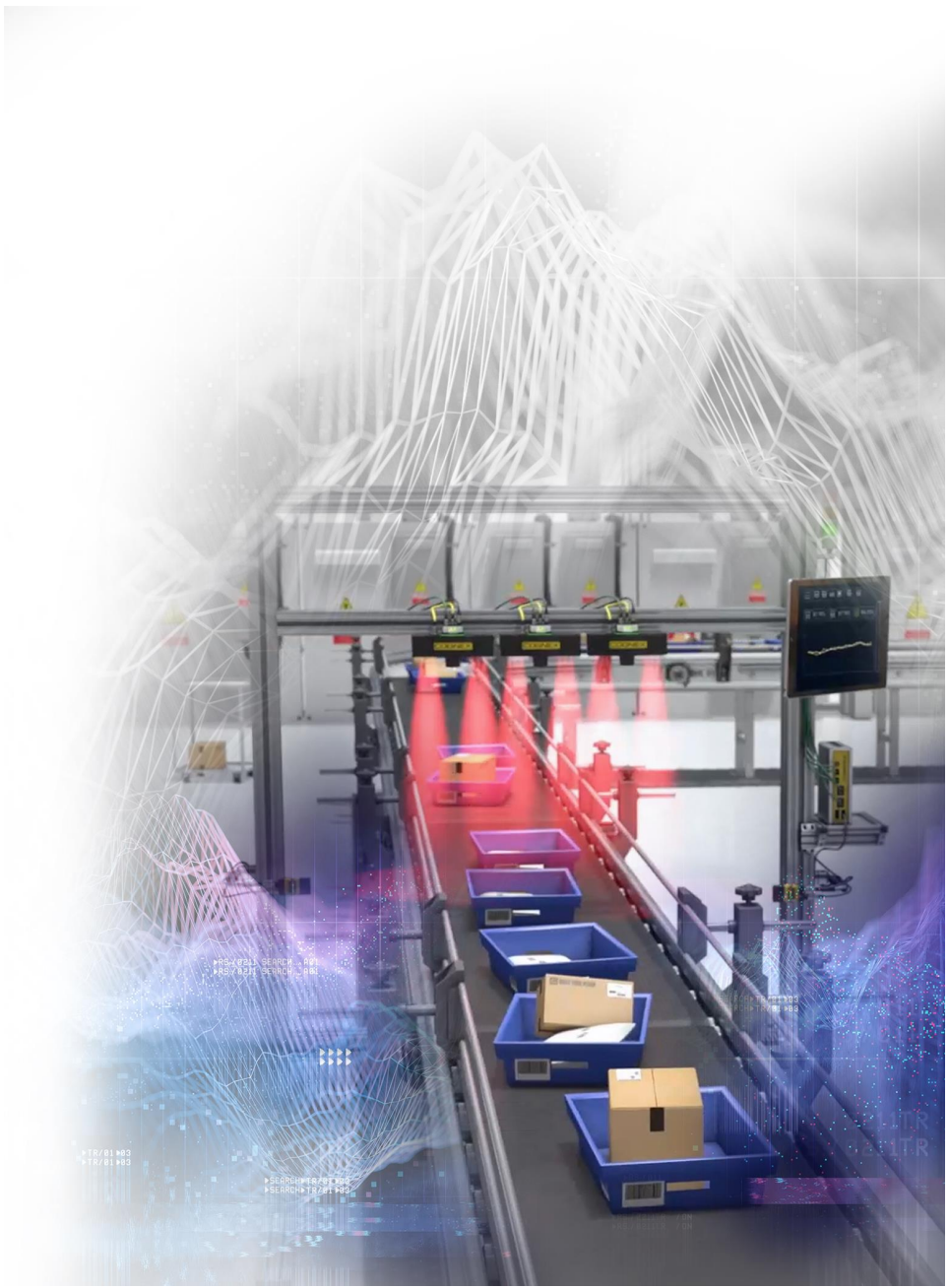
COGNEX

Edge Intelligence®

Reference Manual



2021 July 27

Revision: 1.0.0.289

Table of Contents

Legal Notices

Precautions

To reduce the risk of injury or equipment damage, observe the following precautions when you install the Cognex product:

- This product is intended for industrial use in automated manufacturing or similar applications.
- The safety of any system incorporating this product is the responsibility of the assembler of the system.
- Do not install Cognex products where they are exposed to environmental hazards such as excessive heat, dust, moisture, humidity, impact, vibration, corrosive substances, flammable substances, or static electricity.
- Route cables and wires away from high-current wiring or high-voltage power sources to reduce the risk of damage or malfunction from the following causes: over-voltage, line noise, electrostatic discharge (ESD), power surges, or other irregularities in the power supply.
- This product does not contain user-serviceable parts. Do not make electrical or mechanical modifications to product components. Unauthorized modifications can void your warranty.
- Changes or modifications not expressly approved by the party responsible for regulatory compliance could void the user's authority to operate the equipment.
- Include service loops with cable connections.
- Ensure that the cable bend radius begins at least six inches from the connector. Cable shielding can be degraded or cables can be damaged or wear out faster if a service loop or bend radius is tighter than 10X the cable diameter.
- This device should be used in accordance with the instructions in this manual.
- All specifications are for reference purposes only and can change without notice.

Symbols

The following symbols indicate safety precautions and supplemental information:

WARNING: This symbol indicates a hazard that could cause death, serious personal injury or electrical shock.

CAUTION: This symbol indicates a hazard that could result in property damage.

Note: This symbol indicates additional information about a subject.

Tip: This symbol indicates suggestions and shortcuts that might not otherwise be apparent.

Getting started

Edge Intelligence improves overall equipment effectiveness (OEE) and increases throughput across a range of industries including logistics, food and beverage, consumer products, packaging, automotive, medical devices, and electronics.

About Edge Intelligence

Edge Intelligence is a performance monitoring tool that collects and analyzes data generated by Cognex devices. Edge Intelligence provides reader statistics, no read images, trigger details, and configuration changes for all connected devices.

The Edge Intelligence solution consists of a physical Edge Intelligence box and a browser-based user interface that provides access to the Edge Intelligence functions.

Edge Intelligence provides the following features through the UI:

- **Real Time Monitoring (RTM)**
  - Live
  - Performance Overview
  - No Read Trigger Review
  - Configuration Change History
  - Settings
- **Performance Analytics**
  - Dashboard
  - Performance Review
  - Results Explorer
- **Validation Failure**
  - Trigger Review
  - Settings
- **Multi-Reader Configuration (MRC)**
  - DataMan
  - Feature Keys
- **Reporting**
  - Generate
- **User Management**
  - Users
  - Roles

- **Settings**
  - Edge Device
  - MQTT Forwarding
  - DataMan WebHMI
  - Firmware Upgrade

Supported DataMan readers compatible with Edge Intelligence:

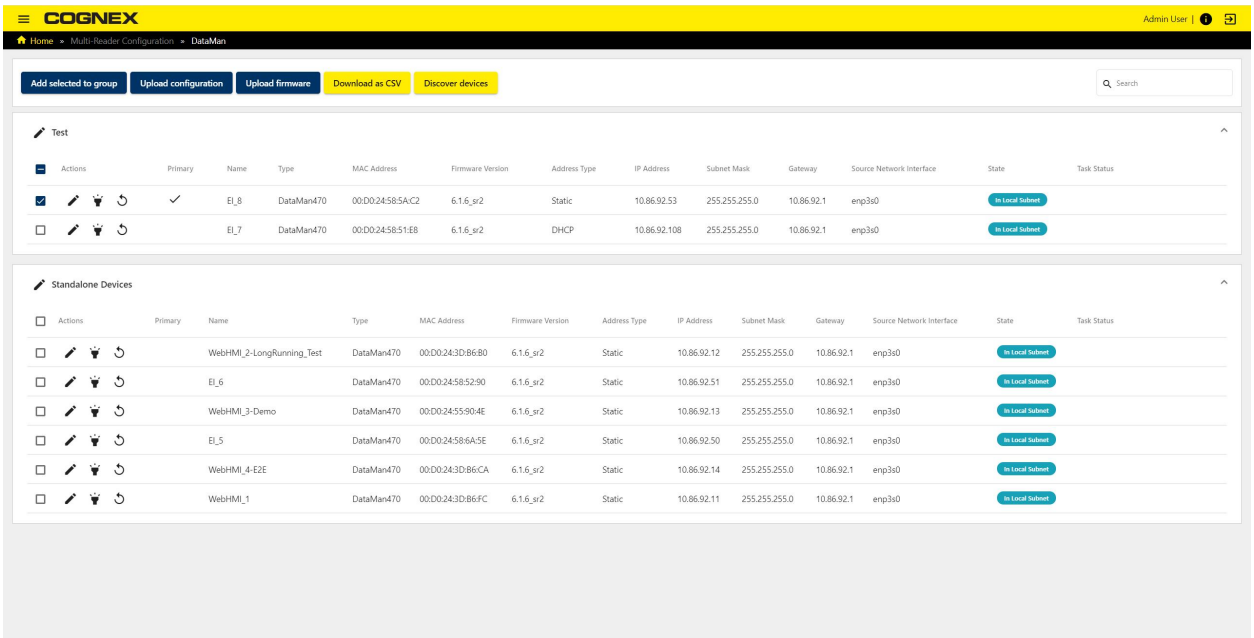
- DM260 Series
- DM280 Series
- DM300 Series
- DM360 Series
- DM370 Series
- DM470 Series
- DM503 Series

Note: Legacy readers must be on firmware 5.7.3 or higher to be compatible with Edge Intelligence.

Edge Intelligence Features

Device Management

The Device Management feature provides the ability to automatically discover, connect, and configure multiple readers for setup and data collection.



Icon	Description
☐	Click the checkbox to select a single reader or multiple readers to be configured at once.

Icon	Description
✓	The check mark denotes the primary reader in the MRS group.
	Click to edit the name and network settings (IP Address, Subnet Mask, Default Gateway) of each individual reader.
	Click to strobe the LEDs on a DataMan Reader to identify it.
	Click to reboot the reader.

Button	Description
Add selected to group	Add the selected reader(s) to an MRS group.
Upload configuration	Upload configuration for the selected reader(s).
Upload firmware	Upload firmware for the selected reader(s).
Download as CSV	Download the list of readers with all information displayed in the DataMan page in .csv file format.
Discover devices	Discover readers available on the network for setup and data collection.

Column Name	Description
Actions	Displays the icons of actions available for each reader: Single Device Edit, Flash LED, and Reboot.
Primary	Identifies the primary reader in an MRS group.
Name	Displays the name of the reader.
Type	Displays the type of the reader, for example DataMan 470.
MAC Address	Displays the media access control (MAC) address of the reader.
Firmware Version	Displays the firmware version of the reader.
Address Type	Displays the address type: static or DHCP.
IP Address	Displays the IP address of the reader.
Subnet Mask	Displays the Subnet Mask of the reader.
Gateway	Displays the gateway the reader uses.
Source Network Interface	Displays the Source Network Interface of the reader.
State	Displays the state of the reader, which can be: In Local Subnet, In Remote Subnet, In Remote Subnet Behind NAT, Waiting For DHCP, Misconfigured, or Unknown.
Task Status	Displays the status of the task, such as rebooting, applying network settings, and name changes.

Secure Data Storage

The Secure Data Storage feature includes:

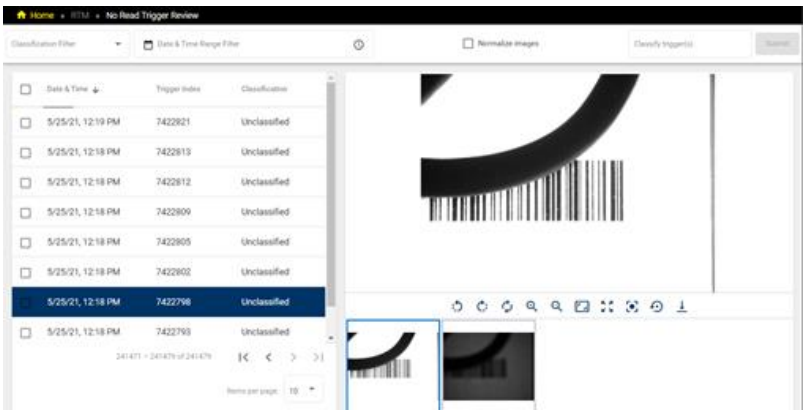
- Capturing and storing decode results in local database
- Capturing and storing device configuration files
- Capturing and storing no-read images in local partition of hard drive

- Option to clear the hard drive is only available for Admins
- Data management is First In First Out using all but 50 GB of the hard drive
- Failed Validation Images

No Read Trigger Review

The No Read Trigger Review feature includes:

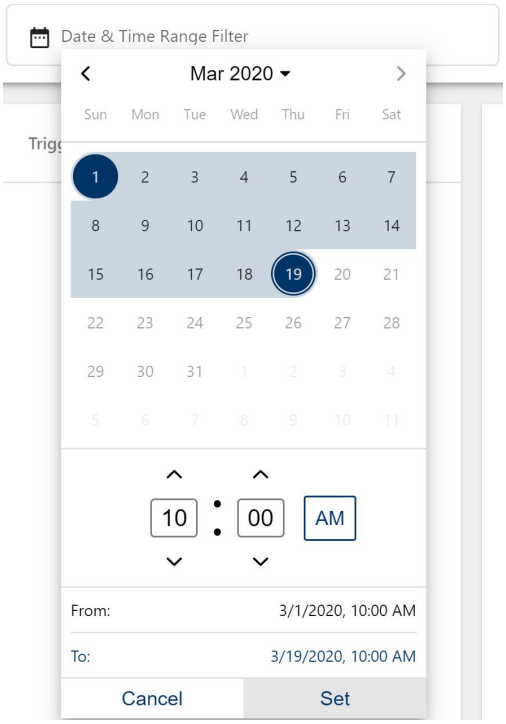
- Device tree displayed on the page
- Grouped No Read Images from multiple readers in MRS
- No Read Images by trigger index
- Classifying multiple triggers at a time
- Filter image table by classification. Changes with the global date picker
- Manual No Read image classification



Item	Description
Classification filter	Filter for the following no read classifications: Damaged Code, Motion Blur, No Label, Unclassified, and manually added custom classifications, for example: "Obscure Code", or "Too much glare" and "Hot Spot".
Date & Time Range Filter	Filter for no read triggers in a set date and time range which can be specified in the drop down menu.
Normalize images	Check to enhance the quality of images. Normalizing improves the contrast by stretching the intensity values of an image.
Classify trigger(s)	Classify no read images manually or add them to one of the following classification categories: Damaged Code, Motion Blur, No Label, or Unclassified.
Submit	Submit the set trigger classification.

Example of setting the Date & Time Range Filter:

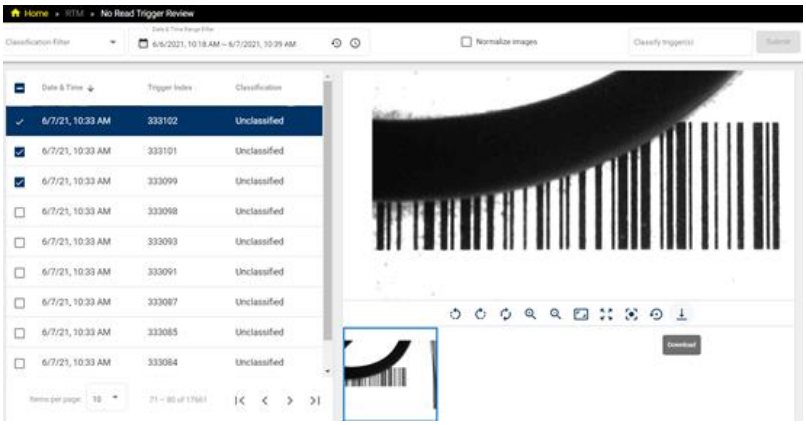
Note: The selected range filter stays the same between Performance Overview, Configuration Change History, and No Read Trigger Review pages.



Set the number of items (images) listed in a page and sort items by Date & Time, Trigger Index, or Classification.

Select an item to display the corresponding filmstrip, and select an image in the filmstrip to display it in the window. Use the icons directly below the selected image to rotate ( ), flip ( ), zoom in or out ( ), fit to frame ( ), view in full size ( ), center ( ), reset zoom ( ), or download ( ).

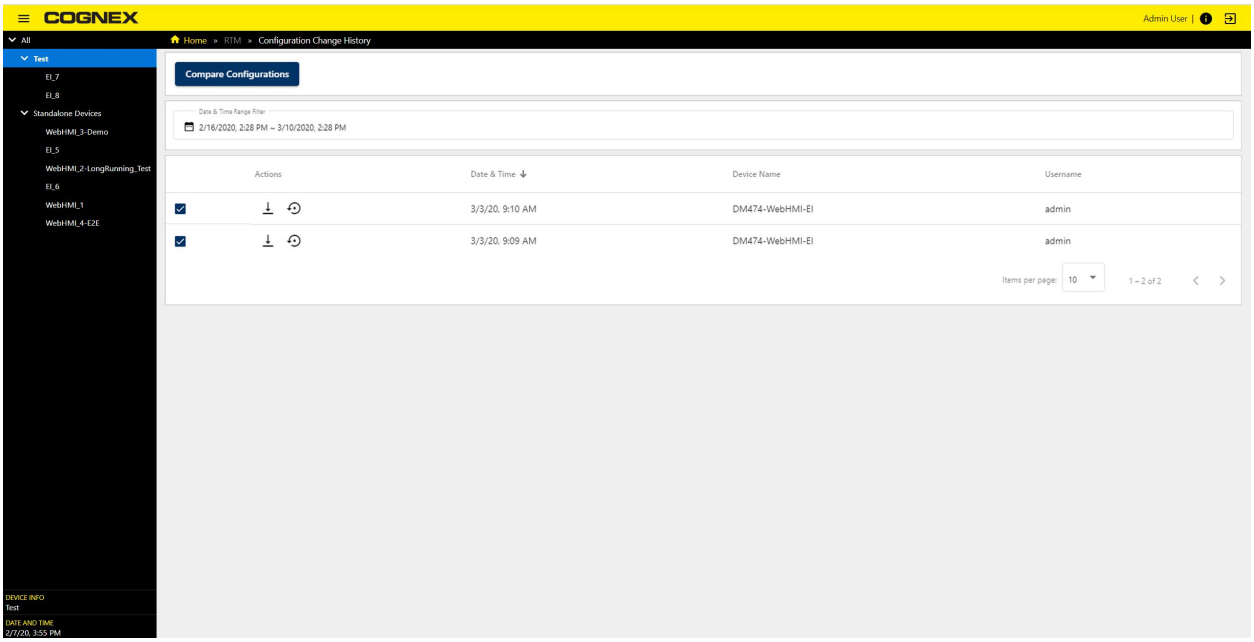
The following figure shows an example of an enlarged image, with the cursor over the download icon:



Configuration Change History

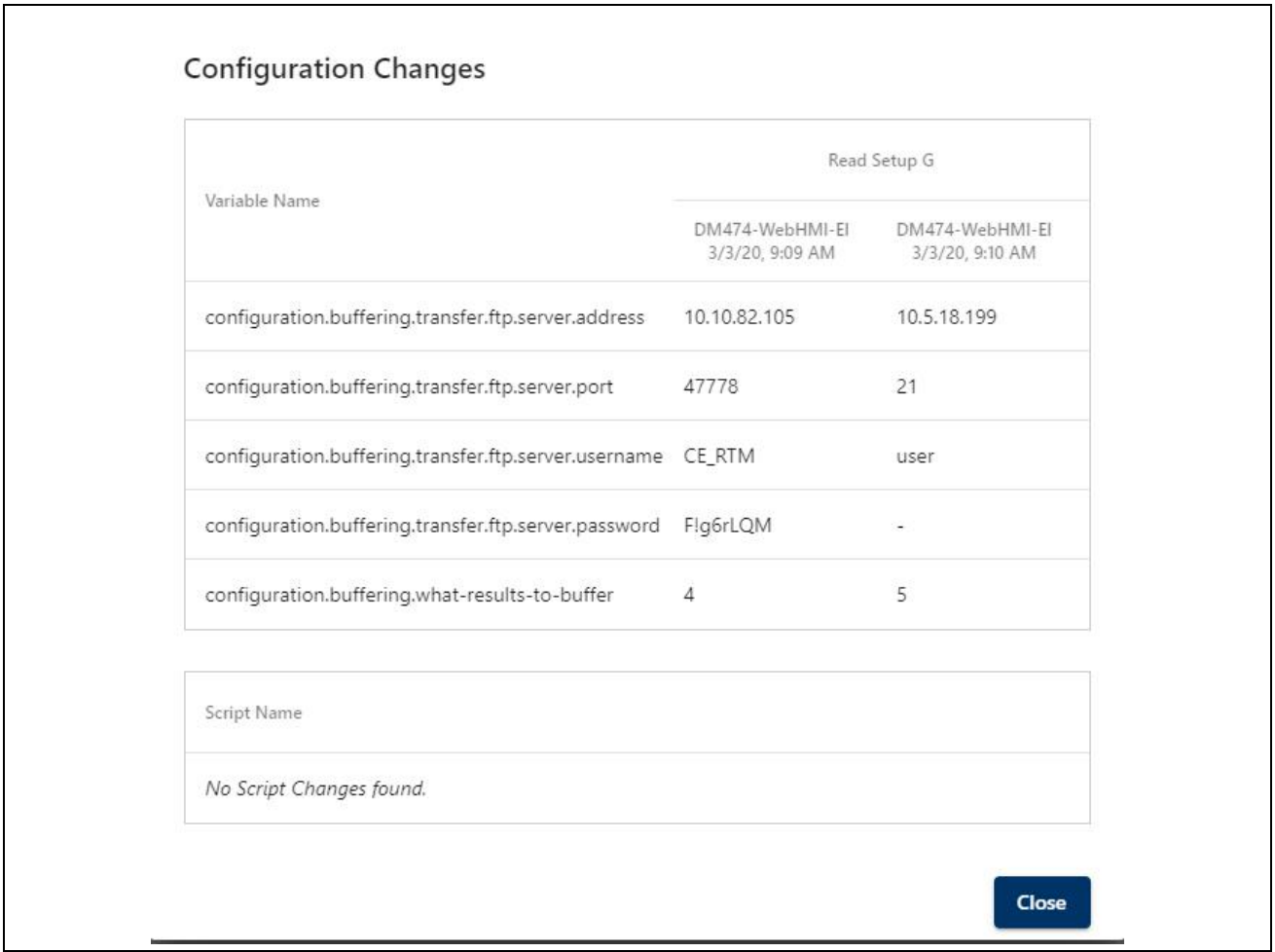
The Configuration Change History feature includes:

- Tracking configuration changes made to readers in a group
- Comparing previous configurations
- Reverting to a previous configuration
- Linking each configuration with a username automatically



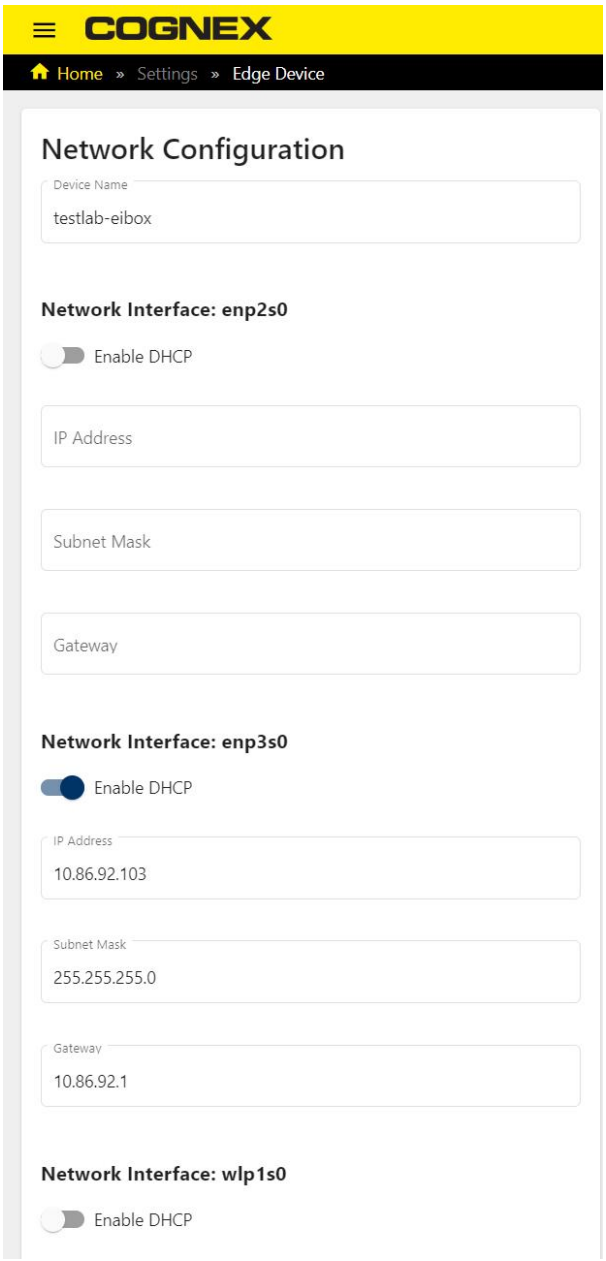
Item/Icon	Description
	Click to restore configuration.
	Click to download a configuration file with the reader settings of the entry.
Compare Configurations	After selecting two configurations, click to compare.
Date and Time	Date and time from when the configuration change was implemented.
Device Name	Name of the device on which the configuration change was initiated.
Username	Name of the user who made the configuration change.

Note: Changes made from Dataman Setup Tool are labeled as admin changes.



