



Central Management Console User Guide

Legal notices

Information about the Nozomi Networks copyright and use of third-party software in the Nozomi Networks product suite.

Copyright

Copyright © 2013-2024, Nozomi Networks. All rights reserved. Nozomi Networks believes the information it furnishes to be accurate and reliable. However, Nozomi Networks assumes no responsibility for the use of this information, nor any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent, copyright, or other intellectual property right of Nozomi Networks except as specifically described by applicable user licenses. Nozomi Networks reserves the right to change specifications at any time without notice.

Third Party Software

Nozomi Networks uses third-party software, the usage of which is governed by the applicable license agreements from each of the software vendors. Additional details about used third-party software can be found at <https://security.nozominetworks.com/licenses>.

Contents

Chapter 1. Introduction.....	7
CMC overview.....	9
Functionalities.....	10
Alerts.....	12
Updates.....	13
Chapter 2. Sensors.....	15
Sensors.....	17
List.....	17
Map.....	19
Graph.....	21
Do a force update on sensors.....	22
Allow a sensor.....	23
Export a list of sensors.....	24
Upload a map.....	25
Chapter 3. Alerts.....	27
Alerts.....	29
Standard mode.....	30
Expert mode.....	31
View alerts in standard mode.....	32
View alerts in expert mode.....	32
Closing alerts.....	33
Edit a playbook associated with an alert.....	36
Chapter 4. Assets.....	37
Assets.....	39
List.....	39
Diagram.....	41
Details window.....	42
Configure an asset.....	44
Generate a PDF report of an asset.....	45
Navigate from an asset.....	46
View more details for an asset.....	47
Overview.....	48
Sessions.....	49
Alerts.....	50
Software.....	51
Installed hotfixes.....	52
Missing hotfixes.....	53
Vulnerabilities.....	54

- Variables..... 55
- Chapter 5. Queries..... 57**
- Queries..... 59
 - Data sources..... 61
 - Basic operators..... 64
 - Commands..... 66
 - Functions..... 74
 - Examples..... 78
- Chapter 6. Smart Polling..... 85**
- Smart Polling in CMC..... 87
 - Plans..... 88
 - Node points..... 89
- View the enriched information history for a node..... 90
- Chapter 7. Arc..... 91**
- Arc overview..... 93
- Architecture..... 94
- Arc in CMC..... 95
- Node points..... 96
- Chapter 8. Reports..... 97**
- Reports..... 99
 - Dashboard..... 100
 - Management..... 101
 - Generated..... 104
 - Scheduled..... 105
 - Settings..... 106
 - Create a report..... 107
 - Generate a report..... 109
 - Download a report..... 111
 - Delete a report..... 111
 - Add a folder..... 112
 - Edit a folder..... 113
 - Delete a folder..... 114
 - Import a schema..... 114
 - Export a schema..... 115
 - Upload a custom logo..... 116
 - Configure SMTP settings..... 118
 - Filter a report globally..... 120
 - Add a widget to a report..... 123
 - Filter a report with a widget..... 125
- Chapter 9. Assertions..... 127**
- Assertions..... 129
 - Assertion operators..... 131

Save an assertion.....	132
Edit an assertion.....	135
Configure an assertion.....	136
Configure an assertion on links.....	137
Configure an assertion on variables.....	139
Chapter 10. Vulnerabilities.....	143
Vulnerabilities.....	145
Assets.....	146
List.....	147
Stats.....	148
Details page.....	149
Chapter 11. Administration.....	151
Administration page.....	153
Chapter 12. Personal settings.....	155
Personal settings.....	157
Clear your personal settings.....	158
Chapter 13. Troubleshooting.....	159
Troubleshooting.....	161
Glossary.....	163



Chapter 1. Introduction



CMC overview

The *Central Management Console (CMC)* aggregates information from thousands of sites and assets to deliver instant awareness of your networks and their activity patterns.

Overview

The *Central Management Console (CMC)* makes it easy to have visibility of all your Nozomi Networks sensors. The *CMC* aggregates information from thousands of sites and assets to deliver instant awareness of your *operational technology (OT)/Internet of Things (IoT)* networks and their activity patterns, enabling users to quickly troubleshoot issues and accelerate incident response across your network.

CMC can be deployed:

- On-premises
- In a public cloud provider such as *Amazon Web Services (AWS)* or Microsoft Azure
- At the edge on physical or virtual appliances

Functionalities

The *CMC* has been designed to support complex deployments that cannot be addressed with a single sensor. The *CMC* shares the user experience of the sensor. In comparison to the sensor, some functionalities have been added, and some have been removed. The functionalities that have been added let you manage *hundreds* of sensors. The functionalities that have been removed increase efficiency for real-world, geographic deployments of the Nozomi Networks Solution architectures.

