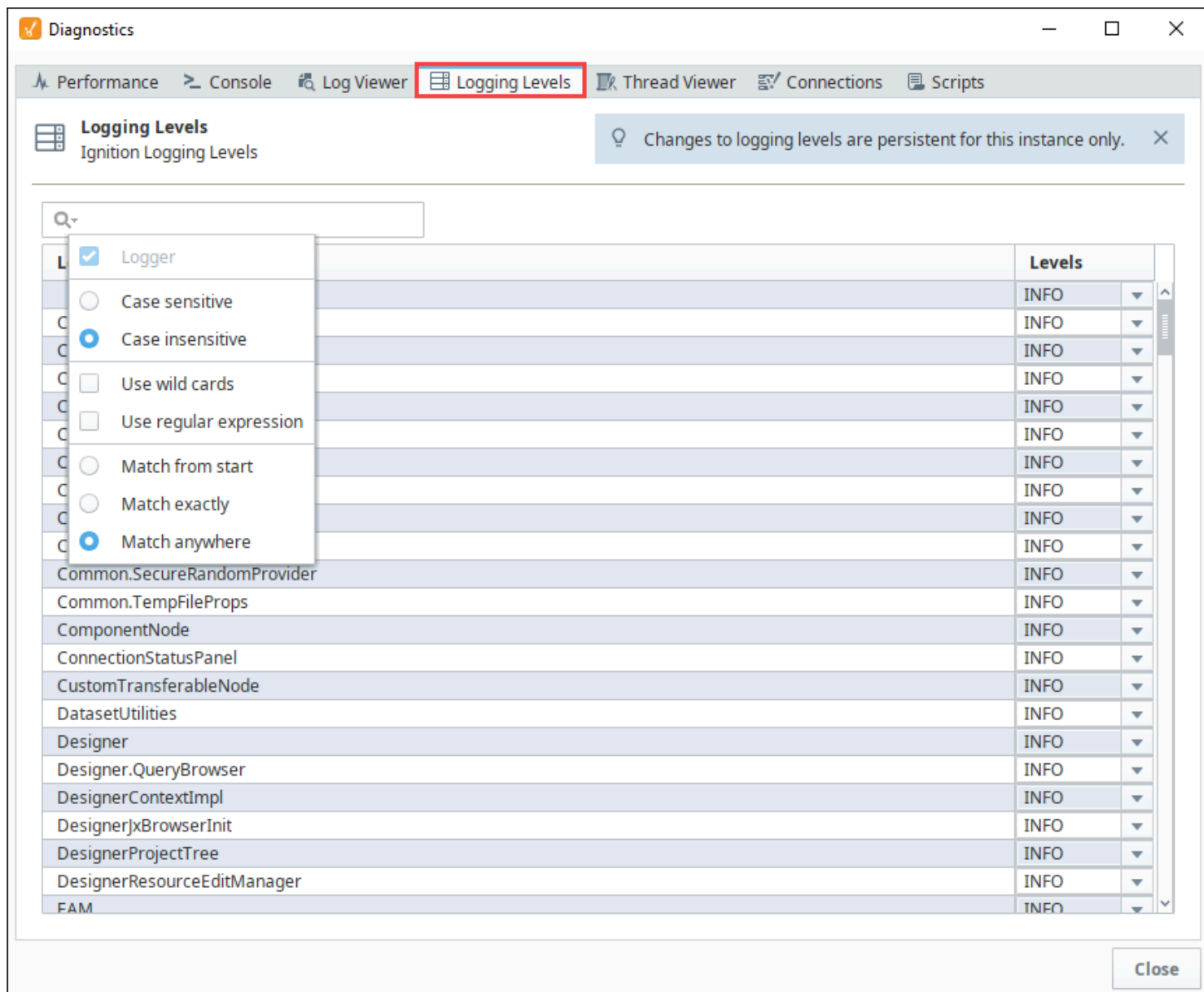
Logs can be filtered by severity by selecting an option in the Filters dropdown. To view entries across all categories chronologically, uncheck the **Group Categories** checkbox.



Logging Levels

The Logging Levels tab displays the list of internal loggers. Most users will not use this tab unless prompted by a technical support representative. Make sure to change logging levels back to info when you are done, otherwise they will flood your console and make it difficult to find any new problems.

A Search box in the upper left enables you to search the loggers. You can also set options to make the search case sensitive, use wildcards, use regular expressions, match from start, match exactly, or match anywhere.



Thread Viewer

The Thread Viewer tab displays information about the currently running threads. Each thread can be expanded by clicking the **Expand** ► icon or collapsed by clicking the **Collapse** ▲ icon. Most users will not use this tab unless prompted by a technical support representative.

New in 8.1.12 Now in the Designer and the Vision Client, there is an option to save a thread dump via the Thread Viewer tab. Additionally, automated thread dumps will be saved to the Client Launcher's directory in **.ignition/cache** when a UI thread takes longer than 2-5 seconds. Should the Designer or Vision Client recover, a message will appear in the console stating that a thread dump was taken, along with the full path where the file was saved.

Diagnostics

Performance

Console

Log Viewer

Logging Levels

Thread Viewer

Connections

Scripts

Thread Viewer

Shows the state of all application threads

Thread	State
▶ Attach Listener	RUNNABLE
▶ AWT-EventQueue-0	RUNNABLE
▶ AWT-Shutdown	WAITING
▶ AWT-Windows	RUNNABLE
▼ Batik CleanerThread java.base@11.0.11/java.lang.Object.wait(Native Method) java.base@11.0.11/java.lang.ref.ReferenceQueue.remove(Unknown Source) java.base@11.0.11/java.lang.ref.ReferenceQueue.remove(Unknown Source) org.apache.batik.util.CleanerThread.run(CleanerThread.java:106)	WAITING
▶ Browser Thread: 60583	WAITING
▶ Chromium Process Logger	RUNNABLE
▶ Chromium Process Thread	RUNNABLE
▶ Client_Id_Keepalive	TIMED_WAITING
▶ ClientProgressManager-1	WAITING
▶ Common-Cleaner	TIMED_WAITING
▶ designer-expr-pollingfunc-timer	WAITING
▶ DesignerExecEngine-1	WAITING
▶ DesignerExecEngine-2	TIMED_WAITING
▶ DesignerExecEngine-3	WAITING
▶ DesignerExecEngine-4	WAITING
▶ DestroyJavaVM	RUNNABLE
▶ EDT-Watchdog-1	TIMED_WAITING
▶ Finalizer	WAITING
▶ ForkJoinPool.commonPool-worker-19	WAITING
▶ GatewayConnection-1	TIMED_WAITING

Save Thread Dump

Close

Connections

The Connections tab displays the Gateway connection status as well as a realtime chart of the Gateway ping time and a summary with the current ping time and average, minimum, and maximum ping times.

Database Connections

How are Databases Used in Ignition?

While connecting to a database is not required for basic status and control functionality, it can dramatically increase the possibilities that the system offers. There are a few places where databases are used in Ignition, such as historical data logging, reporting, storing alarm logs, and as your tags storage.

Historical Data Logging

Logging data for historical analysis, either through [Tags Historian](#) or with the [SQL Bridge](#) module, requires a database connection. Databases are great at handling historical data, and by using a standard relational database your data is stored in an open format that can be used in many ways.

Reports, Graphs, and Charts

The Vision module makes it easy to present data stored in databases in a variety of ways. You can quickly create charts that show performance over time, locate anomalies, detect trends, and more. Furthermore, it's important to remember that it is possible to pull data from any database that Ignition is connected to, even if the data wasn't placed there by Ignition. This means you can tie in data from other sources or areas of your company, such as pulling in inventory and staff information, as well.

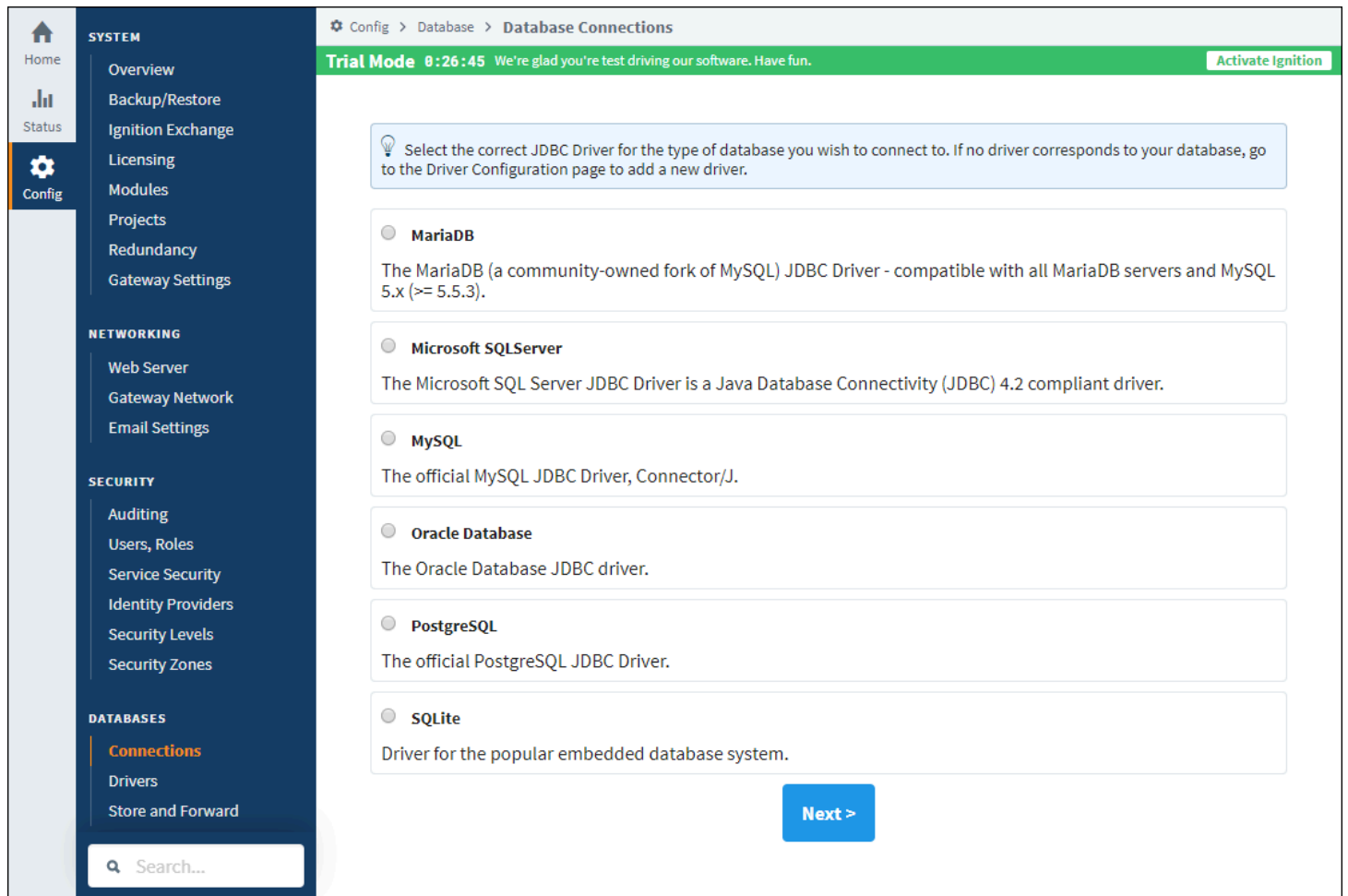
Storing Alarm Logs

[Store alarm information historically](#) and examine it later for patterns or trouble spots.

Getting Started with Databases

The first step in using a database with Ignition is to identify a database server. Many companies already have database servers maintained by their IT departments. If you do not, or wish to set up your own database server for Ignition, the Supported Databases section below offers some advice on choosing a database vendor.

Once you've identified a server, all you need to do is [create a connection](#) to that server to get up and running.



Supported Databases in Ignition

Ignition has been tested with the following databases, and can connect to them directly after installation. You can connect to other databases by installing additional JDBC drivers (the Java database connection specification), which are often provided by database vendors.

Full Support

Database	Version
MySQL	5.0+ for full support. Ignition can connect to 4.x, but many features such as Tags are not tested.
Microsoft SQL Server	2005, 2008, 2012, 2014, 2016, 2017, 2019, 2022 (full and express editions). Ignition can connect to 2000, but has not been fully tested.
Oracle	10g, 11g, 12c (full and express). The letters stand for "grid" and "cloud"
PostgreSQL	8.0+
Firebird	All versions.
IBM DB2	9.5+
SQLite	A driver for the popular embedded database system. This can be used to connect to an existing SQLite database, or create a new database: setting the connect URL property to a file that doesn't exist will result in the driver attempting to create the database.

Limited support

Database	Version
Other JDBC drivers	Due to variances in databases, some features may not work fully through other non-tested JDBC drivers. However, it is usually possible to get full functionality though the careful use of the database translator feature. For example, the JDBC driver for MariaDB could be downloaded and added to Ignition.

Installing and Connecting to a Database

Once you've identified a server, all you need to do is create a connection to that server to get up and running. See the [Installing Databases](#) and [Connecting to Databases](#) sections for details about how to install and connect to different databases through Ignition.

If we don't already have a connector for your database type, you can [simply add it in](#) yourself.

Database Drivers and Translators

What Is JDBC?

JDBC stands for the Java DataBase Connectivity API. It is a standardized way for Java-based applications to interact with a wide range of databases and data sources. A JDBC Driver enables Ignition to connect to, and use data from, a particular database system.

JDBC in Ignition

Ignition, being a Java-based application, leverages JDBC in order to connect to a variety of data sources. This enables Ignition to offer a standardized set of functionality on a wide range of different systems and databases. This includes not only commonly-used databases such as MySQL, Microsoft SQL Server, and Oracle, but additionally other lesser-known systems as well, provided the manufacturer offers a JDBC driver for the system.

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Search...

Config > Database > Database Drivers & Settings

Trial Mode 1:59:05 We're glad you're test driving our software. Have fun. [Activate Ignition](#)

JDBC Drivers

Translators

Name	Driver Type	Default Translator	Status	
MariaDB	MySQL	MYSQL	Installed	delete edit
Microsoft SQL Server	Microsoft SQL Server	MSSQL	Installed	delete edit
MySQL	MySQL	MYSQL	Installed	delete edit
Oracle Database	Oracle	ORACLE	Error - either required files are missing or classname is incorrect	delete edit
PostgreSQL	PostgreSQL	POSTGRES	Installed	delete edit

[Create new JDBC Driver...](#)

Note: Please see [this help page](#) for information about installing driver files that are not able to be bundled with Ignition.

Monitoring Connection Status

The state or status of a database can be monitored from the [Status](#) section of the Gateway Webpage, under **Connections > Databases**. The status panels show the current state and a fault message, if applicable, or throughput statistics if the connection is active.

When a connection is not available, it is re-tested every 10 seconds, and the status is updated.

 Config > Database > Database Connections

Name	Description	JDBC Driver	Translator	Status		
DB		MariaDB	MYSQL	Faulted	delete	edit
MSSQL		MySQL	MYSQL	Valid	delete	edit
SQLServer		Microsoft SQLServer	MSSQL	Reconnecting	delete	edit

[→ Create new Database Connection...](#)

Note: For details about a connection's status, see the [Database Connection Status](#) page.

Installing Databases

Why Install a Database?

A lot of additional functionality becomes simple or is only accessible when Ignition is connected to a database. Storing Historical data, storing notes or files, and creating dynamic lists to name a few. It is important to note that Ignition does not install any databases for you. There are many types that you can connect to, but you need to choose the database that is best for you. Installing your own database means you have complete control over it, anything Ignition adds to it can be accessed by another program easily.

You can install as many database systems as you like, and each of them allow your to create as many schemas (or groups of data) as you want. You get to decide where your database is installed, or where you want to install all of them.

Which Database Should You Use?

There is a lot of debate on this subject but the short answer to this question is 'whichever database your IT department already uses.' Modern relational database all have the same basic functionality, but slightly different ways of doing things. If your IT department already supports Microsoft SQL Server (MSSQL), then they already have the tools and knowledge to manage those databases. Because they are so similar (and Ignition takes care of so much for you), it is almost always easier to learn to use an existing database than to add IT support for a second type. Not to mention that adding a second type might mean hiring new personnel in the IT department.

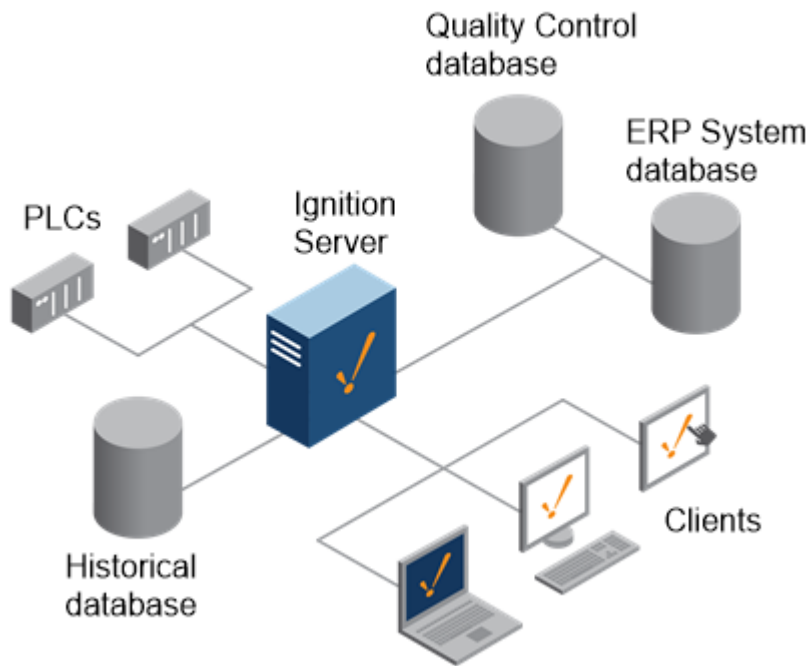
If your company does not already have a database preference, then it's up to you to decide which is best based on your needs. They all have a free version, but different limitations. For example: MSSQL has a cap on how much data can be stored in their free version. MySQL does not have a cap like this, but also does not allow phone support for their free version.

Where to Install a Database

You can install your database anywhere that Ignition has access to through the network. There are two main options for installing your database: one is on the computer that Ignition is installed on, and the other is installed on a different server in your network. Technically there is a third option to connect Ignition to a database that is in a remote location using a VPN or some other way to access it. This

third option will work, but because of latency and the data being physically very far away, it is not recommended for storing data that will be accessed often like Tag History.

For production systems, we recommend that your database is on it's own server, not installed on the computer with Ignition. This is helpful for many reasons, but mostly because databases can potentially take up a lot of resources on a computer. If the database is on it's own computer, you don't have to worry about other programs starving for memory or CPU. If you do this and install your database on another computer, just make sure to adjust your firewalls and pay attention to the database connection security. Most databases don't allow the default username to connect remotely.



Installing IBM DB2

You need to install **IBM DB2 Community Edition** before you connect to the database.

To Download IBM DB2 Community Edition

1. Go to the [Db2 Download](#) page and sign in with your IBM credentials.
2. Download the IBM® Db2 11.5 Edition for your Operating System.
3. Log on to your system using a local administrator account.
4. Locate the `v11.5_ntx64_dec.zip` file that you downloaded and extract it to your desired location.
5. In the extracted folder, right-click on the setup.exe file and select **Run as administrator**.
6. Click **Install a Product**
7. Scroll down to the end of the `Db2 Version 11.5.0.0 Server Editions` section and click **Install New**, then click **Next** to begin the installation process.
8. Review and accept the software license agreement and click **Next**.
9. Select the **Typical** Installation option and then click **Next**.
10. Select **Install Db2 Server Edition on this computer and save my settings in a response file** and click **Next**.
11. Set your installation path and click **Next**.
12. Set your **DB2 copy name** and click **Next**.
13. Select **Local user or Domain user account** and enter your user credentials.
14. Select **DB2** as the default instance and click **Next**.
15. Uncheck the **Set up your DB2 server to send notifications checkbox** and click **Next**.
16. Select the **Enable operating system security** checkbox and click **Next**.
17. Click **Finish** to finalize your installation.

NOTE

For detailed instructions, refer to the links below:

[Installing the Db2 server by using the Db2 Setup wizard \(Windows\)](#)

[Installing the Db2 server by using the Db2 Setup wizard \(Linux and UNIX\)](#)

[Downloading and Installing Docker Editions](#)

The links above are for the IBM DB2 Database version 11.5. You can change the instruction version by using the drop-down list located on the top left side

After you have successfully installed IBM DB2, you will need to create a database.

Creating a database in Windows

1. Open Command Prompt with Administrator privileges.
2. Type `db2cmd` (This will open the DB2 Command Line Tool)
3. Type `db2` (This will open the Command Line Processor for DB2 Client)
4. To create a database: `CREATE DATABASE database_name`

IBM DOCUMENTATION ON CREATING DATABASES:

[Creating Databases](#)

Installing MySQL



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Installing MySQL

[Watch the video](#)

Install the MySQL Server and Workbench

The goal of this page is to demonstrate how to install MySQL Server, and a helpful tool called MySQL workbench. This guide is not an exhaustive listing of all of the various installation steps or scenarios for MySQL. For more information, take a look at MySQL's documentation: [MySQL Documentation](#).

1. Go to the MySQL website at <https://dev.mysql.com/downloads/mysql/>.
2. Click the Download option for **Windows (x86, 64-bit), MSI Installer**.
3. You can login or create an account before downloading if you'd like. Otherwise, click **No thanks, just start my download**.

📌 MySQL Community Downloads

Login Now or Sign Up for a free account.

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- Fast access to MySQL software downloads
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- Post messages in the MySQL Discussion Forums
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Login »

using my Oracle Web account

Sign Up »

for an Oracle Web account

MySQL.com is using Oracle SSO for authentication. If you already have an Oracle Web account, click the Login link. Otherwise, you can signup for a free account by clicking the Sign Up link and following the instructions.

No thanks, just start my download.

4. Once the **.msi** file is downloaded, run the file to begin the installation process.
5. Complete the MySQL Installer steps until installation is complete. At minimum you'll want to install both the server (the actual database) and MySQL Workbench (an application that allows you to quickly and easily interact with the database, without using a command-line client). Any other items beyond these two are generally unnecessary in most environments.

If you want to learn more, MySQL does have some additional information in their [documentation](#).

6. Once the configuration is applied and the database is initialized, you'll see a confirmation message. Click **Finish** to complete the install process.
7. The **MySQL Workbench** window is now displayed. MySQL Workbench lets you to administrate the MySQL server.
8. Click on **Local instance MySQL** to connect to the newly installed MySQL server. You'll have to enter the password you chose during the installation.
9. You are now connected and can see, in the Navigator, the default **sys** schema. Click on the **Schemas** tab to see a listing of schemas
10. A "schema" is a collection of tables and other database objects. Ignition needs a schema to connect to. Instead of using the **sys** schema, we can create a scheme dedicated to Ignition. To create the schema, click the **Create New Schema**  icon.
11. You'll see the Schema creation tab. This allows you to make a new **Schema**. Type in **test** as the name, and click **Apply**. Technically you can call the schema anything the database allows, but the default MySQL connection in Ignition assumes a schema named "test". If you name the schema something else here, you'll need to remember the name when creating the database connection in Ignition later.
12. You'll see the **Apply SQL Script to Database** window. Click **Apply**, and then click **Finish**. You should now see the **test** schema in the Navigator.

Now that the database is installed, you can connect Ignition to it. Learn more here: [Connecting to MySQL](#).

Installing Microsoft SQL Server Express



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Installing Microsoft SQL
Server Express

[Watch the video](#)

You need to download and install both the **SQL Server Express** and the **SQL Management Studio** before you connect to the database.

To Download SQL Server Express

This section walks through the process of installing a new instance of SQL Server Express.

1. Go to <https://www.microsoft.com/en-us/sql-server/sql-server-downloads>.
2. Look for the link/button to download the **Express Edition**.
3. Run the installer.
4. When given a choice between installation type, select **Custom**.
5. Select an installation directory. If you don't have a preference, simply use the default.
6. The installer will unpack and download required files.
7. Once the installer is ready, the **SQL Server Installation Center** window will appear. Select the **Installation** heading on the side bar, and click on the **New SQL Server stand-alone installation or add features to an existing installation** link.
8. On the **License Terms** window, choose **I accept the license terms** and click **Next**.
9. On the **Product Updates** window, click **Next** to start installing the SQL Server.
10. On the **Feature Selection** window, select the features you require and click **Next**.

i NOTE

Be mindful that you may find some of the default packages extraneous. You can uncheck many of the options, such as the optional Machine Learning Services and Language Extensions. The Server and SQL Server Management Studio are the main tools you'll need when interacting with an Ignition installation. You can always remove additional components from the SQL Server installer later if you choose so.