Item	Description
Configuration Changes	Lists variables which have different values in the compared versions.
Variable Name	Name of the variable which has different values in the compared versions.
Script Name	Name of the recently modified script.
Read Setup	Name of the read setup.

Device IP Configuration



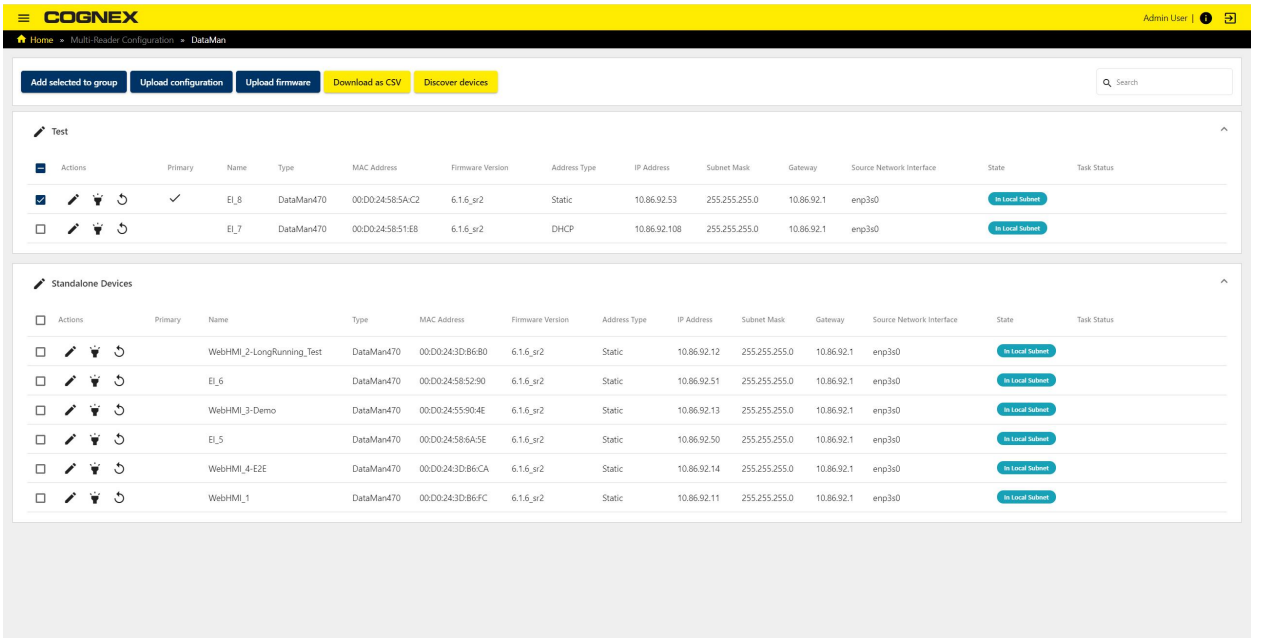
The Edge Device page helps identifying and changing network settings for Edge Intelligence.

Item	Description
Device Name	Name of the Edge Intelligence unit.
Network Interface	Network interface identifier belonging to the Edge Intelligence unit.
Enable DHCP	When enabled, the device automatically gets IP Address, Subnet Mask, and Gateway settings. When disabled, network settings must be done manually.
IP Address	Enter IP Address here.
Subnet Mask	Enter Subnet Mask here.
Gateway	Enter Gateway here.

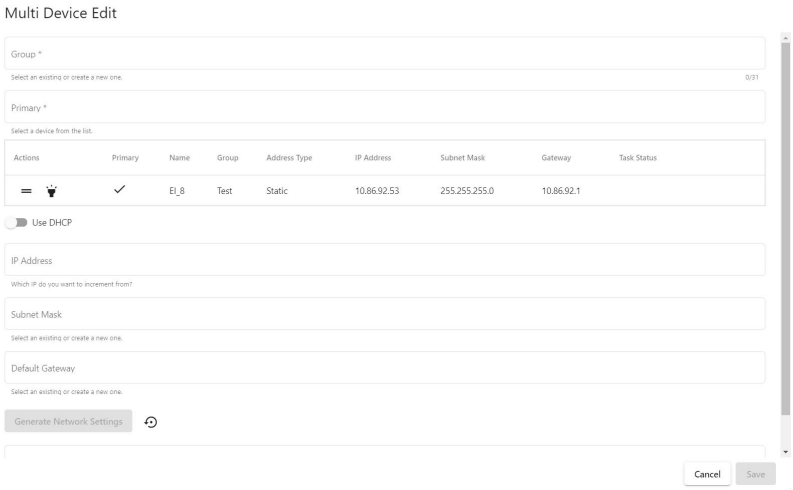
Multi-Reader Sync (MRS) Grouping

The MRS Grouping feature includes:

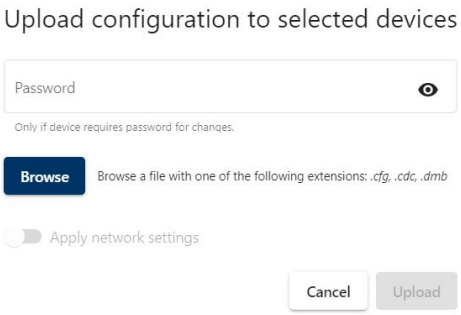
- Generating MRS group



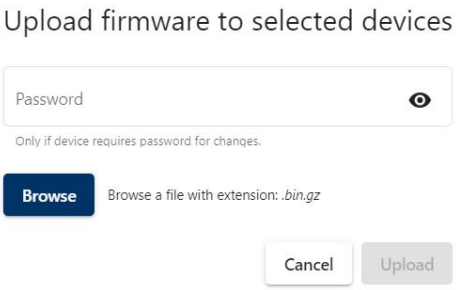
Button/Icon	Description
	Click to strobe the LEDs on a DataMan Reader to identify it.
	Click to drag and drop item.
	Click to restore the configuration.
Add selected to group	Add selected device(s) to a group of devices.
Upload configuration	Upload configuration to selected devices.
Upload firmware	Upload firmware to selected devices.
Download as CSV	Download device list with all data in CSV format.
Discover devices	Discover connected devices.



Item	Description
Group	Select an existing group or create a new group.
Primary	Select a primary reader from the list.
Use DHCP	Enable to use DHCP settings.
IP Address	Enter IP Address manually. Which IP do you want to increment from?
Subnet Mask	Enter Subnet Mask manually. Select an existing or create a new Subnet Mask.
Default Gateway	Enter Default Gateway manually. Select an existing or create a new Default Gateway.
Generate Network Settings	Click to generate network settings.
Password	Applicable/Enter only if the device requires a password for making changes.



Item	Description
Password	Password is only needed if the device to which the changes are to be applied requires a password.
Browse	Browsing for .cfg, .cdc, .dmb files on your computer.
Apply network settings	Toggle to apply network settings uploaded with the selected configuration file.

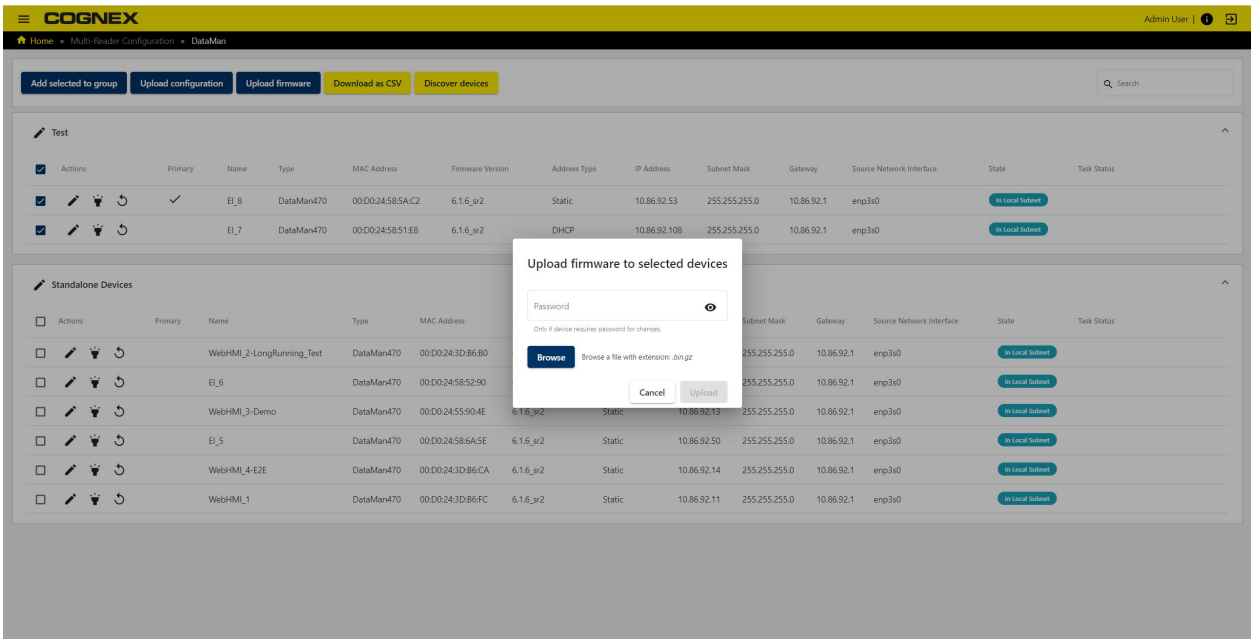


Item	Description
Password	Password is only needed if the device to which the changes are to be applied requires a password.
Browse	Browsing for .bin.gz.

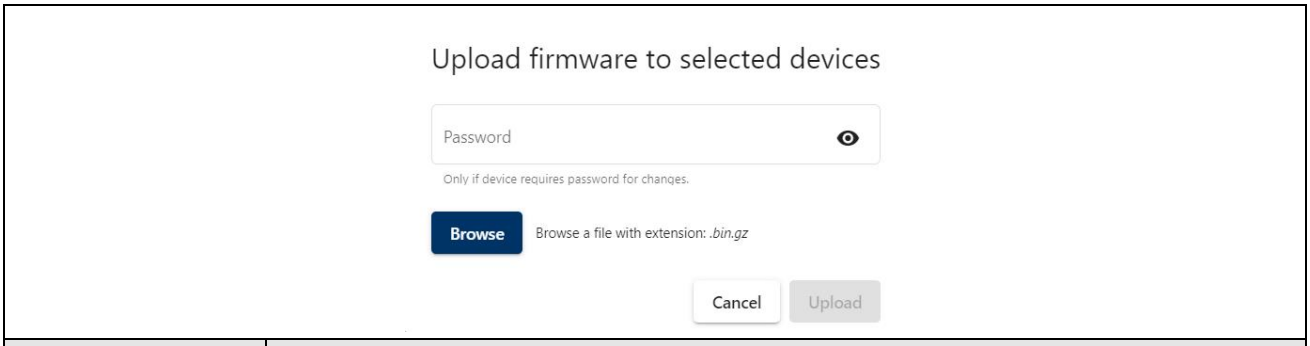
Note: Find the latest firmware updates on the MyCognex site: https://support.cognex.com

Firmware and Configuration Mass Update

The Firmware and Configuration Mass Update feature helps updating standalone or groups of readers with new firmware or configuration files.



To use this feature, select one or more devices, and click **Upload firmware**.

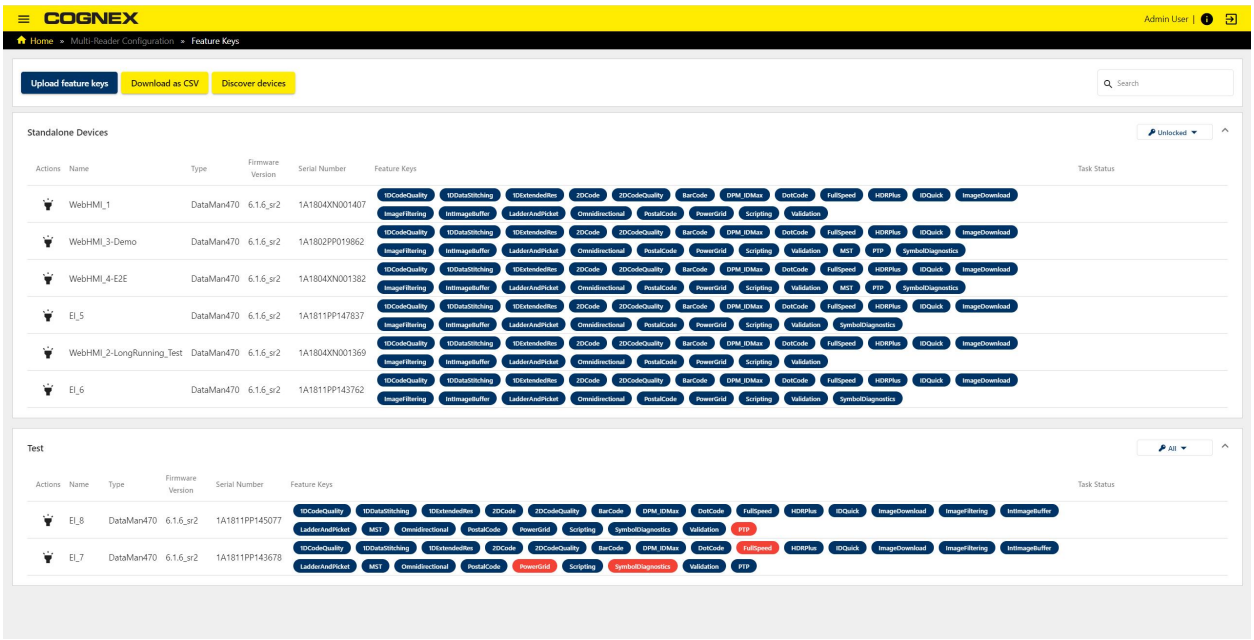


Item	Description
Password	Password is only needed if the device to which the changes are to be applied requires a password.
Browse	Browse files with .bin.gz. extension on your computer.

Feature Keys Management

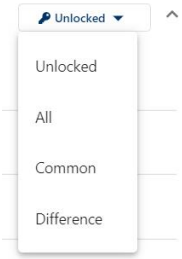
The Feature Keys Management feature includes:

- Comparing feature keys in different readers
- Uploading new feature keys

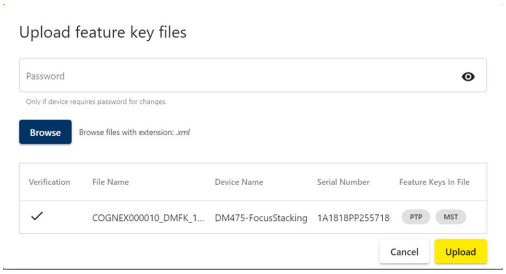


Button	Description
Upload feature keys	Upload feature key files.
Download as CSV	Download device list with all data in CSV format.
Discover devices	Discover connected devices.

Feature Key Color	Description
BLUE	The feature is unlocked for the device.
RED	The feature is unlocked for some devices in the group, but not for the respective device.



Item	Description
Unlocked	Show unlocked feature keys for all devices.
All	Show unlocked and locked feature keys for all devices.
Common	Show feature keys which are unlocked for all devices.
Difference	Show feature keys which have a different status among the devices.



Item	Description
Password	Password is only needed if the device requires a password.
Browse	Browse files with .xml extension on your computer.
Verification	Shows verified status.
File Name	Name of the feature key files.
Device Name	Name of the device which gets the new feature key file.
Serial Number	Serial number of the device.
Feature Keys in File	Feature keys contained in the file.

Edge Intelligence Systems

Edge Intelligence Model	CPU	Processing Power	Number of Data Streams	Power	I/O	Memory	Image Capacity [1]	Image Storage [2]

[1] Assuming no-read images are saved at full resolution (3 megapixels) in JPEG format.

[2] With full resolution JPEG no-read images from all readers, on a system running 24/7 with 1 trigger per second at a performance of 99% read rate.

EI-200 	Intel Celeron N3350 1.1 GHz	Dual Core	Up to 5 data streams	12 VDC input jack	Not supported	4 GB LLDDR4 2133 MHz	Up to 1 million images	Up to 244 data days
EI-300 	Intel Atom E3950 1.6 GHz	Quad Core	Up to 10 data streams	9~36 VDC 3-pin terminal block	8-bit Isolated Digital I/O	8 GB LPDDR4	Up to 4 million images	Up to 487 data days
EI-700 	Intel Core i7-8700T 2.4 GHz	Hexa Core	Up to 20 data streams	9~48 VDC 5-pin terminal block	8-bit Isolated Digital I/O	8 GB SO-DIMM DDR4 2666 MHz - Wide Temp	Up to 8 million images	Up to 487 data days

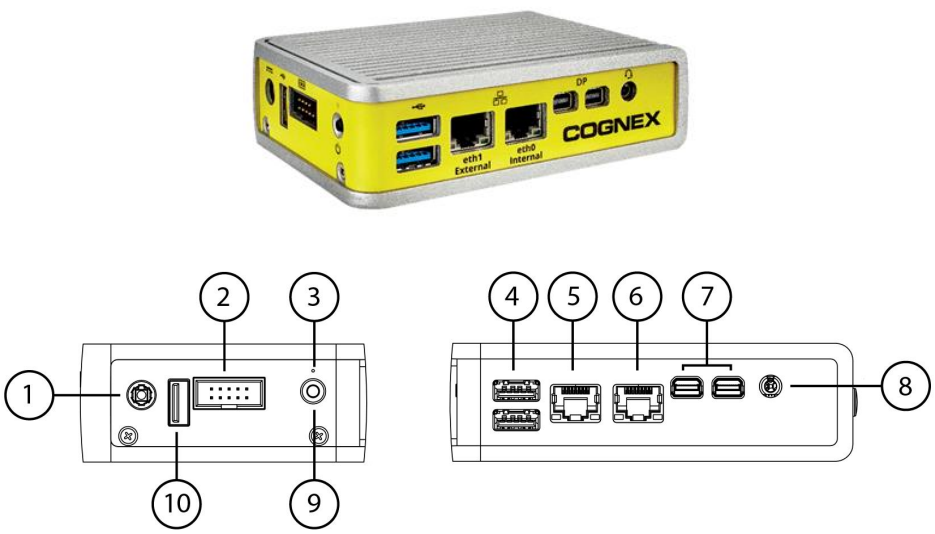
Edge Intelligence Kit

Specifications	EI-200	EI-300	EI-700
Edge Intelligence Model			
Number of Data Streams	Up to 5 data streams	Up to 10 data streams	Up to 20 data streams
EI Kit Component	Mini Display Port-to-VGA male-to-female adapter DIN Rail Mounting Kit Power Adapter DC 12 V, 36 W - with Interchangeable Plug Thermal pads	Display Port-to-VGA male-to-female adapter DIN Rail Mounting Kit Power Adapter 60 W 12 V 5 A Computer Port & Dust Blocking Kit 3-pin Power Terminal Block Connector 3-pin CAN bus Terminal Block Connector 10-pin DIO Terminal Block Connector M.2 and mPCIe expansion card screws	Display Port-to-VGA male-to-female adapter Wall Mounting Bracket with Vibration Isolation Power Adapter 160 W 20 V 8 A Computer Port & Dust Blocking Kit 5-pin Power Terminal Block Connector 3-pin CAN bus Terminal Block Connector 10-pin DIO Terminal Block Connector 2-pin Remote Switch Terminal Block 5-pin Terminal Block to 6-pin Molex Adapter

Product Overview

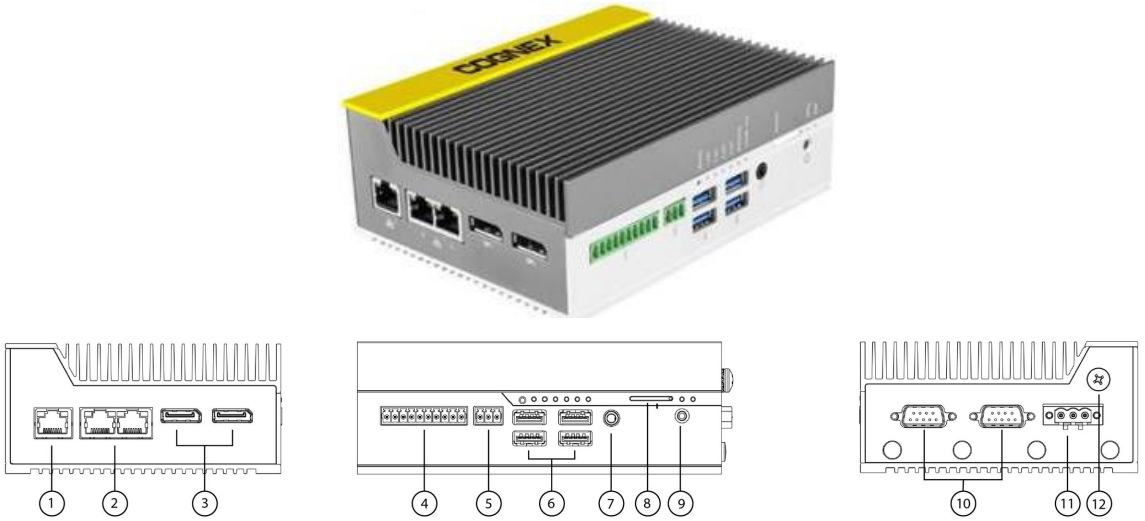
The following table shows the layout of Edge Intelligence Boxes.

EI-200 Layout



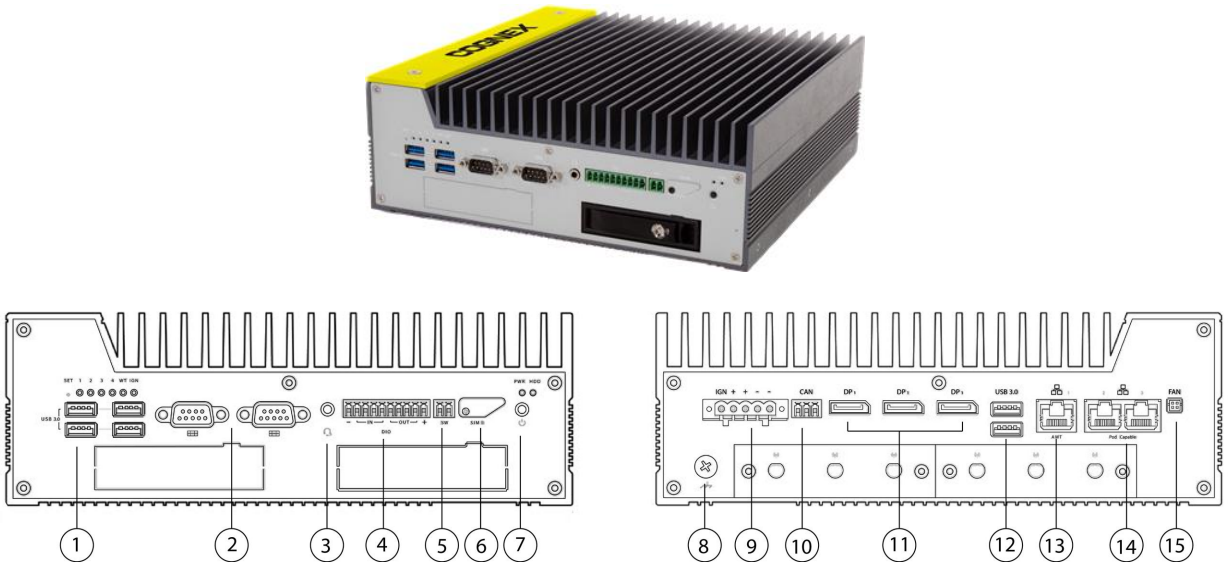
Connector/Button	Function
1	Power Connector (12V DC input jack)
2	COM Port (RS-232)
3	LED for Power
4	USB 3.0 Ports
5	External Port to Network (DHCP)
6	Internal Port to Devices (192.168.1.100)
7	MiniDisplay Ports
8	Audio Jack (Line out; Mic in)
9	Power Button
10	USB 2.0 Port

EI-300 Layout



Connector/Button	Function
1	Port to External Network (DHCP)
2	Ports to Internal Network (Static IP: 192.168.1.100 and DHCP)
3	Video Display Ports
4	8-bit Isolated Digital I/O (4-in, 4-out)
5	3-pin CAN Bus
6	USB 3.0 Ports
7	Audio Jack (Line out; Mic in)
8	Micro-SIM Slot
9	Power Button
10	COM Ports (RS-232)
11	3-Pin Terminal Block Power Input (9 ~ 36 V)
12	Grounding Nut

EI-700 Layout



Connector/Button	Function
1	USB 3.1 Gen 1 Ports ModBay Slots
2	COM Ports (RS-232)
3	Audio Jack (Line out; Mic in)
4	Digital I/O (4-in, 4-out)
5	2-pin Remote Power Switch
6	External Mini-SIM Slot
7	Power Button
8	Grounding Nut
9	5-Pin Terminal Block Power Connector (9 ~ 48 V)
10	3-pin CAN Bus
11	Video Display Ports
12	USB 3.1 Gen 1 Ports
13	Port to External Network (DHCP)
14	Ports to Internal Network (Static IP: 192.168.1.100 and DHCP)
15	External Fan Connection

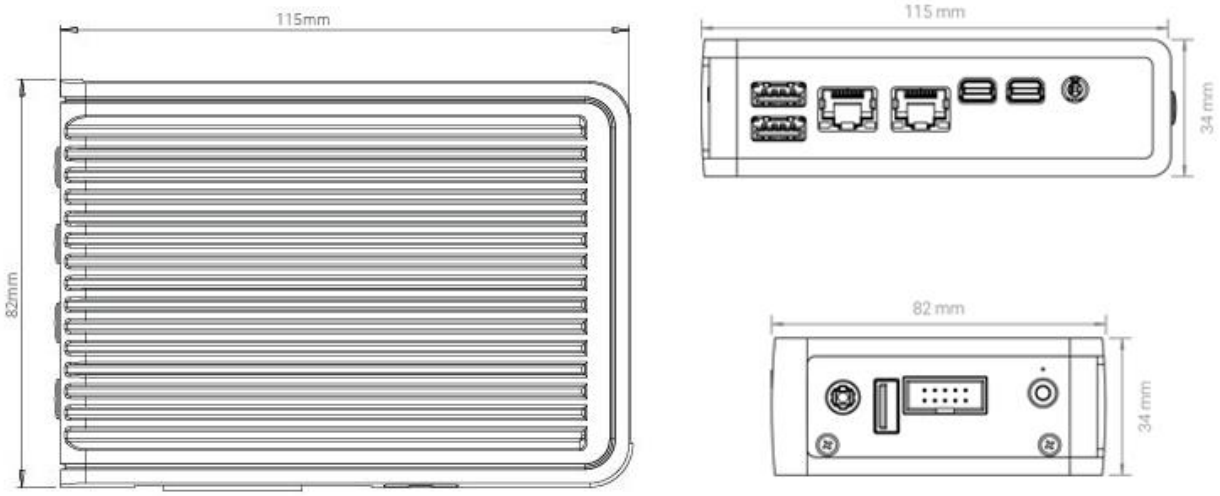
Edge Intelligence Unit Dimensions

Observe the following dimensions when installing your Edge Intelligence.