Sensors

The *CMC Sensors* page lets you see and manage all the connected sensors. A graphical representation of all the hierarchical structure of the connected sensors and the sensor Map is presented to allow a quick health check on a user-provided raster map.

Once sensors are connected, they are periodically synchronized with the *CMC*. In particular, the Environment of each sensor is merged into a global Environment and Alerts are received for a centralized overview of the system. Of course, Alerts can also be forwarded to a *security information and event management (SIEM)* directly from the *CMC*, thus enabling a simpler decoupling of components in the overall architecture.

Synchronization

To synchronize data, the sensors must be running the same major *Nozomi Networks Operating System (N2OS)* release, or one of the two prior major ones. For example, if the *CMC* is running version 23.0.x (the major release is 23.0), sensors can synchronize if running one of the following versions: 23.0.x, 22.5.x or 22.0.x.







Firmware update is also simpler with a *CMC*. Once the new firmware is deployed to it, all connected sensors can be automatically updated.

Functionalities

A description of the differences in functionalities between the Central Management Console (CMC) and sensors. The actions shown below are only applicable for CMCs that are in **All-In-One** mode, not **Multicontext** mode.









Node actions

Table 1. Node actions

Action	Sensor	CMC
 Configure node	✓	✗
 Show alerts	✓	✓
 Show requested traces	✓	✗
 Request a trace	✓	✗
 Manage Learning	✓	✓
 Navigate	✓	✓













Network links

Table 2. Network links

Action	Sensor	CMC
 Configure node	✓	✗
 Show alerts	✓	✓
 Show requested traces	✓	✗
 Request a trace	✓	✗
 Show events	✓	✗
 Show captured urls	✓	✗
 Manage Learning	✓	✓
 Navigate	✓	✓

Process variables

Table 3. Process variables

Action	Sensor	CMC
 Configure variable		
 Variable details		
 Add to favourites		
 Navigate		

Alerts

A description of alerts management in a Central Management Console (CMC).

Alerts management in the [CMC](#) is similar to alerts management in a sensor. However, in the [CMC](#), you can have all the alerts, from all the sensors, in one centralized place.

In a sensor, you can create a query, and therefore an assertion, that includes all the nodes, or links etc., for your complete infrastructure. You can create a *Global Assertion*. This is one or more groups of assertions that can be propagated to all the sensors. The [CMC](#) has control of these assertions, and sensors cannot edit or delete them.

It is possible to configure the [CMC](#) to forward alerts to a [SIEM](#) without the need to configure each sensor. For more details, see **Data integration**.

Updates

A description of the release update and rollback operations when you have a Central Management Console (CMC) and one or more sensors.

The Nozomi Networks update bundle applies to both the [CMC](#) and Guardian, except in the case of the Docker installation. It works for all physical and virtual sensors.

Once a sensor is connected to a [CMC](#), the [CMC](#) will control all the updates. The software bundle is propagated from the [CMC](#) and, once the sensor receives the bundle, you can do the update manually, or automatically. You can configure this behavior in the **General settings** section of the **Synchronization settings** page.

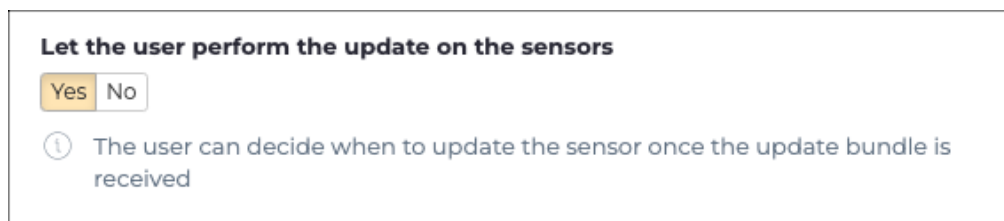


Figure 1. Let user perform updates section

If the [CMC](#) is configured to allow manual updates, the sensor's status bar displays a message that notifies you as soon as the sensor receives the update bundle.



Figure 2. Update available notification

The update process from the [CMC](#) can proceed as described in **Software update and rollback**. After the Central Management Console is updated, each sensor will receive the new software update.

If an error occurs during the update procedure, a message shows next to the related sensor's version number on the **Sensors** page.