Check [Microsoft's documentation](#) for more details on what each package does.

11. The **Instance Configuration** window shows **Named instance: SQLEXPRESS**, you can keep it or change it if you like. Click **Next**.
12. When asked about a JRE to use, you can use the provided JRE. Click **Next**.
13. On the **Server Configuration** window, choose **Automatic** from the dropdown under **Startup Type** for the **SQL Server Browser** service, and click **Next**.
14. On the **Database Engine Configuration** window, for **Authentication Mode** choose **Mixed Mode**, enter a **password** for the SA account. Note that you can use a Windows Authentication Mode with Ignition, but it does require some [additional configuration](#) when connecting later on. In either case, click **Next**.
15. On the next few windows, continue clicking **Next** until it shows installation is **Complete**.

SQL Server Express is now installed.

To Download SQL Management Studio

1. Go to <http://www.microsoft.com/en-us/download/details.aspx?id=8961>
2. Click on the **Download** button.
3. Click on the **SSMS-Setup-ENU.exe** file to run the executable.
4. Confirm the install location and click **Install**. After the install is complete, you will have to restart your PC.



RELEASE 20.2

Microsoft SQL Server Management Studio

Welcome. Click "Install" to begin.

Location:

C:\Program Files\Microsoft SQL Server Management Studio 20

Change

By clicking the "Install" button, I acknowledge that I accept the [Privacy Statement](#) and the License Terms for [SQL Server Management Studio](#)

SQL Server Management Studio transmits information about your installation experience, as well as other usage and performance data, to Microsoft to help improve the product. To learn more about data processing and privacy controls, and to turn off the collection of this information after installation, see the [documentation](#)

Install

Close

5. Once your computer has been restarted, you can run the program. Go to **Start > Programs > Microsoft SQL Server > SQL Server Management Studio**.
6. Click on **Connect** to connect to the Microsoft SQL Server.
7. In **Object Explorer**, you can now see some databases under **Databases > System Databases**.
8. Right-click on **Databases** and select **New Databases....** The **New Databases** window is displayed.
9. In **Database name**, enter **test**, click **Add**, and then **OK**.

Now you can see the **test** database in the **Databases** folder and can connect Ignition to it, see [Connecting to Microsoft SQL Server](#).

Installing PostgreSQL



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Installing PostgreSQL

[Watch the video](#)

To Install the PostgreSQL Database

1. Go to the **Postgre SQL** website at: <http://www.postgresql.org>
2. Click on **Downloads**, look for and click on the **Windows** link.
3. On the **Windows installers** page, find the **Download** link and click on it, and on the next page select the installer you are interested in. For example, you can select the **Wins x86-32**.
4. From you Download folder on your computer, click on the Postgre **.exe** file to install the database.
5. Go through all the windows of the **Install Wizard** until installation is complete.
6. From the Windows **Start** menu, open the **Postgre pgAdmin** database.
7. In the **Object browser** of the **pgAdmin** window, right-click on **PostgreSQL**, select Connect, enter your **password** to connect to the Server, and click **OK**.

You will now see the **Databases** folder in the Object browser.

Connecting to Databases

Connect Once

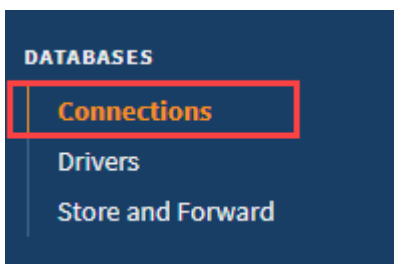
Many of the advanced features of Ignition, such as the Transaction Groups and Tags Historian require a connection to an external database and most databases require special permissions for each computer that wants to connect. Fortunately, Ignition takes care of all of this for us. You can create a connection to your database once and every system in Ignition will use that central connection. There's no need to worry about updating your database settings to add another client.

This central database connection also makes it easy to swap between databases or schemas. You can tell every query to use the default connection, then just change the default to update everything. Alternatively, you can force specific queries or systems to use a particular connection. Create as many database connections as you want and start designing using all of them.

Add a Database Connection

Now that we've installed your database, let's connect to it. You can find detailed descriptions for many database connections in this User Manual, however, they all include the same steps:

1. On the Gateway Webpage, go to the Gateway **Config** tab. Scroll down to the **Databases > Connections** section.



2. On at the Database Connections page, click on the **Create new Database Connection...** link at the bottom of the table.

Config > Database > Database Connections

Trial Mode 1:24:26 We're glad you're test driving our software. Have fun. [Activate Ignition](#)

Name	Description	JDBC Driver	Translator	Status		
DB		MariaDB	MYSQL	Faulted	delete	edit
MSSQL		MySQL	MYSQL	Valid	delete	edit
SQLServer		Microsoft SQLServer	MSSQL	Faulted	delete	edit

[→ Create new Database Connection...](#)

Note: For details about a connection's status, see the [Database Connection Status](#) page.

3. The next step is to choose a JDBC Driver. Ignition ships with drivers for Microsoft SQL Server, MySQL, Oracle, and PostgreSQL. Pick the JDBC driver for your database, and click on the **Next** button.

i NOTE

Ignition connects to databases using JDBC drivers that are unique to each database. If a suitable driver is not available in the list, you need to add a new JDBC driver for other databases, like IBM DB2, see [Adding a JDBC Driver](#).

4. After selecting the driver, you'll configure the settings for the connection. Some settings, such as the Connect URL are specific to the driver that you're using.

Main Database Connection Properties

Property	Description
Name	Each database connection needs a unique name, which consists of letters, numbers and underscores.
Description	A brief description of the database.
JDBC Driver	The JDBC driver dictates the type of database that this connection can connect to. It cannot be changed once created.
Connect URL	A string that instructs the driver how to connect to the database. This string is the server address, and may include the port, instance name, database name, and so on. The format and parameters depend on the driver being used.
Username	The username to use when connecting. Some databases support other authentication methods, such as Windows authentication, in which case this field is not used.
Change Password?	Check the box to change the existing password.
Password	Enter password.
Password	Re-type password for verification.
Extra Connection Properties	Depending on which database you are connecting to, there will be different default values placed in this box. MS SQL Server requires you to place your database name here, but for other databases you can usually leave this at its default values. Each database has its own set of available extra connection properties so you must refer to your Database documentation to determine what is valid here.
Enabled	Lets you to enable or disable a database connection.
Failover Datasource	The connection that is automatically used when this connection is not available.

Property	Description
Failover Mode	Lets you select how to handle the database connection failing and recovering. Database connections support <code>failover</code>. This means that the objects which use a database connection will use a different connection if the one they are using becomes unavailable. The Failover Datasource property determines which connection is used, and the Failover Mode determines when, if ever, the connection is switch back to the primary connection. There are two failover modes: • STANDARD mode means that this datasource will fail over when a connection cannot be retrieved, but when connectivity is restored, connections will again come from this datasource. • STICKY mode means that once this datasource fails over, connections will continue coming from the failover datasource until the failover datasource itself fails or the Gateway is restarted.
Slow Query Log Threshold	Queries that take longer than this amount of time, in milliseconds, will be logged. This helps to find queries that are not performing well. (default: 60,000)
Validation Timeout	The time in milliseconds between database validation checks. (default: 10,000)

Advanced Settings

There are many advanced settings, described below, that you don't need to change under normal circumstances.

SQL Compatibility

Property	Description
Translator	The SQL translator used to negotiate variances in syntax.
Include Schema in Table Name	When true, the schema name will be included in listing tables to create a fully-qualified name. Default is false.

Connection Pooling

Property	Description
Intial Size	The initial number of connections that are created when the pool is started. Default value is 0.
Max Active	The maximum number of active connections that can be allocated from this pool at the same time, or negative for no limit. Default value is 8.
Max Idle	The maximum number of connections that can remain idle in the pool without extra ones being released, or negative for no limit. Default value is 8.
Min Idle	The minimum number of connections that can remain idle in the pool without extra ones being created, or zero to create none. Default value is 0.
Max Wait	The maximum number of milliseconds that the pool will wait (when there are no available connections) for a connection to be returned before throwing an exception, or -1 to wait indefinitely. Default value is 5,000.

Connection Testing

Property	Description
Validation Query	A SQL query that will be used to validate connections from the pool. This query MUST be an SQL SELECT statement that returns at least one row. Default value is SELECT 1.
Test on Borrow?	When true, connections will be validated before being borrowed from the pool. If the connection fails to validate, it will be dropped from the pool, and we will attempt to borrow another. Default value is true.
Test on Return?	When true, connections will be validated before being returned to the pool. Default value is false.
Test While Idle?	When true, connections will be validated by the idle connection evictor. If a connection fails to validate, it will be dropped from the pool. Default value is false.
Eviction Rate	The number of milliseconds to sleep between runs of the idle connection evictor thread. When non-positive, no idle connection evictor thread will be run. Default value is -1.
Eviction Tests	The number of connections to examine during each run of the idle object evictor thread (if any). Default value is 3.
Eviction Time	The minimum amount of time in milliseconds a connection may sit idle in the pool before it is eligible for eviction by the idle object evictor (if any). Default value is 1,800,000.

Connection Initialization

Property	Description
Connection Initialization Commands	A set of commands (one per line) that will be executed each time a connection is pulled from the pool. Can be used to reset environment variables.
Default Transaction Isolation Level	The isolation to use for each connection.

Connecting to IBM DB2

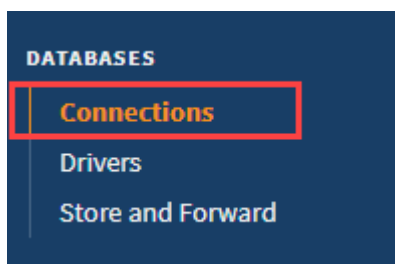
IBM DB2 Connection Requirements

In order to connect Ignition to IBM DB2 you must have a Translator, a Driver, and a Database Connection.

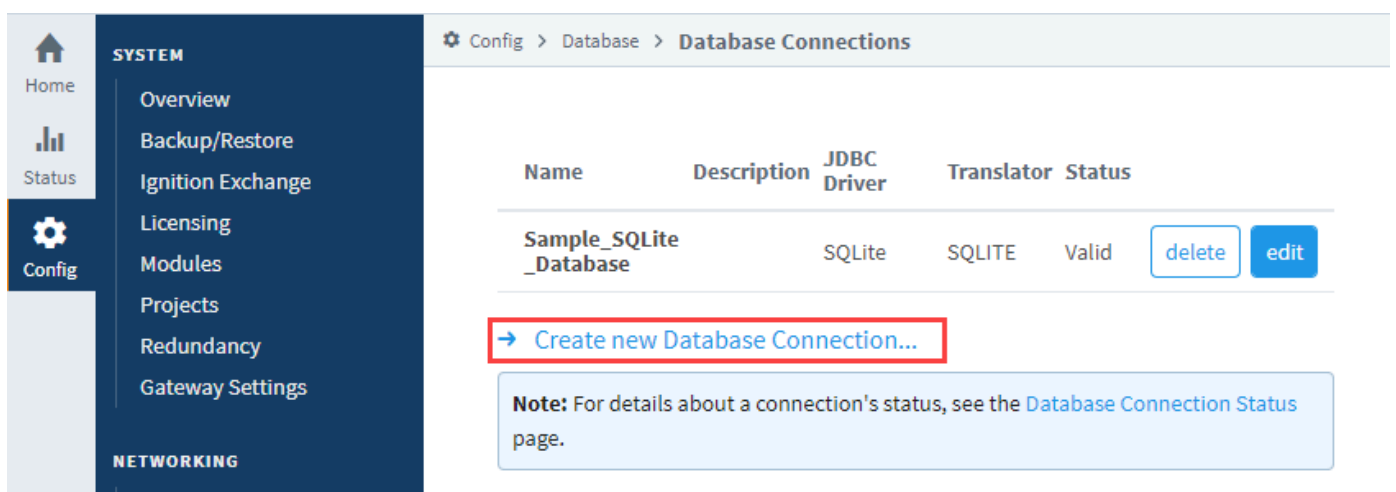
The Translator and Driver only need to be configured once. You can make as many connections as you want to any compatible IBM DB2 database.

Connect to IBM DB2

1. On the Gateway Webpage, go to the **Config** section.
2. Scroll down to **Databases > Connections**.



3. The Database Connections page is displayed. Click on **Create new Database Connection....**



4. Select **IBM DB2 JDBC Driver**, and click **Next**.

Home
Status
Config

SYSTEM
Overview
Backup/Restore
Ignition Exchange
Licensing
Modules
Projects
Redundancy
Gateway Settings

NETWORKING
Web Server
Gateway Network
Email Settings

Config > Database > Database Connections

Select the correct JDBC Driver for the type of database you wish to connect to. If no driver corresponds to your database, go to the Driver Configuration page to add a new driver.

☒ **IBM DB2**
The official IBM DB2 JDBC Driver.

☐ **MariaDB**
The MariaDB (a community-owned fork of MySQL) JDBC Driver - compatible with all MariaDB servers, MySQL 5.x (>= 5.5.3) and MySQL 8.0.

☐ **Microsoft SQLServer**
The Microsoft SQL Server JDBC Driver is a Java Database Connectivity (JDBC) 4.2 compliant driver.

NOTE

For more information, see [JDBC Drivers and Translators](#) for instructions on obtaining the requisite JAR file, and then follow the steps for [Upgrading a JDBC Driver](#) before continuing with these instructions.

5. On the New Database Connection page, enter the following information:

- Name: **IBM_DB2**
- Connect URL: **jdbc:db2://localhost:25000/SAMPLE**

INFO

If on Db2 Version 11.5.5 and older, the default port number is 50000. If on Db2 Version 11.5.6 and newer, the default port number is 25000.

- Username: **your_username**
- Password: **your_password**

Main Properties

Name

IBM_DB2

Choose a name for this database connection.

Description

JDBC Driver

IBM DB2

The JDBC driver dictates the type of database that this connection can connect to. It cannot be changed once created.

Connect URL

jdbc:db2://localhost:25000/SAMPLE

The Connect URL is JDBC-driver specific. It usually contains the address of the machine that the database is running on. The format of the DB2 connect URL is:

db2://host:port/database

With the three parameters (in bold)

host: The host name or IP address of the database server.

port: The port that the database server is running on. DB2 default port is **50000**.

database: The name of the logical database that you are connecting to on the DB2 server.

Username

your_username

Password

.....

Password

.....

Re-type password for verification.

6. At the bottom of the form, click on **Create New Database Connection**.

Your connection is now created. The Database Connections page is displayed and will show the status of Reconnecting, then Valid.

Config

>

Database

>

Database Connections

✓

Successfully created new Database Connection "IBM_DB2"

Name	Description	JDBC Driver	Translator	Status
IBM_DB2		IBM DB2	IBM DB2	Valid

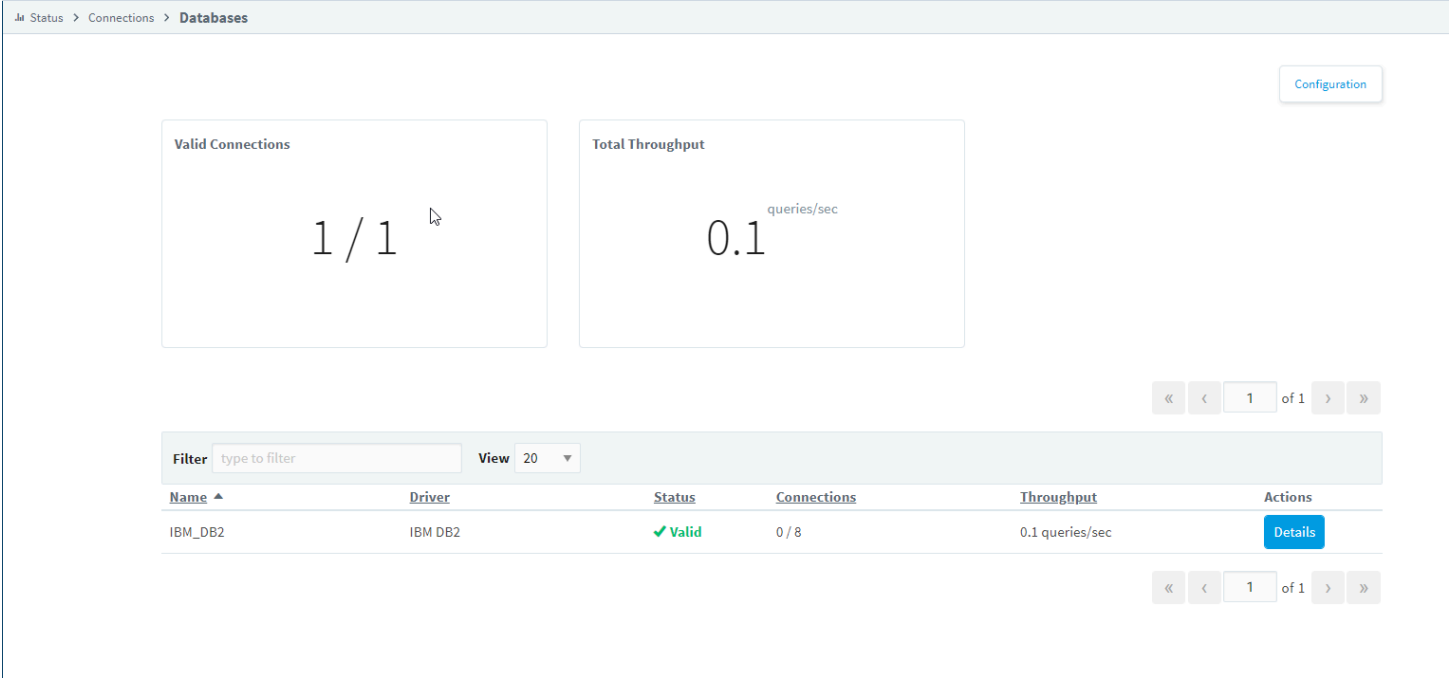
→

Create new Database Connection...

Note:

For details about a connection's status, see the [Database Connection Status](#) page.

7. To display the details about the status of your database connection, see the **Note** on the above window and click on the **Database Connection Status** link.



Troubleshooting

Troubleshooting Tools

IBM DOC - Troubleshooting Tools

Installation Issues

DB2 installation fails to create instance and DAS: [IBM DOC - DB2 installation fails to create instance and DAS](#)

Other Issues

Error Code	Error Description	Resources
SQL30081N	Various TCP/IP communication errors. Each error has its own definition and action plan.	SQL30081N TCP/IP communication errors
SQL1092N	“USERID does not have the authority to perform the requested command or operation”	SQL1092N Error

JDBC Drivers and Translators

In some cases, you may need to add your own JDBC Driver, or configure a Translator. More information on configuring these can be found on the [JDBC Drivers and Translators](#) page. However, you may need to check the JDBC driver's documentation for information on how to configure them.

Connecting to MariaDB

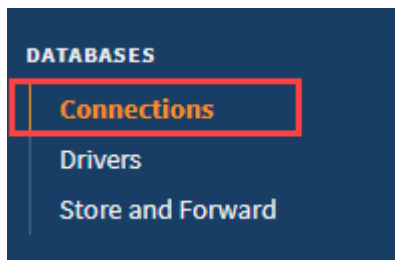


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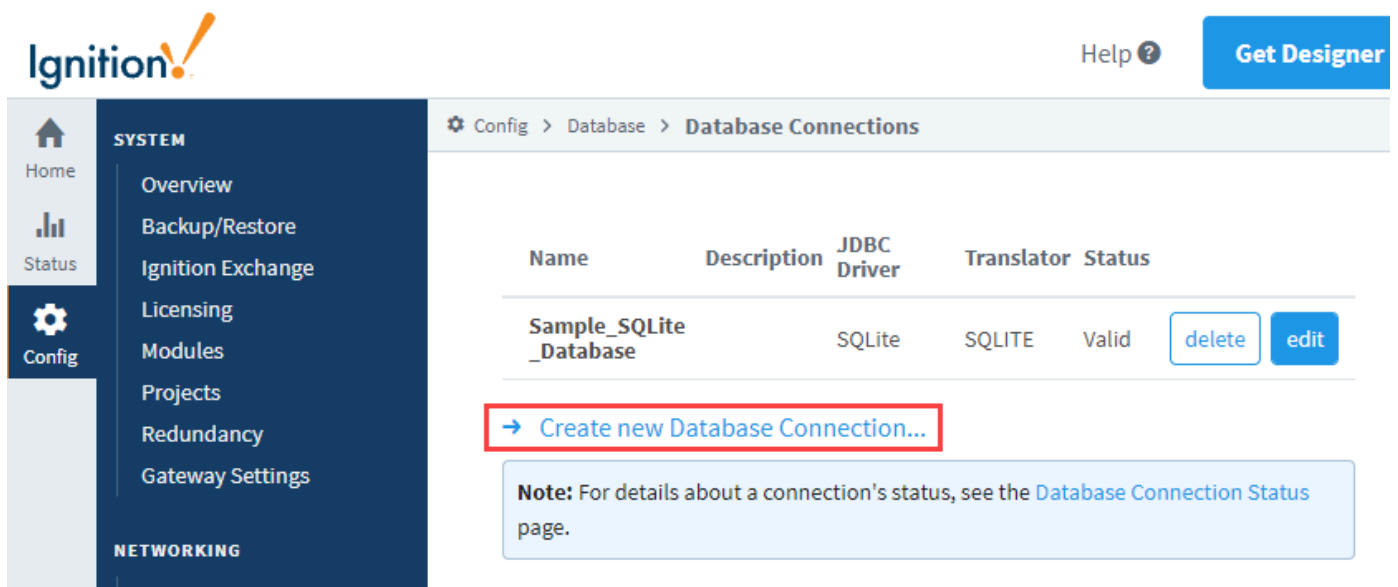
Connecting to MariaDB

[Watch the video](#)

1. On the Gateway Webpage, go to the **Config** section.
2. Scroll down to **Databases > Connections**.



3. Click on **Create new Database Connection...**



4. Select the **MariaDB** driver and click **Next**.
5. On the New Database Connection page, enter the following information:
 - Name: **MariaDB** (or use a meaningful name for this connection)
 - Connect URL: **jdbc:mariadb://localhost:3306/myDB**

Main Properties	
Name	MariaDB  Choose a name for this database connection.
Description	
JDBC Driver	MariaDB The JDBC driver dictates the type of database that this connection can connect to. It cannot be changed once created.
Connect URL	jdbc:mariadb://localhost:3306/myDB The Connect URL is JDBC-driver specific. It usually contains the address of the machine that the database is running on. The format of the MariaDB connect URL is: jdbc:mariadb://host:port/database With the three parameters (in bold) host: The host name or IP address of the database server. port: The port that the database server is running on. MariaDB default port is 3306. database: The name of the logical database that you are connecting to on the MariaDB server.

Where **localhost** is the IP address or hostname of the machine with MariaDB installed, for example: localhost, 192.168.1.1, db-server, etc.

myDB specifies the name of the database in MariaDB you want Ignition to connect to. If you're uncertain which database to connect to, speak with your local database administrator.

6. To configure the connection, Ignition needs credentials to connect to MariaDB. The **Username** and **Password** fields are where you provide credentials for a user that Ignition will use to authenticate against the database. The user should be able to do the following:
 - i. Create and drop tables within the schema
 - ii. Alter tables within the schema
 - iii. Insert, update, select, and delete rows from tables in the schema
 - iv. Create, alter, and execute stored procedures within the schema
7. After entering a username and password, click on **Create New Database Connection** at the bottom of the form. Your connection is now created and the Database Connections page is displayed showing the **Status** of your connection as **Valid**.

Connecting to Microsoft Azure SQL

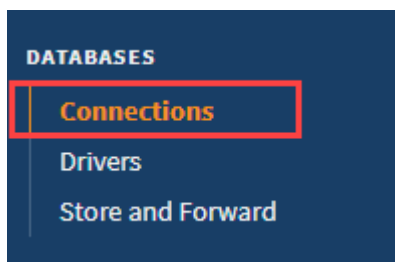
Azure SQL Server Requirements

Microsoft Azure SQL Server uses the same **Java Database Connectivity** (JDBC) driver as **Microsoft SQL Server** (MSSQL). As long as you are able to connect to an MSSQL database in Ignition, you can use the same JDBC driver to connect to Azure SQL Server. The steps below will show you how to set up Ignition to connect to Azure SQL Server.