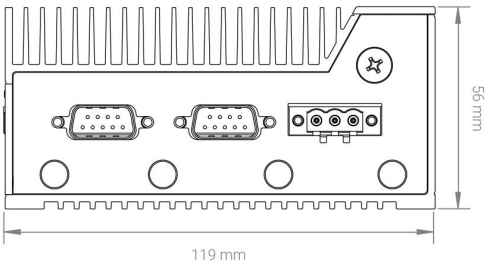
Note:
Dimensions are in millimeters and are for reference purposes only.

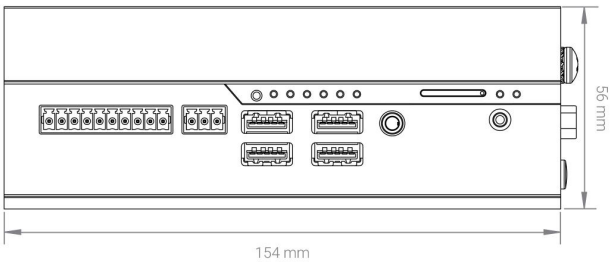
All specifications are for reference purposes only and can change without notice.

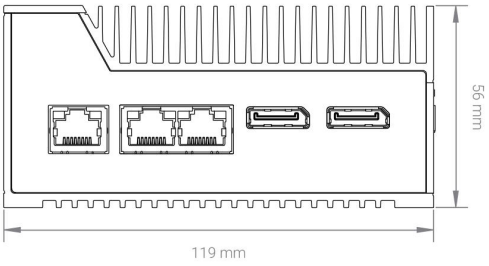
EI-200 Dimensions

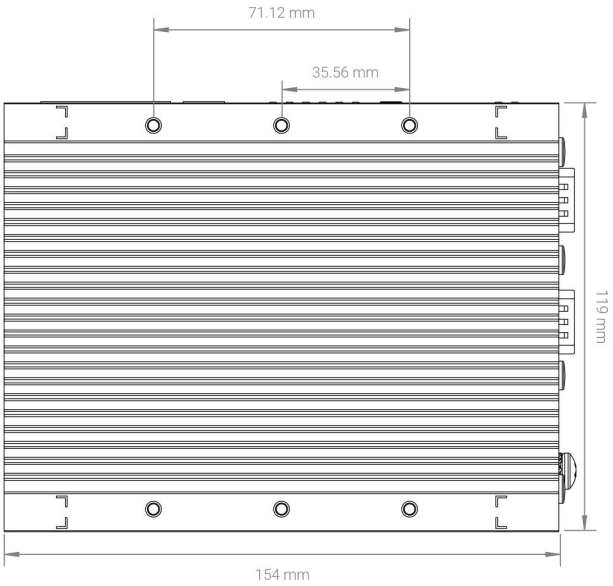


EI-300 Dimensions

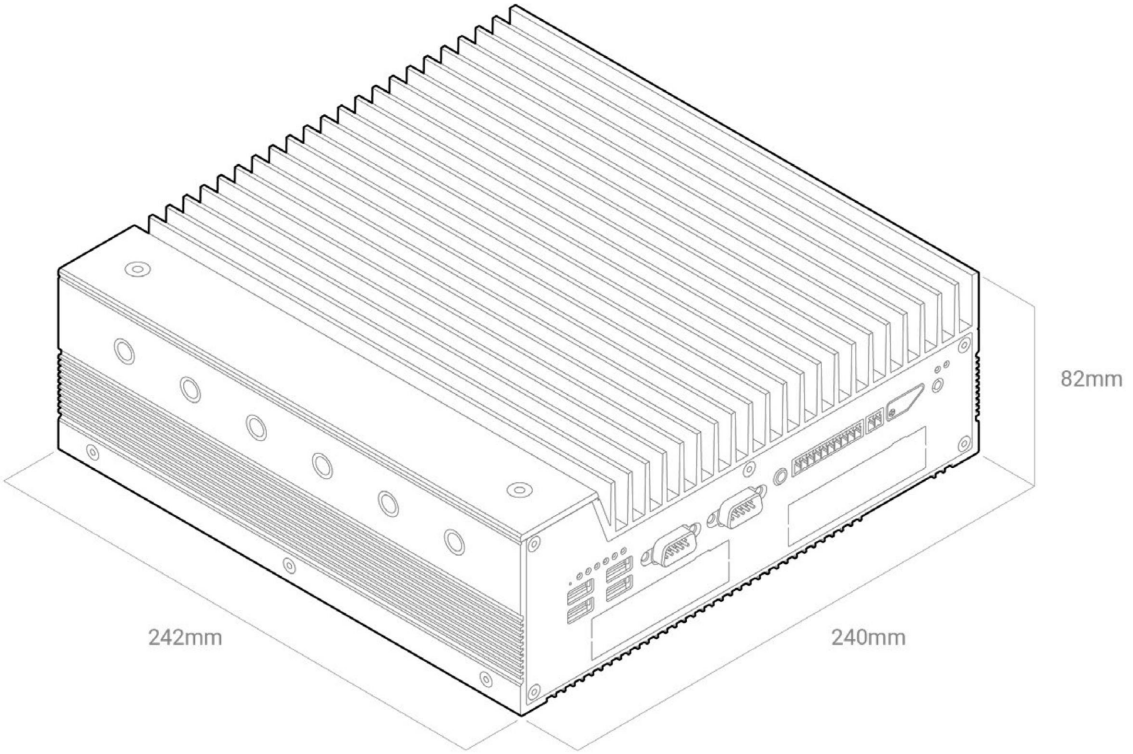


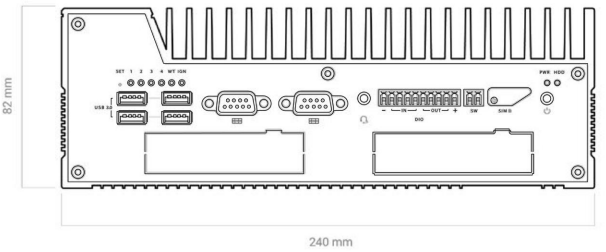


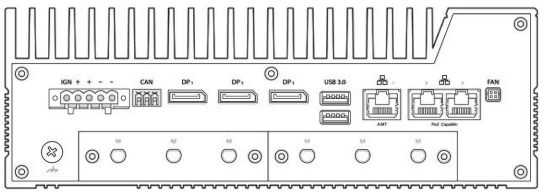




EI-700 Dimensions







Installation

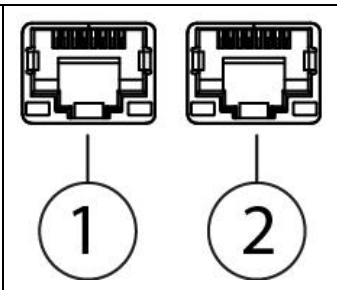
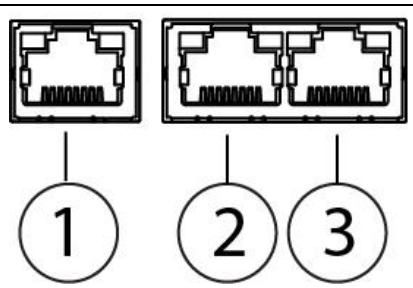
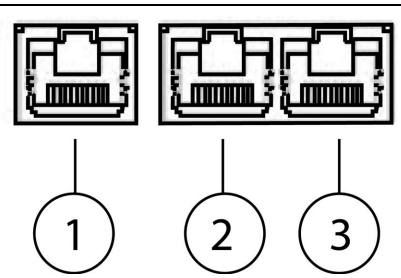
This section describes the installation process.

Connecting the Edge Intelligence

Unpack your Edge Intelligence unit and check that the following components have been included: power cable, display port to VGA adapter, and DIN rail mounting kit.

Perform the steps below before connecting to the web user interface:

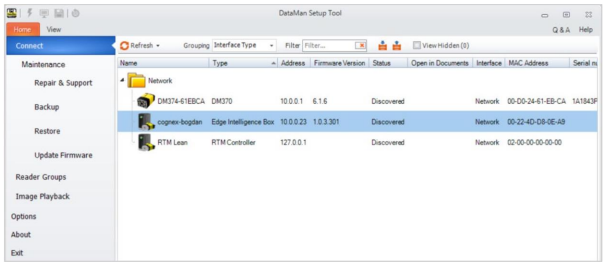
1. Connect Edge Intelligence unit to your Enterprise network using the External Ethernet port.

			
	EI-200	**EI-300**	**EI-700**
1	External (DHCP)	External (DHCP)	External (DHCP)
2	Internal (192.168.1.100)	Internal (192.168.1.100)	Internal (192.168.1.100)
3	N/A	Internal (DHCP default)	Internal (DHCP default)

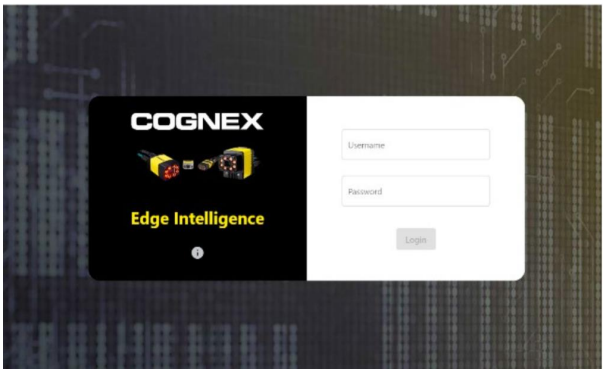
2. Connect Edge Intelligence unit to your reader network LAN using the Internal Ethernet port.
3. Connect any desired peripherals such as monitor, mouse, or keyboard to your Edge Intelligence unit using the USB ports before powering on the device.
4. Connect Edge Intelligence unit to power and start the device.

Accessing the Web Interface and Logging In

After connecting the Edge Intelligence, connect directly to a VGA monitor and peripherals or by using Cognex DataMan Setup Tool (6.1.8 or later) to discover and configure Edge Intelligence to access the Edge Intelligence web interface, which makes it possible to connect remotely via web browser from any device in the network.



Click the discovered device and enter your credentials in the pop-up Login page.



The following predefined users are available by default:

Note: After creating the user profiles, changing the default password of each user profile is necessary to avoid security risks.

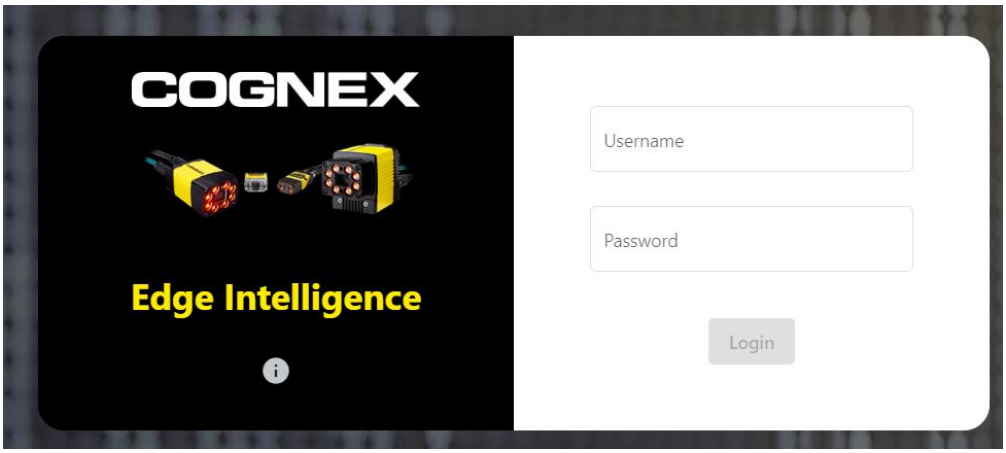
User	Password	Permission
admin	BnthWWSD	Has access to all apps and features.
engineer	TaRDpKVx	Has access to all apps and features.
operator	SxtXGmxs	User with read-only rights. The operator does not have access to the Multi-Reader Configuration app and the Settings.

You can click the information button which opens a pop-up to shows the following device details:

- Documentation – a link that opens the reference manual stored on the box
- Network Interfaces– shows available and connected network ports with their configurations
- Component Versions – highlights different features that run on the platform

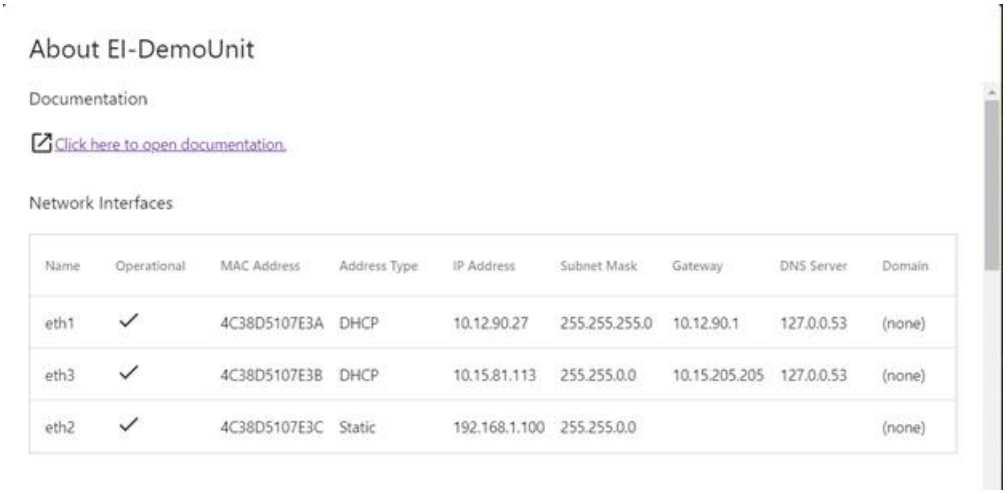
Directly Connecting Using a Monitor

1. Connect your Edge Intelligence unit to a monitor using the provided Display Port to VGA adapter, or mini Display Port to VGA adapter when connecting EI-200.
2. The login page appears.



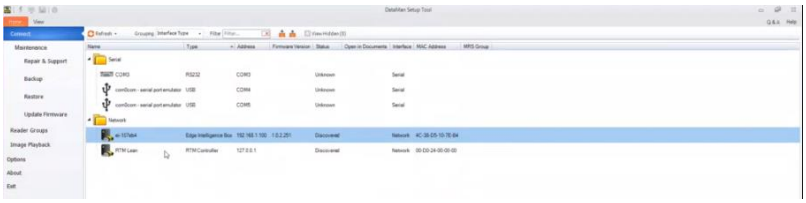
3. Click the information icon to get the external IP address. The internal IP address is **192.168.1.100** by default.

4. Take note of the external IP address, as you will need it to remotely connect to Edge Intelligence.

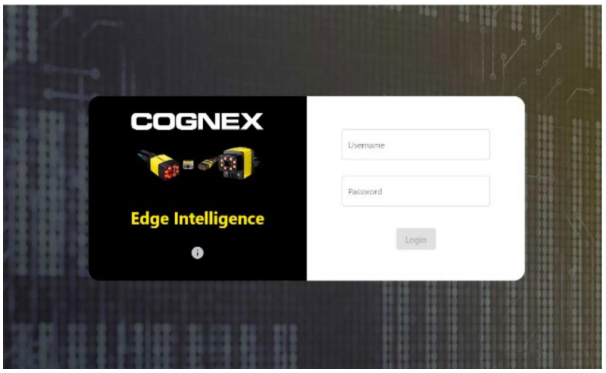


Remotely Connecting Using DataMan Setup Tool

1. Open Cognex DataMan Setup Tool (6.1.8 or later) to discover and connect to Edge Intelligence device. For more information on Setup Tool and troubleshooting, see ***DataMan Setup Tool Reference Manual***.
2. Double click on the icon of the discovered Edge Intelligence



3. Login to the Edge Intelligence software. For login information, see *Accessing the Web Interface and Logging In* on page 28.



Discovering Devices on the Network

The default IP address for the Internal Ethernet port of Edge Intelligence is set to 192.168.1.100. All devices on the network are discovered automatically, regardless of the network settings. However, discovered devices are labeled as misconfigured if they are not in the local subnet.

Discover Devices

Upon successfully logging in, the web UI launches, and Edge Intelligence auto-discovers the devices on your network, which appear listed on your home screen.

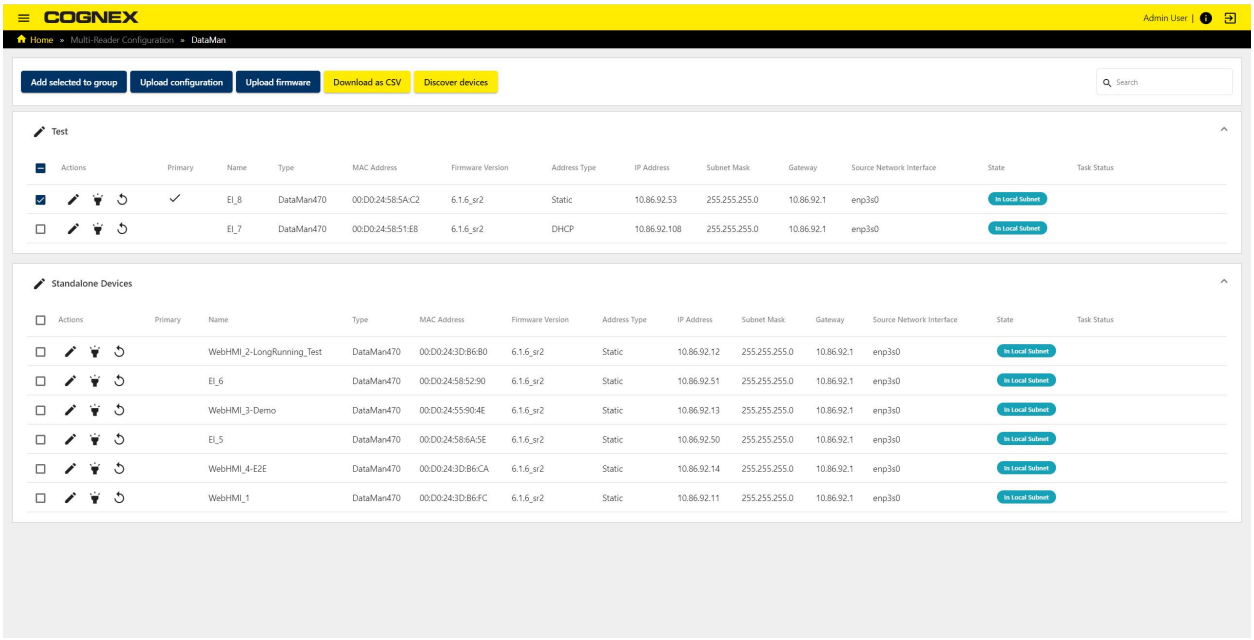
Click on the **Discover Devices** button in the header of the web interface to force a rediscovery if you have connected a new device after the initial auto-discovery.

Note:
If you need to change your Edge Intelligence's network settings, open the menu and go to the Settings > Edge Device. From there, you can set the network settings.

Network Settings

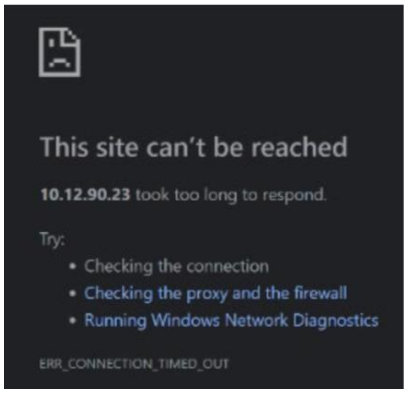
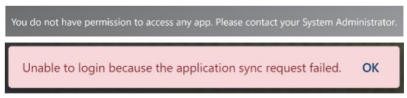
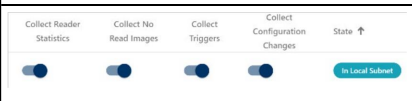
It is recommended that all Cognex devices be on the same network as Edge Intelligence. In order to make this happen, change the IP address of all readers on the network to be in the same network as 192.168.1.xxx, or change the IP address of the Ethernet port to match those of the readers.

Note: The devices found on the network are listed on the first page of the Multi-reader Configuration Application.



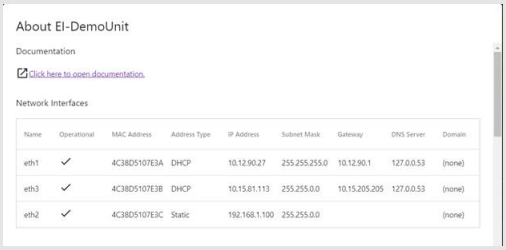
Remote Connection Troubleshooting

This section lists the most common errors and their solutions.

Error	Illustration	Solution
Edge Intelligence is not visible in the Setup Tool or in the browser		Check wire connectons, secure them if necessary.
Failed login error message		Check the credentials and re-enter username and/or password.
Component load error message		Reboot device and wait for services to start.
No data/images available		Check reader availability and setup.

Note: An Ethernet connection to your network is recommended, as Wi-Fi may not allow the connection depending on your network settings.

Note:
The IP address of your device is listed on the login page.



Edge Intelligence User Interface

The Edge Intelligence user interface provides the following applications:

- Real Time Monitoring (RTM)
- Performance Analytics
- Validation Failure
- Multi-Reader Configuration (MRC)
- Reporting
- User Management
- Settings

Click the Menu icon in the upper left corner to open the navigation pane. Use the tree to navigate between the available apps and their pages.

Real Time Monitoring (RTM)

Real Time Monitoring (RTM) is a software application that collects statistical data including configuration history from readers on the network. RTM pages provide visualization of the collected data real-time, as well as over a longer period. The app provides the user with options of manual classification for no reads to troubleshoot the performance of the readers quickly.