To Rollback, first rollback the Central Management Console, and then proceed to rollback all the sensors as described in **Software update and rollback**.



Chapter 2. Sensors



Sensors

The **Sensors** page lets you view all of the sensors that you have in your system.

The **Sensors** page has these three tabs:

- List
- Map
- Graph

List

The **List** page lets you view all of the sensors that you have in your system.

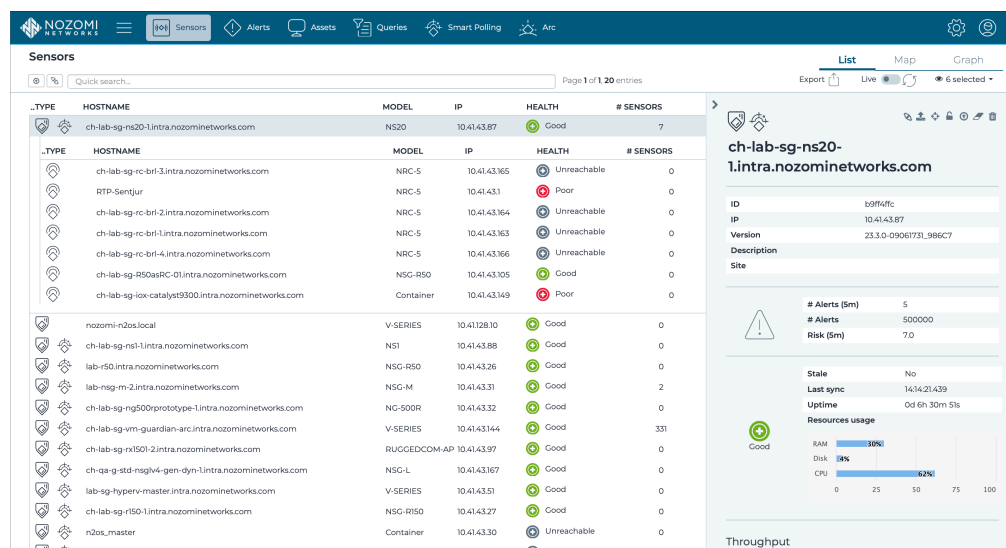


Figure 3. Sensors list

Force update

The force update  icon lets you do a force update on the selected sensors.


Allow/disallow

The allow/disallow  icon lets you allow or disallow sensors.

Quick search

The quick search field lets you easily do a search on the current page.


Export

The **Export**  icon lets you export the current list in either *comma-separated value (CSV)* or Microsoft Excel format.

Download Arc

The **Download Arc** dropdown lets you select, and download, the applicable Arc package for your *operating system (OS)* and architecture.

Live

The **Live**  toggle lets you change live view on, or off. When live mode is on, the page will refresh periodically.

Refresh

The **Refresh**  icon lets you immediately refresh the current view.

Column selection










The columns selection  icon lets you choose which columns to show or hide.

Information pane

The information pane to the right of the list of sensors shows additional information for the selected sensor.

It also lets you do these actions shown below.

Table 4. Sensors list actions

 Allow/Disallow sensor	After allowing a sensor, this icon shows:  Synchronized data coming from the sensor become part of the Environment of the CMC . Alerts coming from the sensor can be seen in the Alerts section.
 Focus on sensor	Allows to filter out only the sensor chosen data, such as Alerts and Environment.
 Go to sensor	Connect to a remote sensor directly from the CMC . Select this to open a new browser tab to the sensor selected login page. The action is hidden if the CMC isn't configured to allow this type of communication between sensors and CMC .
 Place in map	This action is used to place the sensor on the map.
 Toggle version lock	When locked, the sensor will not automatically update its software.
 Force update	Even if it is locked, the sensor will automatically update its software, with the version installed on the CMC .
 Clear sensor data on this machine	Clear all synchronized data at the CMC received from the selected sensor. Use this in combination with the clearing of the data on the sensor, and you will be able to restart the synchronization between the sensor and the CMC from an empty state
 Delete sensor	Clear all data received from the selected sensor and delete it from the list. If the sensor tries to sync with the CMC again, it shows as disallowed in the list.

Map

You can use the **Map** page to upload, and view, a map of the sensors in your environment.