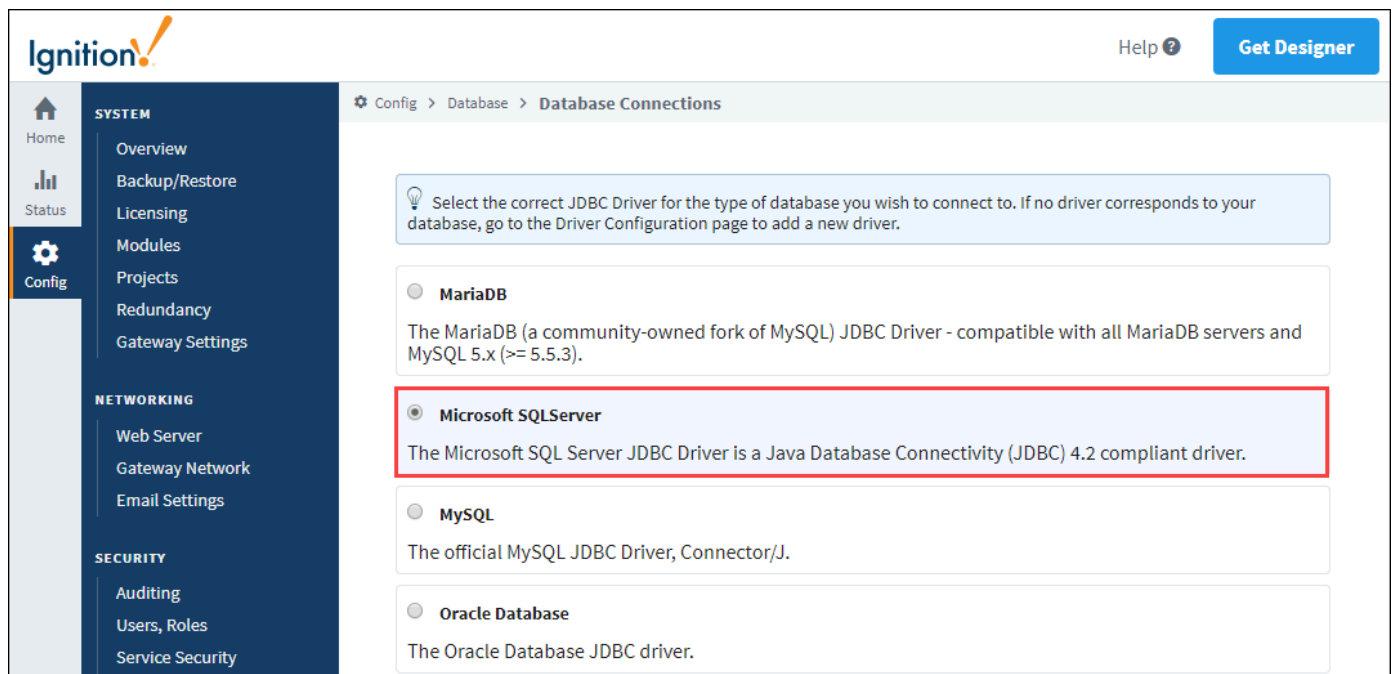
Connect Ignition to Azure SQL Server

In this example, we are using SQL Authentication. For information on using Microsoft Entra ID (formerly Azure Active Directory) authentication with Java-based applications, see [Microsoft's official documentation](#).

1. On the Gateway Webpage, go to the **Config** section.
2. Scroll down to **Databases > Connections**.



3. The Database Connections page is displayed. Click on **Create new Database Connection...**
4. Select **Microsoft SQLServer**, and click **Next**.



5. On the Database Connections page, enter the following information:

- **Name:** The name of the connection. In this example, we are naming our connection **AzureSQLServer**.
- **Connect URL:** The address that your Azure SQL Server instance is hosted on. In this example, we are using **jdbc:sqlserver://sudev.database.windows.net:1433**.
- **Username:** The username of your database login credentials. In this example, we are using **dev_admin@sudev**.
- **Password:** The password of your database login credentials.
- **Extra Connection Properties** (Optional): Any other properties you may need to configure to connect to your Azure SQL Server instance will be listed here, such as the database name and SSL.

i NOTE

In this example, we are using port 1433 to connect to our Azure instance. This is the default port Ignition uses and is called **Proxy** since it uses Microsoft's proxy servers to connect. Connecting to an Azure SQL Server instance while using Microsoft's proxy servers is easier to configure as you only need to have one IP/port open. However, this method can increase latency and reduce throughput.

If you want to connect directly to your Azure SQL Server instance, you can instead use port 3306. This policy is called **Redirect** and requires many more open ports and IP addresses. However, since the connection is direct, performance will be much better with decreases in latency and increases in throughput.

You can learn more about Microsoft's proxy settings in their [Azure SQL documentation](#).

⚙️ Config > Database > Database Connections

Main Properties	
Name	AzureSQLServer ⓘ Choose a name for this database connection.
Description	
JDBC Driver	Microsoft SQLServer ▼ The JDBC driver dictates the type of database that this connection can connect to. It cannot be changed once created.
Connect URL	jdbc:sqlserver://sudev.database.windows.net:1433 The Connect URL is JDBC-driver specific. It usually contains the address of the machine that the database is running on. The format of the SQL Server connect URL is: jdbc:sqlserver://host\instanceName[:port] With the three parameters (in bold) host: The host name or IP address of the database server. instanceName: (optional) the instance to connect to on the host. If not specified, a connection to the default instance is made. port: (optional) the port to connect to. The default is 1433. If you are using the default, you can omit the port and the preceding '':. For SQL Server, you specify the <i>database name</i> to connect to using the <code>databaseName</code> property in the <i>Extra Connection Properties</i>.
Username	dev_admin@sudev
Password	 ⓘ
Password	 ⓘ Re-type password for verification.
Extra Connection Properties	databaseName=dev Use <code>databaseName=YOUR_DATABASE</code> to specify the database to connect to.

6. At the bottom of the form, click in **Create New Database Connection**.

Your connection is now created. The Database Connections page is displayed and will show the status of **Reconnecting**, then **Valid**.

⚙️ Config > Database > Database Connections

Name	Description	JDBC Driver	Translator	Status		
AzureSQLServer		Microsoft SQLServer	MSSQL	Valid	<button>delete</button>	<button>edit</button>
Sample_SQLite_Database		SQLite	SQLITE	Valid	<button>delete</button>	<button>edit</button>

→ [Create new Database Connection...](#)

Note: For details about a connection's status, see the [Database Connection Status](#) page.

7. To display the details about the status of your database connection, see the **Note** on the above window and click on the **Database Connection Status** link.

Status > Connections > Databases

Configuration

Valid Connections

2 / 2

Total Throughput

14.9^{queries/sec}

« < 1 of 1 > »

Filter

View 20 ▾

Name ▲	Driver	Status	Connections	Throughput	Actions
AzureSQLServer	Microsoft SQLServer	✓ Valid	1 / 8	13.8 queries/sec	<button>Details</button>
Sample_SQLite_Database	SQLite	✓ Valid	0 / 8	1.1 queries/sec	<button>Details</button>

« < 1 of 1 > »

Troubleshooting and Tips

TCP/IP Communication

If your database connection is not successfully connecting, you may need to check your TCP/IP settings. See Microsoft's documentation on [configuring IP addresses for an Azure network interface](#).

Windows Firewall

In some situations, you may need to configure your firewall to set up any required ports. Typically, ports 1433 and 1434 need to be open for TCP traffic, but other ports may also need to be configured, such as when connecting to your Azure SQL Server instance directly using port 3306.

JDBC Drivers

When using a JDBC driver to connect Ignition to Azure SQL Server, there are two things you may need to check:

- Make sure your JDBC driver is up to date.
- Make sure the JDBC driver version you are using is the same as the Java version Ignition is using. Using an incompatible JDBC driver may result in Gateway errors and crashes.

Connecting to Microsoft SQL Server Express



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Connecting to Microsoft SQL
Server Express

[Watch the video](#)

SQL Server Connection Requirements

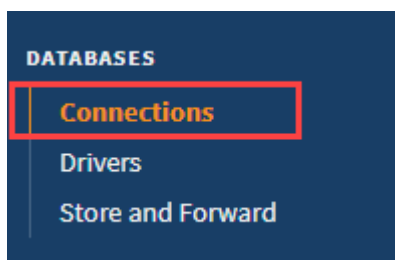
In order to get connected to SQL Server, you must have a Translator, a Driver, and a Connection. The Translator and Driver only needs to be installed once, and after that you can make as many connections as you want to any compatible SQL Server databases.

NOTE

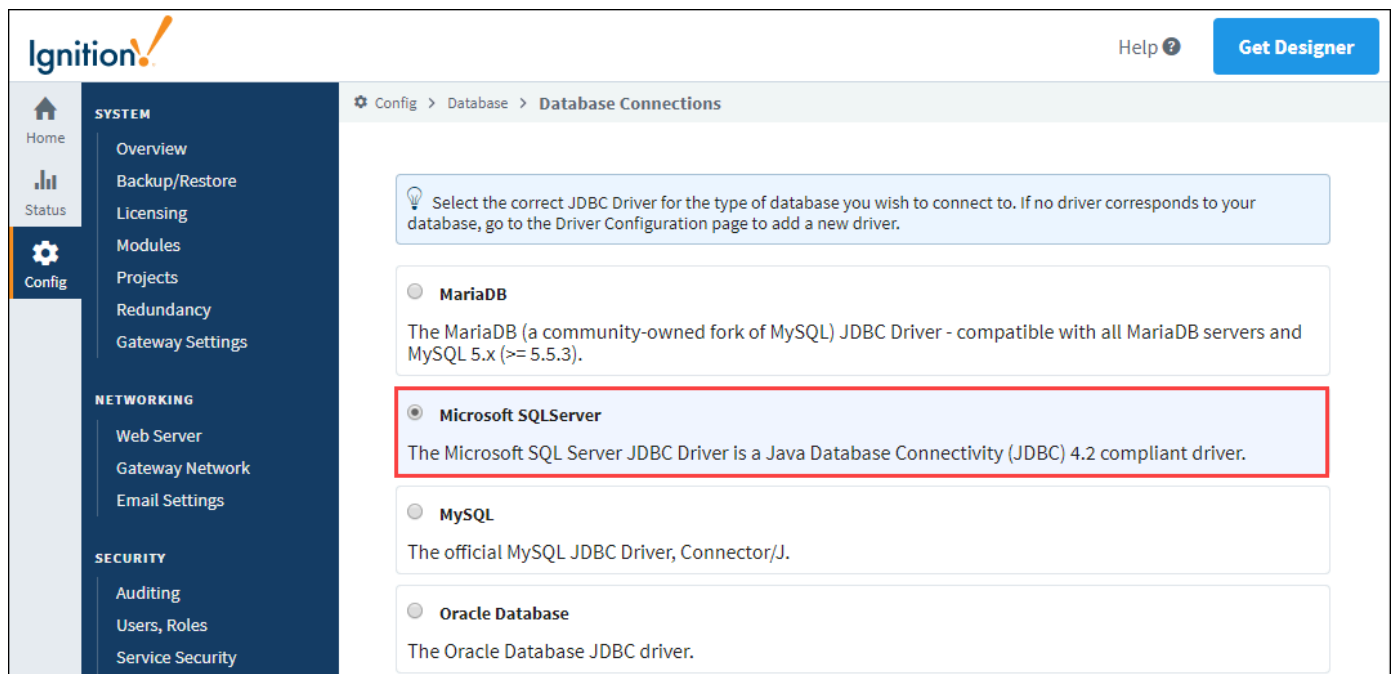
When you Upgrade Ignition, any existing drivers are carried over. This means only a fresh install of Ignition will not have a SQL Server Connector.

Connect to Microsoft SQL Server

1. On the Gateway Webpage, go to the **Config** section.
2. Scroll down to **Databases > Connections**.



3. The Database Connections page is displayed. **Click on Create new Database Connection....**
4. Select **Microsoft SQLServer JDBC Driver**, and click **Next**.



5. On the **Database Connections** page, enter the following information:

- Name: **SQLServer**
- Connect URL: **jdbc:sqlserver://localhost\SQLEXPRESS**

i NOTE

We are connecting to the express edition of SQL Server using the default instance name. If you have the full SQL Server with default settings, replace SQLEXPRESS with the instance name of your SQL Server installation. Non-express versions of SQL Server tend to use MSSQLSERVER as a default instance name.

- username: **sa**
- password: **sqlserver** (password is what you entered during the SQL Server installation. For this example, password is **sqlserver**)

Config > Database > Database Connections

Main Properties

Name	SQLServer Choose a name for this database connection.
Description	
JDBC Driver	Microsoft SQLServer The JDBC driver dictates the type of database that this connection can connect to. It cannot be changed once created.
Connect URL	jdbc:sqlserver://localhost\MSSQLSERVER The Connect URL is JDBC-driver specific. It usually contains the address of the machine that the database is running on. The format of the SQL Server connect URL is: jdbc:sqlserver://host\instanceName[:port] With the three parameters (in bold) host: The host name or IP address of the database server. instanceName: (optional) the instance to connect to on the host. If not specified, a connection to the default instance is made. port: (optional) the port to connect to. The default is 1433. If you are using the default, you can omit the port and the preceding '!'. For SQL Server, you specify the <i>database name</i> to connect to using the <code>databaseName</code> property in the <i>Extra Connection Properties</i>.
Username	sa
Password	
Password	 Re-type password for verification.

6. At the bottom of the form, click on **Create New Database Connection**.

Your connection is now created. The Database Connections page is displayed and will show the status of Reconnecting, then Valid.

Config > Database > Database Connections

 Successfully created new Database Connection "SQLServer"

Name	Description	JDBC Driver	Translator	Status	
DB		MariaDB	MYSQL	Valid	delete edit
SQLServer		Microsoft SQLServer	MSSQL	Reconnecting	delete edit

[→ Create new Database Connection...](#)

Note: For details about a connection's status, see the [Database Connection Status](#) page.

7. To display the details about the status of your database connection, see the **Note** on the above window and click on the **Database Connection Status** link.

Help ?
Get Designer

Status > Connections > Databases

Configuration

Valid Connections

1 / 2

Total Throughput

12.2 queries/sec

« < 1 of 1 > »

Filter View 20 ▼

Name ▲	Driver	Status	Connections	Throughput	Actions
SQLServer	Microsoft SQLServer JDBC Driver	✓ Valid	0 / 8	12.0 queries/sec	Details

« < 1 of 1 > »

Microsoft SQL Server Connection Guide

This guide helps you with any difficulties you may have in getting the correct settings and parameters when connecting Ignition to Microsoft SQL Server, a popular and robust relational database.

Multiple Instances of Database

Microsoft SQL Server supports multiple instances of the database running concurrently on the same computer. Each instance has its own name and set of system and user databases that are not shared between instances. Applications, such as Ignition, can connect to each instance on a computer in much the same way they connect to databases running on different computers. By default, each instance gets assigned a dynamic TCP/IP port on startup that listens for any incoming requests. Since the port is dynamic and the application does not know what the new port is, it must connect using the instance name.

So if the communication is over TCP/IP and the application knows the instance name, how does the application find which port to communicate to?

The answer is the **Microsoft SQL Server Browser** service. The Microsoft SQL Server Browser program runs as a Windows service and listens for all incoming requests for resources and provides information, such as the TCP/IP port, about each instance installed on the computer. Microsoft SQL Server Browser also contributes to these two actions: browsing a list of available servers and connecting to the correct server instance.

If the Microsoft SQL Server Browser service is not running, you can still connect to SQL Server if you provide the correct port number. For example, you can connect to the default instance of SQL Server with TCP/IP if it is running on port 1433.

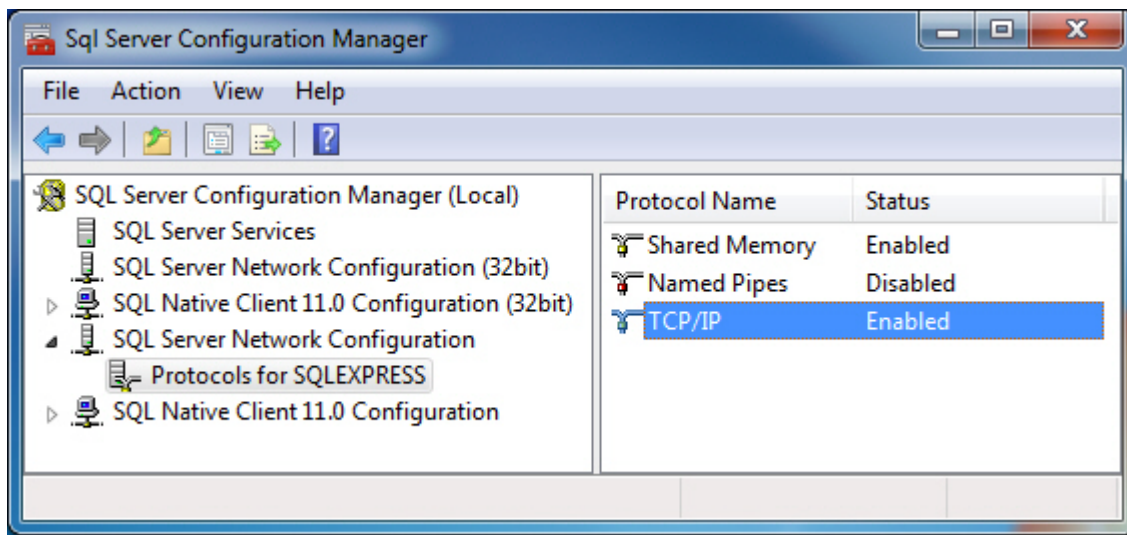
Check 1: Make Sure the Database has TCP/IP Enabled

Ignition connects using TCP/IP, therefore make sure your database has TCP/IP enabled.

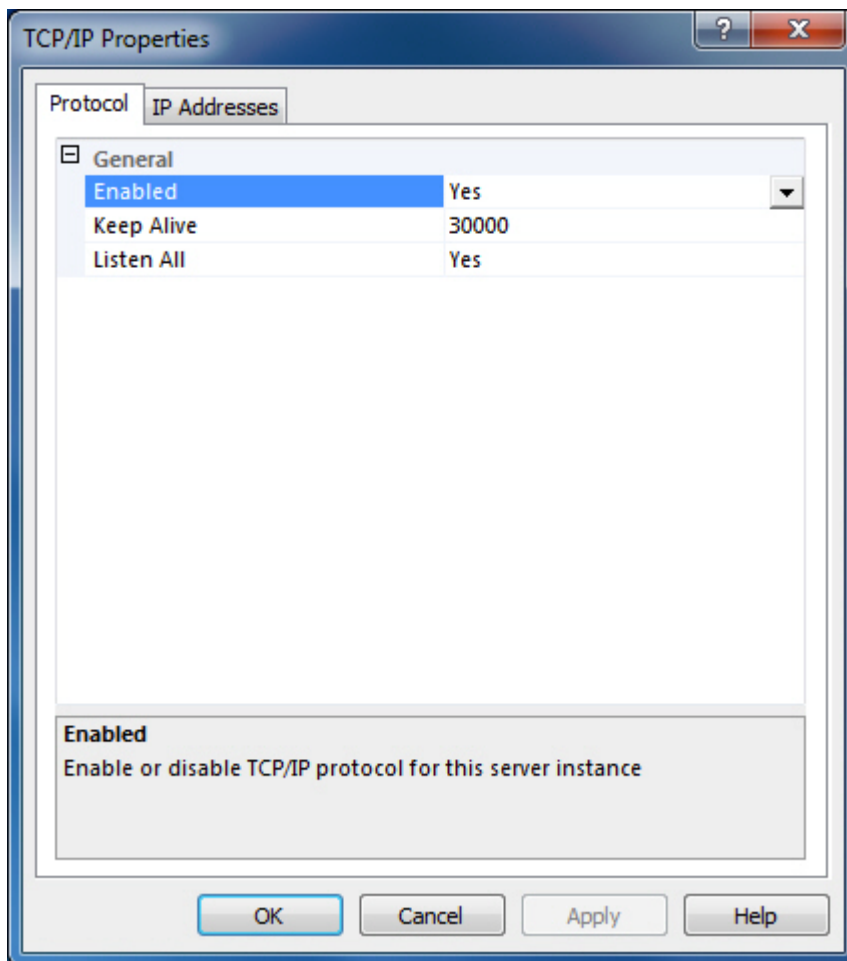
1. Open the SQL Server Configuration Manager from **Start > All Programs > Microsoft SQL Server Version # > Configuration Tools > SQL Server Configuration Manager**.

The Sql Server Configuration Manager window is displayed.

2. To see all the instances set up on that machine, expand **SQL Server Network Configuration**.
3. Find the database (or instance) you plan on using. To the right, all of the protocols the database supports are shown. Find the **TCP/IP** protocol and select it.



4. Make sure the **Status** next to TCP/IP is **Enabled**. If not, double-click **TCP/IP** and choose **Yes** from the drop-down next to Enabled and click **OK**.



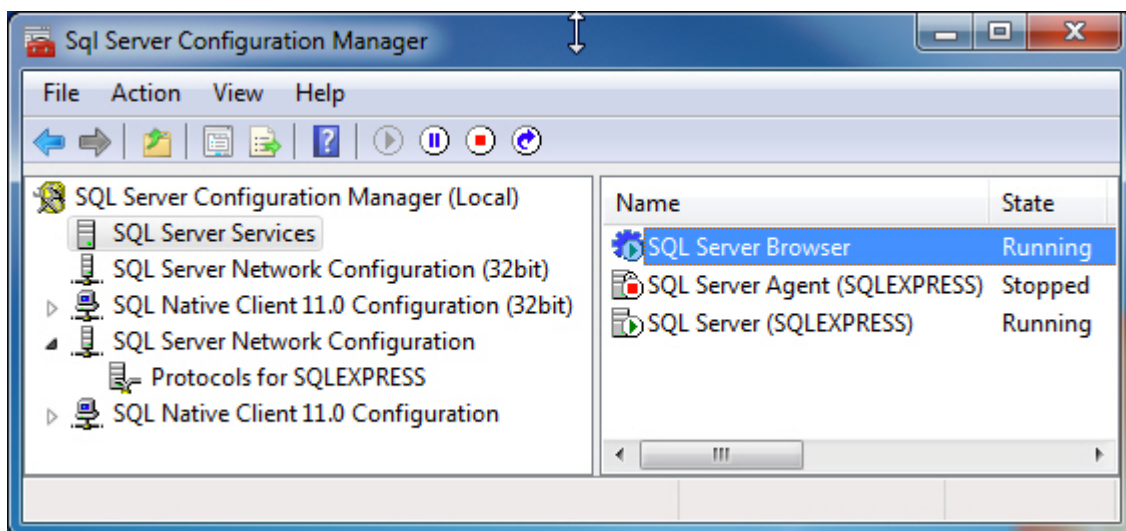
Check 2: Make Sure Microsoft SQL Server Browser is Running

If you ARE connecting to your database using a NAMED INSTANCE, you must make sure that the Microsoft SQL Server Browser is running. As mentioned earlier, the Microsoft SQL Server Browser translates the instance name to a TCP/IP port in order for Ignition to connect to it.

1. Open the **SQL Server Configuration Manager** from **Start > All Programs > Microsoft SQL Server Version # > Configuration Tools > SQL Server Configuration Manager**.
2. Select the **SQL Server Services** section.
3. On the right, see all of the services installed. One of the services is **SQL Server Browser**. Make sure this service is in fact running. If the service is not running, right-click and select **Start**.

NOTE

The service could be disabled, so you may need to double-click it to enable the service before starting it up.



Check 3: Make Sure There is a Database Created

If you are connecting to an existing SQL Server installation, you only need to know the name of the database and you can skip this step. In newer versions of SQL Server, a fresh installation does not include a database so you must first create a new database.

1. Open the **SQL Server Management Studio** program. This program was an option when you installed SQL Server.
2. Log into the Management Studio using either SQL Server Authentication or Windows Authentication.
3. In the **Object Explorer** (on the left), expand the instance folder to find the **Databases** folder. The instances folder is usually expanded by default.
4. Right Click on the **Databases** folder and select the **New Database...** option.
5. Type in a Database Name.

6. Click the OK button in the lower right. You can then expand the **Databases** folder in the Object Explorer to see the new database. If it doesn't show up right away you can right-click to refresh.

Security - Make your user a db_owner of the new database.

7. In the Object Explorer, expand to the **Security > Logins** folder, right click on your username, and select **Properties**.

8. In the **User Mapping** page click the checkbox next to your new database, then click the **db_owner** checkbox below.