RTM visualizes collected data in counters and trackers on 2 overview pages while users are able to view and change settings on 2 other pages:

- Live - home page of Edge intelligence, allows the user to asses the activity of the readers on the network in real time, group by group or per reader

- Performance Overview - allows the user to assess the performance of the readers on the network over a period of time
- No Read Trigger Review - provides a list of No reads, allows manual classification of no reads and provides the no read images in the image panel
- Configuration Change History - lists past configuration for a given group or reader, allows the user to compare configurations in a time frame
- Settings - the user can add and discover devices, view reader data like IP address, firmware version, model and change collection settings

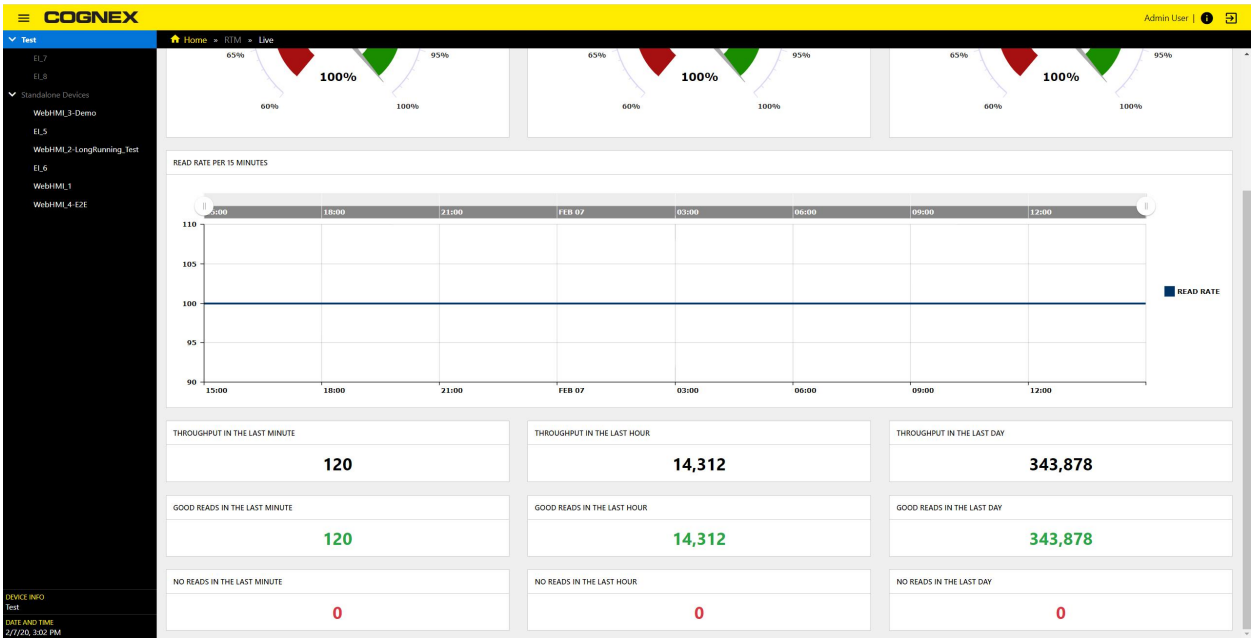
RTM provides the user rich data on system performance in different arrangement and detail on the pages. Standalone readers and groups provide RTM with collectable information about:

- Read rate
- Throughput
- Good read
- No read
- Passed validations
- Failed validations
- Trigger overrun
- Buffer overflow
- Missed triggers

Live

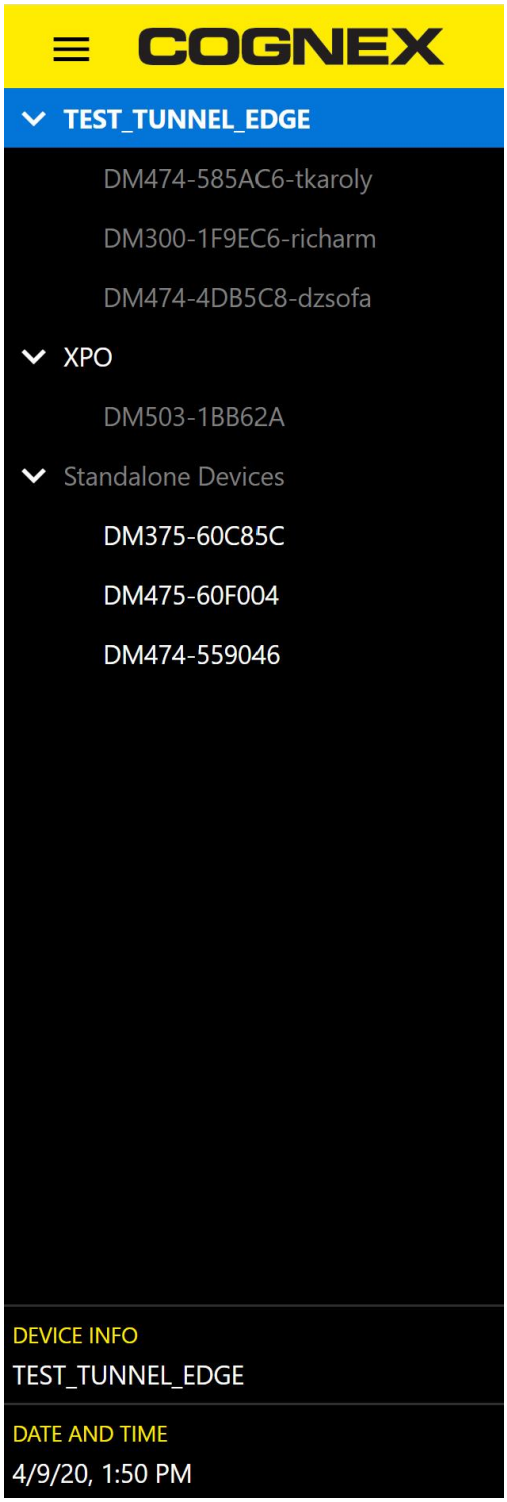
The Live page is the home page of Edge intelligence. It provides real-time information from grouped or standalone devices.

The device tree on the left lets the user select groups, or standalone readers. If a reader is a member of a group it is not possible to select it in this device tree. On the Dashboard the user sees an overview of read rate of the selected group or reader per 15 minute intervals. Above the read rate table a percentage counters for read rates show the percent of good reads per 1 minute, 1 hour and 1 day. Below the read rate table this data is sectioned throughput, good reads, and no reads aligned to the passed minute, hour, and day.



Item	Description
Top ribbon	Main menu, About section pop-up window, and Log out button are located on the yellow top ribbon. The ribbon displays the type of the user signed in.
Device tree	The left side of the window shows the readers or reader groups.
Dashboard	The window arranges the collected Throughput, Good read and No read rates data for the selected group or reader. The window orders the data by the last minute, hour or day.

Device tree

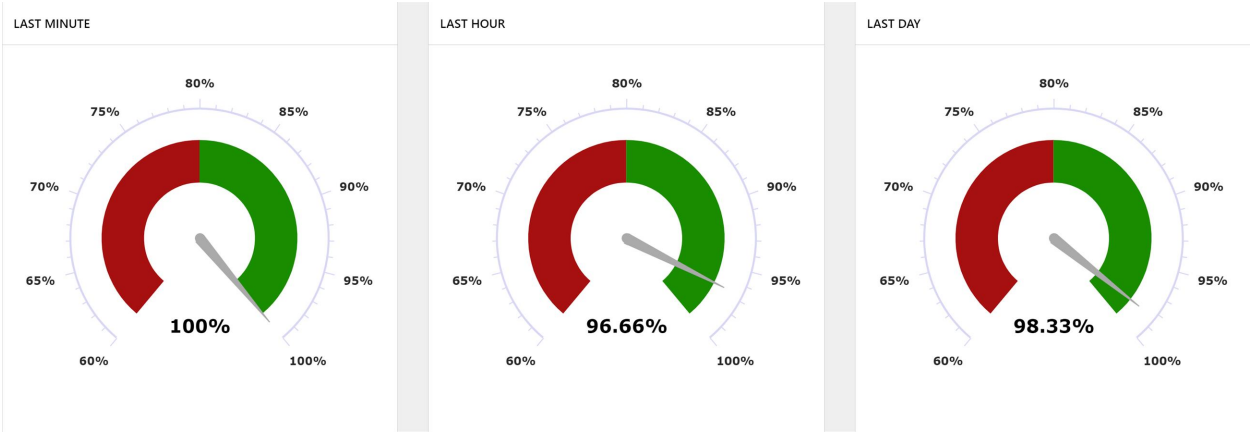


The device tree shows the user what devices, readers and reader groups, are on the network. Click on the group or standalone reader to view the live data collected from it. IDs of the individual readers within a group are displayed in grey, but data collected separately from the individual readers within a group is unavailable. The bottom of the pane displays information about the selected group and the date and time.

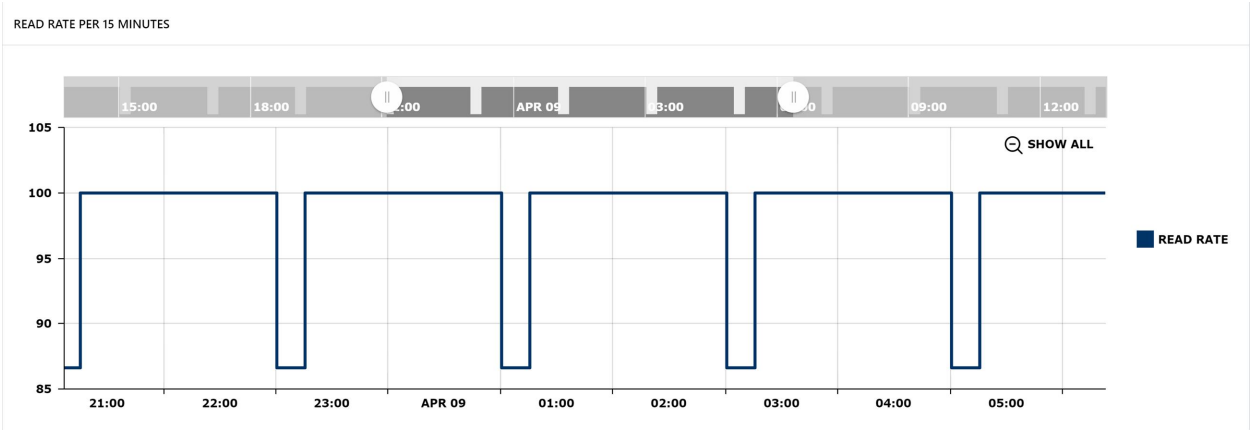
Dashboard

The window arranges the collected data in 3 time-frames:

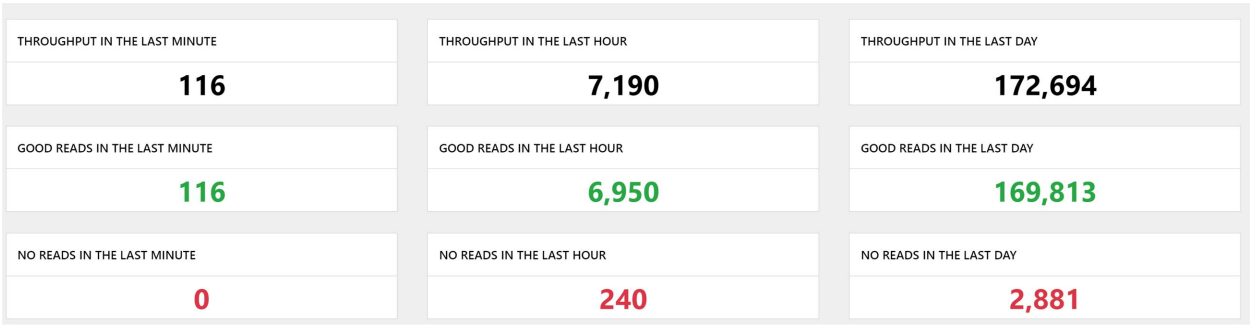
- Last minute
- Last Hour
- Last Day



The top row indicates the percentage of Good Reads in the time frames. Percentage measurements start from 60% up to 100%. The Good read percentage overview allows the user to assess performance of the MRS group or reader at a glance.



The middle section shows a fifteen minute interval read rate tracker. The user is able to select the time range of the tracker in the header by dragging the selector nob to view shorter ranges of time in more detail. To return to the maximum value, click on the **Show all** option. The user is able to see and get detailed data about good and bad reads from the tracker. Hovering over the tracker highlights events and Good Reads or Bad reads bringing up the details of the event like percentage and time stamp.



The bottom 3 rows of the dashboard separates the collected read rate date into:

- Throughput count per time frame
- Good Reads count per time frame
- No Reads count per time frame

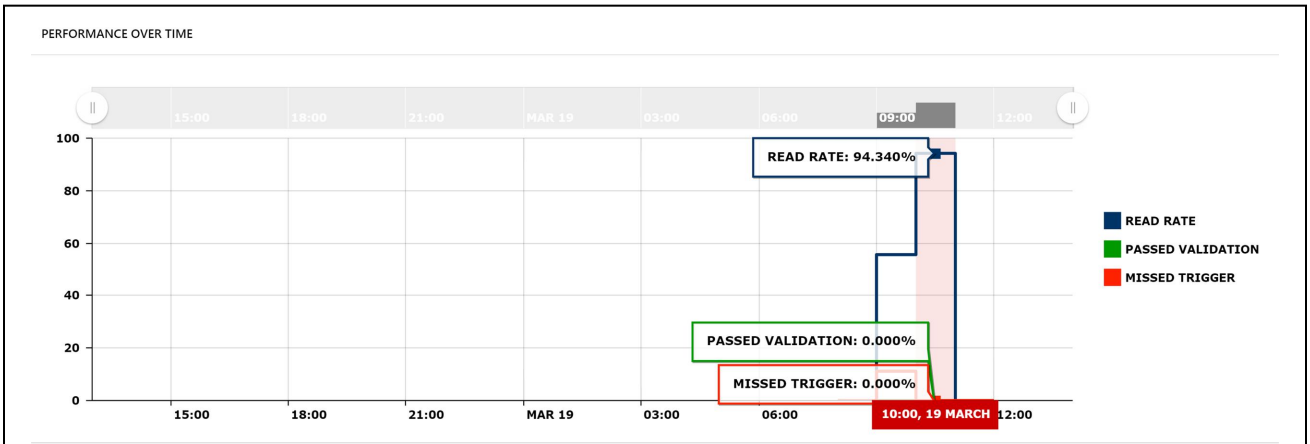
For more clear overview the data is color coded: BLACK indicates Throughput, GREEN indicates Good Reads, and RED indicates No Reads.

Note: To navigate to a different RTM page or to a different app, use the Main menu opening from the top left side corner.

Performance Monitoring

Edge Intelligence can track a number of trigger statistics from DataMan readers, and visualize the data in various ways. This suite of tools includes the following:

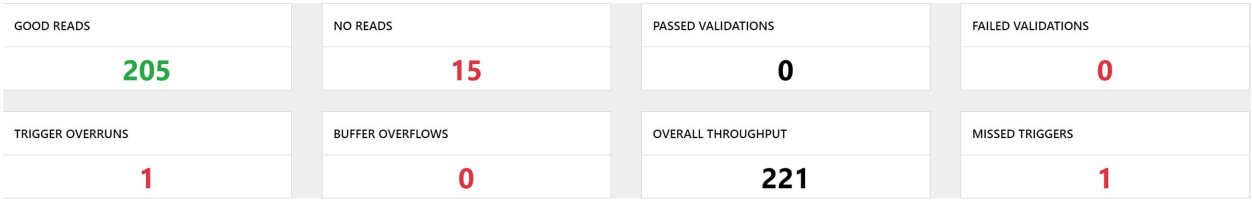
- Rolling data that updates every minute in real time for increments of 1 minute, 1 hour, and 24 hours
- Global selector of time range to specify data range
- Showcasing system events within the read rate graphics
- Ability to zoom into the collected data in different increments and have it displayed accordingly:
  - by day for sets larger than 24 hours
  - by hour for sets smaller than 24 hours
- Throughput chart with stacked bars of good reads and no reads per hour, with tool tips giving values of bars.



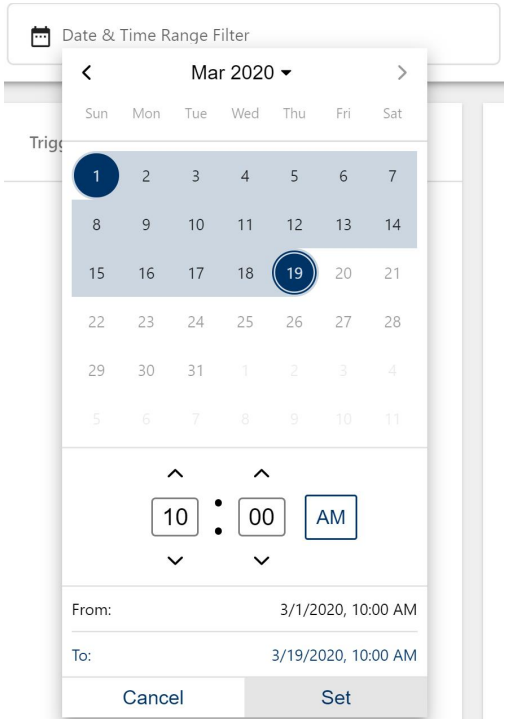
Statistics	Description
Read Rate	Rate of good reads compared to the number of total triggers.
Passed Validation	Rate of passed validations compared to the number of total triggers.
Missed Trigger	Rate of missed triggers compared to the number of total triggers.

Statistics	Description
Good Reads	Number of good reads.
No Reads	Number of no reads.

Overall reader statistics:



Date and Time Range Filter:

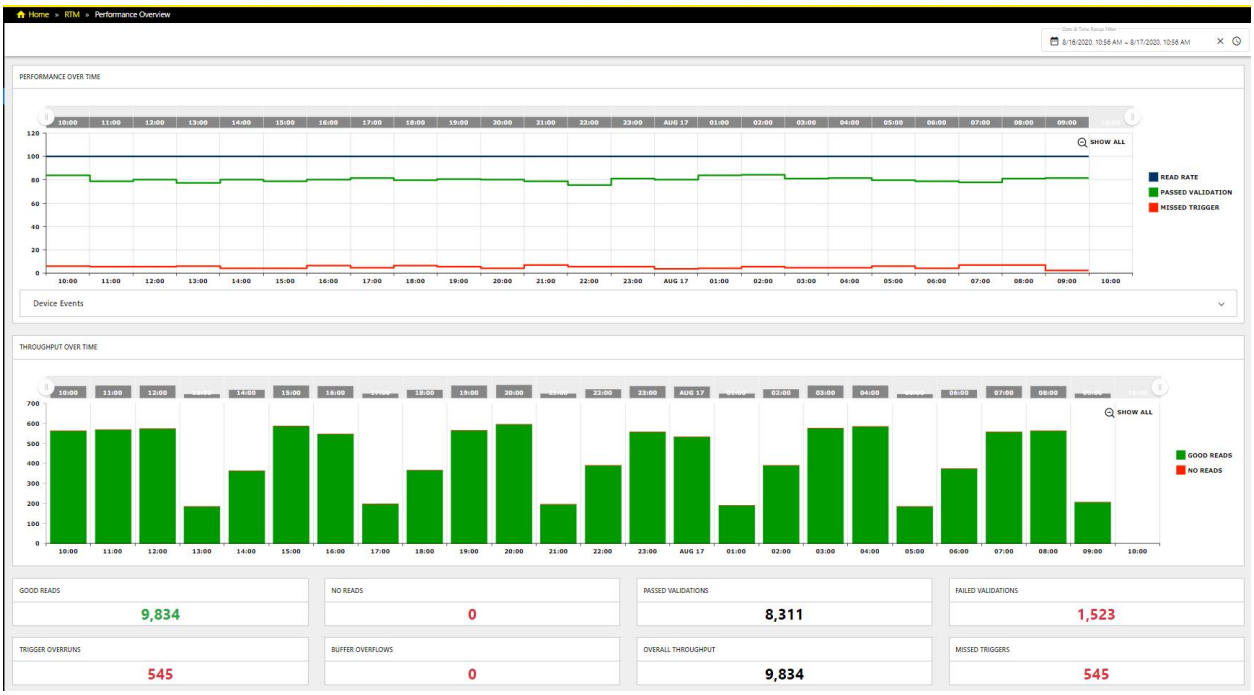


Set the time range to define a period of time from which performance data is collected for the charts.

Performance Overview

The Performance Overview page of the RTM app provides the performance data from time intervals older than 24 hours. The user is able to select the time range for a group or reader. The Dashboard displays the data collected in trackers arranged to performance over time, throughput over time and an adjustable tracker at the bottom of the dashboard. The dashboard also displays counters for:

- Good Reads – The number of triggers where a code was successfully decoded.
- No Reads – The number of triggers where a code was not decoded.
- Passed Validations – The number of good reads whose encoded data passes a specified content, format, or quality standard.
- Failed Validations – The number of good reads whose encoded data does not pass a specified content, format, or quality standard.
- Trigger Overruns – The number of times that the image could not be acquired because the reader was busy (for example, due to an ongoing burst or a long exposure).
- Buffer Overflows – The number of times it was possible to acquire an image, but there is no space left to save it on the reader. In other words, images are acquired faster than they can be processed. One possible situation is when decoding takes longer than what the image/trigger interval is.
- Overall Throughput – The sum of good reads and no reads.
- Missed Triggers – The sum of trigger overruns and buffer overflows.



Dasboard Item	Description
Date and Time Range Filter	Enables setting date and time range of collected data to view on the Dashboard.
Performance Over Time tracker	Shows color coded performance data in the selected range of time.

Throughput Over time tracker	Shows color coded throughput data in the selected range of time.
Counters	Shows numbers of good-reads, no-reads, passed validations, failed validations, trigger overrun, buffer overflow, overall throughput, and missed triggers in the selected range of time.

To select a standalone reader or group, click on the name in the device tree.

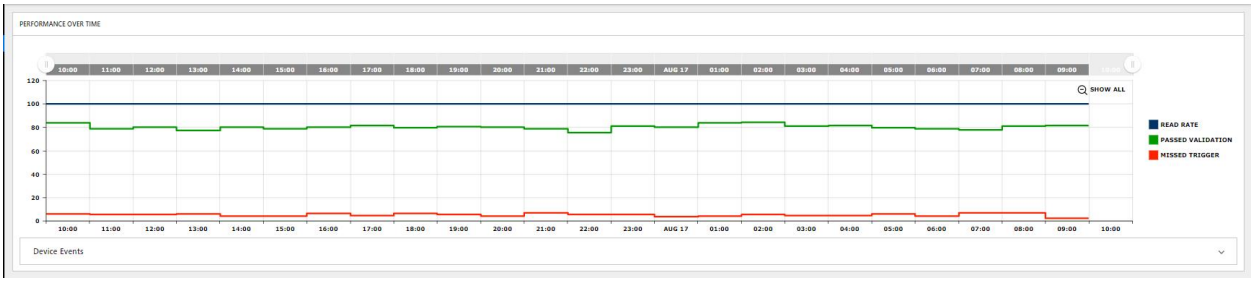
To set a time range click in the date and time range filter field and chose the dates from the drop down calendar and clock.

Note: The date and time range selected on the Performance Monitoring page remains the same when navigating to other RTM app pages, except from the Live page.

Trackers

Trackers provide detailed information about each event. To see details of an event, hover the mouse over the tracker. To zoom in, use the slides above the trackers. To returned to the selected time range, click Show all.

Performance Over Time Tracker

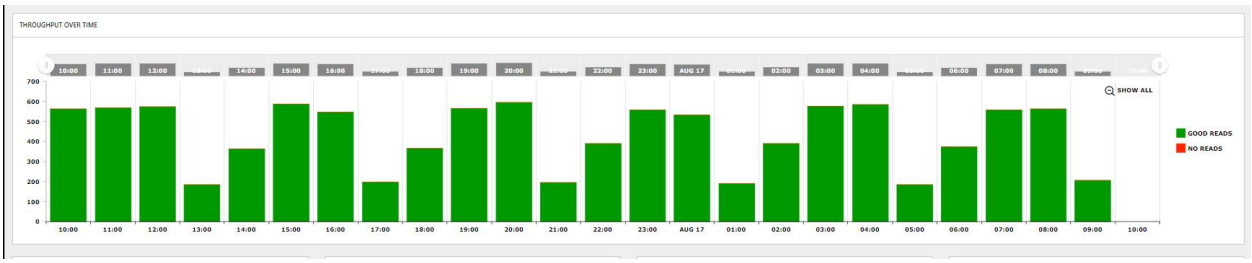


The tracker is dynamic chart that sums up read rate, passed validations and missed triggers over the given time range. The data showed in the chart is color coded.

Color	Description
BLUE	Read rate
GREEN	Passed validation
RED	Missed triggers

To see the percentage of Read rate, Passed Validation, and Missed Triggers hover the mouse over the tracker. To take a more detailed look over a certain part in the time range given, drag the slides above the tracker. To return to the overview, click on Show all.

Throughput Over Time Tracker



The tracker is dynamic chart that sums up throughput over the given time range. The data shown in the chart is color coded.

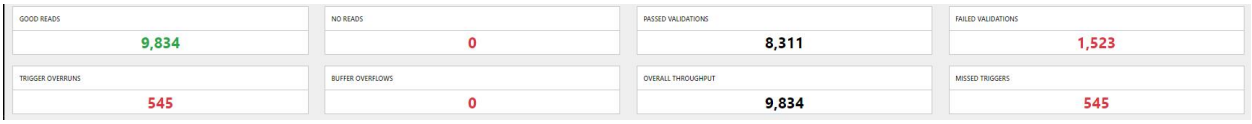
Color	Description

GREEN	Good reads
RED	No reads

To see the number of Good Reads or No reads hover the mouse over the tracker. To take a more detailed look over a certain part in the time range given, drag the slides above the tracker. To return to the overview, click on Show all.

Counters

Counters provide statistical data separated into categories of the overall read rate pertaining to the given time range. The Counters are color coded to give the user an at-a-glance overview of the performance of the group or standalone reader.



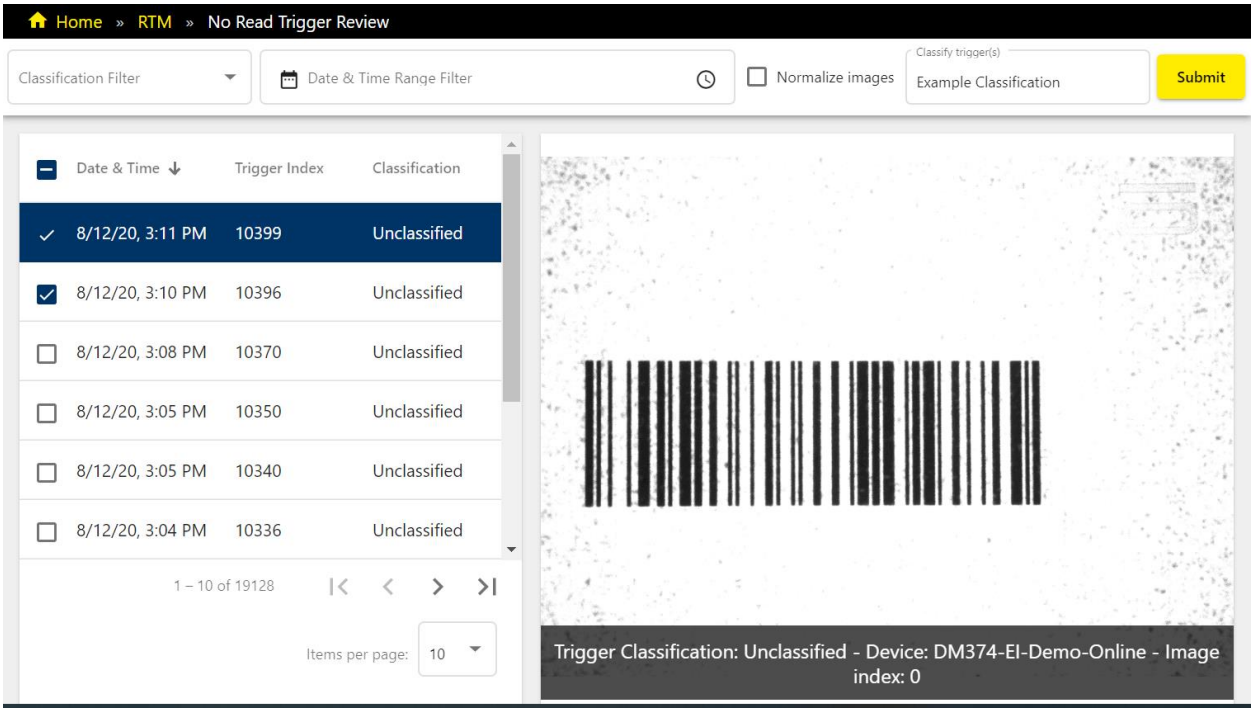
Color	Description
BLACK	Count of passed Validation and Overall Throughput. The numbers that display neutral information about the performance of the readers or group.
GREEN	Count of Good Reads.
RED	Count of No Reads, Failed Validation, Trigger Overrun, Buffer Overflow, and Missed Triggers. The counters with RED number signal problems that occurred during the given time range.