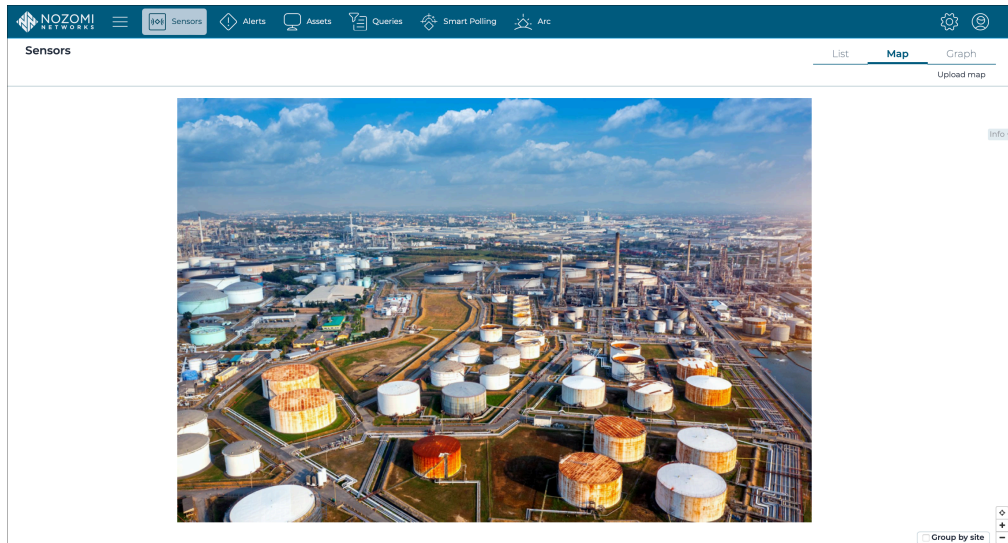


Figure 4. Sensors map

Info(rmation) pane

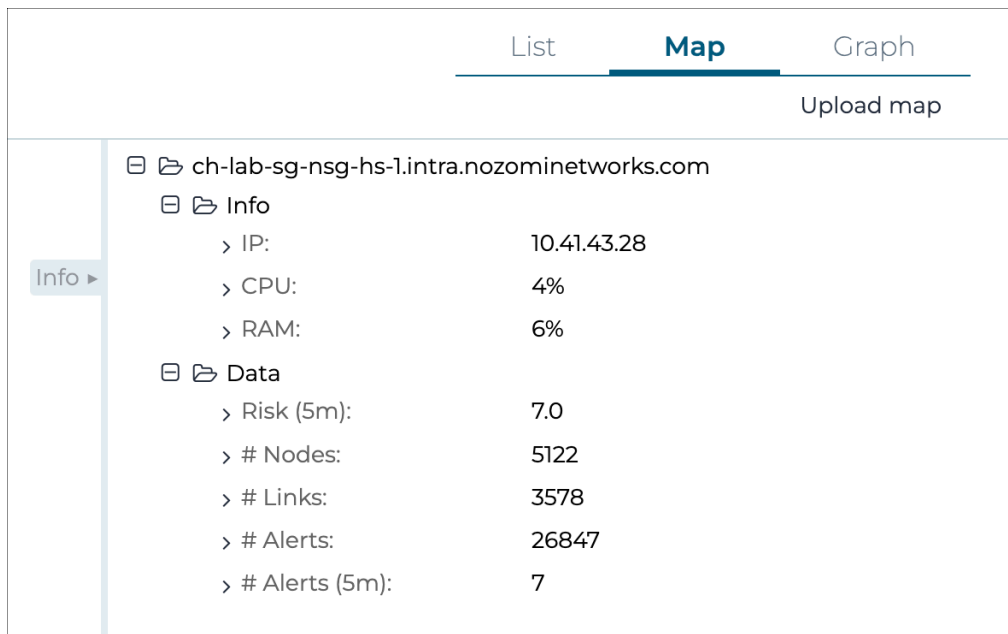



Figure 5. Info(rmation) pane

The **Info** pane lets you view information for the related sensor. The *identifier (ID)* of each sensor is used in the map to help you identify it. The marker color of the sensor relates to the risk of its alerts.

In the map view, a red indicator to the right of the sensor's *ID* shows the number of the alerts in the last five minutes. This indicator only shows if there are some alerts for the sensor. If the alerts in last 5 minutes increase, the sensor marker will blink for one minute.

If the site of the sensor has been specified in  > **System** > **General**, it is possible to enable the **Group by site** option, in the bottom right corner of the map view. The sensors with the same site will be grouped to deliver a simpler view of a complex installation.

**Note:**

The sensors map is also available as a widget.

Graph

The **Graph** page shows a graphical view of all the sensors in your environment.