9. Click OK. Now your user has access to a database.

Different Ways of Connecting to SQL Server

Now that you have ensured that TCP/IP is enabled and the Microsoft SQL Server Browser is running, you can connect to Microsoft SQL Server in four different ways (all using TCP/IP communication) as follows:

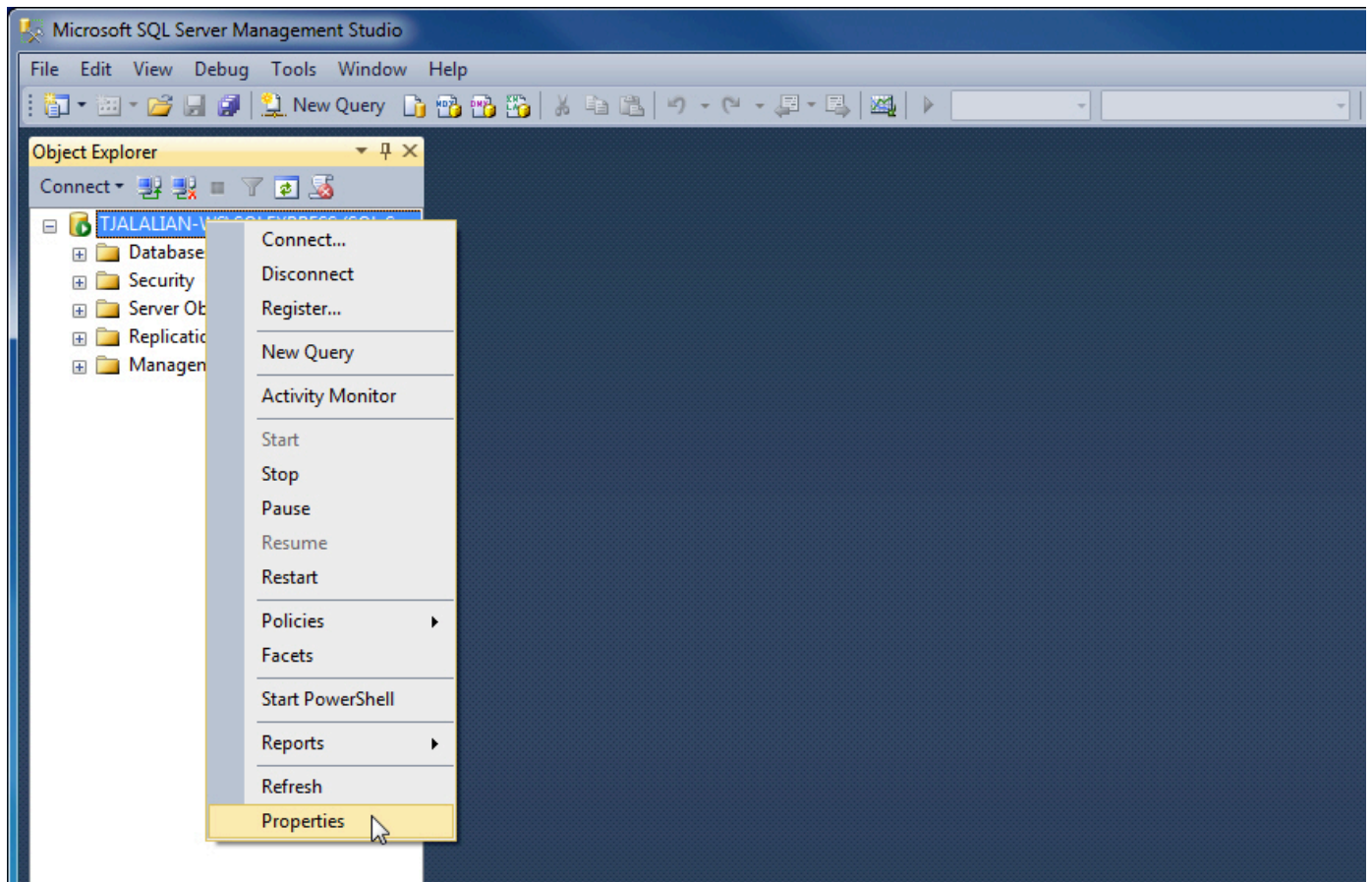
1. Connect using an Instance Name and SQL Authentication.
2. Connect using an Instance Name and Windows Authentication (this is the most common method).
3. Connect using a Port and SQL Authentication.
4. Connect using a Port and Windows Authentication.

Scenario 1: Connect By Using an Instance Name and SQL Authentication

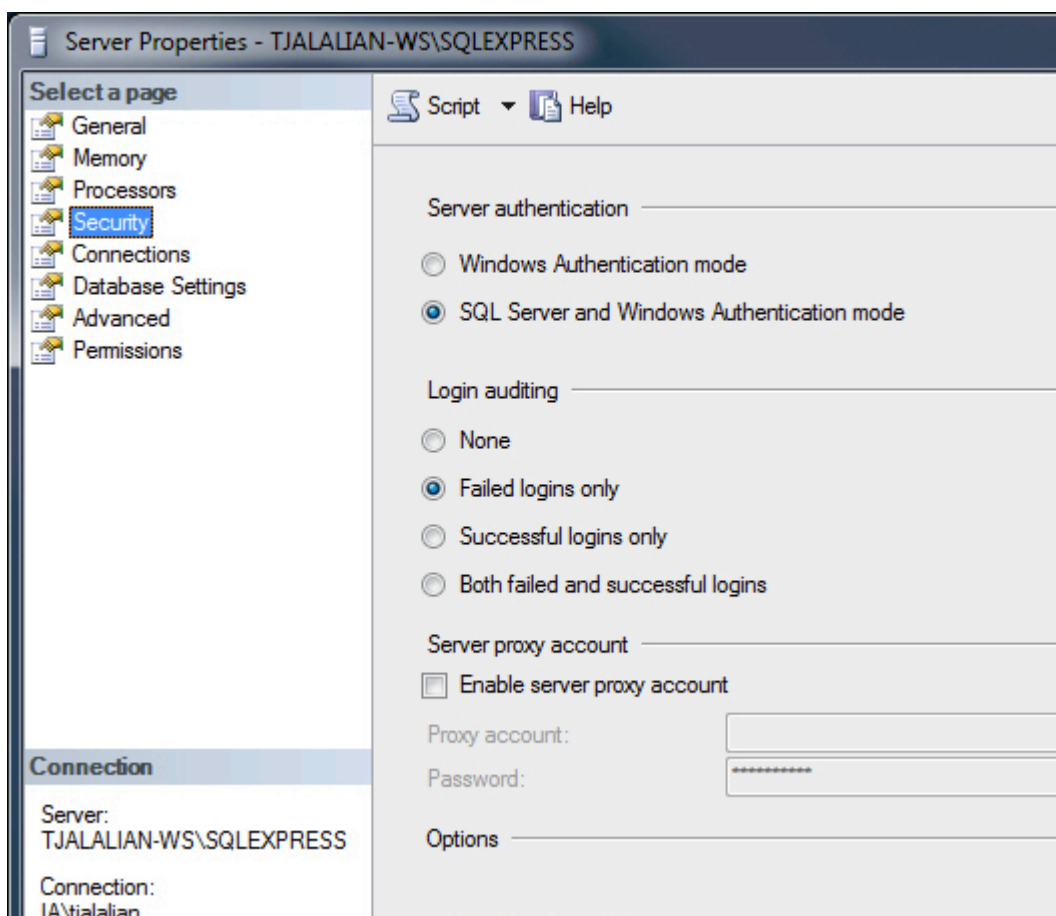
By default, Microsoft SQL Server only allows Windows authentication since it is more secure. But because we are using SQL authentication, we must enable Microsoft SQL to allow this type of authentication.

Enable SQL Authentication

1. Open the **Microsoft SQL Server Management Studio** window from **Start > All Programs > Microsoft SQL Server Version # > SQL Server Management Studio**. The window is displayed showing connections to your database.
2. Right-click the top-level database in the **Object Explorer** and select **Properties**.



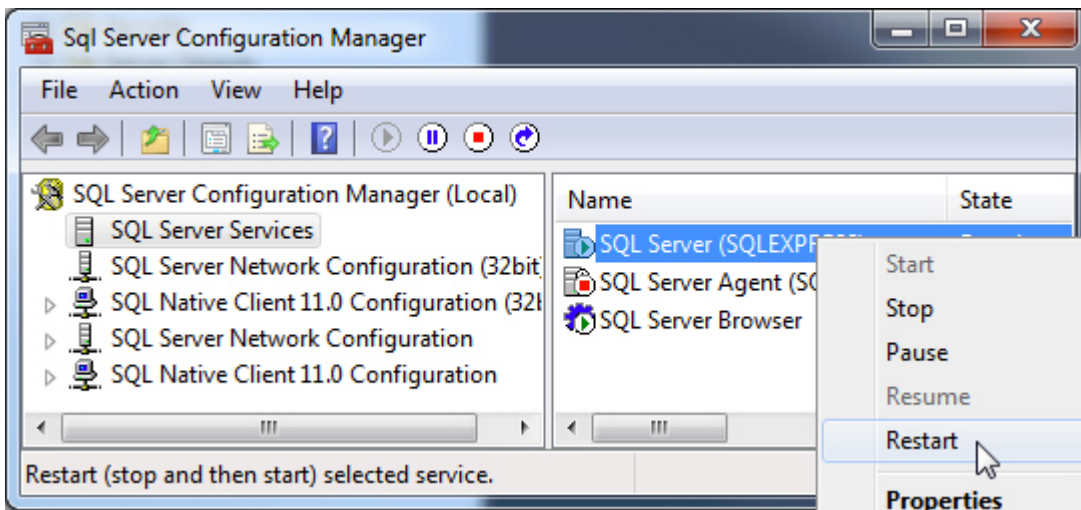
3. From the Server Properties window, on the left side, select **Security**.



4. Verify that **SQL Server and Windows Authentication** mode is selected. If not, select it and click **OK**

Now you need to restart the **SQL Server Windows** service so that this setting takes effect.

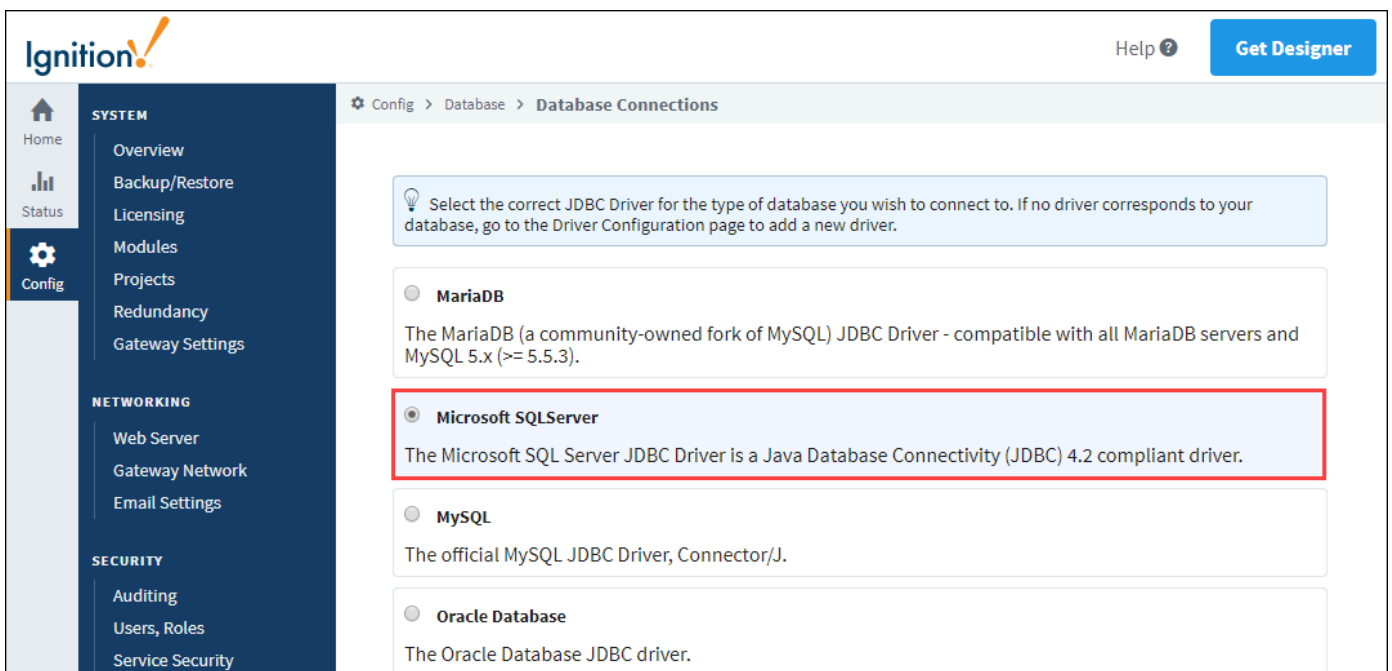
5. Open the **SQL Server Configuration Manager** at **Start > All Programs > Microsoft SQL Server Version # > Configuration Tools > SQL Server Configuration Manager**.
6. Select the **SQL Server Services** section and restart the **SQL Server (Instance Name)** item.



Now that Microsoft SQL Server accepts SQL authentication, we can configure Ignition.

Configure the Database Connection in Ignition

1. Go to and login to the Ignition Gateway Config page from your webbrowser at <http://hostname:8088/main/web/config/>
2. Select **Databases > Connections** from the menu.
3. Click on **Create new Database Connection**.
4. Select **Microsoft SQL Server JDBC Driver** and click **Next**.



5. In the **New Database Connection** window, enter the following information:

- Name: **YourDatabaseConnectionName** (no spaces)
- Connect URL: **jdbc:sqlserver://Hostname\InstanceName**
 - **Hostname** is your databases IP address or hostname and **InstanceName** is your databases instance name, for example:
 - **jdbc:sqlserver://localhost\SQLEXPRESS**
 - **jdbc:sqlserver://10.10.1.5\MSSQLSERVER**

6. Set the username and password to a valid SQL authentication user. For example, sa is the default administrator account you can use.

Config > Database > Database Connections

Main Properties	
Name	SQLServer_SQLAuth ⓘ Choose a name for this database connection.
Description	
JDBC Driver	Microsoft SQLServer ▼ The JDBC driver dictates the type of database that this connection can connect to. It cannot be changed once created.
Connect URL	jdbc:sqlserver://localhost\SQLEXPRESS The Connect URL is JDBC-driver specific. It usually contains the address of the machine that the database is running on. The format of the SQL Server connect URL is: <code>jdbc:sqlserver://host\instanceName[:port]</code> With the three parameters (in bold) host : The host name or IP address of the database server. instanceName : (optional) the instance to connect to on the host. If not specified, a connection to the default instance is made. port : (optional) the port to connect to. The default is 1433 . If you are using the default, you can omit the port and the preceding '!'. For SQL Server, you specify the <i>database name</i> to connect to using the <code>databaseName</code> property in the <i>Extra Connection Properties</i> .
Username	sa
Password	 ⓘ
Password	 ⓘ Re-type password for verification.
Extra Connection Properties	databaseName=test Use <code>databaseName=YOUR_DATABASE</code> to specify the database to connect to.

7. To add your own user account, open the SQL Server Management Studio and expand the **Security > Logins** folder. You will see all the current logins including **sa** and you can add a new

login.

- i. To add a new login, right-click on the **Logins** folder and click **New Login....** The **Login** window is displayed.
- ii. Choose the **SQL Server authentication** mode and type in a Login name and password.

 NOTE

You will also have to add permissions to your database by mapping db_datareader and db_datawriter to the new user in the User Mapping section of the Login window. If you want Ignition to be able to create tables (ie: for Tag History), you also need to give table creation access such as db_owner.

8. Go back to the **New Database Connection** page in the Gateway, enter the name of your database, for example, in the **Extra Connection Properties** enter: **databaseName=test** (replace **test** with your database name, not the instance name).
9. Click **Create New Database Connection**. The Database Connection page is displayed showing the Status as **Valid** after a couple of seconds. If the connection is **Faulted**, click on the Database Connection Status link to find out why. Typically, the username/password is incorrect or the user doesn't have the right permissions.

Scenario 2: Connect By Using Instance Name and Windows Authentication

In Windows authentication mode, the username and password used to connect comes from the Ignition Windows Service login. By default, the Ignition Windows Service is set to local system account which usually doesn't have privileges to connect.

Set Up the Service to Use Windows Authentication

1. Download a copy of the **SQL Server JDBC driver**. Specifically, download a ZIP or tar.gz file (NOT an installer), as you will need to extract a specific file and relocate it to the Gateway's installation directory. The exact version required depends on the version of Java your Gateway is using. Ignition 8.1.33+ uses Java 17, but previous 8.0/8.1 versions use Java 11.

 CAUTION

Although, it's recommended you use the most recent driver available for your system, make sure the version of the JDBC Driver Ignition is using matches the downloaded DLL file. Your

current driver version can be seen in the following directory: `{installDirectory}/user-lib/jdbc`.

2. Locate the DLL file from the correct architecture folder ("x64" for 64-bit JDBC) inside of the `enu/auth` folders in the zip file.
3. Copy the DLL file to the **lib** folder in your install directory. If you have the default install directory, it's in the following location: `C:\Program Files\Inductive Automation\Ignition\lib\core\gateway`

FILE CONSIDERATIONS

- Older versions of the JDBC driver (such as version 7.2.1) need this file to be renamed to `sqljdbc_auth.dll` before Ignition can utilize the file. In more modern versions of the driver, this is no longer the case.
- The path `C:\Program Files\Inductive Automation\Ignition\lib\core\gateway` doesn't survive upgrades. However, keeping the file in `C:\Program Files\Inductive Automation\Ignition\lib` will persist through upgrades.

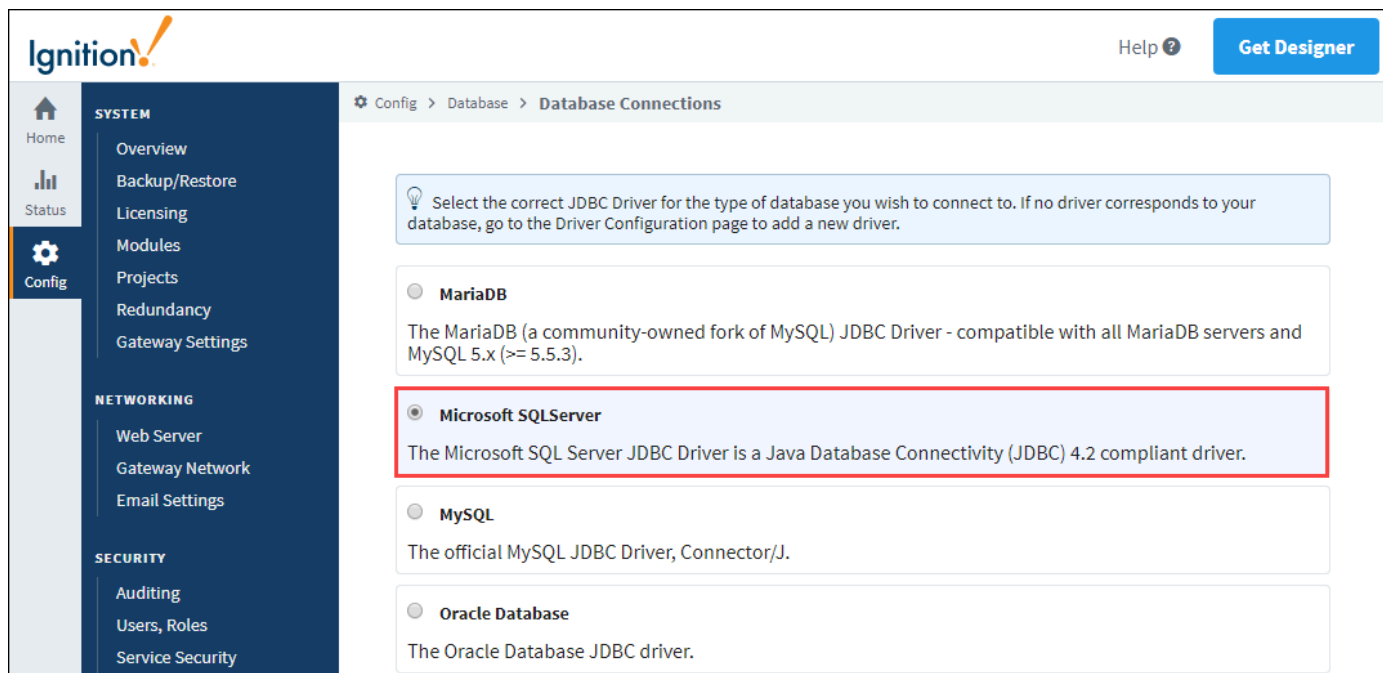
4. The account used to connect will be the account that Ignition is running under in the services menu. To set up Ignition to logon using the right Windows account, open the **Services Control Panel** from Start > Control Panel > Administrative Tools > Services
5. Right-click the **Ignition** service (or whatever service name your Ignition installation is using) and choose **Properties**.
6. Select the **Log On** tab.
7. Choose the **This account** radio button and enter in your Windows username and password.
8. Click **OK** to save.
9. Now restart the Ignition service to make this change take effect. Click the **Action > Restart** button in the menubar to restart the Ignition service (or you can stop and start from the right-click menu).

Configure the Database Connection in Ignition

1. Go to and login to the Ignition Gateway Config page from your webbrowser at <http://hostname:8088/main/web/config/>
2. Select **Databases > Connections** from the menu.

3. Click on **Create new Database Connection**.

4. Select **Microsoft SQL Server JDBC Driver** and click **Next**.



5. On the **New Database Connection** page, enter the following information:

- Name: **YourDatabaseConnectionName** (no spaces)
- Connect URL: **jdbc:sqlserver://Hostname\InstanceName**
 - **Hostname** is your databases IP address or hostname and **InstanceName** is your databases instance name, for example:
 - **jdbc:sqlserver://localhost\SQLEXPRESS**
 - **jdbc:sqlserver://10.10.1.5\MSSQLSERVER**
- **username**: leave blank
- **password**: leave blank
- Extra Connection Properties: **databaseName=test; integratedSecurity=true;** (replace test with your database name)

Config > Database > Database Connections

Main Properties	
Name	SQLServer_WinAuth  Choose a name for this database connection.
Description	
JDBC Driver	Microsoft SQLServer ▼ The JDBC driver dictates the type of database that this connection can connect to. It cannot be changed once created.
Connect URL	jdbc:sqlserver://localhost\MSSQLSERVER The Connect URL is JDBC-driver specific. It usually contains the address of the machine that the database is running on. The format of the SQL Server connect URL is: <code>jdbc:sqlserver://host\instanceName[:port]</code> With the three parameters (in bold) host: The host name or IP address of the database server. instanceName: (optional) the instance to connect to on the host. If not specified, a connection to the default instance is made. port: (optional) the port to connect to. The default is 1433. If you are using the default, you can omit the port and the preceding '':. For SQL Server, you specify the <i>database name</i> to connect to using the <code>databaseName</code> property in the <i>Extra Connection Properties</i>.
Username	
Password	
Password	 Re-type password for verification.
Extra Connection Properties	databaseName=test; integratedSecurity=true Use <code>databaseName=YOUR_DATABASE</code> to specify the database to connect to.
Enabled	☒ Disabling a connection will prevent communication to the target database. (default: true)
Failover Datasource	- none - ▼ Another datasource that will be used to handle queries if this datasource faults.

6. Click on **Create New Database Connection**.

The Status should be Valid after a couple of seconds. Again, if the connection is Faulted, click the Database Connection Status link to find out why.

Scenario 3: Connect By Using Port and SQL Authentication

- Connecting by using a port and SQL authentication is just like scenario 1 above except you specify a port instead of the instance name in the **New Database Connection** page.

2. Enter the following:

- Connect URL: **jdbc:sqlserver://Hostname:Port**
 - **Hostname** is your databases IP address or hostname and **Port** is your databases TCP/IP port (SQLSERVER default port is 1433), for example:
 - **jdbc:sqlserver://localhost:1433**
 - **jdbc:sqlserver://10.10.1.5:1433**

Scenario 4: Connect By Using Port and Windows Authentication

Connecting by using a port and Windows authentication is just like scenario 2 above except you specify a port instead of the instance name in the **New Database Connection** page. Don't forget to download the sqljdbc_auth.dll file if you need it.

Enter the following:

- Connect URL: **jdbc:sqlserver://Hostname:Port**
 - **Hostname** is your databases IP address or hostname and **Port** is your databases TCP/IP port (SQLSERVER default port is 1433), for example:
 - **jdbc:sqlserver://localhost:1433**
 - **jdbc:sqlserver://10.10.1.5:1433**

Troubleshooting

TCP/IP Communication Not Enabled

SQL Server requires that you explicitly turn on TCP connectivity. To do this, use the SQL Server Configuration Manager, located in the **Start** menu under **Microsoft SQL Server > Configuration Tools**. Under **SQL Server Network Configuration**, select your instance, and then enable TCP/IP in the panel to the right. You need to restart the server for the change to take affect.

Window Firewall

When connecting remotely, make sure that Windows Firewall is disabled, or set up to allow the necessary ports. Normally ports 1434 and 1433 must be open for TCP traffic, but other ports may be required based on configuration.

SQL Server Browser Process Not Running

To connect to a named instance, the **SQL Server Browser** service must be running. It is occasionally disabled by default, so you need to verify that the service is not only running, but set to start automatically on bootup. The service can be found in the Windows Service Manager (**Control Panel > Administrative Tools > Services**).