Note: To navigate to a different RTM page or to a different app, use the Main menu opening from the top left side corner.

No Read Trigger Review

The No Read Trigger Review page gives an overview of images and events when no reads occurred during collection. The user is able to set a time frame for overview, classification type and is able to classify the No Read images manually. The user is able to view a maximum of 100 No Read events on a single page.

To view images from a secondary reader (from MRS group), first enable trigger collection on the primary reader on the Settings page.



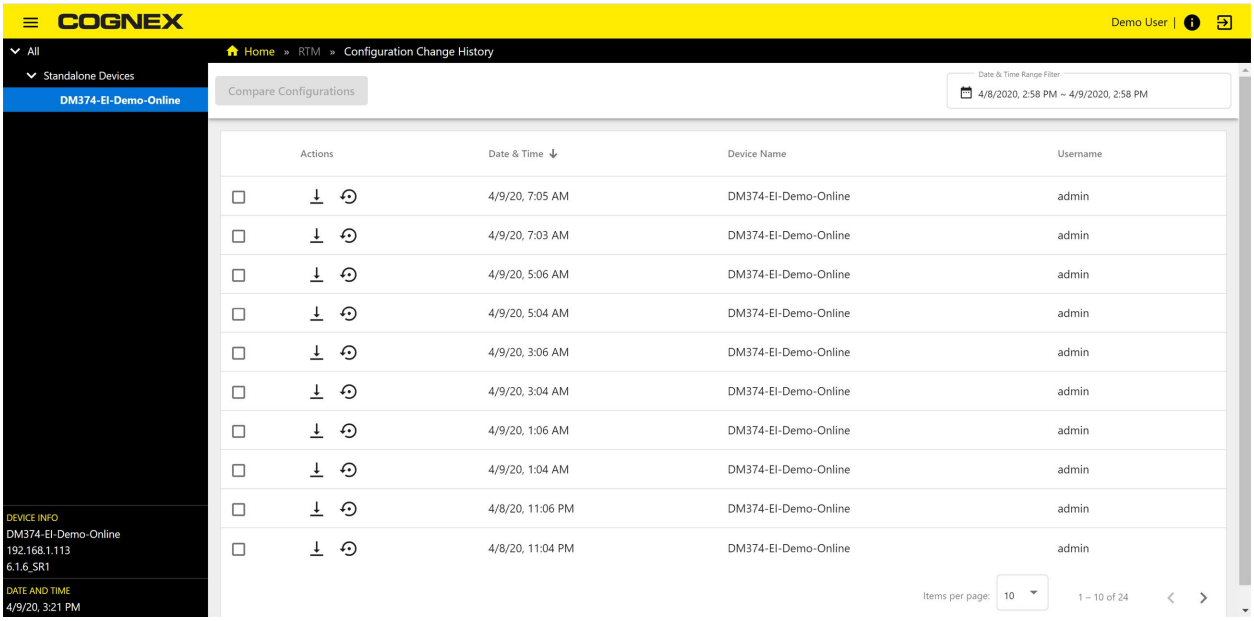
Dasboard Item	Description
Classification Filter	The user is able to chose the classification types from a drop down menu that the table below will filter for: • Damaged Code • Motion blur • No Label • Unclassified • Any other manually entered classification options
Date and Time Range Filter	The user sets date and time range of collected No Read data to view on the No Read Image table and display.
Normalize Image check box	Check to enhance the quality of images. Normalizing improves the contrast by stretching the intensity values of an image.
Classify trigger(s) field	The user is able to manually classify No read images by entering their own classification or choosing from a drop down menu. • Damaged Code • Motion blur • No Label • Unclassified • Any other manually entered classification options

Submit	The Submit button saves the new classifications you assign in the Classify trigger(s) text field.
No Read Image table	The table shows No Read data in three columns: • Date and Time • Trigger index • Classification Each entry in the table represents 1 No read trigger event. To view the No Read image, click on the row of the trigger event and the image is displayed on the right side of the table. The user is able to arrange the data by clicking on the headers of the three columns.
Image Display window	This window displays the No read image of the selected row of the No read trigger Image table.

Note: To navigate to a different RTM page or to a different app, use the Main menu, which opens from the top left corner.

Configuration Change History

The Configuration Change History page tracks changes made to the configuration of all readers respectively and allows the user to view the changes in a customized fashion. The window displays the Device tree with available grouped and standalone readers. The upper ribbon with the Main menu is used to navigate between pages, apps and the Dashboard.



Dashboard overview:

Item	Description
Compare Configurations button	Enables comparison in a pop-up window.
Date and Time Range Filter	Enables setting date and time range of collected data to view on the Dashboard.
Configuration tables	List of readers and groups available for comparison.

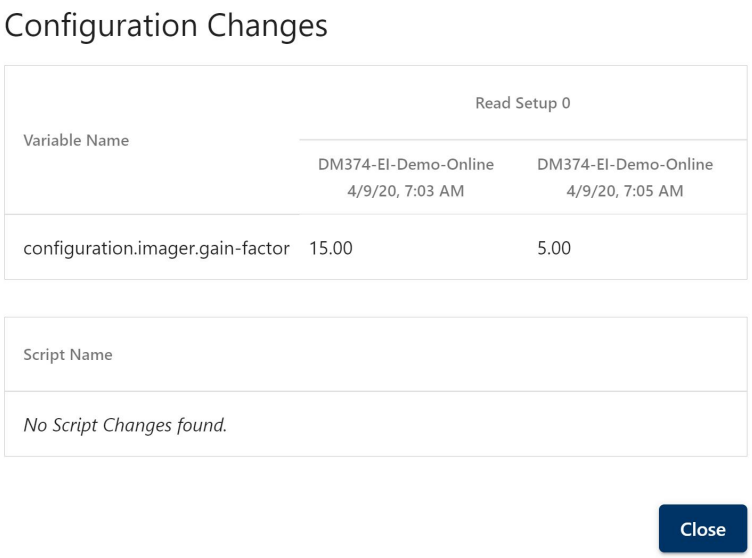
Configuration table overview:

Column Name	Description	Display
Check box	To select a reader or group for comparison, click the check box.	
Actions	Download	
	Restore	
Date and time	Date and time of the configuration change.	3/3/20, 9:10 AM
Device name	Name of the reader on the network.	
Username	Name and type of the user who made the configuration change.	

To compare two configurations, select the readers to compare. Click on the Compare Configurations button.

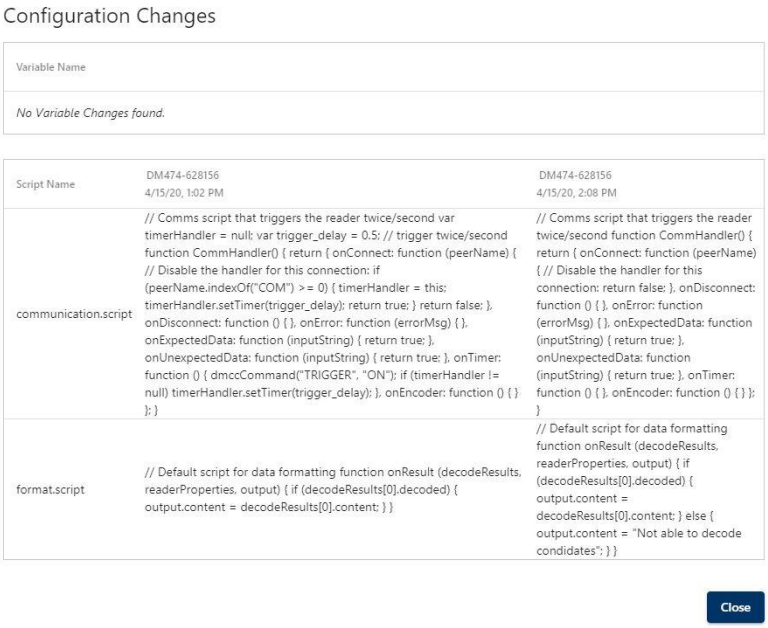
A pop up window appears with a table containing the comparison results.

Variable changes:



Column Name	Description
Variable Name	List of variables that have different values in the compared configuration versions.
Read Setups	Display the name of the readers compared, and the difference in values pertaining to the row of the configuration variables.

Script changes:

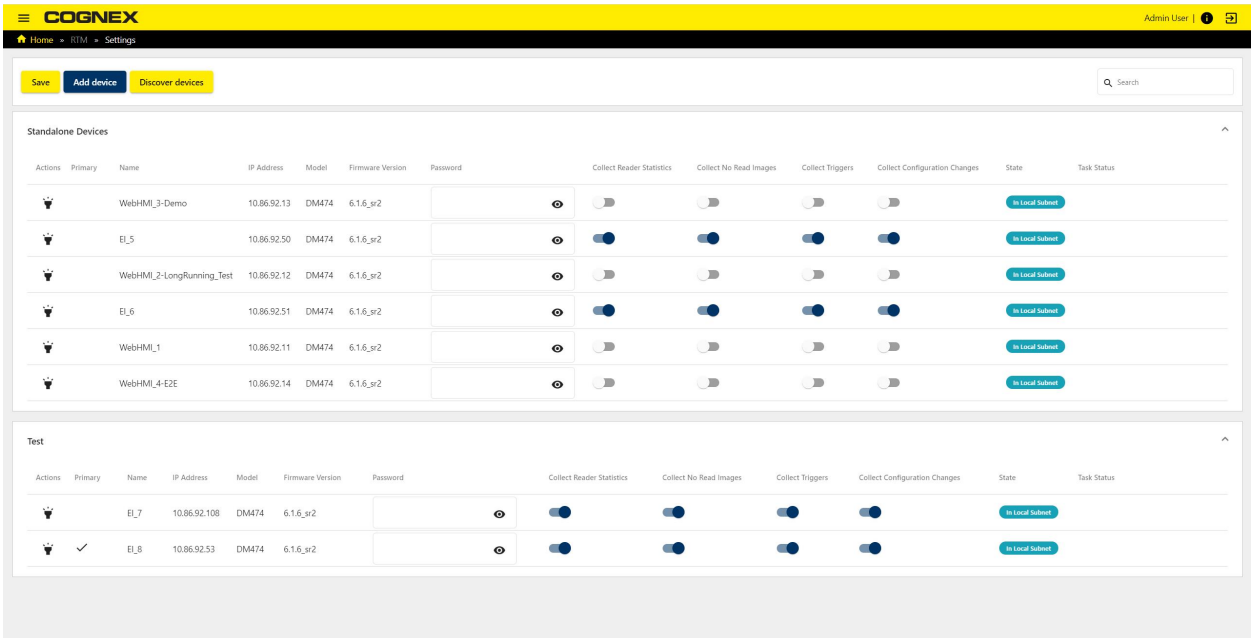


Column Name	Description
Variable Name	List of variables that have different values in the compared configuration versions.
Read Setups	Display the name of the readers compared, and the difference in values pertaining to the row of the configuration scripts.

Settings

The Settings page of the RTM app lists all discovered devices on the network, provides options to subscribe for various statistical data from a reader or groups of readers. The window consists of a Top ribbon, where the Main Menu, the user info, the About section, and the Log out button resides. The window also consists of the Dashboard which contains information and settings options for all readers, standalone or in a group.

Note: To view images from a slave reader (from MRS group), first enable trigger collection on the master reader.



Item	Description
Action ribbon	Ribbon contains actions that can be performed on this page: Save - To save changes to the settings of a reader Add Device - To manually add a device not automatically recognized by the RTM app Discover devices - To trigger the RTM app to find more devices on the network
Standalone reader list	A table view of the settings of the standalone readers that are discovered on the network with options that can be enabled or disabled for the reader
Grouped reader list	Table views of the readers in a group sorted alphabetically by group name with options that can be enabled or disabled for the individual reader
Search Field	Allows searching for a reader by Name, Model or Firmware version

The table view of the standalone or group readers displays information and allows setting changes to the individual readers.

Column Title	Description
Actions	To flash led, click on the Flash icon
Primary	A check mark signifies the primary reader
Name	A customizable name of the reader
IP address	The IP address of the reader
Model	The type of the reader
Firmware version	The version of firmware installed on the reader
Password field	Password of the user allows making changes to the settings
Collect Reader Statistics	Enable or disable collecting statistics from the reader
Collect No Read images	Enable or disable collecting No Read images from the reader
Collect Triggers	Enable or disable collecting triggers from the reader
Collect Configuration Changes	Enable or disable collecting configuration changes from the reader

State	Displays the state of the reader, which can be: • In Local Subnet • In Remote Subnet • In Remote Subnet Behind NAT • Waiting For DHCP • Misconfigured • Unknown
Task status	Displays the status of the task

Note: To navigate to a different RTM page or to a different app, use the Main menu, which opens from the top left corner.

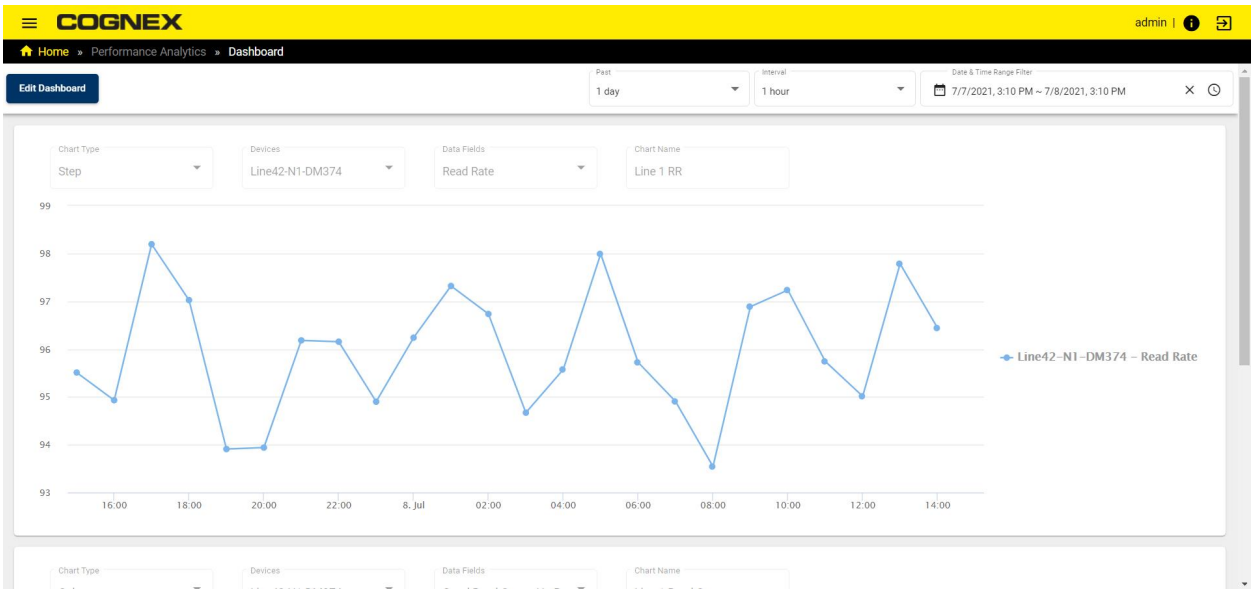
Performance Analytics

The Performance Analytics application of the Edge Intelligence user interface provides additional analytics options over the Performance Monitoring page in the RTM application.

Dashboard

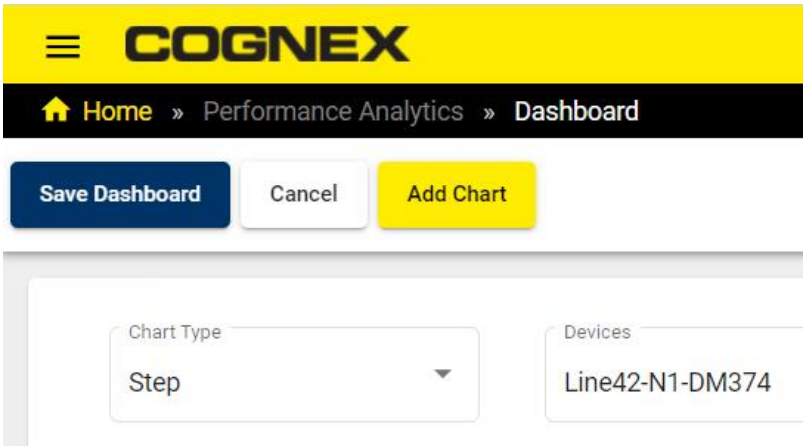
The **Dashboard** page of the Performance Analytics application provides a configurable set of saved charts that visualize the performance data of connected devices. The Dashboard allows you to create and save new charts, and edit existing ones, with multiple chart type display options and a wide array of data sets. You can also set the date and time range, and the charts on the Dashboard update accordingly.

The **Dashboard** page:



Edit Dashboard

Click **Edit Dashboard** in the top left corner of the page to enable creating, editing, moving, and deleting charts on the Dashboard.



To create a new chart at the top of the Dashboard:

1. Click **Add Chart** to create an empty chart.
2. Set the **Chart Type**, **Devices**, or **Data Fields** properties of the chart by clicking on the property box and selecting the desired settings from the dropdown. For a list of available Chart Types and Data Fields, see *Performance Review* on page 50.
3. Fill in the **Chart Name** text box to give the chart a name.

To edit an existing chart, click on its properties and change the settings. The chart updates automatically to reflect the new settings.

To move a chart up or down on the Dashboard, click on the arrow icons in the top right corner of the chart.

To delete a chart, click on the trash icon in the top right corner of the chart.

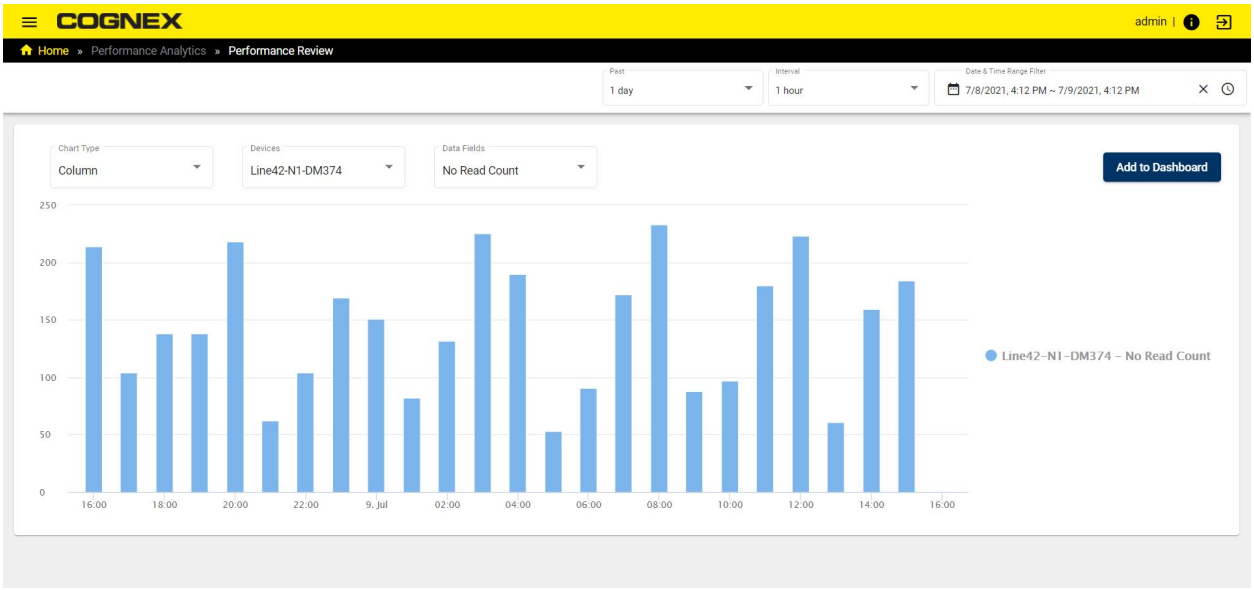
Once you are done editing the Dashboard, click **Save Dashboard** to save your changes, or **Cancel** to discard your changes.

You can zoom into areas of interest on the charts by clicking and dragging the cursor. Click **Reset Zoom** to return to the full time range.

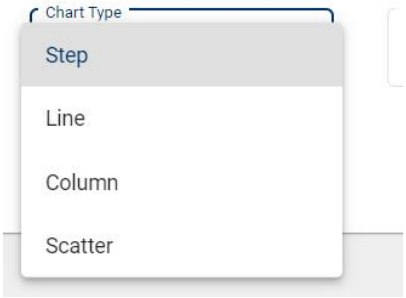
Performance Review

The **Performance Review** page of the Performance Analytics application allows you to configure a chart that visualizes the performance data of connected devices with multiple chart type display options and a wide array of data sets. You can also set the date and time range, and the chart updates accordingly.

The **Performance Review** page:

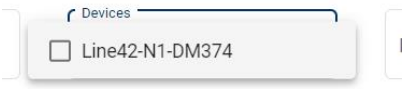


Click on a chart property to open a dropdown with the available configuration options.



Select one of the available **Chart Types**:

- Step
- Line (default)
- Column
- Scatter



The **Devices** property provides a list of all connected devices. Check the checkbox of one or more devices to add their data to the chart.

Select one or more of the available **Data Fields**:

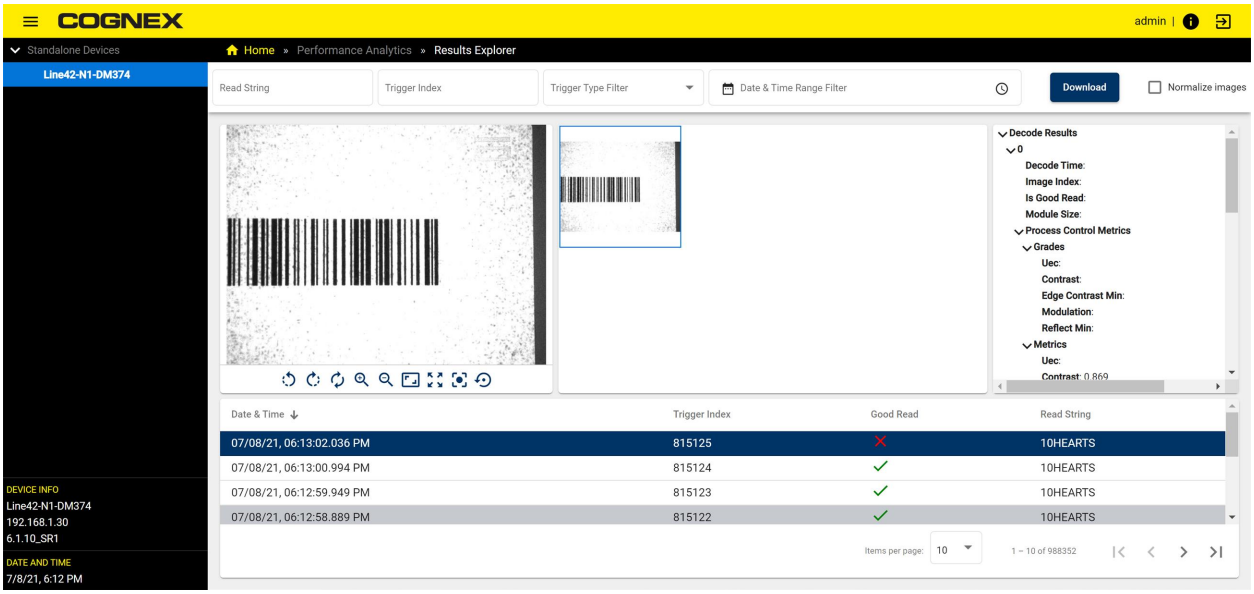
- Good Read Count
- No Read Count
- Read Rate
- Throughput
- Validation Rate
- Failed Validation Count
- Passed Validation Percent
- Missed Trigger Percent
- Buffer Overflow Count
- Trigger Overrun Count

You can zoom into areas of interest on the chart by clicking and dragging the cursor. Click **Reset Zoom** to return to the full time range.

If you want to keep your chart configuration, you can also save it as a chart on the **Dashboard** page. Click **Add to Dashboard** in the top right corner of the chart.

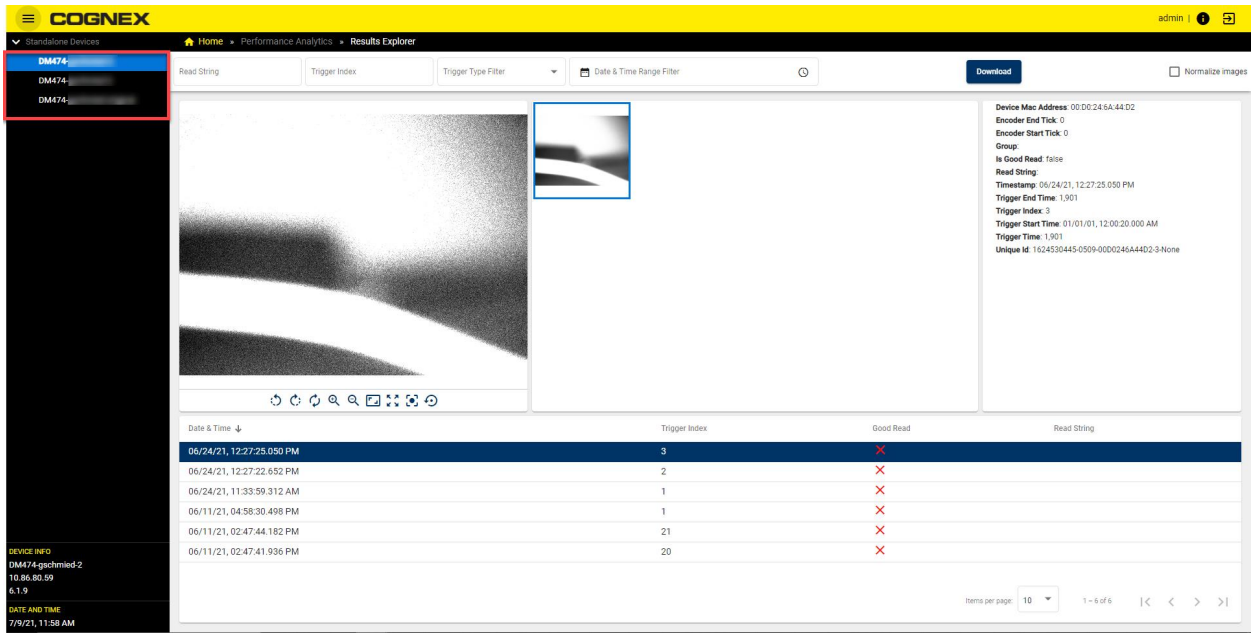
Results Explorer

With Results Explorer you can filter the results collected by Cognex devices and find the data that is most important to you.

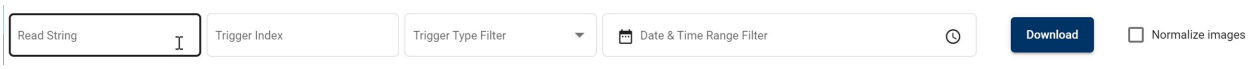


On the device tree select the reader you wish to use with Results Explorer.

Double-clicking the selected device automatically brings you to the Results Explorer window, which provides a list of all trigger acquisitions on thereader and further information about each.

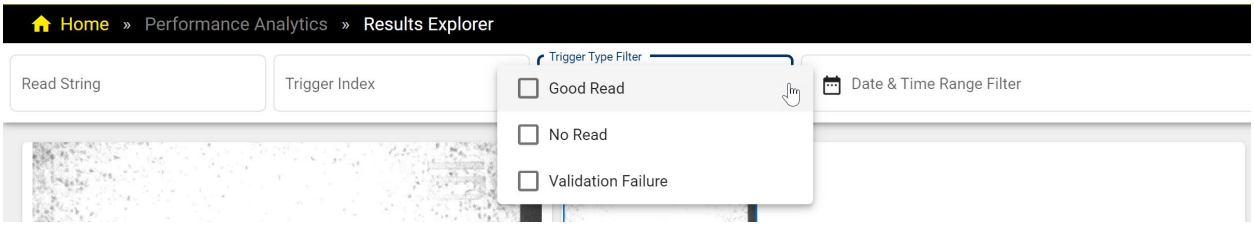


To filter acquisition details for the selected device, fill in the entry fields on the top of the Results Explorer window:

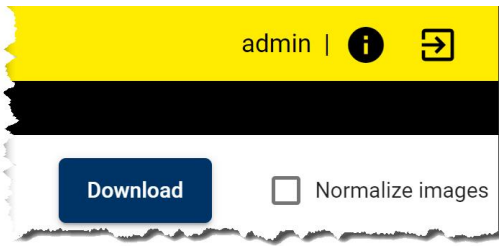


- In **Read string** entry field**,** you can look over the triggers that contain a specific character string.
- In **Trigger Index** entry field**,** you can filter trigger acquisitions by typing in or copy the number of the trigger Index.

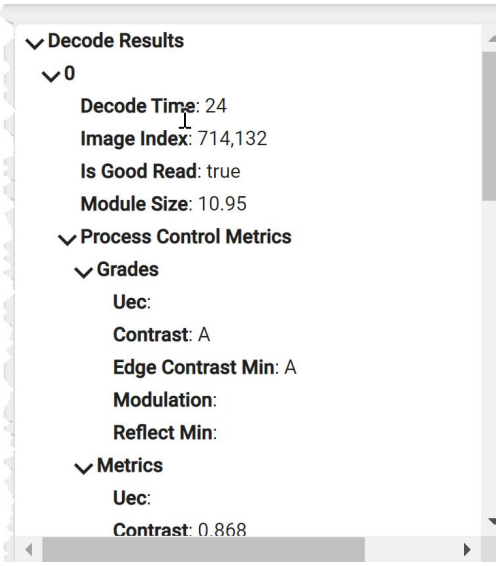
- In the **Trigger Type Filter** drop-down menu, you can choose from the options:
  - Good Read
  - No Read
  - Validation Failure



- Use the **Date & Time Range Filter** to specify the time range of the results
- Click the **Download** button to download the captured images to your computer.
- Select the **Normalize images** checkbox, to increase image contrast. Unselect the checkbox to set the images back to default.



In the sidebar on the right, you can see more in-depth decode results for each of the trigger acquisitions on the list.



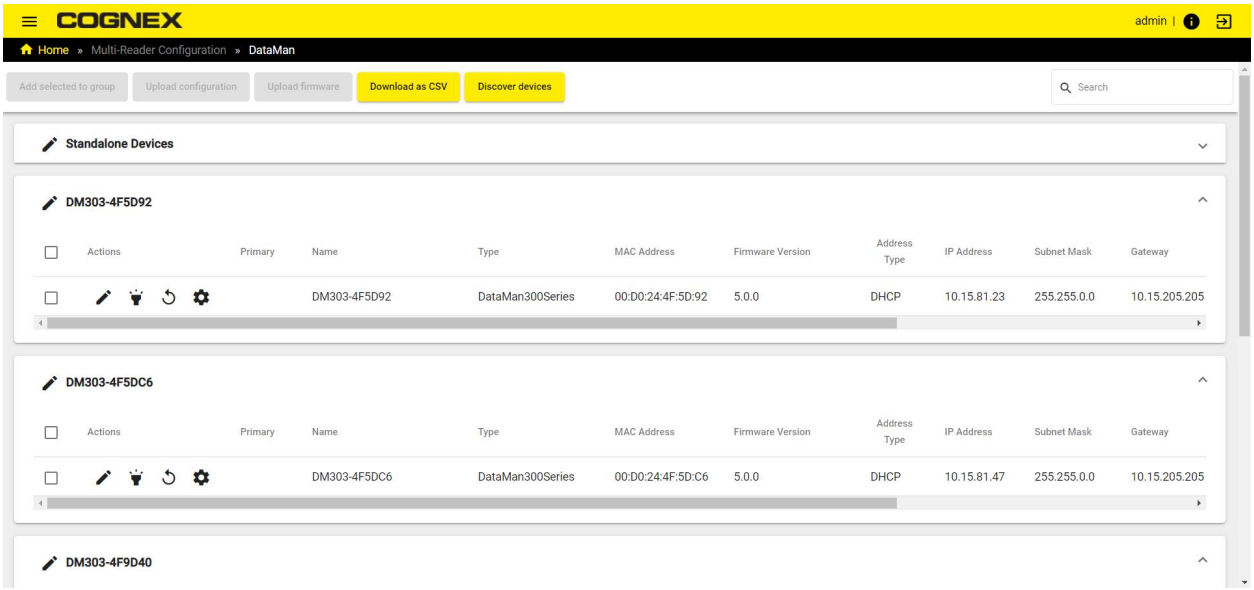
Multi-Reader Configuration (MRC)

The Multi-Reader Configuration application of the Edge Intelligence user interface provides a list of standalone devices and device groups, shows device information, and allows you to modify settings on individual devices as well as multiple devices simultaneously. You can also save entire tables of device configuration data to your local machine.

DataMan

The DataMan page of the Multi-Reader Configuration application provides a list of standalone devices, as well as device groups, including device data. You can edit the configuration, flash the LED, reboot, or access the WebHMI of individual devices from the DataMan page. You can perform mass configuration or firmware updates for device groups.

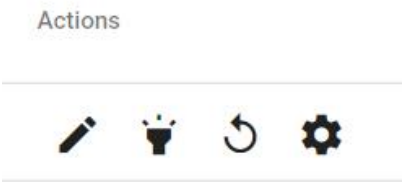
The DataMan page:



Click on the **Discover devices** button in the header to refresh the list of connected devices.

Click on the **Download as CSV** button in the header to save the device information for the connected devices in CSV format.

Individual Device Actions

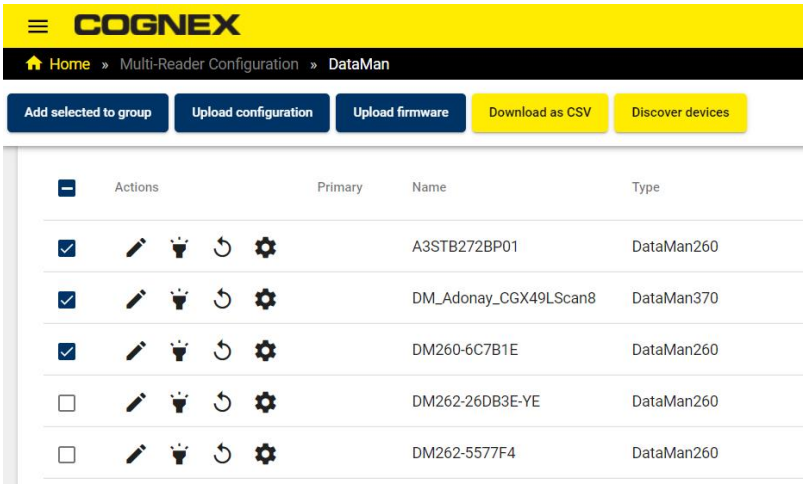


You can perform actions on an individual device by clicking on the icons in the **Actions** column of the row for the selected device:

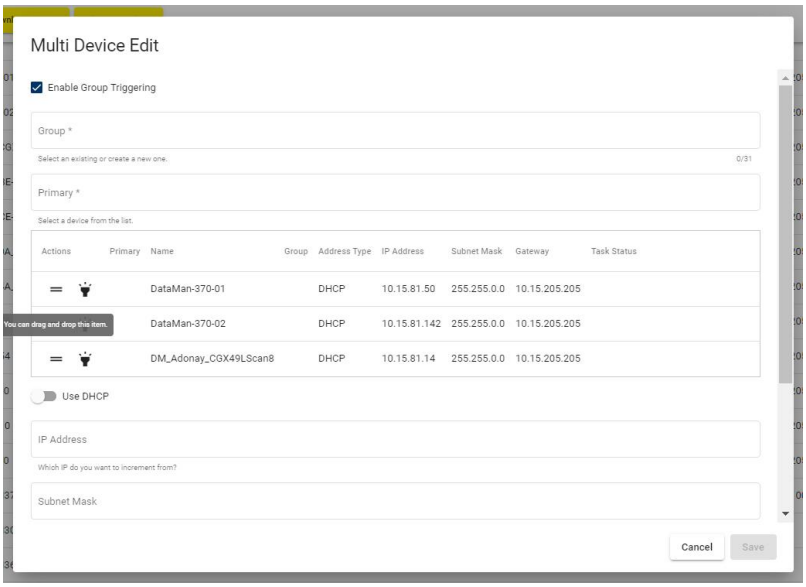
- Click the **Single Device Edit** button to modify the name, IP address, Subnet Mask, and Default Gateway of the device. Enter the device password if required.
- Click the **Flash LED** button to remotely trigger the LED of the device for easy identification.
- Click the **Reboot** button to initiate a reboot on the device.
- Click the **Open WebHMI** button to open the WebHMI in a new tab. For more information on the WebHMI, see *WebHMI* on page 57.

Device Group Actions

To perform group actions, check the checkbox of the selected devices, enabling the group action buttons in the header:



Click the **Add to selected group** button to open the **Multi Device Edit** window:

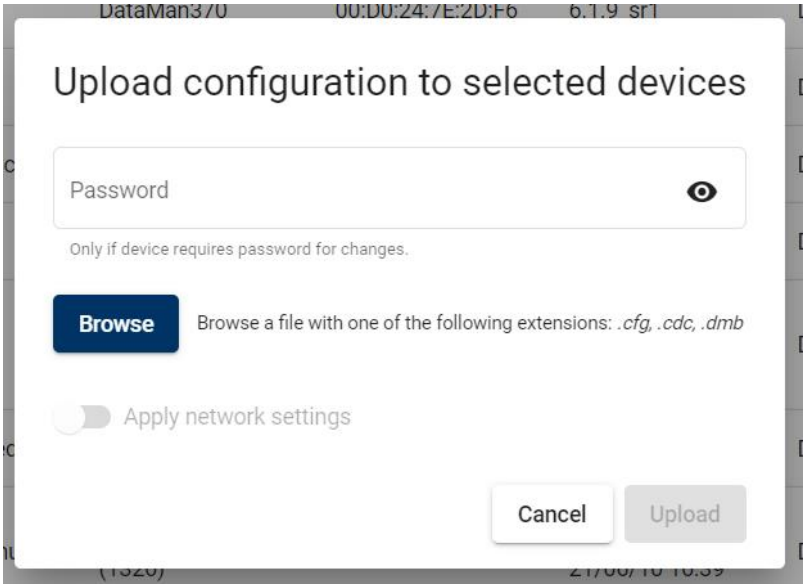


In the **Multi Device Edit** window, you can:

- add the selected devices to an existing group
- create a new group with the selected devices
- define a primary device in the group
- reorder the devices
- flash the LEDs of the individual devices for easy identification
- manually configure the IP Address, Subnet Mask, and Default Gateway

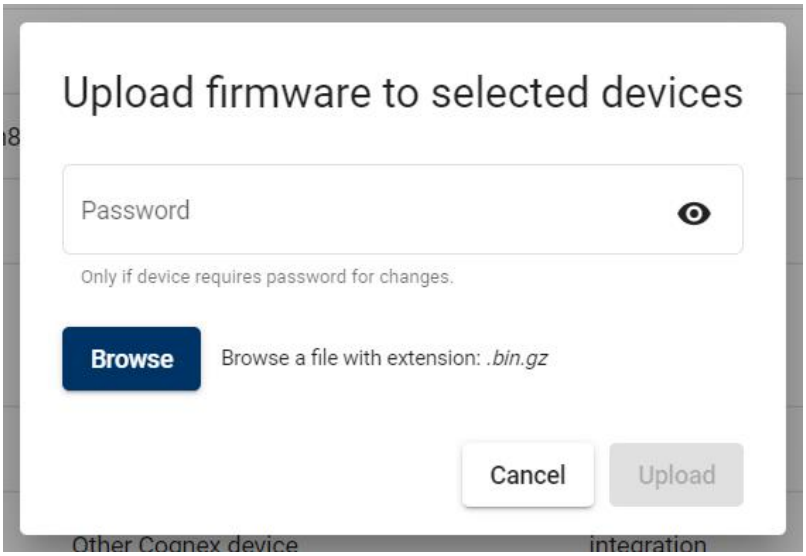
Enter the device password if the device is set up to require it. Click **Save** to apply any changes.

To upload a saved configuration file to selected devices, click the **Upload configuration** button, opening the **Upload configuration to selected devices** window:



Click **Browse** to select the configuration file for upload. Enable **Apply network settings** to apply network settings. Enter the device password if the device is set up to require it, and click **Upload**.

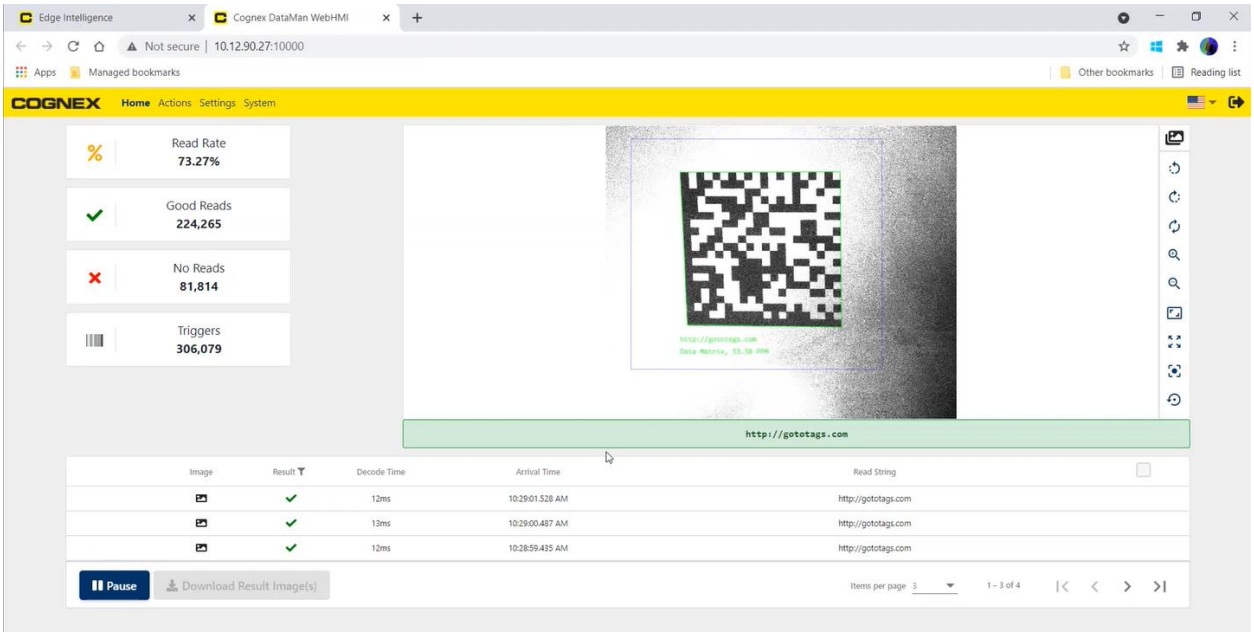
To update the firmware on selected devices, click the **Upload firmware** button, opening the **Upload firmware to selected devices** window:



Click **Browse** to select the firmware file for upload. Enable **Apply network settings** to apply network settings. Enter the device password if required, and click **Upload**.

WebHMI

The WebHMI application provides a live view of device reads, results and statistics, and allows you to pause the feed and scroll back to analyze or download individual result images. You can manually trigger or tune devices and adjust device settings from the WebHMI.



You can access the WebHMI for a connected DataMan device from the DataMan page of the Edge Intelligence user interface by clicking on the gear icon labeled **Open WebHMI** in the **Actions** column of the selected device.

Home

The WebHMI **Home** page displays a live feed of the device with statistics and result logs.

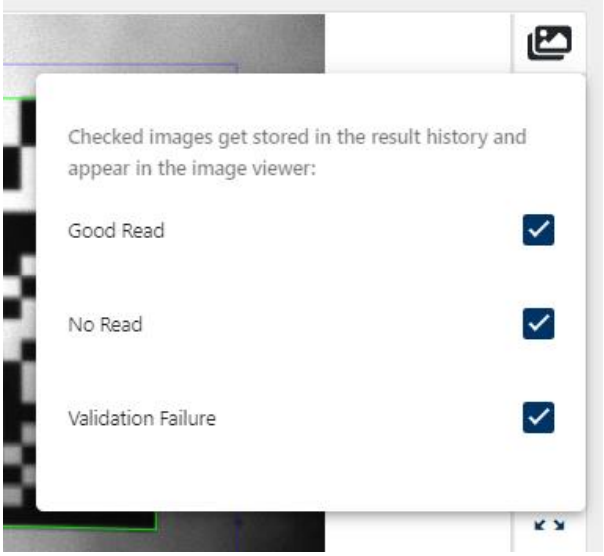
On the left side, the WebHMI home page shows statistics for:

- **Read Rate** percentage
- Number of **Good Reads**
- Number of **No Reads**
- Number of **Triggers**

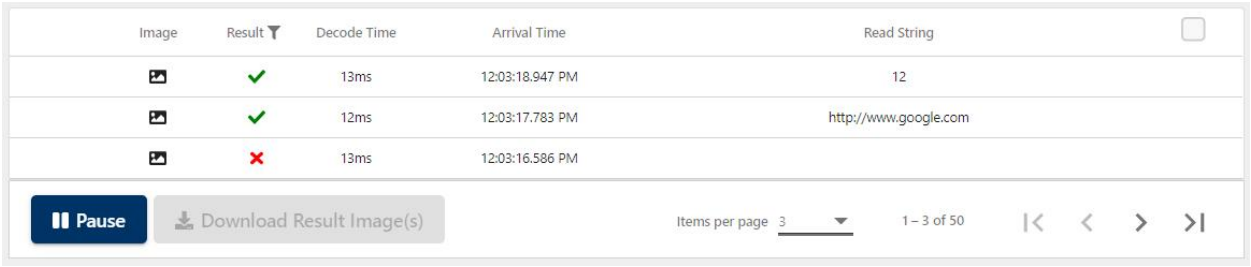
The display on the right side of the page provides a live feed of the device view with additional controls on the right side of the display for changing orientation and zoom:

- Rotate Left 90°
- Rotate Right 90°
- Reset Rotation
- Zoom In
- Zoom Out
- Zoom To Original Size
- Reset Zoom
- Move Center
- Reset All Settings

You can also filter the feed to display only **Good Read**, **No Read**, or **Validation Failure** results by clicking on the **Images** icon in the top right corner of the display.



The result logs of the last 50 captures are listed on the bottom of the page. You can browse the list using the navigation buttons in the bottom right corner of the pane.



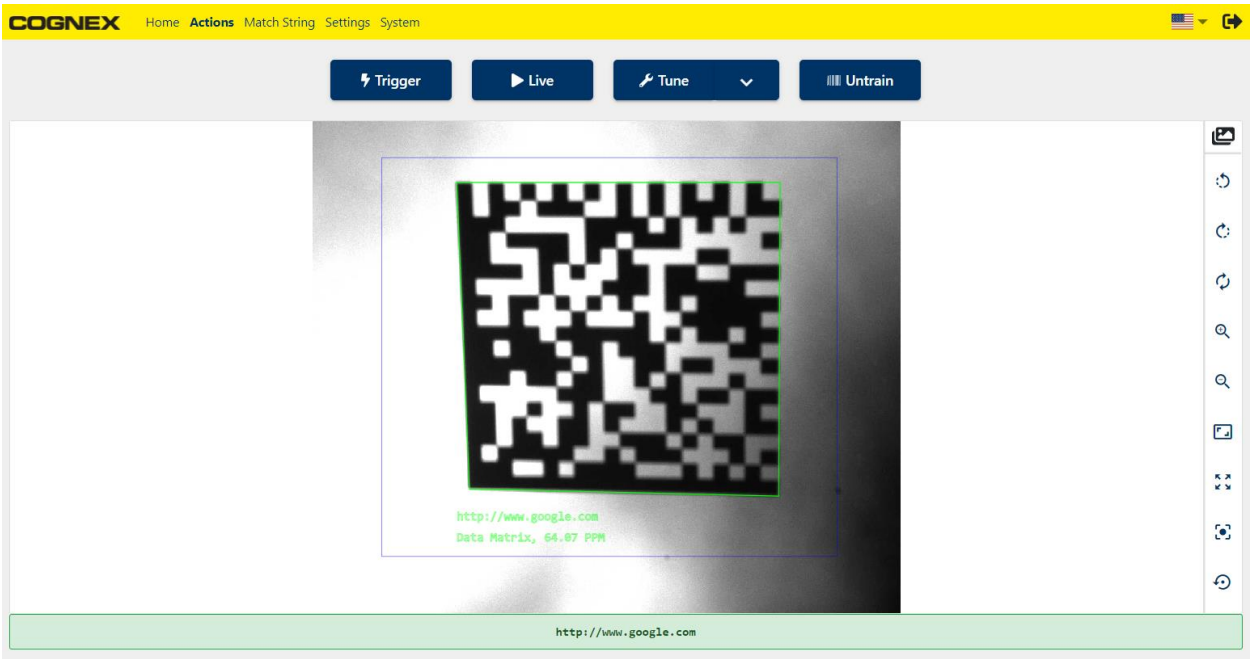
Click on the **Pause** button in the bottom left corner to pause the live feed. Pausing the feed allows you to select and download result images. Click on a log to put the result image on the display.

To download the image currently on the display, click on the **Download Result Image(s)** button without selecting any images from the result logs.

Check the checkboxes in the rightmost column of the result logs to select images for download, or check the checkbox in the table header to select all images. Click on **Download Result Image(s)** while multiple images are selected to download a ZIP file containing the selected result images.

Actions

The **Actions** page of the WebHMI allows you to manually trigger, start or stop, tune, or untrain the device.



Click **Trigger** to trigger the device manually.

Click **Live** to show the live feed of the device camera.