Mixed Mode Authentication Not Enabled

Unless selected during setup, **mixed mode** or **SQL authentication** is not enabled by default. This mode of authentication is the **username/password** scheme that most users are used to. When not enabled, SQL Server only allows connections using Windows Authentication. Due to the ease of using SQL Authentication over Windows Authentication, we recommend enabling this option and defining a user account for Ignition.

1. To enable this, open the SQL Server Management Studio.
2. Connect to the server.
3. Right click on the instance and select **Properties**.
4. Under **Security**, select **SQL Sever and Windows Authentication mode**.

TLS/Security

An update starting in Java 8 disables TLS 1.0 and 1.1, which may affect your connection to an MSSQL database. The [Support](#) department has written a [guide on how to resolve this issue](#).

JDBC Drivers and Translators

In some cases, you may need to add your own JDBC Driver, or configure a Translator. More information on configuring these can be found on the [JDBC Drivers and Translators](#) page. However, you may need to check the JDBC driver's documentation for information on how to configure them.

If you are using a more recent JDBC driver such as 10.2 or 11.2, you will need to add the following argument to the extra connection properties: **trustServerCertificate=true**. This will allow the transport layer to use SSL to encrypt the channel and bypass going through the certificate chain to validate trust.

Connecting to MySQL



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Connecting to MySQL

[Watch the video](#)

On this page we'll demonstrate how to connect Ignition to MySQL.

MariaDB Connections to MySQL Databases

Ignition can use the built-in MariaDB driver to connect to MySQL 5.7 and prior databases. This circumvents the need to manually provide a JAR file to the MySQL JDBC Driver configuration on the Gateway.

New in 8.1.2

Ignition version 8.1.2 includes a **MariaDB** driver that can connect to **MySQL 8** databases. Note that upgrading Ignition does not replace existing JDBC drivers. See the [JDBC Drivers and Translators](#) page for more information.

MySQL Connector/J Connections to MySQL Databases

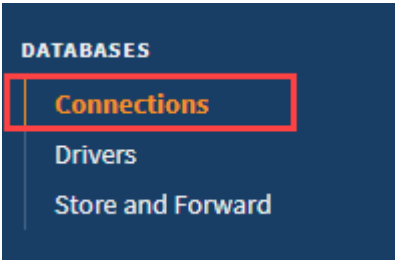
Should you choose to connect to a MySQL database using the official MySQL JDBC Driver, you will need to install the driver. New Ignition installations do not have the driver (a JAR file), so you will have to acquire the file yourself. See the [JDBC Drivers and Translators](#) page for more details on obtaining the required file.

Once acquired, you can follow the steps for [Upgrading a JDBC Driver](#). Once the JAR file has been provided, you can follow the steps listed on this page to configure a connection between Ignition and MySQL.

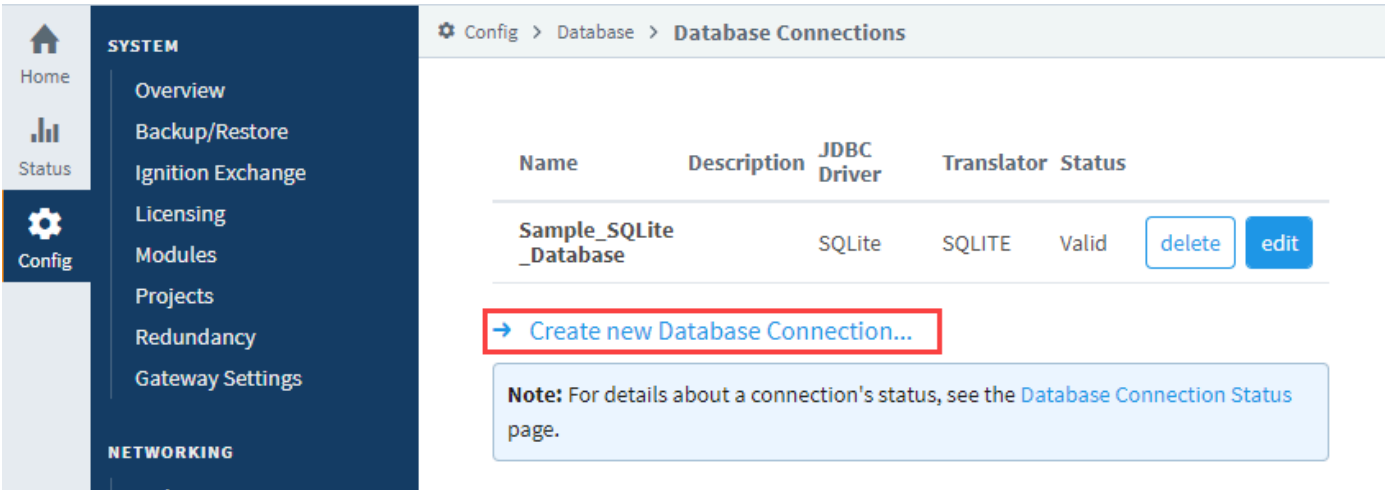
Connect Ignition to MySQL Database

1. On the Gateway Webpage, go to the **Config** section.

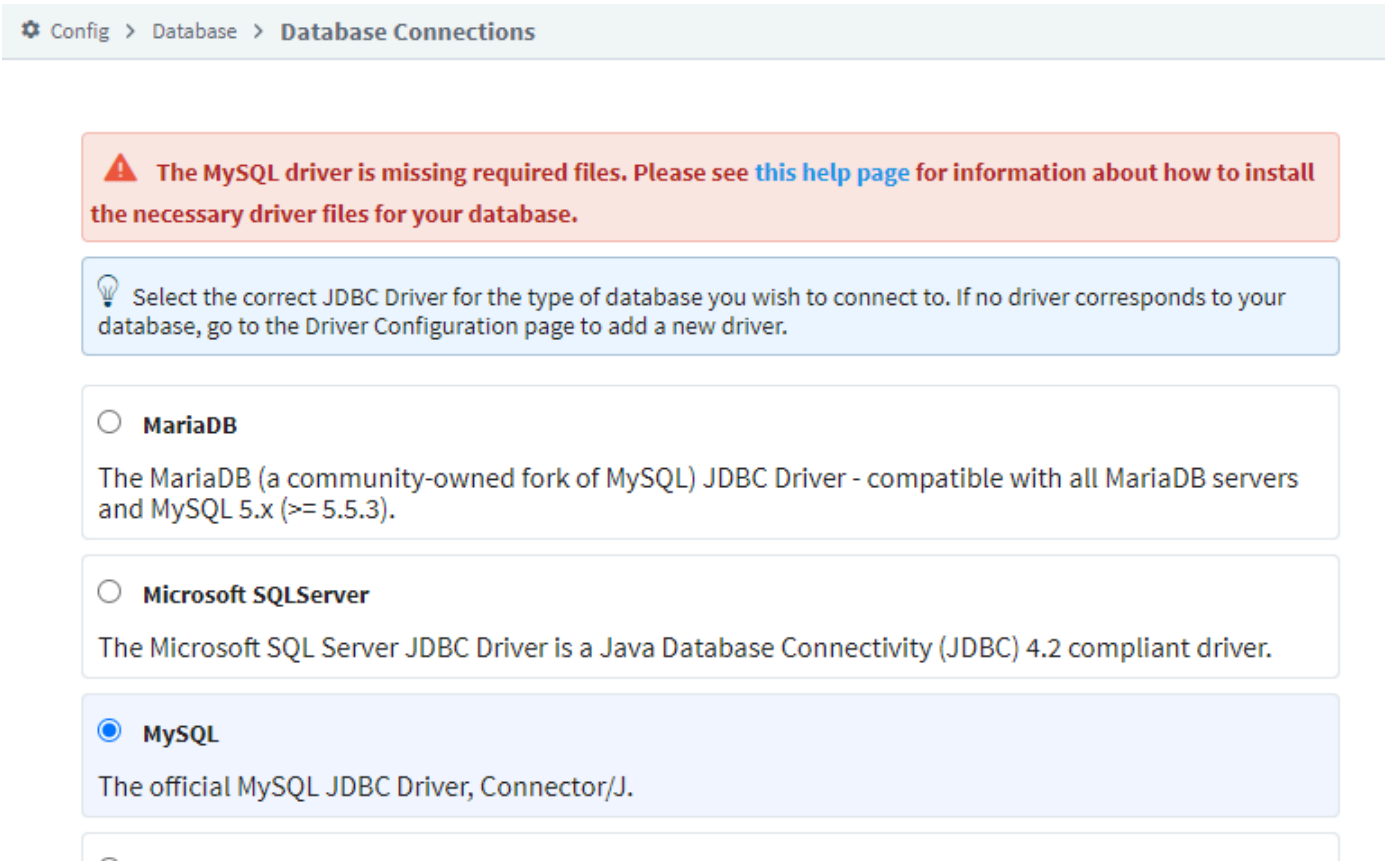
2. Scroll down to **Databases > Connections**.



3. Click on **Create new Database Connection....**



4. Select the **MySQL** driver and click **Next**. You may need to install a JDBC driver for MySQL.



Alternatively, you may select the **MariaDB** driver, and use that to connect to MySQL. See the [MariaDB Connections to MySQL Databases](#) section above.

5. On the New Database Connection page, enter the following information:

- Name: **MySQL** (use a meaningful name such as **MySQL**)
- Connect URL: **jdbc:mysql://localhost:3306/test** (By default, MySQL creates an empty database called test)

Main Properties	
Name	MySQL  Choose a name for this database connection.
Description	
JDBC Driver	MariaDB ▼ The JDBC driver dictates the type of database that this connection can connect to. It cannot be changed once created.
Connect URL	jdbc:mariadb://localhost:3306/test The Connect URL is JDBC-driver specific. It usually contains the address of the machine that the database is running on. The format of the MariaDB connect URL is: <code>jdbc:mariadb://host:port/database</code> With the three parameters (in bold) host: The host name or IP address of the database server. port: The port that the database server is running on. MariaDB default port is 3306. database: The name of the logical database that you are connecting to on the MariaDB server.

As you see in the example above, MySQL uses the following **Connect URL** format:

jdbc:mysql://hostaddress:3306/database

Where **hostaddress** is the address of the machine with MySQL installed, for example: localhost, 192.168.1.1, db-server, etc. **Database** specifies the database schema the connection will target. The connection will target one schema (a collection of tables and other objects) in the database.

6. To configure the connection, Ignition needs credentials to connect to MySQL. The **Username** and **Password** fields are where you provide credentials for a user that Ignition will use to authenticate against the database. The user should be able to do the following:

- Create and drop tables within the schema
- Alter tables within the schema
- Insert, update, select, and delete rows from tables in the schema
- Create, alter, and execute stored procedures within the schema

7. After entering a username and password, click on **Create New Database Connection** at the bottom of the form. Your connection is now created and the Database Connections page is displayed showing the **Status** of your connection as **Valid**.

✓ Successfully created new Database Connection "MySQL"

Name	Description	JDBC Driver	Translator	Status		
MySQL		MySQL	MYSQL	Valid	delete	edit
Sample_SQLite_Database		SQLite	SQLITE	Valid	delete	edit

→ [Create new Database Connection...](#)

8. To display the details about the status of your database connection, click on the **Database Connection Status** link in the page note. This will display any errors if your status is Faulted, in this example it shows the status as being Valid.

Connecting to Oracle Express



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Connecting to Oracle Express

[Watch the video](#)

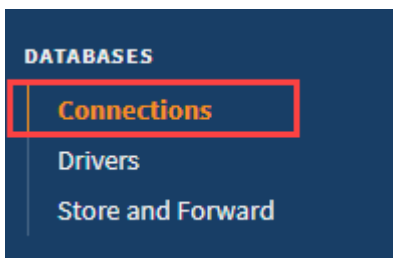
This page documents how to configure a database connection to an Oracle Express instance.

Oracle User Grants

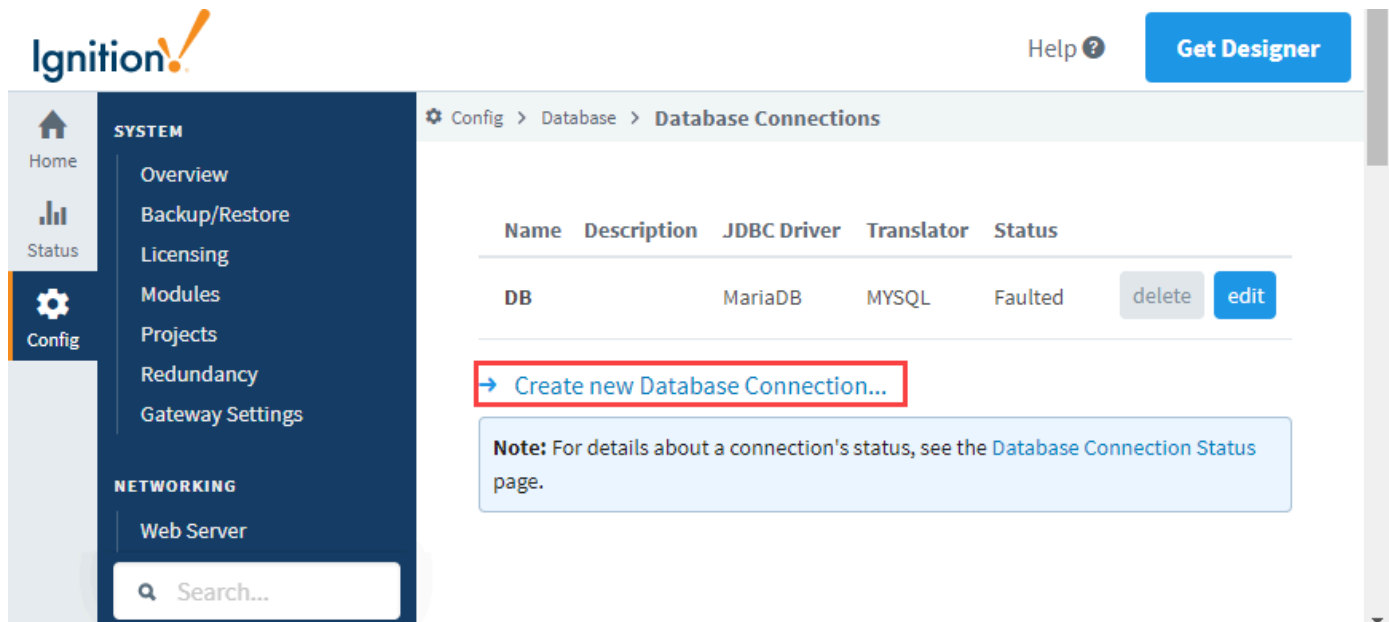
When using an Oracle Express database connection, it is required to provide user credentials that have grants for "CREATE TRIGGER" and "CREATE SEQUENCE". Some of Ignition's subsystems, such as the [Tag Historian](#) and [Audit Log and Profiles](#), will fail to work properly if the user defined in the database connection does not have these grants. In addition, any manual queries (for example, those called by [system.db.runNamedQuery](#)) that need to insert records or create sequences may fail if the gateway does not have the grants.

Connect Ignition to the Oracle Express Database

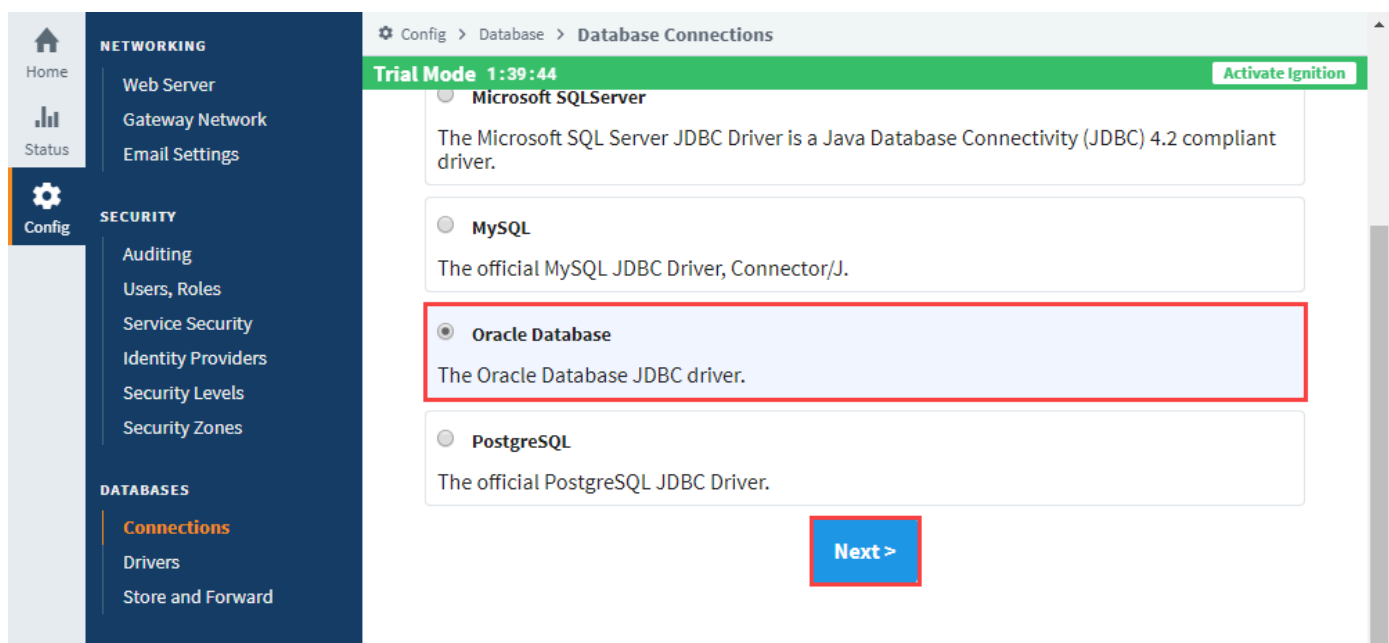
1. On the Gateway Webpage, go to the **Config** section.
2. Scroll down to **Databases > Connections**.



3. The Database Connections page is displayed. Click on **Create new Database Connection....**



4. Select the **Oracle JDBC Driver** and click **Next**.



5. Enter the following information:

- **Name:** The name of the database connection. Other features in Ignition will reference this connection by the name specified here.
- **Connect URL:** A URL that describes where on the network the database is, as well as information about which schema to connect to. The initial value should look something like the following: `jdbc:oracle:thin:@localhost:1521:XE` However, you may need to make some changes. If we examine the key pieces of the URL, it would look like this: `jdbc:oracle:thin://1:2:3` Where:

- 1 = The IP Address or hostname of the computer/sever that the database is installed on.
- 2 = The port that the database is running on. The default is 1521, but this could have been changed during installation, or sometime afterwards. When in doubt, ask the

person that installed the database.

- 3 = The System ID for the database. More information on the System ID can be found in Oracle's documentation.
- **Username:** The username that the Gateway will use to connect to the database.
- **Password:** The password for the user specified under the Username property.

For our example, we entered information relevant to our installation. The values seen below may differ from each installation.

The screenshot shows the Ignition Gateway Configuration interface. The sidebar on the left contains navigation options: Home, Status, Config, SYSTEM (Overview, Backup/Restore, Licensing, Modules, Projects, Redundancy, Gateway Settings), NETWORKING (Web Server, Gateway Network, Email Settings), SECURITY (Auditing, Users, Roles, Service Security, Identity Providers, Security Levels, Security Zones), DATABASES (Connections, Drivers, Store and Forward), and ALARMING (General, Journal, Notification). The main area displays the 'Database Connections' page. The 'Main Properties' section includes fields for Name (Oracle), Description, JDBC Driver (Oracle Database), Connect URL (jdbc:oracle:thin:@localhost:1521:test), Username (SYSTEM), and Password (masked). A red box highlights the Username and Password fields.

6. Click **Create New Database Connection** at the bottom of the form.

7. The Database Connections page is displayed showing the **Status** of your connection as **Valid**.

In some cases, you may need to add your own JDBC Driver, or configure a Translator. More information on configuring these can be found on the [JDBC Drivers and Translators](#) page.

Connecting to PostgreSQL



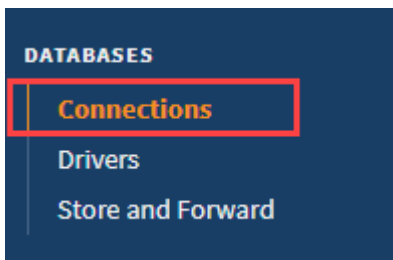
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Connecting to PostgreSQL

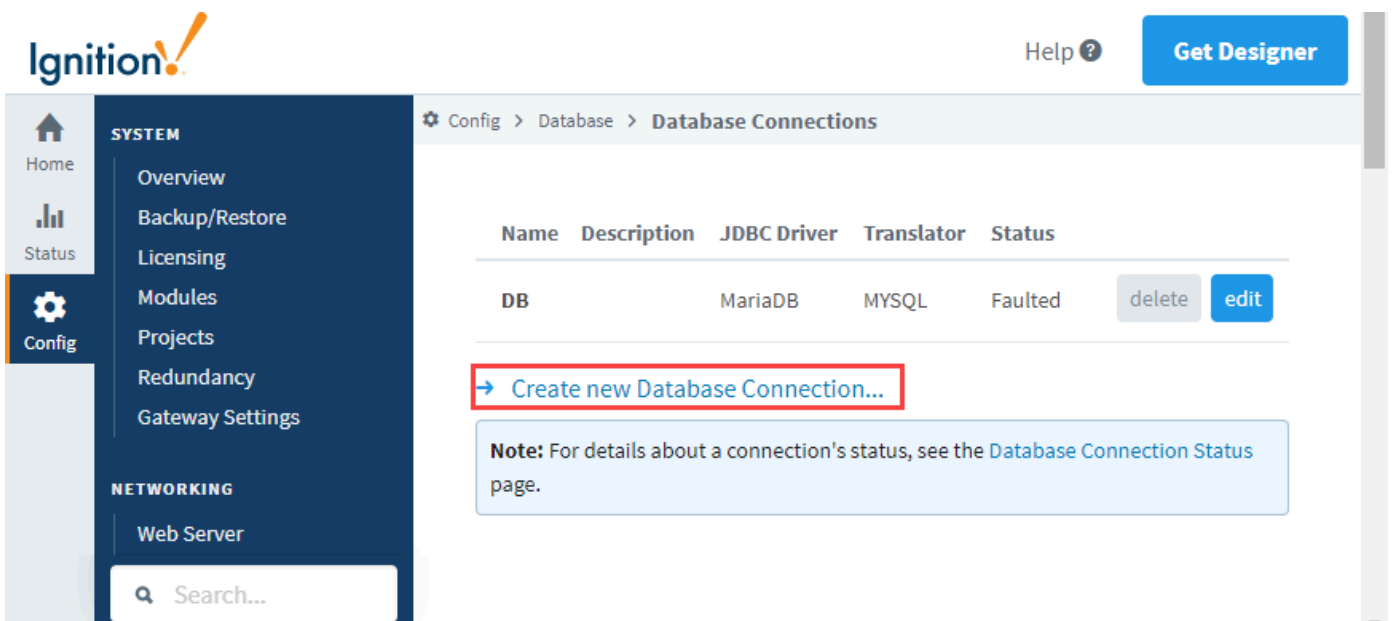
[Watch the video](#)

Connect Ignition to the PostgreSQL Database

1. On the Gateway Webpage, go to the **Config** section.
2. Scroll down to **Databases > Connections**.



3. The Database Connections page is displayed. Click on **Create new Database Connection....**



4. Select the **PostgreSQL JDBC Driver** and click **Next**.
5. Next, you'll need to enter information that will allow the Gateway to connect to a Postgres instance. In most cases, the following properties should be updated:

- **Name:** The name of the database connection. Other features in Ignition will reference this connection by the name specified here.
- **Connect URL:** A URL that describes where on the network the database is, as well as information about which database to connect to. The initial value should look something like the following:

```
jdbc:postgresql://localhost:5432/database
```

However, you may need to make some changes. If we examine the key pieces of the URL, it would look like this:

```
jdbc:postgresql://1:2/3
```

Where:

- 1 = The IP Address or hostname of the computer/sever that Postgres is installed on
 - 2 = The port that Postgres is running on. The default is 5432, but this could have been changed during installation, or sometime afterwards. When in doubt, ask the person that installed the database.
 - 3 = The database name that this connection will provide access to.
- **Username:** The username that the Gateway will use to connect to the database.
 - **Password:** The password that the Gateway will use to connect to the database.

6. Click **Create New Database Connection** at the bottom of the form.

7. The Database Connections page is displayed showing the **Status** of your connection as **Valid**.

8. To display the details about the status of your database connection, see the **Note** on the above window and click on the **Database Connection Status** link.

JDBC Drivers and Translators

In some cases, you may need to add your own JDBC Driver, or configure a Translator. More information on configuring these can be found on the [JDBC Drivers and Translators](#) page.