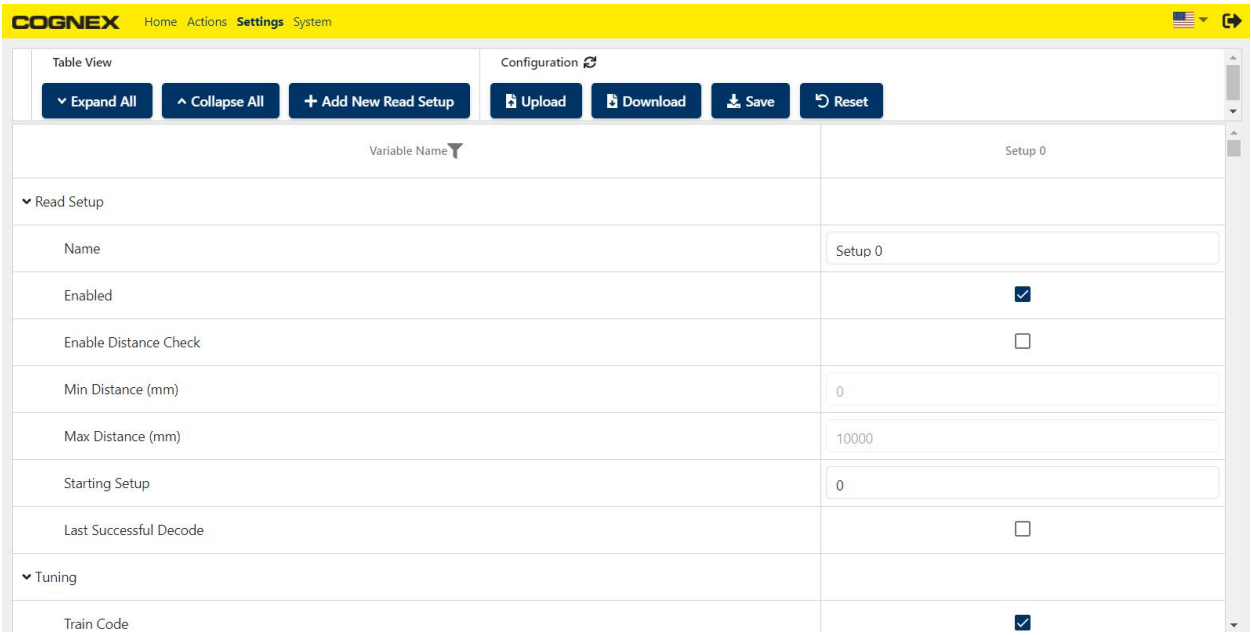
Click **Tune** to initiate an automatic recalibration. Open the Tune dropdown to optimize brightness or focus individually.

Note: When you tune a device, the device stops triggering.

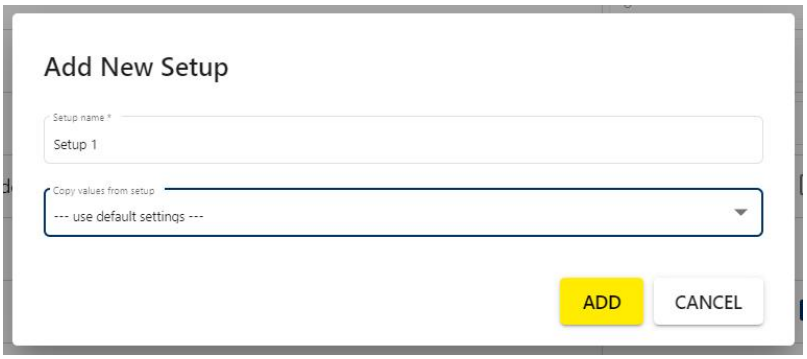
Click **Untrain** to untrain the device.

Settings

The **Settings** page of the WebHMI allows you to manually change the device configuration, upload, download, or save the current configuration, or reset the device to a previously saved configuration.



- Click **Expand All** or **Collapse All** at the top of the page to expand or collapse the setting categories in the settings table.
- Click **Add New Read Setup** to create a new setup using default settings or an existing setup as a template.

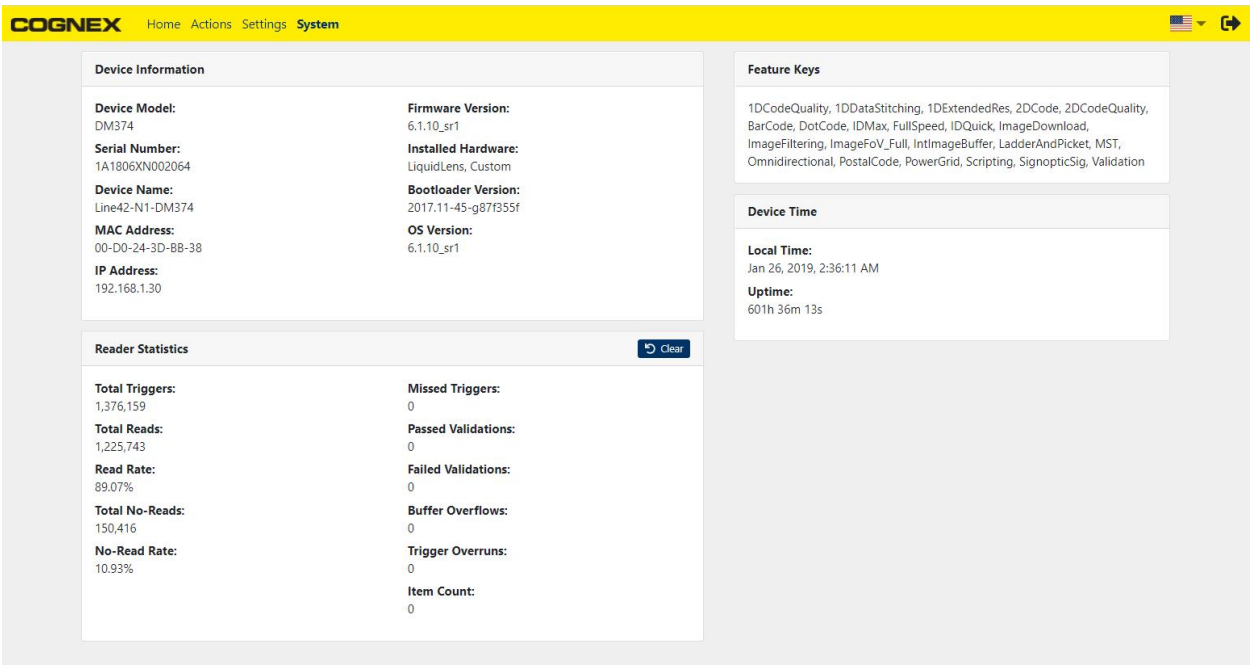


- Click **Upload** to upload a local configuration file to the device.
- Click **Download** to save the device configuration locally.
- Click **Save** to save the configuration on the device flash memory.
- Click **Reset** to reset the device configuration to default or a saved configuration.

The settings table provides you with detailed and in-depth configuration options for all device functionality. For a detailed description of the available settings, see Device Settings in WebHMI on page 1.

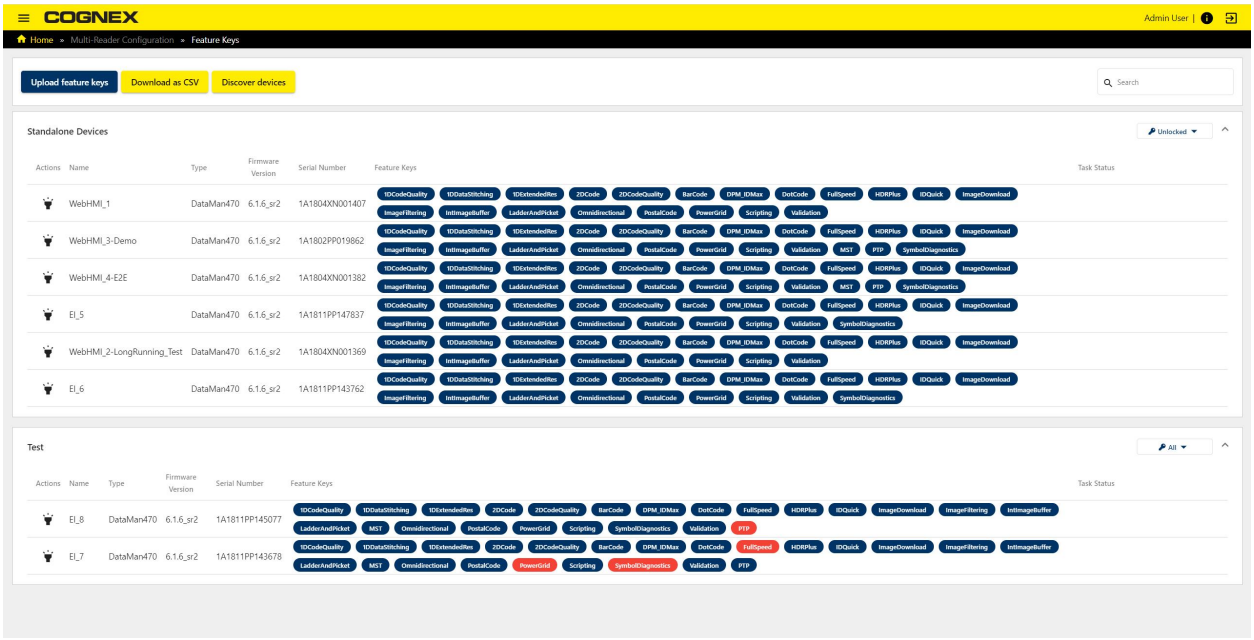
System

The **System** page of the WebHMI displays detailed device information, reader statistics, feature keys, and device time.



Feature Keys

The Feature Keys page shows the feature keys applied on each discovered reader.



The following actions are available:

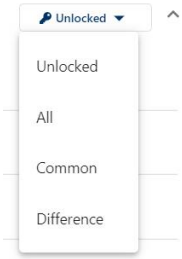
- Uploading feature key files
- Downloading Feature Keys page information in CSV
- Discovering devices

Button	Description
Upload feature keys	Upload feature key files.
Download as CSV	Download device list with all data in CSV format.
Discover devices	Discover connected devices.

The Feature Keys page also allows comparing uploaded feature keys between readers in a group:

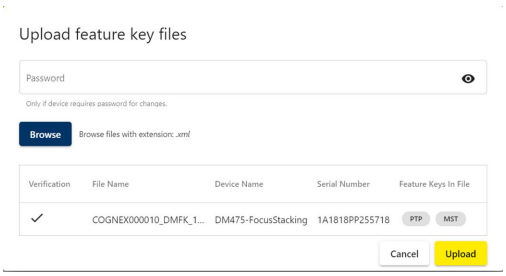
Feature Key Color	Description
	The feature is unlocked for the device.
	The feature is unlocked for some devices in the group, but not for the respective device.

Click the **Difference** dropdown menu to select the following menu items for comparison:



Item	Description
Unlocked	Show unlocked feature keys for all devices.
All	Show unlocked and locked feature keys for all devices.
Common	Show feature keys which are unlocked for all devices.
Difference	Show feature keys which have a different status among the devices.

Click the **Upload feature keys** button to upload a feature key file from your computer:



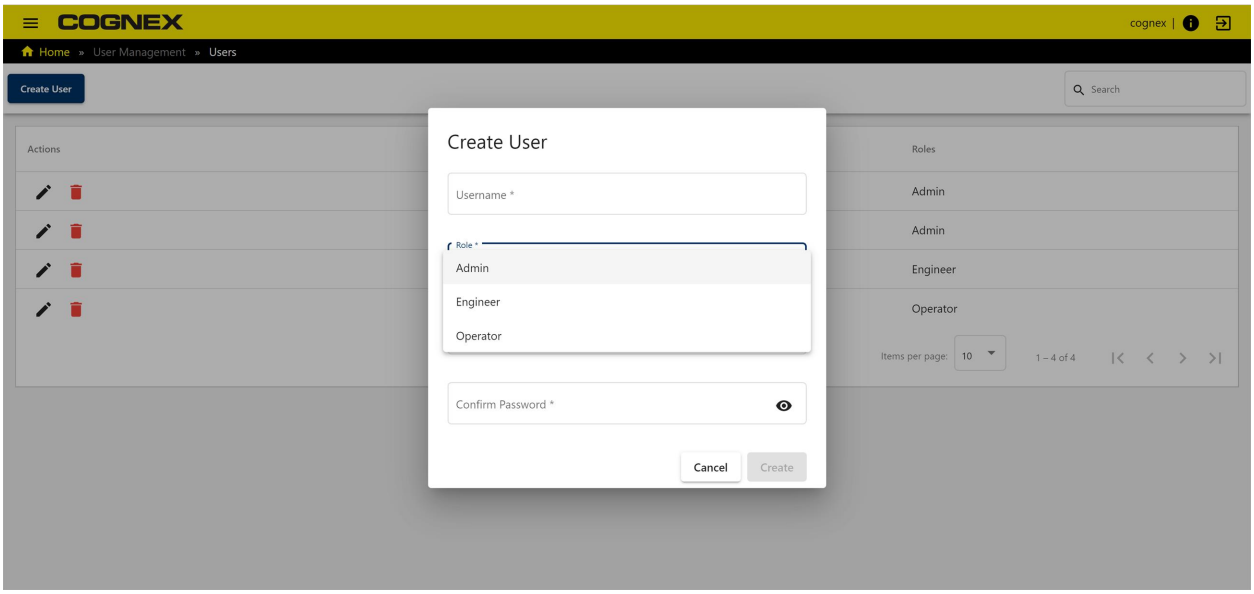
Item	Description
Password	Password is only needed if the device requires a password.
Browse	Browse files with .xml extension on your computer.
Verification	Shows verified status.
File Name	Name of the feature key files.
Device Name	Name of the device which gets the new feature key file.
Serial Number	Serial number of the device.
Feature Keys in File	Feature keys contained in the file.

User Management

The **Roles** page allows an admin level user to create roles and define which EI features those roles have access to. The **User** page allows an admin level user to create users and assign them roles.

User Management

The Users page provides tools for managing the user profiles available on the device. Admins can add, remove, and edit other user profiles. Each profile has a username, password, and role permissions.



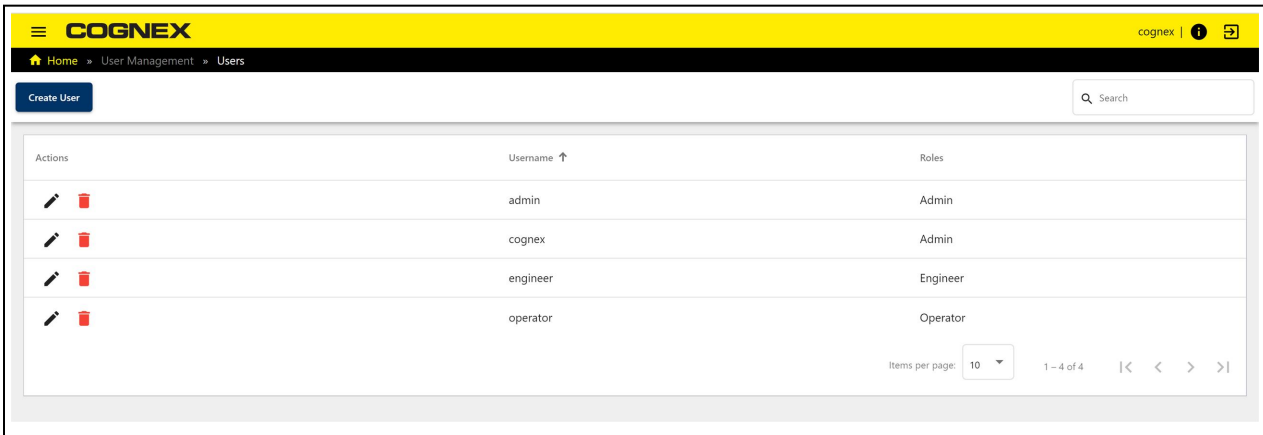
The following predefined users are available by default:

Note: After creating the user profiles, changing the default password of each user profile is necessary to avoid security risks.

User	Password	Permission
admin	BnthWWSD	Has access to all apps and features.
engineer	TaRDpKVx	Has access to all apps and features.
operator	SxtXGmxs	User with read-only rights. The operator does not have access to the Multi-Reader Configuration app and the Settings.

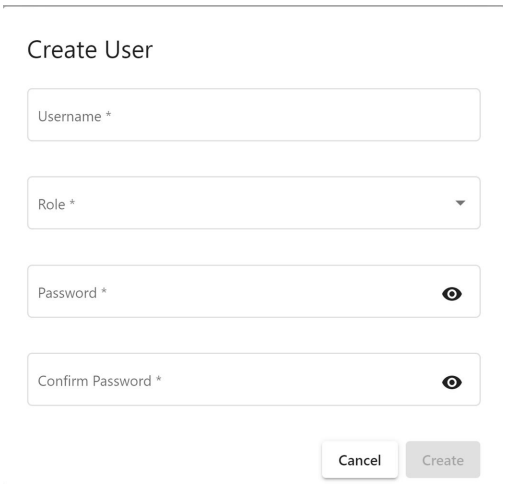
Users

The Users page allows creating new users and assign them Roles.



Item	Description
Create User	Brings up the pop-up window to add a new user.
User management table	Table listing the existing users, the assigned Username and roles.

The Create user action is available on the top ribbon. Set the following options for each user:



Item	Description
Username	The username of the user for logging in.
Role	The role of the user: • Admin • Engineer • Operator
Password	The password of the user for logging in.
Confirm Password	Reenter the password.

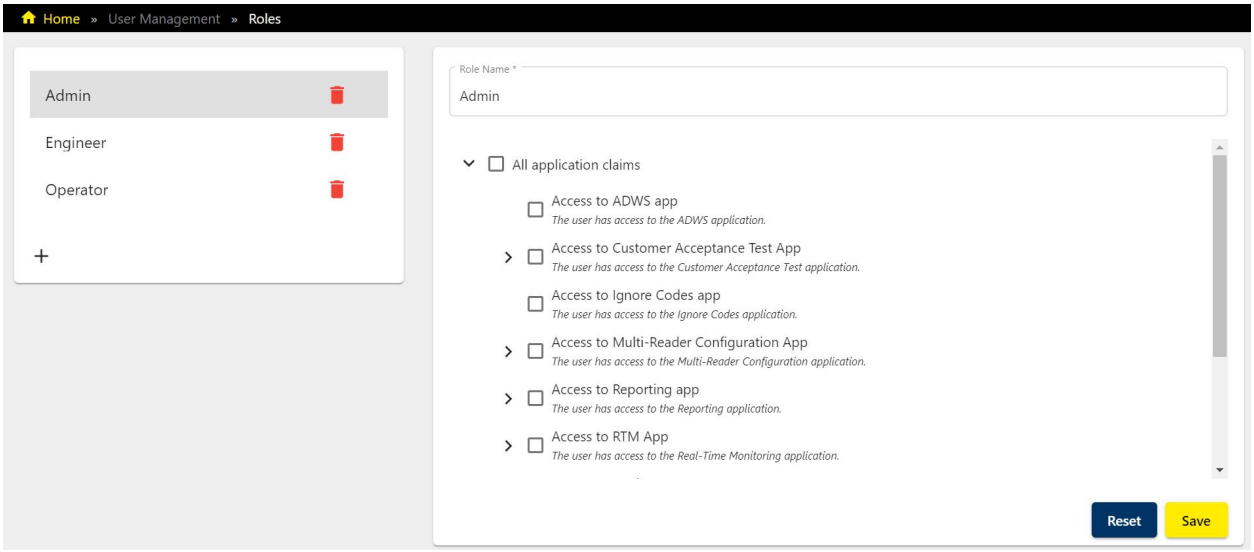
Note: A user with admin rights can also edit the same options for each user by clicking the **Edit** button.

The Users page lists the existing users. Edit or delete an existing user by clicking the appropriate icon.

Icon	Description
	Click Edit to edit the settings of a user.
	Click Delete to delete a user.

Roles

This page allows admin level users to create new roles and grant access to certain applications.



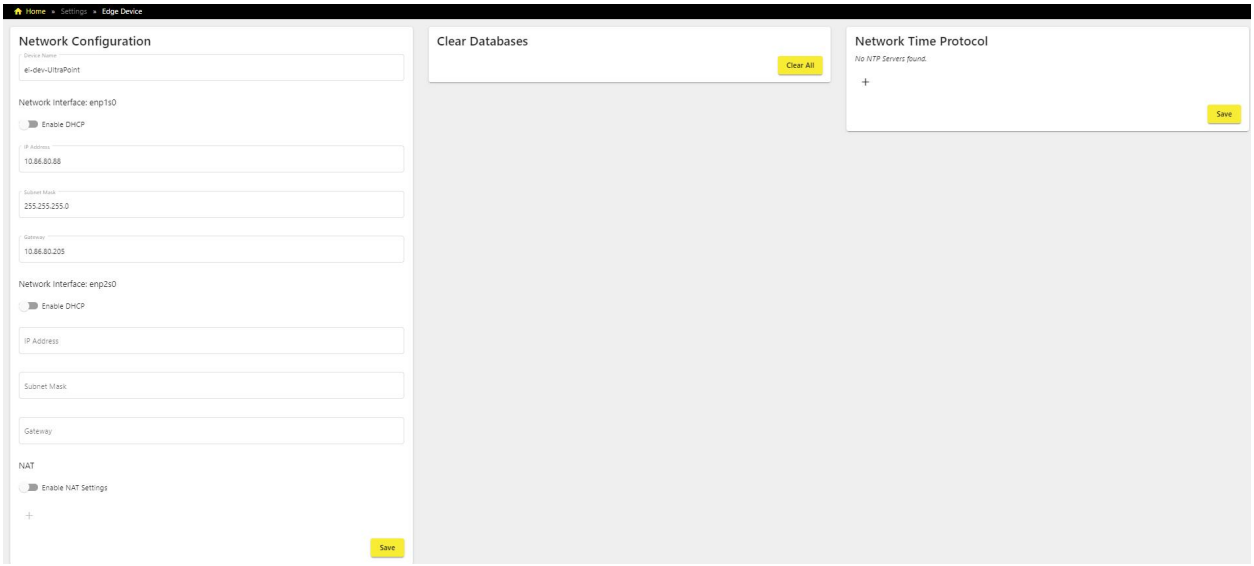
Item	Description
Roles	List of roles.
Accesses	List of accesses for the role specified.

Settings

In the Settings app, you can configure the Edge Device.

Edge Device

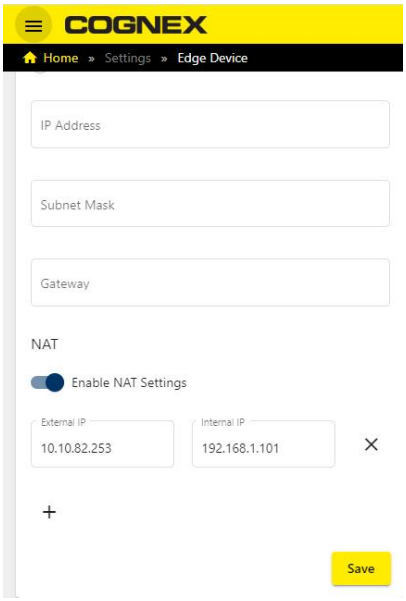
The Edge Device page shows the network configuration and allows editing and saving the network settings of the Edge Intelligence device.



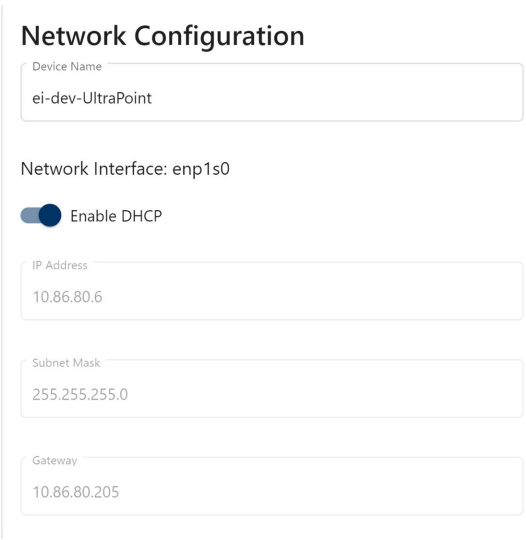
To set up the NAT execute the following steps:

1. Make sure that the DataMan readers have their Default Gateway set to be the IP address of the EI network port they are connected to.

2. Set the switch to enable NAT Settings.

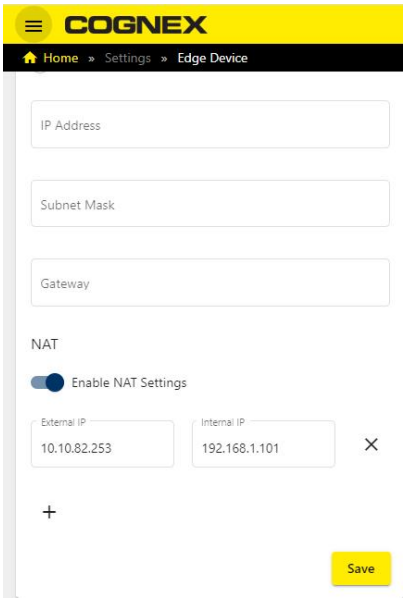


3. Click the **+** symbol to Add New Mapping.
4. Set the reader IP address as the Internal IP.
5. For the External IP, enter an available IP address you want to map to the reader.
6. Click Save.



Item	Description
Device Name	The name of the Edge Intelligence device.
Enable DHCP	Toggle the switch to enable using DHCP protocols instead of static protocols.
IP Address	The IP Address of the Edge Intelligence device.
Subnet Mask	The Subnet Mask of the Edge Intelligence device. **Note**: Do not set more than one network port to the same subnet mask.
Gateway	The Gateway of the Edge Intelligence device.

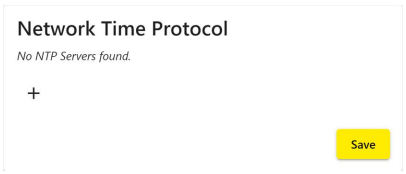
Network address translation (NAT) remaps IP address spaces into other IP address spaces by modifying network address information in the IP header of information packets. Scroll down for the NAT option. Toggle the switch to enable **NAT Settings**.