Connecting to Snowflake

Snowflake Connection Requirements

In order to connect Ignition to Snowflake you must have a translator, a driver, and a database connection. See the [JDBC Driver and Database Translator Settings](#) page for more information on configuring the Snowflake driver and translator settings.

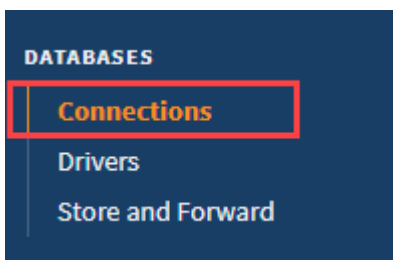
The translator and driver only need to be configured once, then you can make as many connections as you want to any compatible Snowflake database.

NOTE

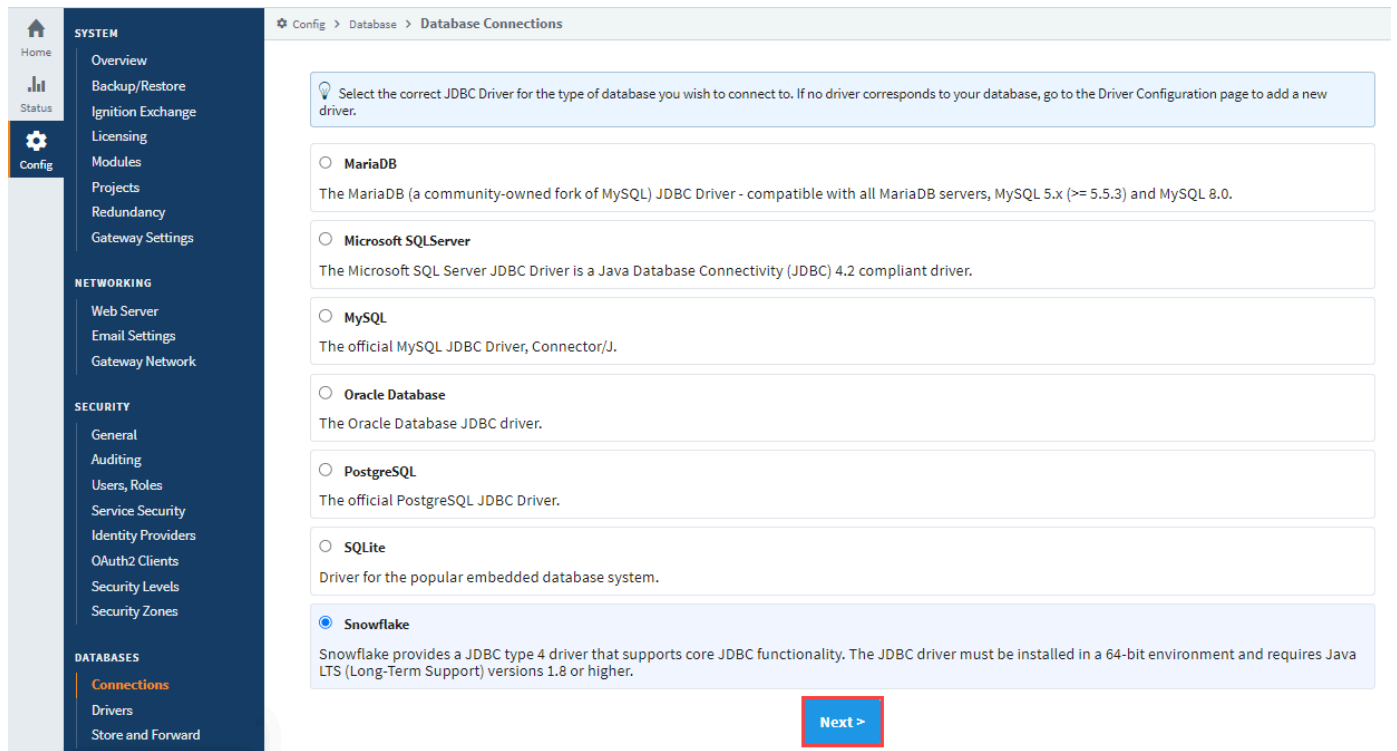
Query customization may be required when connecting to Snowflake to ensure all native Ignition modules function correctly. For instance, the Alarm tables, Historian tables, and SQL Bridge systems won't work automatically and custom coding is needed to provide the necessary formatting adjustments.

Connect to Snowflake

1. On the Gateway Webpage, go to the **Config** section.
2. Scroll down to **Databases > Connections**.



3. Click **Create new Database Connection...** on the Database Connections page
4. Select **Snowflake** and click **Next**.



5. Enter a name for your connection.
6. Enter the the connect URL for the database.
7. Click **Create New Database Connection**.

Your connection is now created and the Database Connections page is displayed showing the Status of your connection as Valid.

❗ IGNITION EXCHANGE RESOURCE SOLUTION

The Ignition Exchange has a [Perspective Snowflake Dashboard](#) resource available to download that queries data models and historical data from Snowflake. This resource requires Ignition version 8.1.37, the MQTT Transmission module, a Snowflake Account, and [Cirrus Link IoT Bridge](#) to provide the easily deployable solution when connecting to Snowflake. Refer to the [Cirrus Link documentation](#) for more information on how this architecture is connected and related Snowflake tools.

Connecting to SQLite

An Ignition Gateway can create a SQLite database, allowing for data collection without installing a separate SQL database. This is ideal for small scale applications, as well as testing and demonstrations.

NOTE

SQLite connections offer convenience, but Relational Database Management Systems (RDBMS) generally offer better performance, especially in cases where queries are frequently executed such as systems utilizing a historian system. As a result, the SQLite connection is **not** recommended for production systems as a historian database. Learn more about appropriate uses of SQLite in their [official documentation](#).

Unlike other database connections, SQLite databases only support a single connection at a time. Configuring this type of Database Connection means the Gateway will constantly be connected to the SQLite database, preventing other systems from connecting.

SQLite Connect URL

Ignition Gateways can configure a SQLite database connection without any additional installation. This is because the driver will create a file (which is the SQLite database) at the directory specified in the Connect URL property. Pointing the Connect URL to an existing IDB file will cause the connection to access the existing tables within the file. All Connect URLs must start with the following pattern:

```
jdbc:sqlite:
```

Followed by the destination to the database file.

```
# On Windows
jdbc:sqlite:C:/Path/To/File.db

# On Mac
jdbc:sqlite:/path/on/mac/File.db

# On Linux
jdbc:sqlite:/path/on/linux/File.db
```

NOTE

For Windows machines, either forward / or backslashes \ can be used.

Storing to Memory

Instead of creating a file, the Connect URL can specify that data should be stored in memory. As expected, this is not an ideal solution for systems that require any sort of long term storage, but can be useful in cases where data should be ephemeral.

```
jdbc:sqlite::memory
```

Relative Paths

New in 8.1.10 SQLite database connections feature several keywords that represent relative locations within Ignition's installation directory.

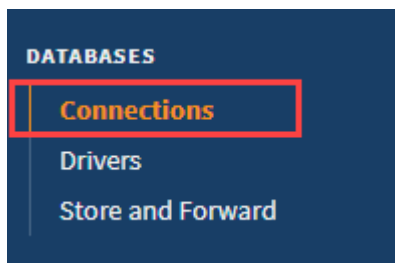
Keyword	Description
<code>\${data}</code>	Represents the Gateway's "data" directory at /usr/local/ignition/data/.
<code>\${local}</code>	Represents the Gateway's "local" directory at /usr/local/. Note: SQLite files created in this directory will not be included in gateway backup files. If you wish for a GWBK to include the SQLite file, then set the path to another location within the data directory, but outside of the local file.

In both cases, additional folders can be added after the keyword. The example below would create "Folder" in the gateway's data directory, and place the DB file in the Folder.

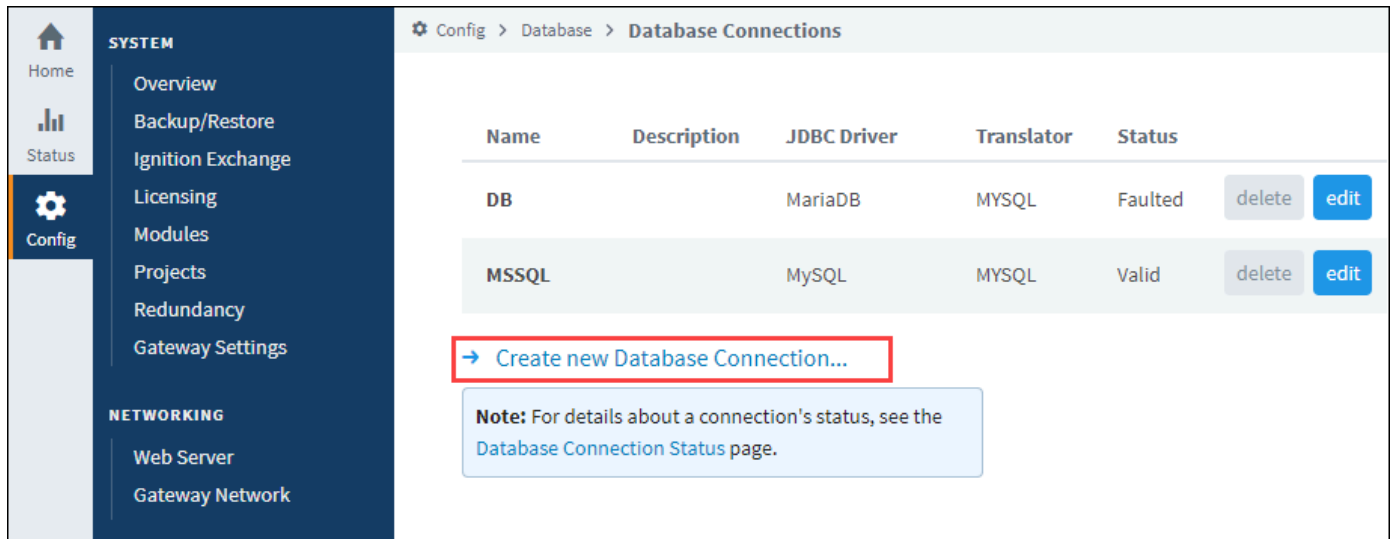
```
jdbc:sqlite:${data}/Folder/File.db
```

Connect Ignition to SQLite Database

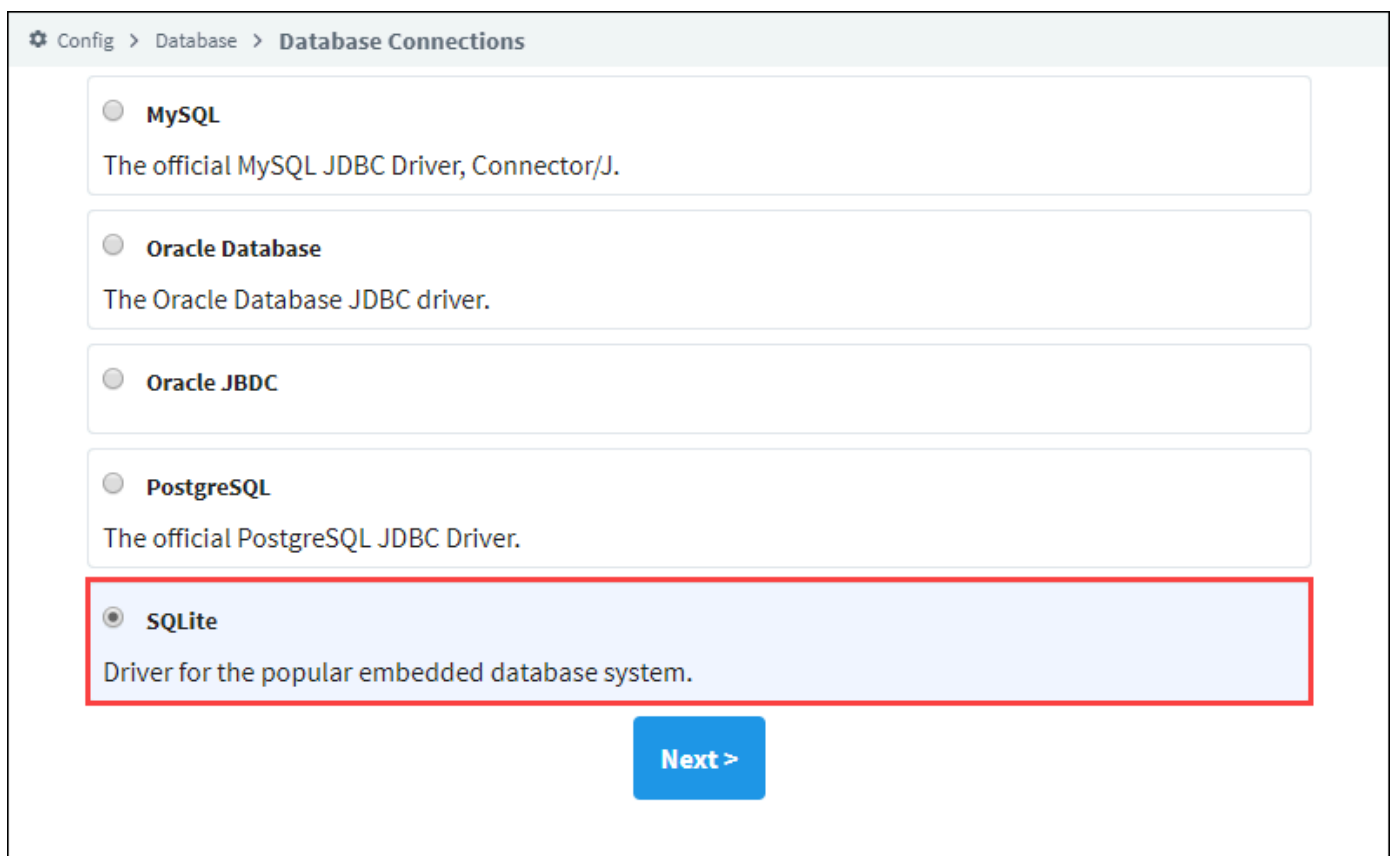
1. On the Gateway Webpage, go to the **Config** section.
2. Scroll down to **Databases > Connections**.



3. The Database Connections page is displayed. Click on **Create new Database Connection....**



4. Select the **SQLite** driver and click **Next**.



5. On the **New Database Connection** page, enter a name for your connection. We used **SQLite_Connect**.

6. Next, enter the connect URL for the database. For SQLite this setting must lead to a location on a filesystem. In our example here we used **jdbc:sqlite:C:/Program Files/SQLite/File.db**. This path ultimately must lead to a local directory, or a locally mapped drive.

Config > Database > Database Connections

Main Properties	
Name	SQLite_Connect  Choose a name for this database connection.
Description	My SQLite connection
JDBC Driver	SQLite ▼ The JDBC driver dictates the type of database that this connection can connect to. It cannot be changed once created.
Connect URL	jdbc:sqlite:C:/Program Files/SQLite/File.db The Connect URL is JDBC-driver specific. It usually contains the address of the machine that the database is running on. The format of the SQLite connect URL is: jdbc:sqlite:C:/Path/To/File.db jdbc:sqlite:/path/on/linux/File.db jdbc:sqlite::memory

7. Click on Create **New Database Connection** at the bottom of the form.

Your connection is now created and the Database Connections page is displayed showing the **Status** of your connection as **Valid**.

✓ Successfully created new Database Connection "SQLite_Connect"

Name	Description	JDBC Driver	Translator	Status		
DB		MariaDB	MYSQL	Faulted	delete	edit
MSSQL		MySQL	MYSQL	Valid	delete	edit
SQLServer		Microsoft SQLServer	MSSQL	Reconnecting	delete	edit
SQLite_Connect		SQLite	SQLITE	Valid	delete	edit

→ [Create new Database Connection...](#)

Note: For details about a connection's status, see the [Database Connection Status](#) page.

JDBC Drivers and Translators

In most cases, the default JDBC drivers and Translator settings in Ignition will not need to be modified. However, there are cases where drivers or translators may need modification.

JDBC Drivers and Ignition Upgrades

When upgrading Ignition, JDBC drivers are **not** modified during the upgrade process. This is to prevent database connection issues on upgrade: you should only need to upgrade your JDBC drivers when the database is updated, not when Ignition is upgraded. Only new Ignition installations will always use the JDBC drivers that are included with the installer.

CAUTION

New in 8.1.33 The bundled version of Java in Ignition has been upgraded from Java 11 to Java 17.0.8. If upgrading, make sure to check if any JDBC drivers need to be modified for Java 17 compatibility.

Running the installer to upgrade a preexisting Ignition installation will not modify the installed JDBC drivers, even if newer drivers are included in the installer. In addition, restoring a Gateway backup from an older version will replace any new versions of the drivers with the versions from the backup. In this case, you will need to manually update the JDBC drivers.

Common Third Party Drivers

Commonly, you will have to download the official JAR file from the creator's website. We have a few links here to make it easy to find.

Database	Link	Notes
IBM DB2	https://www.ibm.com/support/pages/db2-jdbc-driver-versions-and-downloads	1. Select the GA version of your desired driver. 2. Select the desired package 3. Log in with your IE account, complete your package download
MySQL	https://dev.mysql.com/downloads/connector/j/	1. Select your Operating system and Platform. Platform: Indep if you are on Windows 2. After the file has been downloaded, unzip the archive. On Windows, you can right-click and select the Extract All option 3. The location of the file we need

Database	Link	Notes
		should the ext folder u mysql- conne java-X where are the version numbe are loo for a fil is nam mysql- conne java- X.X.XX Compatibili different JR versions ca found in the MySQL connector
MSSQL	https://github.com/microsoft/mssql-jdbc/releases	You only ne the .jar file, you can sel just the ms jdbc- X.X.XX.jre file. The Xs be replacec the version numbers of the jdbc dri and jre use

Database	Link	Notes
		Check the Server doc for more detail which jdbc drivers compatible your Ignition server's embedded version.
Oracle	https://www.oracle.com/technetwork/database/application-development/jdbc/downloads/index.html	1. You will need to create an Oracle account to download the JAR. 2. You can select the version of the new JAR. 3. You are looking for a file that is named odbcX. Where X is the version number.

Bundled JDBC Drivers and Ignition Upgrades

Ignition installers come with the latest version of some JDBC drivers. During the installation process, the installer will use these drivers. However, during upgrade, the installer will not replace existing

drivers with those in the installer. This is to preserve your existing connections, since newer drivers may not work with older database installations.

New in 8.1.8

As of 8.1.8, upgrading Ignition will create a directory at `installDirectory/user-lib/jdbc-bundled` and place updated JDBC drivers in the directory, allowing you to manually update your system's JDBC drivers at a later time without having to obtain more recent drivers yourself.

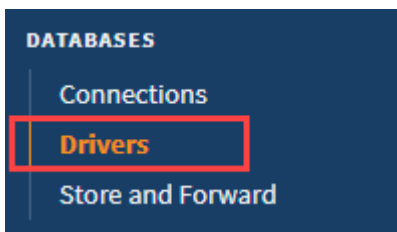
Database Translator and JDBC Driver Settings

In some cases, you may need to add your own JDBC Driver, or configure a Translator. However, you may need to check the JDBC driver's documentation for information on how to configure them. The [JDBC Driver and Database Translator Settings](#) page contains some recommended settings, but the vendor's documentation should always supersede any suggestions here.

Add a New JDBC Driver

To add a new JDBC driver to Ignition, do the following steps:

1. On the Gateway Webpage **Config** section, click on **Databases > Drivers**.



The Database Drivers & Settings page is displayed.

2. Click on the **Create new JDBC Driver...** link at the bottom of the page.

i NOTE

Ignition comes preconfigured with some popular JDBC drivers already. In some cases you may only need to provide a JAR file to an existing driver configuration, instead of creating a new driver configuration. See the [Common Third Party Drivers table](#) for a list of preconfigured drivers that need a JAR file.

Config > Database > Database Drivers & Settings

JDBC Drivers Translators

Name	Driver Type	Default Translator	Status		
MariaDB	MySQL	MYSQL	Installed	delete	edit
Microsoft SQLServer	Microsoft SQL Server	MSSQL	Installed	delete	edit
MySQL	MySQL	MYSQL	Installed	delete	edit
Oracle JDBC	Oracle	ORACLE	Installed	delete	edit
PostgreSQL	PostgreSQL	POSTGRES	Installed	delete	edit
SQLite	Generic	SQLITE	Installed	delete	edit

→ Create new JDBC Driver...

Note: Please see [this help page](#) for information about installing driver files that are not able to be bundled with Ignition.

3. In the **Name** field, type the full name of the JDBC driver, see the manufacturer's documentation to get the name.
4. In the **JAR File(s)** field, specify the JAR file that contains the driver, as well as any other required JARs. If you do not have the JAR file needed, see above for download links.
5. Use the default settings for the following properties:

Driver Defaults and Instructions

Driver Type	Is the brand of database. This is used for optimizations in the Gateway, if in doubt, select GENERIC.
URL Format	Is a default value for the connect URL. This provides a hint to the format of the connect URL that this driver requires while adding a datasource connection. For example, the hint for the format can be, <code>jdbc:dbtype://host:port/database</code> .
URL Instructions	Free form instructions that are shown to help the user to create a connection.
Default Connection Properties	Any additional properties to add by default to the connection string.
Connection Properties Instructions	Tips about which connection properties might be useful.
Default Validation Query	The default query that is used to verify that the connection is available.

SQL Language Compatibility

Default Translator	The database translator that is used by default for connections from this driver.
--------------------	---

- Click the **Create New JDBC Driver** button, located at the very bottom of the page, to create the new driver.

Upgrade a JDBC Driver

In some cases you may need to upgrade a driver. The steps below detail where this would take place

- You will need to obtain the new driver. These are typically provided by the same organization that made the database. The driver will be a JAR file.
- Once you have the new driver, head to your Ignition Gateway's **Config** section, click on **Databases > Drivers**.

3. The Database Drivers & Settings page will be displayed. These are the currently configured JDBC drivers on the Gateway, and can be modified from the Edit button. Click the **Edit** button for the driver you need to upgrade.
4. You will need to pass in the new driver to the **JAR File(s)** property.
 - i. Click the **Choose File** button
 - ii. Navigate to the driver, and click **Open**.
5. **[Optional]**: Update any other properties. In most cases, you may skip this step. However you may need to update some other properties when a new driver is in place. This step depends on the driver, and what it changes. Refer to the driver's documentation to determine if any connection properties need to be changed. For example, users upgrading to MySQL 8.0 from legacy versions will need to change the Default Connection Properties value from:

```
zeroDateTimeBehavior=convertToNull;
```

to:

```
zeroDateTimeBehavior=CONVERT_TO_NULL;useSSL=false;allowPublicKeyRetrieval=true;
```

Again, this step depends on the driver, and in some cases you may be able to skip it.

6. Click the **Save Changes** button at the bottom of the page.

Database Translators

Despite the presence of a SQL standard, many database system vary in how they implement or accomplish various tasks. The JDBC driver system tries to hide these differences as much as possible, but unfortunately some differences persist.

The database translator system in Ignition navigates these differences as they apply to the system. It provides a way to define certain key operations that are commonly different between database vendors, such as creating auto-incrementing index columns, and the keywords used for different data types.

Translator Management

Database translators are managed in the Gateway from the **Databases > Drivers > Translators** tab. Ignition comes pre-configured with translators for the major supported databases, but you can edit

and remove them, as well as create new translators. It is necessary to create a new translator only when adding a new JDBC driver for a database that does not share syntax with any of the existing translators.

Creating a New Translator

To add a new database translator to Ignition, do the following steps:

1. In the Gateway Config section, click on **Databases > Drivers**. The Database Drivers & Settings page is displayed.
2. Go to the Translators tab, find the blue arrow, and click on the **Create new Database Translator...** link. The New Database Translator page is displayed showing a list of all the translator properties.
3. Define the tokens used with the translator properties on the New Database Translator page.

For most of the properties, you need to define special token markers to indicate places where other values are placed. For example, the default **Create Table Syntax** entry looks as follows:

```
CREATE TABLE {tablename} ({creationdef}{primarykeydef})
```

Where:

`{tablename}`, `{creationdef}`, and `{primarykeydef}` are all tokens that are expanded. `{tablename}` is replaced directly with the table, `{creationdef}` is a list of columns, and `{primarykeydef}` is the phrase created by the **Primary Key Syntax** entry in the translator.

The possible tokens are as follows:

Token	Description
<code>tablename</code>	The name of the table being created.
<code>indexname</code>	The name of the index to create, when adding a column index to the table.
<code>primarykeydef</code>	A clause that defines a primary key for a new table.
<code>creationdef</code>	The list of columns to create in the table.
<code>alterdef</code>	A list of columns to add/remove/modify in the table.
<code>columnname</code>	The name of a column.
<code>type</code>	The data type of a column.
<code>limit</code>	The value of the limit clause.

Other Properties

Token	Description
Limit Position	Defines where the limit clause should be placed. Back , the limit is placed at the end of the query. Front , places it directly after the SELECT keyword.
Column Quote Character	All columns are created and accessed with the defined quote, which tells the database to use a specific casing, as well as avoiding collisions between the column name and database keywords.
Supports Returning Auto-generated Keys?/Fetch Key Query	Indicates whether the JDBC driver supports the return of generated keys. If the driver does not support this feature, the Fetch Key Query is used to retrieve the last key.

Date Type Mapping

Token	Description
All data types	The keywords that are used when creating columns of the given types.

- Click the **Create New Database Translator** button, located at the very bottom of the page, to create the translator.

JDBC Driver and Database Translator Settings

This page details various JDBC driver and translator settings. See the [JDBC Drivers and Translators page](#) for information on adding and configuring JDBC drivers and translators.

IBM

IBM Default JDBC Driver Settings

Main Properties

Property	Value
Name	IBM DB2
Description	The official IBM DB2 JDBC Driver.
Classname	com.ibm.db2.jcc.DB2Driver
JAR File(s)	Click on the Choose File button to select and upload the JAR(s). This is the part where you upload the JDBC driver.

Driver Defaults & Instructions

Property	Value
Driver Type	DB2
URL Format	jdbc:db2://localhost:50000/SAMPLE OR jdbc:db2://localhost:25000/SAMPLE
URL Instructions	The format of the DB2 connect URL is: db2://host:port/database With the three parameters (in bold) • host: The host name or IP address of the database server. • port: The port that the database server is running on. DB2 default port is 50000. • database: The name of the logical database that you are connecting to on the DB2 server.
Default Connection Properties	Blank
Connection Property Instructions	Blank
Default Validation Query	select 1 from sysibm.sysdummy1

SQL Language Compatibility

Property	Value
Default Translator	The Translator this driver should use. Default: IBM DB2

IBM Default Translator Settings

Main Properties

Property	Value
Name	(Name of the Translator. The JDBC driver will reference the settings below by the name specified here)
Create Table Syntax	<code>CREATE TABLE {tablename} ({creationdef} {primarykeydef})</code>
Create Sequence Syntax	Blank
Create Trigger Syntax	Blank
Create Index Syntax	<code>CREATE INDEX {indexname} ON {tablename}({columnname})</code>
Auto Increment Field Definition	<code>{type} GENERATED ALWAYS AS IDENTITY PRIMARY KEY</code>
Alter Table Syntax	<code>ALTER TABLE {tablename} {alterdef}</code>
Add Column Syntax	<code>ADD COLUMN {columnname} {type}</code>
Primary Key Syntax	Blank
Limit Syntax	<code>FETCH FIRST {limit} ROWS ONLY</code>
Limit Position	Back
Current Timestamp Query	The value's current timestamp.
Column Quote Character	"
Supports Returning Auto-generated Keys?	False
Fetch Key Query	<code>SELECT max({columnname}) FROM {tablename}</code>
Table List Filter	Blank

Data Type Mapping

Name	Type
Byte (I1)	int
Short (I2)	int
Integer (I4)	int
Long (I8)	bigint
Boolean	int
Datetime	timestamp
Float (R4)	float
Double (R8)	double
String	varchar(255)
Binary	blob
Long Text	clob(65536)



MySQL Default JDBC Driver Settings

Main Properties

Property	Value
Name	MySQL
Description	The official MySQL JDBC Driver, Connector/J.
Classname	com.mysql.cj.jdbc.Driver
JAR File(s)	Click on the Choose File button to select and upload the JAR(s). This is the part where you upload the JDBC driver.

Driver Defaults & Instructions

Property	Value
Driver Type	MySQL
URL Format	jdbc:mysql://localhost:3306/test
URL Instructions	The format of the MySQL connect URL is: jdbc:mysql://host:port/database With the three parameters (in bold) • host: The host name or IP address of the database server. • port: The port that the database server is running on. MySQL default port • database: The name of the logical database that you are connecting to or
Default Connection Properties	zeroDateTimeBehavior=CONVERT_TO_NULL;connectTimeout=120000;sock
Connection Properties Instructions	There is an extensive list of extra connection properties available for MySQL C connection properties. A default <code>serverTimezone</code> value (taken from the Gateway) will be appended t
Default Validation Query	SELECT 1

SQL Language Compatibility

Property	Value
Default Translator	MySQL

MySQL Default Translator Settings

Main Properties

Property	Value
Name	MySQL
Create Table Syntax	<code>CREATE TABLE {tablename} ({creationdef} {primarykeydef})</code>
Create Sequence Syntax	Blank
Create Trigger Syntax	Blank
Create Index Syntax	<code>CREATE INDEX {indexname} ON {tablename} ({columnname})</code>
Auto Increment Field Definition	<code>{type} NOT NULL AUTO_INCREMENT</code>
Alter Table Syntax	<code>ALTER TABLE {tablename} {alterdef}</code>
Add Column Syntax	<code>ADD COLUMN {columnname} {type}</code>
Primary Key Syntax	<code>PRIMARY KEY ({columnname})</code>
Limit Syntax	<code>LIMIT {limit}</code>
Limit Position	Back
Current Timestamp Query	<code>SELECT CURRENT_TIMESTAMP</code>
Column Quote Character	`
Supports Returning Auto-generated Keys?	True
Fetch Key Query	Blank
Table List Filter	Blank

Data Type Mapping

Name	Type
Byte (I1)	int
Short (I2)	int
Integer (I4)	int
Long (I8)	bigint
Boolean	int
Datetime	datetime
Float (R4)	float(10)
Double (R8)	double
String	varchar(255)
Binary	varbinary
Long Text	text

MSSQL Default JDBC Driver Settings

Main Properties

Property	Value
Name	Name of the driver, as you would like it to appear on the Gateway.
Description	Enter a useful description you would like to see next to the driver.
Classname	com.microsoft.sqlserver.jdbc.SQLServerDriver
JAR File(s)	Click on the Choose File button to select and upload the JAR(s). This is the part where you upload the JDBC driver.

Driver Defaults & Instructions

Property	Value
Driver Type	Microsoft SQL Server
URL Format	jdbc:sqlserver://localhost\SQLEXPRESS
URL Instructions	The format of the SQL Server connect URL is: jdbc:sqlserver:// host \ instanceName [:port] With the three parameters (in bold) • host: The host name or IP address of the database server. • instanceName: (optional) the instance to connect to on the host. If not specified, a connection to the default instance is made. • port: (optional) the port to connect to. The default is 1433. If you are using the default, you can omit the port and the preceding ':'. For SQL Server, you specify the database name to connect to using the <code>databaseName</code> property in the Extra Connection Properties.
Default Connection Properties	databaseName=test
Connection Properties Instructions	Use <code>databaseName=YOUR_DATABASE</code> to specify the database to connect to.
Default Validation Query	SELECT 1

SQL Language Compatibility

Property	Value
Default Translator	The Translator this driver should use.

MSSQL Default Translator Settings

Main Properties

Property	Value
Name	Name of the Translator. The JDBC driver will reference the settings below by the name specified here.
Create Table Syntax	<code>CREATE TABLE {tablename} ({creationdef} {primarykeydef})</code>
Create Sequence Syntax	Blank
Create Trigger Syntax	Blank
Create Index Syntax	<code>CREATE INDEX {indexname} ON {tablename}({columnname})</code>
Auto Increment Field Definition	<code>{type} IDENTITY(1,1)</code>
Alter Table Syntax	<code>ALTER TABLE {tablename} ADD {alterdef}</code>
Add Column Syntax	<code>{columnname} {type}</code>
Primary Key Syntax	<code>PRIMARY KEY CLUSTERED ({columnname})</code>
Limit Syntax	<code>TOP {limit}</code>
Limit Position	Front
Current Timestamp Query	<code>SELECT CURRENT_TIMESTAMP</code>
Column Quote Character	"
Supports Returning Auto-generated Keys?	True
Fetch Key Query	Blank
Table List Filter	Blank

Data Type Mapping

Name	Type
Byte (I1)	int
Short (I2)	int
Integer (I4)	int
\Long (I8)	bigint
Boolean	int
Datetime	datetime
Float (R4)	float(10)
Double (R8)	double precision
String	varchar(255)
Binary	varbinary
Long Text	nvarchar(max)

Oracle Express Default JDBC Driver Settings

Main Properties

Property	Value
Name	Name of the driver, as you would like it to appear on the Gateway.
Description	Enter a useful description you would like to see next to the driver.
Classname	oracle.jdbc.driver.OracleDriver
JAR File(s)	Click on the Choose File button to select and upload the JAR(s). This is the part where you upload the JDBC driver.

Driver Defaults & Instructions

Property	Value
Driver Type	Oracle
URL Format	jdbc:oracle:thin:@localhost:1521:test
URL Instructions	The format of the Oracle connect URL is: jdbc:oracle:thin:@ host : port : SID With the three parameters (in bold) • host: The host name or IP address of the database server. • port: The port that the database server is running on. Oracle's default port is 1521. • SID: the system ID that identifies the database to connect to.
Default Connection Properties	Blank
Connection Properties Instructions	Blank
Default Validation Query	SELECT 1 FROM DUAL

SQL Language Compatibility

Property	Value
Default Translator	The Translator this driver should use.

Oracle Express Default Translator Settings

Main Properties

Property	Value
Name	Name of the Translator. The JDBC driver will reference the settings below by the name specified here
Create Table Syntax	<code>CREATE TABLE {tablename} ({creationdef}{primarykeydef})</code>
Create Sequence Syntax	<code>CREATE SEQUENCE {tablename}seq START WITH 1 INCREMENT BY 1</code>
Create Trigger Syntax	<code>CREATE TRIGGER {tablename}trig BEFORE INSERT ON {tablename} REFERENCING NEW AS NEW FOR EACH ROW BEGIN select {tablename}seq.nextval INTO :NEW.{columnname} FROM dual; END;</code>
Create Index Syntax	<code>CREATE INDEX {indexname} ON {tablename}({columnname})</code>
Auto Increment Field Definition	<code>{type} NOT NULL</code>
Alter Table Syntax	<code>ALTER TABLE {tablename} ADD ({alterdef})</code>
Add Column Syntax	<code>{columnname} {type}</code>
Primary Key Syntax	<code>PRIMARY KEY ({columnname})</code>
Limit Syntax	<code>rownum<={limit}</code>
Limit Position	Wrap
Current Timestamp Query	<code>SELECT CURRENT_TIMESTAMP FROM DUAL</code>
Column Quote Character	"

Property	Value
Supports Returning Auto-generated Keys?	False
Fetch Key Query	SELECT {tablename}SEQ.CURRVAL FROM DUAL
Table List Filter	Blank

Data Type Mapping

Name	Type
Byte (I1)	int
Short (I2)	int
Integer (I4)	int
Long (I8)	int
Boolean	int
Datetime	timestamp
Float (R4)	float
Double (R8)	double precision
String	varchar2(255)
Binary	varbinary
Long Text	nclob

PostgreSQL Default JDBC Driver Settings

Main Properties

Property	Value
Name	Name of the driver, as you would like it to appear on the Gateway.
Description	Enter a useful description you would like to see next to the driver.
Classname	org.postgresql.Driver
JAR File(s)	Click on the Choose File button to select and upload the JAR(s). This is the part where you upload the JDBC driver.

Driver Defaults & Instructions

Property	Value
Driver Type	PostgreSQL
URL Format	jdbc:postgresql://localhost:5432/test
URL Instructions	The format of the PostgreSQL connect URL is: jdbc:postgresql://host:port/database With the three parameters (in bold) • host: The host name or IP address of the database server. • port: The port that the database server is running on. PostgreSQL default port is 5432. • database: The name of the logical database that you are connecting to on the PostgreSQL server.
Default Connection Properties	Blank
Connection Properties Instructions	No extra connection parameters are recommended for PostgreSQL. For possible parameter values, see the documentation at the PostgreSQL JDBC driver website.
Default Validation Query	SELECT 1

SQL Language Compatibility

Property	Value
Default Translator	The Translator this driver should use.

PostgreSQL Default Translator Settings

Main Properties

Property	Value
Name	Name of the Translator. The JDBC driver will reference the settings below by the name specified here
Create Table Syntax	<code>CREATE TABLE {tablename} ({creationdef} {primarykeydef})</code>
Create Sequence Syntax	Blank
Create Trigger Syntax	Blank
Create Index Syntax	<code>CREATE INDEX {indexname} ON {tablename}({columnname})</code>
Auto Increment Field Definition	SERIAL NOT NULL
Alter Table Syntax	<code>ALTER TABLE {tablename} {alterdef}</code>
Add Column Syntax	<code>ADD COLUMN {columnname} {type}</code>
Primary Key Syntax	<code>PRIMARY KEY ({columnname})</code>
Limit Syntax	<code>LIMIT {limit}</code>
Limit Position	Back
Current Timestamp Query	<code>SELECT CURRENT_TIMESTAMP</code>
Column Quote Character	"
Supports Returning Auto-generated Keys?	True
Fetch Key Query	Blank
Table List Filter	Blank

Data Type Mapping

Name	Type
Byte (I1)	int
Short (I2)	int
Integer (I4)	int
Long (I8)	bigint
Boolean	int
Datetime	timestamp
Float (R4)	float
Double (R8)	double precision
String	varchar(255)
Binary	bytea
Long Text	text

Snowflake

Snowflake Default JDBC Driver Settings

 NOTE

Many of the fields for the Snowflake JDBC driver can be left blank if your custom Snowflake translator is set up properly and referenced in the "Default Translator" field.

Changed in 8.1.33

Due to security updates in Java 17, Snowflake JDBC drivers may not interact correctly with Ignition. This can be fixed by adding the following Java argument to the [Gateway Configuration File](#):

```
wrapper.java.additional.1=--add-opens=java.base/java.nio=ALL-UNNAMED
```

See the official [Snowflake Knowledge Base](#) for more information about this issue.

Main Properties

Property	Value
Name	Name of the driver, as you would like it to appear on the Gateway.
Description	Enter a useful description you would like to see next to the driver.
Classname	net.snowflake.client.jdbc.SnowflakeDriver
JAR File(s)	Click on the Choose File button to select and upload the JAR(s). This is the part where you upload the JDBC driver.

Driver Defaults & Instructions

Property	Value
Driver Type	Generic
URL Format	Blank
URL Instructions	Blank
Default Connection Properties	Blank
Connection Properties Instructions	Blank
Default Validation Query	SELECT 1

SQL Language Compatibility

Property	Value
Default Translator	Your custom Snowflake Translator.

Snowflake Default Translator Settings

 NOTE

If you have a database table called "NO_OP_TABLE", you should use a different table name for the "Create Index Syntax" field.

Main Properties

Property	Value
Name	Name of the translator, as you would like it to appear on the Gateway.
Create Table Syntax	<code>CREATE TABLE IF NOT EXISTS {tablename} ({creationdef}{primarykeydef})</code>
Create Sequence Syntax	<code>CREATE SEQUENCE IF NOT EXISTS {tablename}seq</code>
Create Trigger Syntax	Blank
Create Index Syntax	<code>ALTER TABLE IF EXISTS NO_OP_TABLE SET COMMENT='no-op table due to forced value for TRANSLATORS &lt; ALTER TABLE SYNTAX;</code>
Auto Increment Field Definition	<code>{type} NOT NULL AUTOINCREMENT</code>
Alter Table Syntax	<code>ALTER TABLE {tablename} {alterdef}</code>
Add Column Syntax	<code>ADD COLUMN {columnname} {type}</code>
Primary Key Syntax	<code>PRIMARY KEY ({columnname})</code>
Limit Syntax	<code>LIMIT {limit}</code>
Limit Position	Back
Current Timestamp Query	<code>SELECT CURRENT_TIMESTAMP</code>
Column Quote Character	Blank
Supports Returning Auto-generated Keys?	False
Fetch Key Query	<code>SELECT NEXT_VALUE FROM INFORMATION_SCHEMA.SEQUENCES WHERE SEQUENCE_NAME='{tablename}'</code>

Property	Value
Table List Filter	Blank

Data Type Mapping

Name	Type
Byte (I1)	int
Short (I2)	int
Integer (I4)	int
Long (I8)	bigint
Boolean	int
Datetime	datetime
Float (R4)	float
Double (R8)	double
String	string
Binary	binary
Long Text	text

** NOTE**

In addition to a custom JDBC driver and custom translator, you may need to also configure the `Connection Initialization Commands` property in your Snowflake [database connection](#) to properly store Tag History. Add the following values to the `Connection Initialization Commands` property:

- USE DATABASE ignition_db
- USE SCHEMA ignition_db.time_series

Store and Forward



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Using Store and Forward

[Watch the video](#)

The store-and-forward system provides a reliable way for Ignition to store data to the database. In Ignition, systems such as [Tag Historian](#) and [SQL Bridge \(Transaction Groups\)](#) use store-and-forward to ensure that data reaches its destination in the database, and is stored in an efficient manner. The store-and-forward system can be configured in a number of ways, offering both memory buffering for performance and local disk caching for safe storage.

NOTE

Store-and-forward engines are automatically created for each Database Connection.

Primary Features and Benefits

The store-and-forward system offers a number of benefits over other systems that log directly to the database, such as:

- **Data loss prevention**

Data is removed from the system only when the write to the database has executed successfully.

- **Guaranteed ordering**

Data is forwarded in the same order that it arrived, even if a database connection is not currently available.

- **Enhanced performance**

By first buffering the data in memory, the store-and-forward system can optimize writes, and prevent the originating systems from blocking. This means that the system is less likely to lose data samples in the event of system slow downs.

Store and Forward Data Flow

Although the system offers settings that can affect the pipeline, by default the data flow occurs as follows:

1. Data is generated in some system.
2. Data is placed in a memory buffer.
3. If not removed from memory buffer in some time (the **Write Time**), or if a certain amount of data accumulates (**Write Size**), it is placed in the local cache.
4. The data sink, based on a database connection, pulls data in first from the local store, and then the memory buffer, based on the **Write Time** and **Write Size** settings under **Forward Settings**.
5. If the data fails to forward, either due to an error in the connection or in the data itself, it is returned to the buffer or cache.
6. If the data errors out too many times, it becomes quarantined.
7. Quarantined data can be managed through the Gateway, and can be deleted or un-quarantined, once the error is resolved.

Understanding the Forward Triggers

Data is forwarded from one stage to the next based on the **Write Time** and **Write Size** triggers. These settings work as an **either/or** manner, meaning that if either of them is surpassed, the data is forwarded. One important point to note is that the **Write Size** setting influences the transaction size of similar data to be forwarded, and therefore can have a big impact on performance. As a result, the **Write Time** should normally be used as the controlling factor, with the **Write Size** set to something that will provide reasonable transactions, like 100.

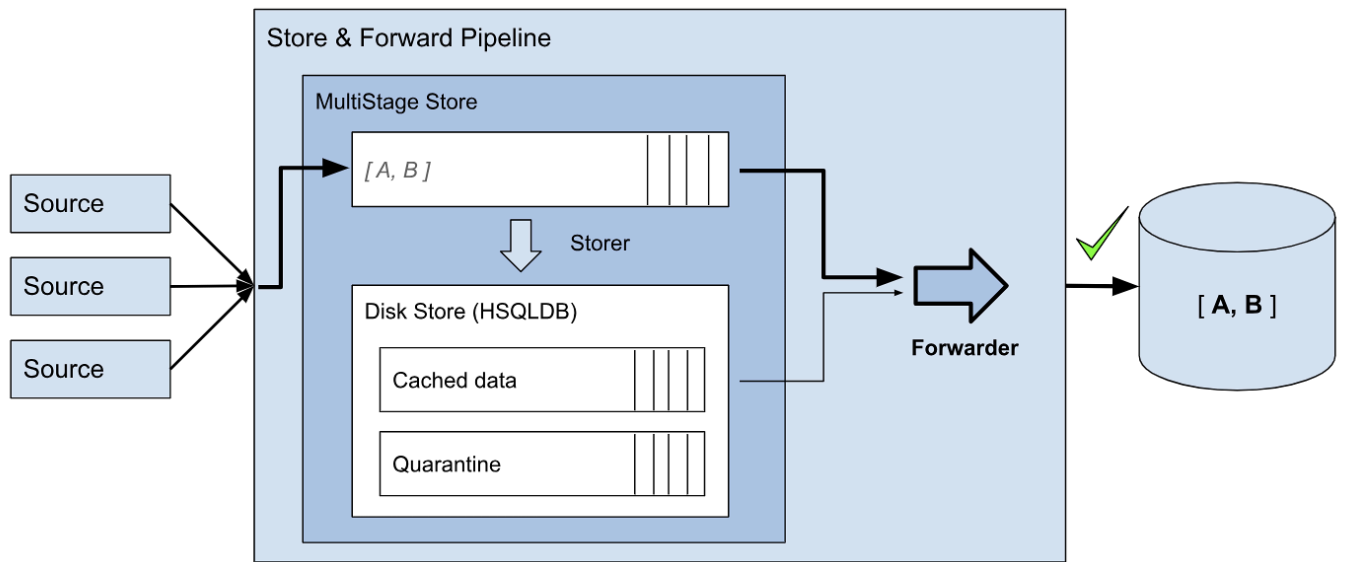
Single Connection Policy

While database connections have a pool of multiple connection (8 by default), the Store and Forward engine only uses one of those connections. The system heavily optimizes queries by grouping multiple queries into a single transaction before sending the data off.

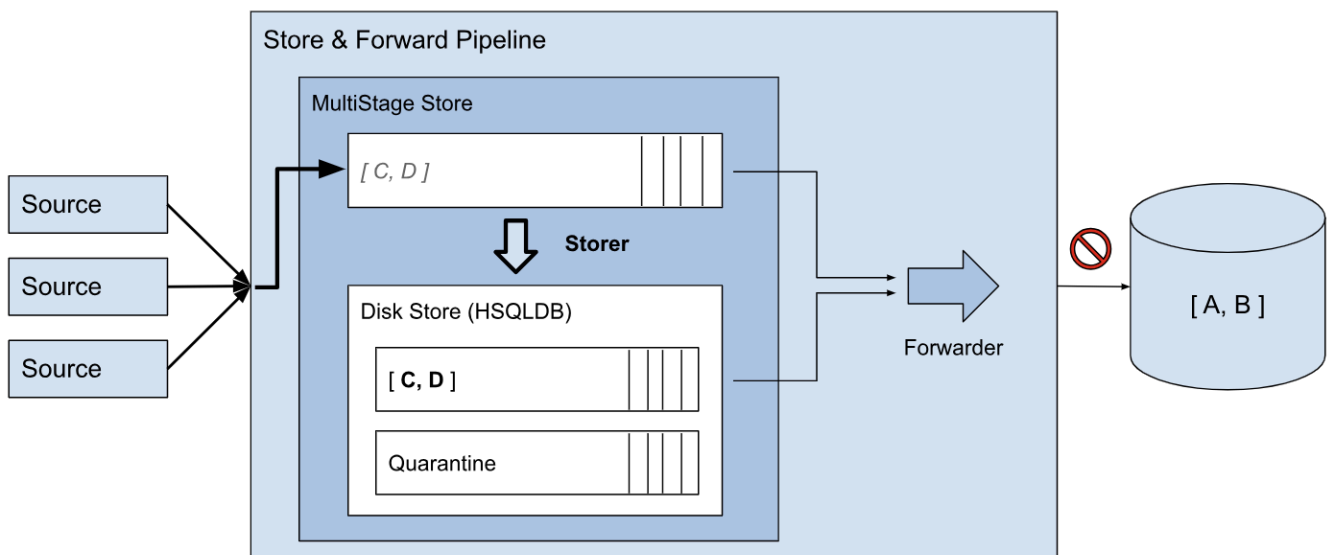
Example Data Flow

The following example shows sets of data moving through the Store and Forward system. The diagrams demonstrate how the order of data is maintained from when it enters the memory buffer until being forwarded to the sink as new data continues coming in.