Under **Clear Databases** in the Dashboard, an Admin level user can clear the device lists, data, and images from the EI device, and create a new state.

Under **Network Time Protocol** in the Dashboard, any user can sync the time between the EI device and an NTP server:

1. Click the **+** symbol to Add New Address.
2. Enter IP address of the NTP Server.
3. Click **Save**.

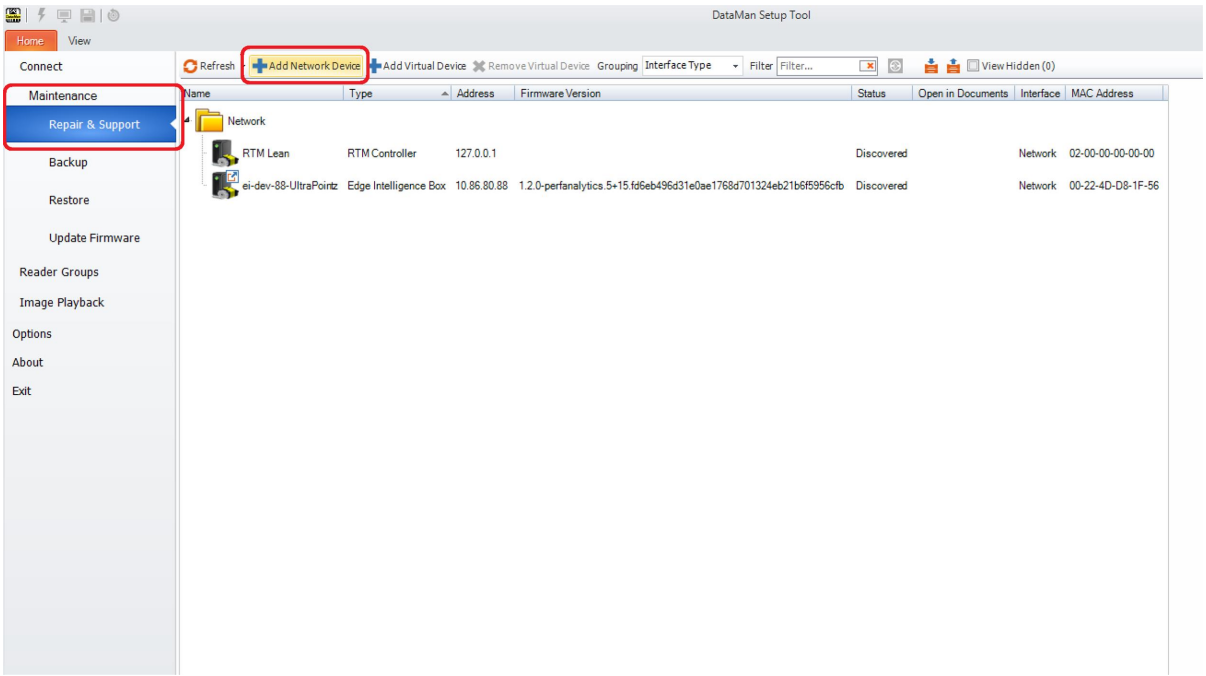


Software Update

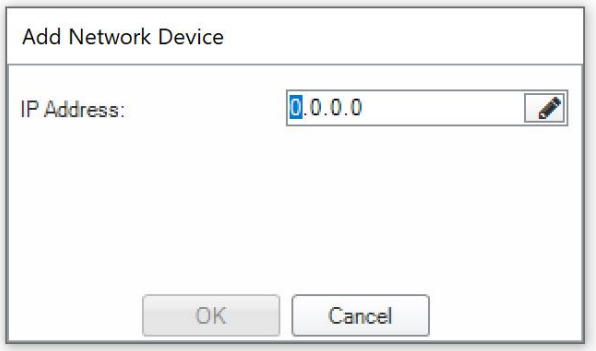
Perform the Edge Intelligence software update through the DataMan Setup Tool. Make sure that you have installed the latest available version of the DataMan Setup Tool.

1. Make sure that the DataMan Setup Tool identifies the Edge Intelligence system as an accessible network device. If the DataMan Setup Tool has not yet identified the Edge Intelligence system, navigate to the **Maintenance: Repair and Support** menu and click **Add Network Device.**

> **Note**: If the DataMan Setup Tool already recognizes and lists the Edge Intelligence system as an accesible device, skip **Step 1** and **Step 2**.

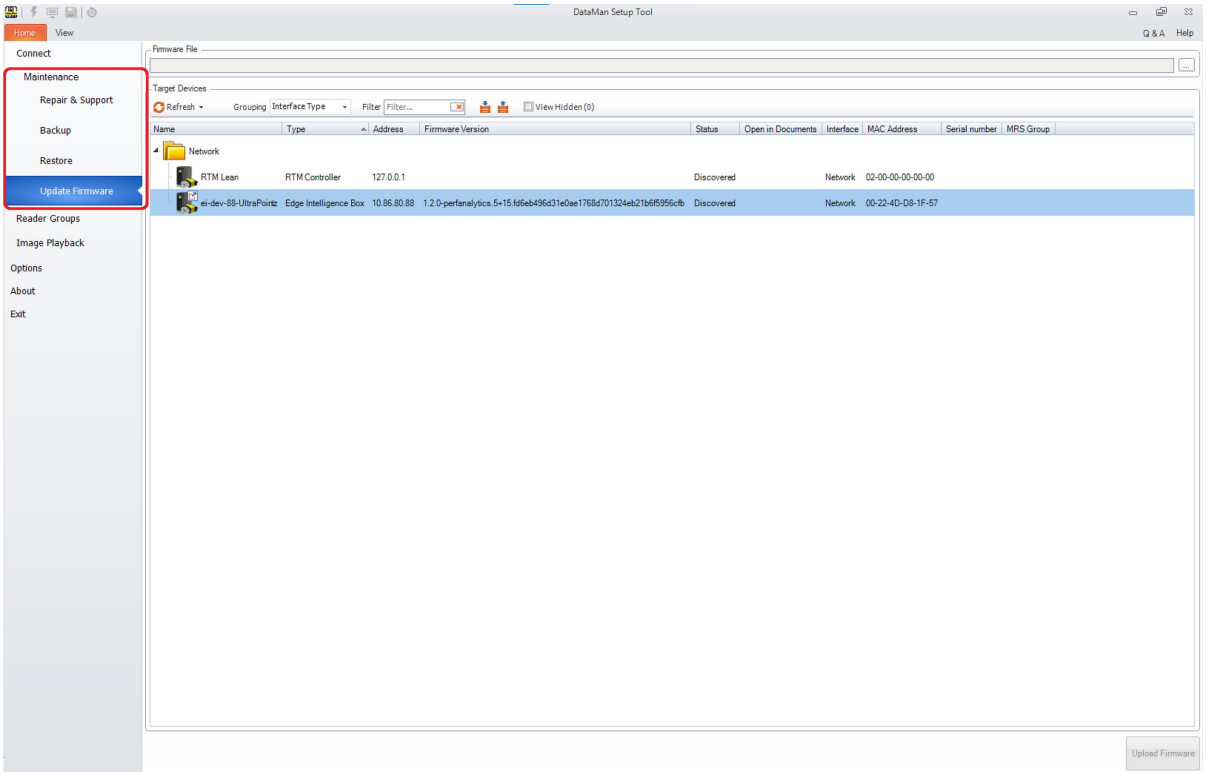


2. Specify the Edge Intelligence system by entering the IP address then click **OK**.

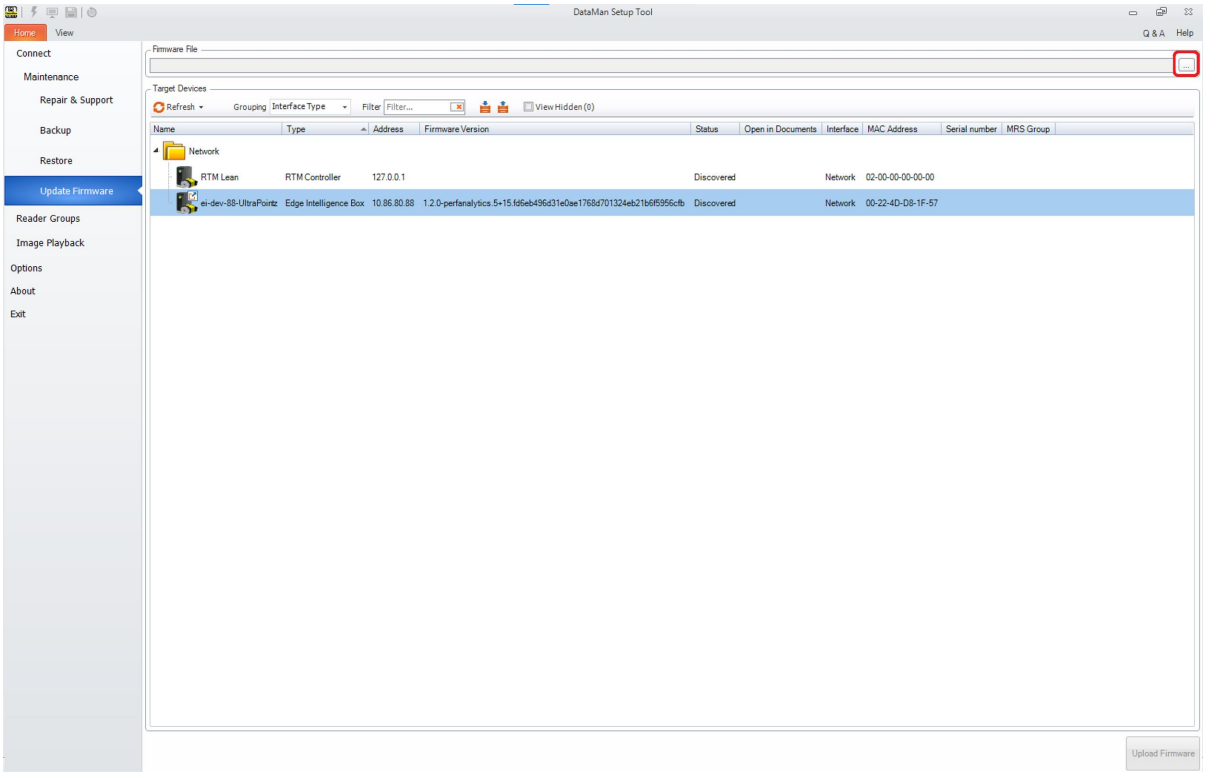


> **Note**: Click the **Pen Symbol** to enable pasting a copied address. Clicking the **Pen Symbol** alternates between an automatically segmented and a manually segmented address format.

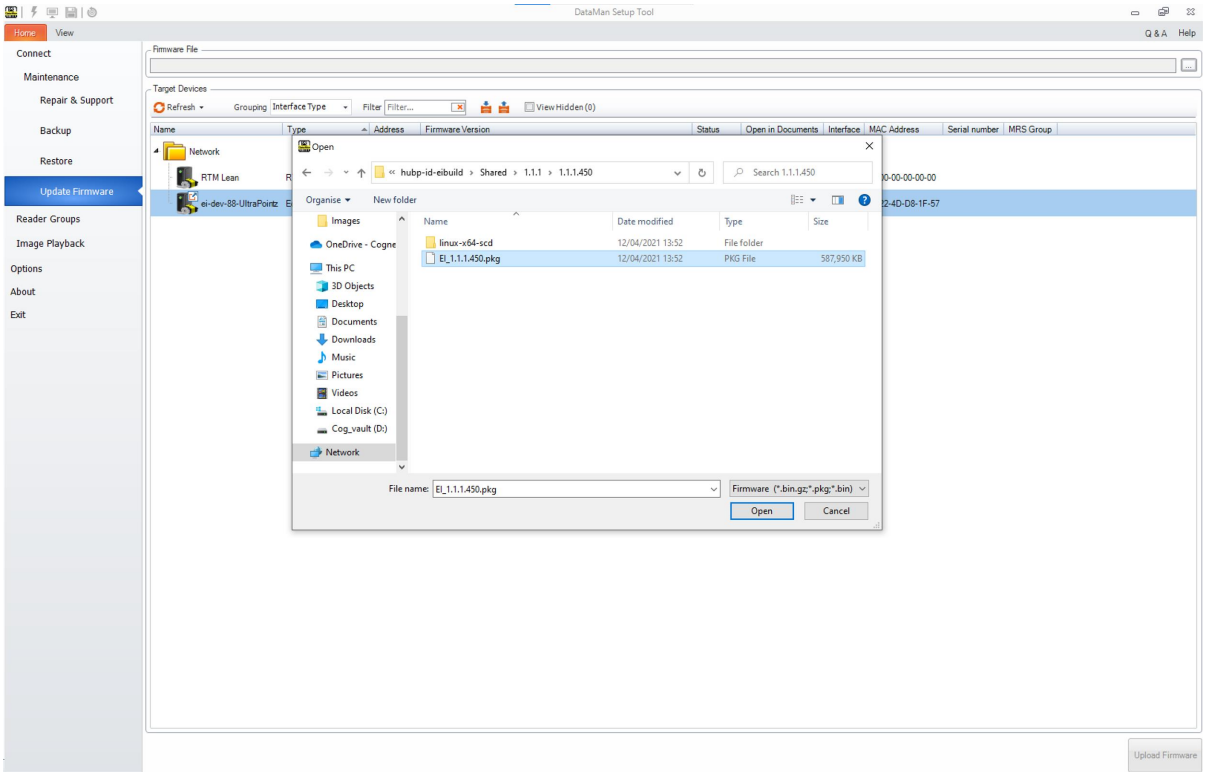
3. Navigate to the **Maintenance: Update Firmware** menu.



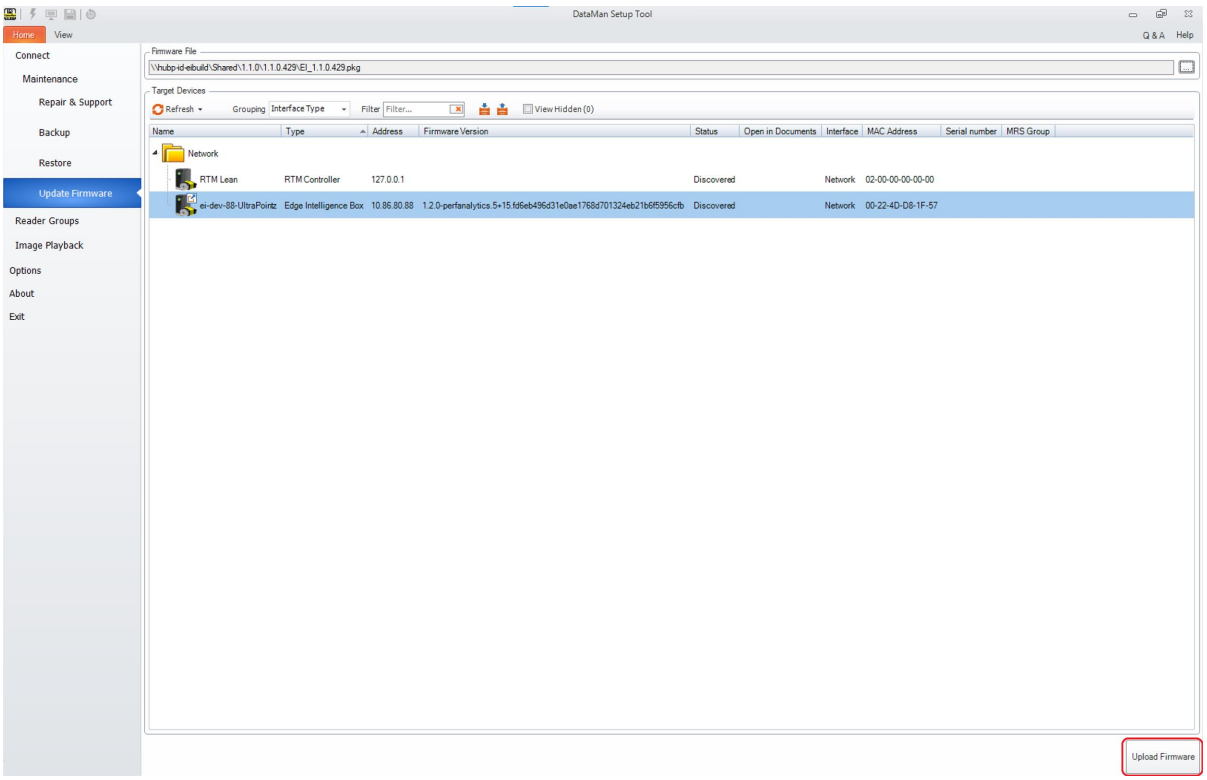
4. Select your Edge Intelligence device and browse the appropriate **.pkg** file from the Cognex network or local directories by clicking the ellipsis icon.



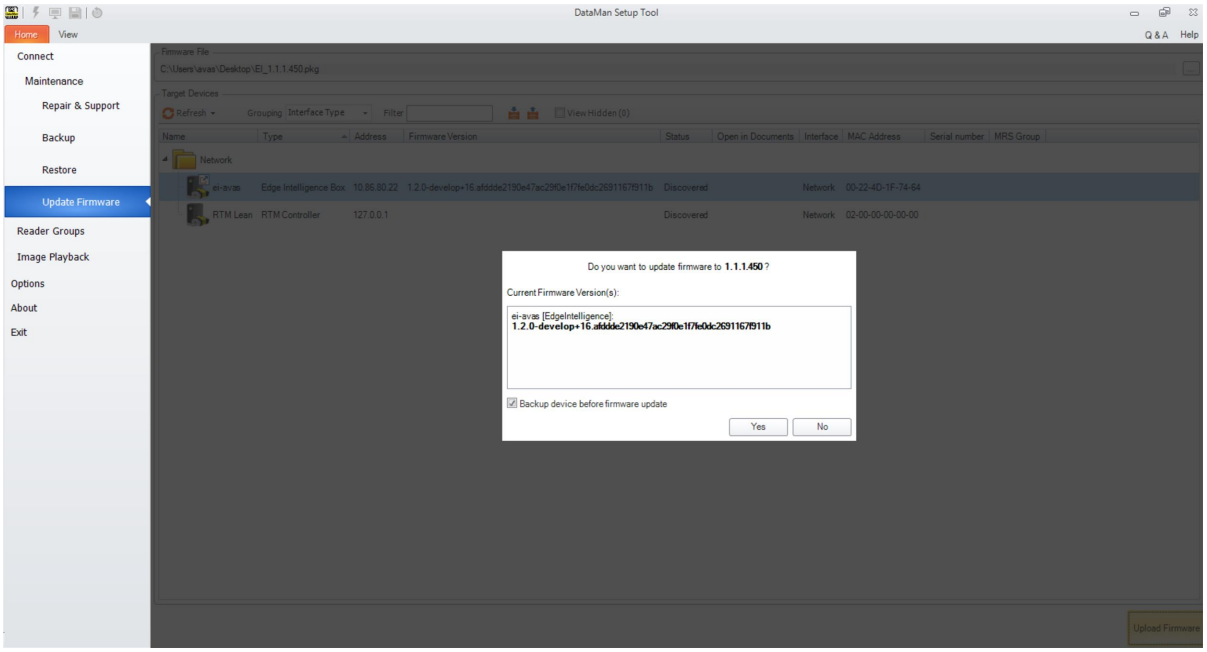
5. Select the **.pkg** file and click **Open**.



6. Click the **Upload Firmware** button.

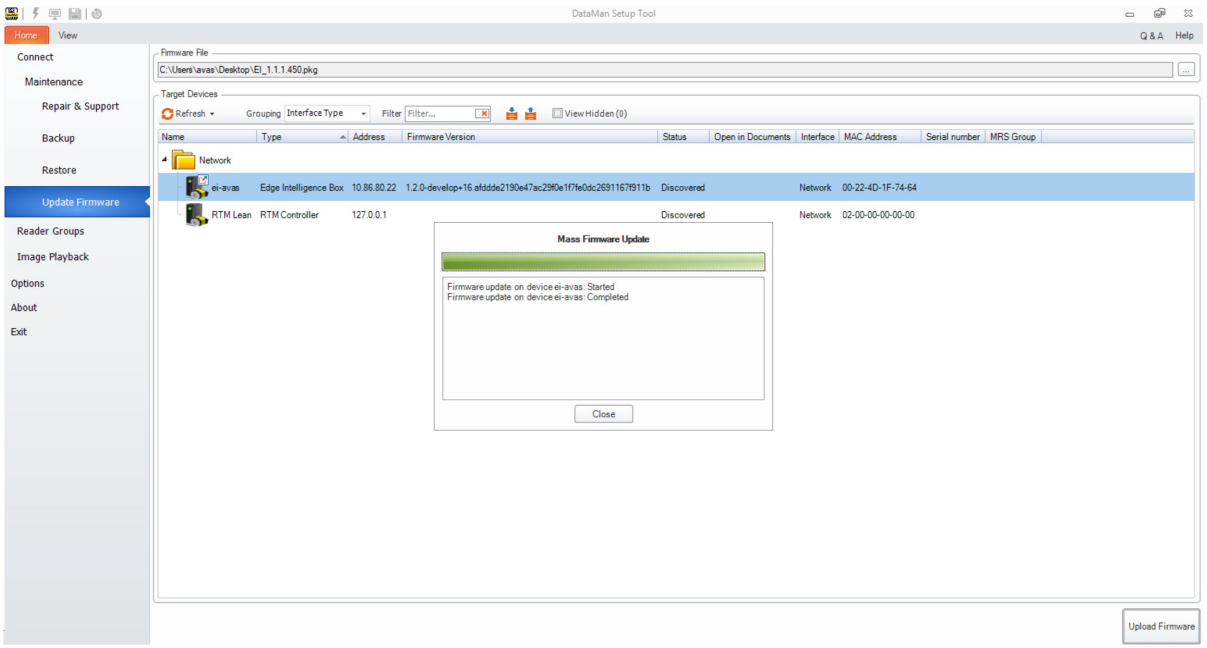


7. Confirm the firmware update by clicking **Yes**.



Note: Creating a backup by selecting the checkbox is optional.

8. Wait until the update procedure is complete then click **Close**.



Edge Intelligence Specifications

Specification category	EI-200	EI-300	EI-700
Weight	453 g (15.98 oz)	1360 g (47.97 oz)	5851 g (206.38 oz)
Housing	Fanless cast aluminum, steel	Fanless aluminum extrusion, steel	Fanless aluminum extrusion, steel
Power Input	12 VDC input jack	9~36 VDC 3-pin terminal block	9~48 VDC 5-pin terminal block
Power Consumption	9.2 W	19.04 W	80.64 W
Operating Temperature	0-40°C (32-104°F)	-25-70°C (-11-158°F)	-40-70°C (-40-158°F)
Storage Temperature	0-60°C (32-140°F)	-40-85°C (-40-185°F)	
Environmental Protection	IP50		
Image Storage[1]	Up to 1 million images	Up to 4 million images	Up to 8 million images
Image Storage[2]	Up to 244 data days	Up to 487 data days	Up to 487 data days

[1] Assuming no-read images are saved at full resolution (3 megapixels) in JPEG format.

[2] With full resolution JPEG no-read images from all readers, on a system running 24/7 with 1 trigger per second at a performance of 99% read rate.

Cleaning and Maintenance

To clean the outside of the chassis, use a dry cleaning cloth.

CAUTION: Do not clean Edge Intelligence products with liquids.

CAUTION: Do not attempt to clean any Edge Intelligence product with harsh or corrosive solvents, including lye, methyl ethyl ketone (MEK) or gasoline.

Regulations/Conformity

Note: For the most current CE declaration and regulatory and conformity information see OnLogic support site:.onlogic.com/support.

Safety and Regulatory			
Variants	EI-200	EI-300	EI-700
Certifications	2002/96/EC (WEEE Directive) 2011/65/EU (RoHS 2 Directive) Additional Safety and EMC certifications pending CB scheme CE EN 55024 EN 55032 EN 62368-1 FCC 47 CFR Part 15 IEC 62368-1 UL Listed	UL Listed configurations available CB Scheme FCC 47 CFR Part 15 Low-Voltage (2014/35/EU) Electromagnetic Compatibility (2014/30/EU) Radio Equipment (2014/53/EU) - Only applicablefor configurations with wireless transmitters EN 55032 EN 55035 RoHS 3 (2015/863/EU) WEEE Directive (2012/19/EU) Power Immunity According to E-Mark 7637-2 & 16750-2 EN 50121 EN 62368-1 IEC 62368-1 UL 62368-1	FCC 47 CFR Part 15 Low-Voltage (2014/35/EU) Electromagnetic Compatibility (2014/30/EU) Radio Equipment (2014/53/EU) - Only applicablefor configurations with wireless transmitters EN 55032 EN 55035 RoHS 3 (2015/863/EU) WEEE Directive (2012/19/EU) Power Immunity According to E-Mark 7637-2 & 16750-2 EN 50121 Additional Safety and EMC certifications pending. Some certifi-cations configuration dependent.
Manufacturer	USA: OnLogic 35 Thompson Street South Burlington, VT 05403 USA Europe: OnLogic De Boedingen 39 4906 BA Oosterhout The Netherlands		

Open Source Licences

The table below shows the open source licences used by Edge Intelligence:

angular-resize-event	MIT
angular2-moment	MIT
core-js	MIT
dateformat	MIT
daterangepicker	MIT
fullscreen	MIT
moment	MIT
ngx-daterangepicker-material	MIT
ngx-spinner	MIT
primeicons	MIT
rxjs	Apache-2.0
rxjs-compat	Apache-2.0
screenfull	MIT
socket.io	MIT
socket.io-client	MIT
zone.js	MIT
@amcharts/amcharts3-angular	Paid