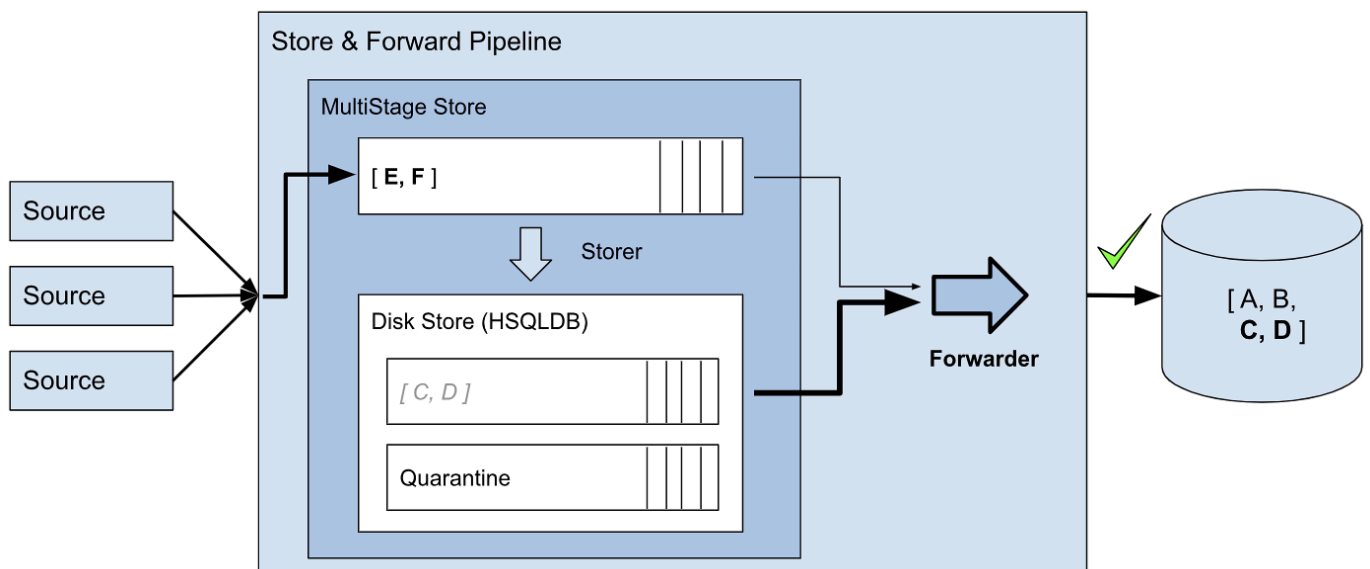
1. Data A and B moves into the memory buffer, and since no other data is already being processed, it is then forwarded to sink.



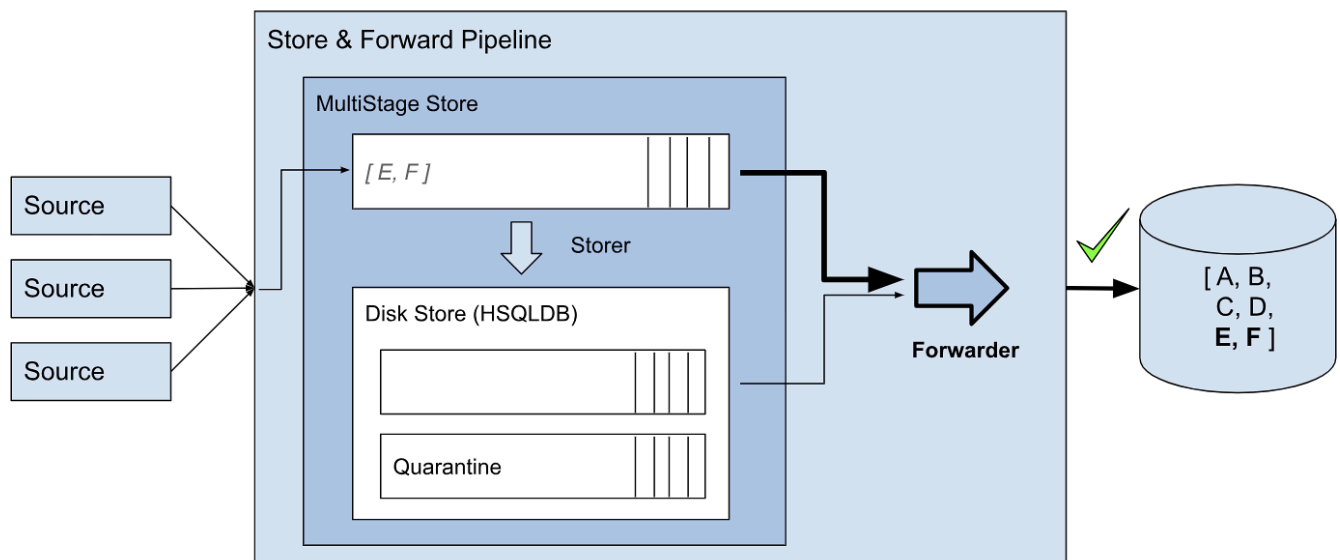
2. Data C and D moves into the memory buffer and is stored to disk cache, while A and B finishes transferring.



3. Data C and D is now forwarded from disk cache to sink, while data E and F moves into memory buffer.



4. Data E and F is forwarded directly to sink as the memory store is clear again.



Store and Forward for Reliability

The store-and-forward system settings, while seemingly limited, offer a good deal of flexibility in tuning. Different types of situations and goals will likely require different configurations.

When the safety of the data is a concern, the goal is to get the data stored to disk as quickly as possible in order to minimize risk of loss due to a power outage or system failure. The local cache plays a crucial role in this, allowing the system to store data locally for any amount of time until the remote database can accept it. This protects against network failures and database failures, as well.

By setting the **write size** and **write time** of both the local cache and forwarder to low values, the data spends less time in the memory buffer. While the memory buffer can be set to 0 to bypass it completely, this is not usually recommended, as the buffer is used to create a loose coupling between the history system and other parts of Ignition that report history. This disconnect improves performance and protects against temporary system slowdowns. In fact, it is recommended that for reliable logging, this value be set to a high value, to allow the maximum possible amount of data to enter the system in the case of a storage slowdown.

Using Store and Forward



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Using Store and Forward

[Watch the video](#)

The current status of the Store and Forward system can be viewed from the Status section of the [Gateway Web Interface](#). These pages provide detailed analysis on each Store and Forward engine.

To Monitor the Store and Forward Engine

1. Go to the **Status** section of the Gateway.
2. Click on **Store & Forward** from the left menus.

The **Store & Forward Connections** page will be displayed showing each store-and-forward engine along with the current throughput and capacity of its **Memory Buffer** and **Disk Cache**.

On this page, there are several notable items:

Name	Description
Aggregate Throughput	The aggregated number of records inserted into a database from any engine, per second.
Total Quarantined	The current count of quarantined items across all engines.
Total Dropped	The number of records that have been dropped from all store and forward engines. A record is considered dropped if it can not be added to one of the buffers, such as when a buffer is full, and the engine can no longer accept new records.



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Aggregate Throughput

0.5^{per second}

Total Quarantined

0

Total Dropped

0

Store and Forward Engines

« < 1 of 1 > »

Filter

View 20 ▾

Name ▲	Store Throughput	Forward Throughput	Quarantined	Activity	Actions
DB	0.5/sec	0.5/sec	0	✓ Available	Details
Local Edge Historian	N/A	N/A	0	✓ Available	Details
SQLite	N/A	N/A	0	✓ Available	Details

« < 1 of 1 > »

You can click on **Details** under the **Store and Forward Engines** section to refresh and update the displayed values. This page provides in-depth information on the current status of the engine.

Name	Description
Memory Buffer	The number of records entering the Memory Buffer per second. The progress bar shows the percent of the buffer being utilized, along with the current and max number of records.
Disk Buffer	The number of records entering the Disk Buffer per second. Note that a state of "idle" means the engine is able to successfully store all records into the database before the Write Size or Write Time values have been reached. The progress bar shows the percent of the buffer being utilized, along with the current and max number of records.
Database	Shows the number of records pushed from either buffer to the database per second
Quarantined Items	Lists all quarantined items in the engine. Includes the number of occurrences, a description of where the items originated from, and the reason why the record was placed into the quarantine. Provides an opportunity to retry, export, or delete the items.



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- Devices
- Gateway Network
- Store & Forward**
- OPC Connections
- Perspective Sessions
- Vision Clients

Status > Connections > Store and Forward

[Configuration](#)

Store Details

Memory Buffer

0/sec

0% (0/250)

Local Cache

Idle

0% (0/25000)

Database Storage

0/sec

Quarantined Items

[Import quarantine file](#)

Retry All

Delete All

Configuring Store and Forward



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Configuring Store and
Forward

[Watch the video](#)

Store and Forward for High-speed Buffering

When configuring the store-and-forward system for high-speed buffering, you are expecting the case that data will come in quick bursts. By buffering the data, the system can accommodate more information than would be possible going directly against the database.

The key points in configuring a buffering system is to avoid expensive operations like storing and reading from the local cache, and to set the memory buffer large enough to accommodate the expected burst sizes.

Each database connection has its own store and forward settings. Store-and-forward engines are directly correlated to database connections, and are automatically managed so that each connection has an engine defined.



TIP

You can create multiple database connections pointing to the same database if you wish to configure multiple store-and-forward engines for different purposes.

Configuring Store and Forward

To configure the Store and Forward engine for your database, do the following steps:

1. Go to the Gateway **Configure** section and select **Databases > Store and Forward**.
The **Store and Forward** page is displayed and you will see a store-and-forward setting for each of your database connections and you can edit these settings.
2. On the **Store and Forward** page, look for **edit** at the far right of the table and click on it to see all the store-and-forward settings.
The settings of a store-and-forward engine define how and when data is moved through the

system. You must understand these settings so that you can carefully set them according to your goals.

The screenshot shows the Ignition configuration web interface. The top navigation bar includes the Ignition logo, a user profile 'admin', and a 'Log Out' button. A 'Get Designer' button is also present. The left sidebar contains a 'SYSTEM' menu with options like Overview, Backup/Restore, Ignition Exchange, Licensing, Modules, Projects, Redundancy, and Gateway Settings. Below this is a 'NETWORKING' menu with Web Server, Gateway Network, and Email Settings. The main content area is titled 'Config > Database > Store and Forward > Overview'. It features a green 'Trial Mode 0:09:55' banner with an 'Activate Ignition' button. Below the banner is a table of database connections. The table has columns for Name, Memory Buffer Size, Disk Cache Size, Disk Cache Enabled, and Actions. One entry is visible: 'Sample_SQLite_Database' with a Memory Buffer Size of 250, Disk Cache Size of 25000, and Disk Cache Enabled set to true. The 'Edit' button for this entry is highlighted with a red box. A note at the bottom states: 'Note: Store and Forward engines are automatically created for configured database connections and remote history providers. For details about a store's status, see the [Store and Forward Status](#) page.'

Name	Memory Buffer Size	Disk Cache Size	Disk Cache Enabled	Actions
Sample_SQLite_Database	250	25000	true	More Edit

Store and Forward Settings

Buffer Settings

Setting	Description
Memory Buffer Size	The number of records that can be stored in the memory buffer, the first stage of the store-and-forward chain. Other settings define when the data will move from the memory buffer forward, this setting only determines the maximum size. If the max size is reached, additional data will error out and be discarded. The memory buffer cannot quarantine data, so if there are errors and the disk cache is not enabled, the data will be lost. If set to 0, the memory buffer will not be used.

Store Settings

These settings apply to the local disk storage cache.

Setting	Description
Disk Cache Enabled	Turns on the hard-disk cache. Data is stored here if it cannot be forwarded in a timely manner. The cache also stores quarantined data (that is, data with errors).
Max Records	The maximum size of the cache. After the max is reached, data is backed up into the memory buffer, and once that is full, it is dropped. A 'record' is an insert or update statement. These statements may be batches, thus it is possible for a single 'record' to impact multiple rows. The default value is 25,000. Note: The disk cache is intended to be a short term storage system. It is not recommended to increase the Max Records beyond 50,000.
Write Size	The number of records that should be accumulated in the memory store before written to the cache. Writing data in blocks can increase performance, but too large of a size increases the risk of data being lost in the event of a power outage or system failure.
Write Time	The max age of records in the memory buffer before they are stored to the cache. This setting is used in combination with the write size in order to give the forwarder the opportunity to retrieve data directly from the memory store and avoid the write to disk entirely.

Forward Settings

These settings govern when data is forwarded to the database. The data is pulled first from the local cache, and then from the memory store. When no data is present in the cache, it is pulled directly from the memory store.

Setting	Description
Write Size	The number of records that can accumulate in either the store or the buffer, depending on whether or not the store is enabled, before being forwarded. Default is 25.
Write Time	The maximum age of records in the cache or memory buffer before they are forwarded. Default is 1000.
Enable Schedule	If enable schedule is selected, the forward engine will only be enabled during the times specified by the pattern. The pattern can specify specific times and ranges using a simple syntax.
Schedule Pattern	The schedule is specified as a comma separated list of times or time ranges. You can use the following formats: 24-hour times, that is 8:00-15:00 (for 8am through 3pm) or 21:00-24:00 (9pm through midnight). 12-hour with am/pm (if not specified, 12 is considered noon): 8am-3pm or 9pm-12am Note: When the time period is over, any queued data will remain cached until the next execution period. That is, the forward engine does not run until all data is forwarded.

Once you made the changes you want, click **Save Changes** at the bottom of the page. This will take you back to the Store and Forward page.

Controlling Quarantine Data



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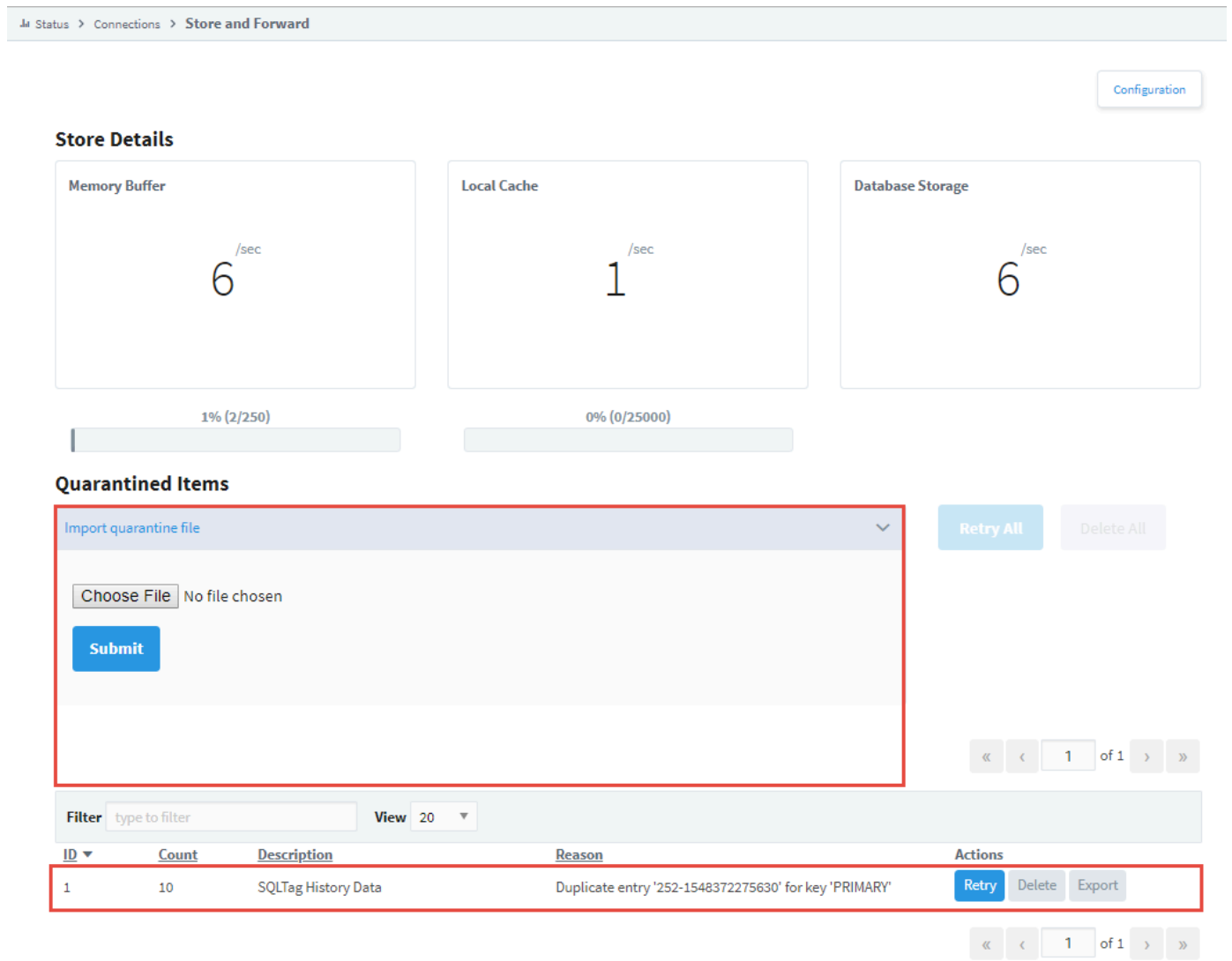
Controlling Quarantine Data

[Watch the video](#)

Quarantined data is data that has erred-out multiple times during attempts to forward it or data that could not be stored because of some configuration issues. It is removed from the forward queue to allow other data to pass. The most common reason for data quarantining is an invalid schema in the database for the data that is being stored. Quarantined data is held indefinitely until the issue is resolved, then you can either delete it or re-insert it into the queue.

Handle the Quarantined Data

1. From **Status** section of the Gateway, go to **Connections > Store and Forward**.
2. Click the **Details** tab next to a Store and Forward engine that you would like to see the quarantine data for. Here you will see any quarantined data which are listed according to the order they got quarantined. Each set of data has the option to retry it, delete it, or export it for later use. If there are a lot of quarantined records, it may be a good idea to export and delete them so that the store and forward engine won't fill up and drop records.
3. Fix the problem/error you found that caused the quarantine data.
4. Click on **retry**, or if the data had been exported, import the data using the import tool and then **retry**. This way, you can ensure no data gets lost.



Disk Cache Management

New in 8.1.21 In the Gateway's Config > Databases > Store and Forward section, there are two options regarding a database connection's disk cache. Note that the following options will only appear if the Disk Cache Enabled property for the specified database connection is set to true:

- Archive Disk Cache
- Load Disk Cache

Archive Disk Cache

The screenshot shows the Ignition web interface. The top navigation bar includes the Ignition logo, a user profile (admin), and a 'Log Out' button. The main navigation menu on the left is divided into 'SYSTEM' and 'NETWORKING' sections. The 'SYSTEM' section includes links for Overview, Backup/Restore, Ignition Exchange, Licensing, Modules, Projects, Redundancy, and Gateway Settings. The 'NETWORKING' section includes links for Web Server, Gateway Network, and Email Settings. The main content area is titled 'Config > Database > Store and Forward > Overview'. It shows a 'Trial Mode 1:59:38' status bar and an 'Activate Ignition' button. Below this is a table with columns: Name, Memory Buffer Size, Disk Cache Size, Disk Cache Enabled, and Actions. The table contains one entry: 'Sample_SQLite_Database' with a 'Memory Buffer Size' of 250 and a 'Disk Cache Size' of 25000. The 'Disk Cache Enabled' column for this entry has a red box around the 'Archive Disk Cache' button. There is also a 'Load Disk Cache' button. A note at the bottom states: 'Note: Store and Forward engines are automatically created for configured database connections and remote history providers. For details about a store's status, see the [Store and Forward Status](#) page.'

Attempting to archive a disk cache will result in Ignition throwing a warning, saying that the existing cache will be locked and incoming data may be blocked or lost.

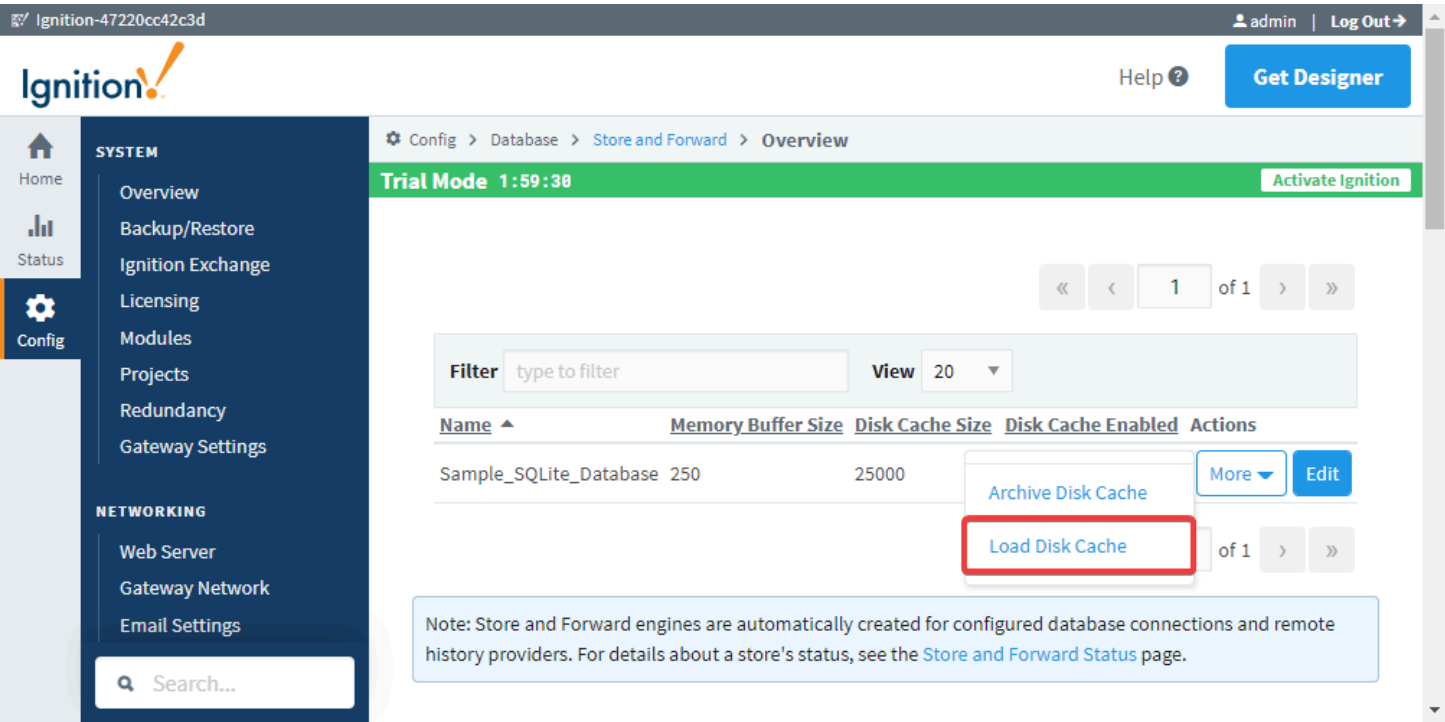
The screenshot shows a dialog box titled 'Archive Disk Cache'. It contains a warning message: 'During this operation, the existing disk cache will be locked, and incoming data may be blocked or lost.' Below this is a checkbox labeled 'I understand that archiving the existing disk cache will result in the store and forward engine restarting with a new, empty cache.' The 'Archive' button is disabled (grayed out), and the 'Cancel' button is active (blue outline).

During the archiving process:

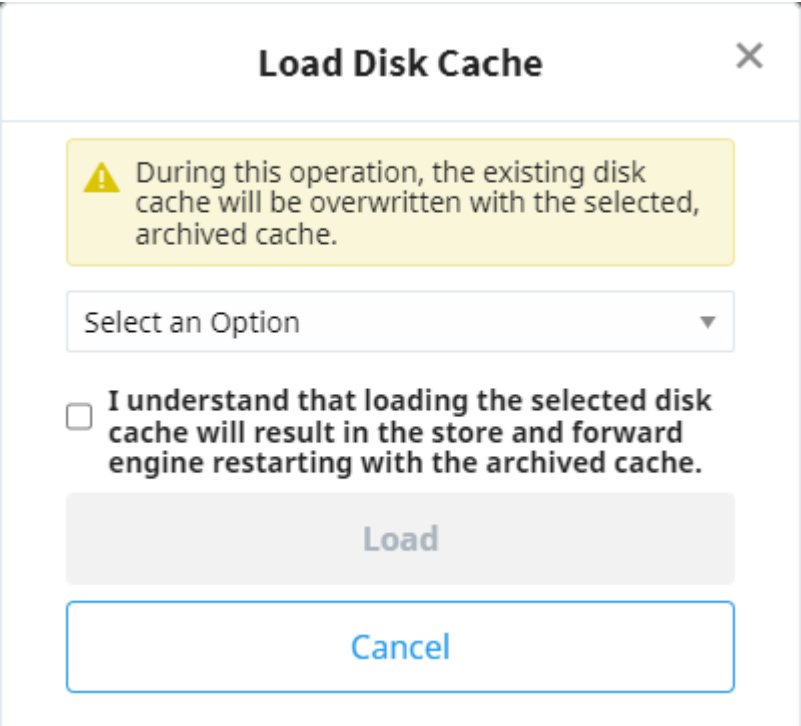
1. The disk cache is shut down.
2. Archived data is moved to a folder located at `%IgnitionInstallationDirectory%/data/datacache/archives`, making it available to load to replace an existing disk cache. The cache folder will use the following naming convention: `{database name}_{timestamp}`.

3. The disk cache is started again, and a new cache folder is created.

Load Disk Cache



Attempting to load a disk cache will result in Ignition throwing a warning, saying that the existing disk cache will be overwritten.



During the loading process:

1. The local disk cache is stopped and deleted.
2. The chosen archived disk cache is renamed.

3. The disk cache is started again.