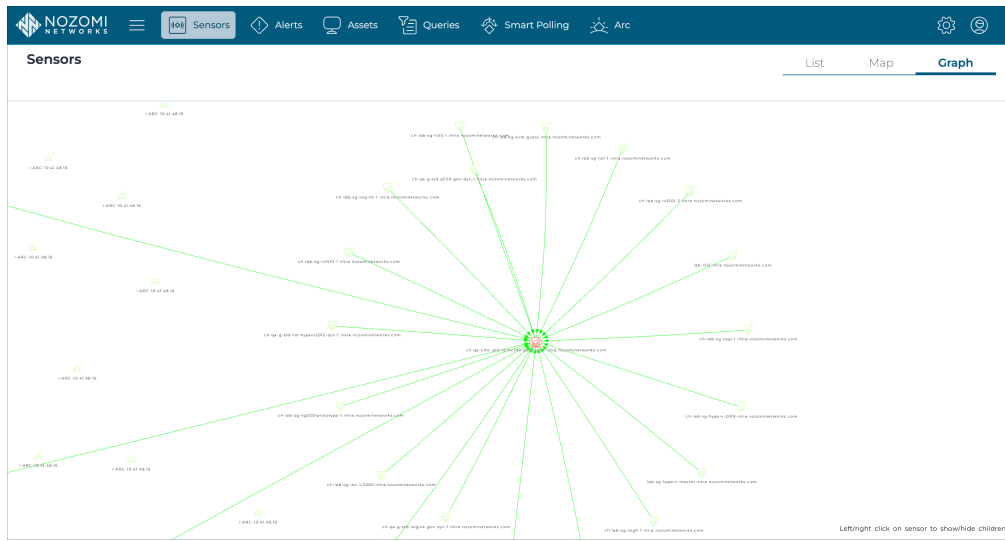


Figure 6. Sensors graph


Do a force update on sensors

If you have disabled auto updates, you can use the force update icon to do a manual update.

Procedure

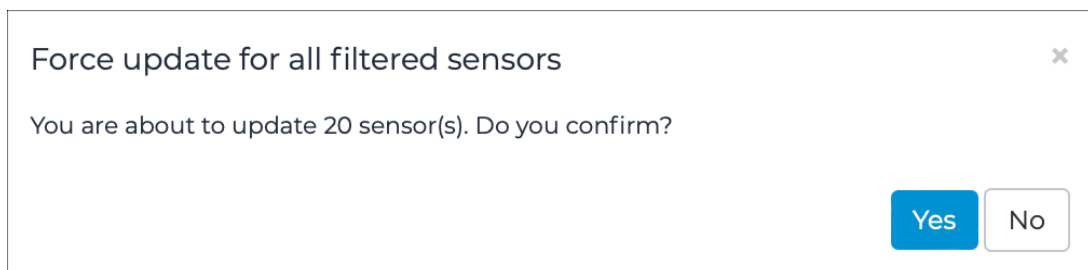
1. In the top navigation bar, select **Sensors**.

Result: The **Sensors** page opens.

2. In the top left section, select .

Result: A dialog shows.

3. To confirm, select **Yes**.



Allow a sensor

The allow icon lets you give permission for a new sensor to connect to Central Management Console (CMC).

Procedure

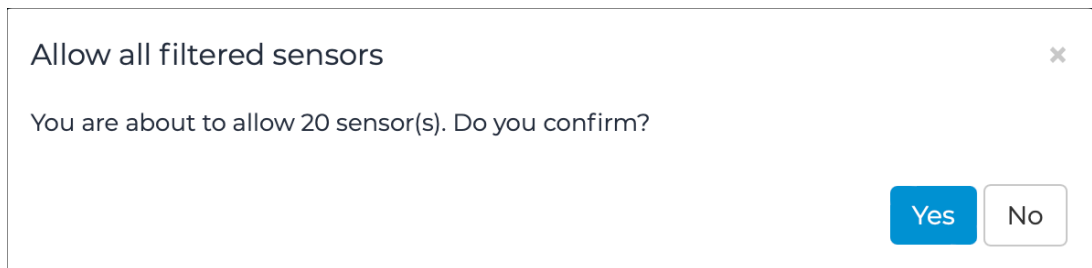
1. In the top navigation bar, select **Sensors**.

Result: The **Sensors** page opens.

2. In the top left section, select the  icon.

Result: A dialog shows.

3. To confirm, select **Yes**.



Export a list of sensors

You can export a list of the sensors from the current view.

Procedure

1. In the top navigation bar, select **Sensors**.

Result: The **Sensors** page opens.

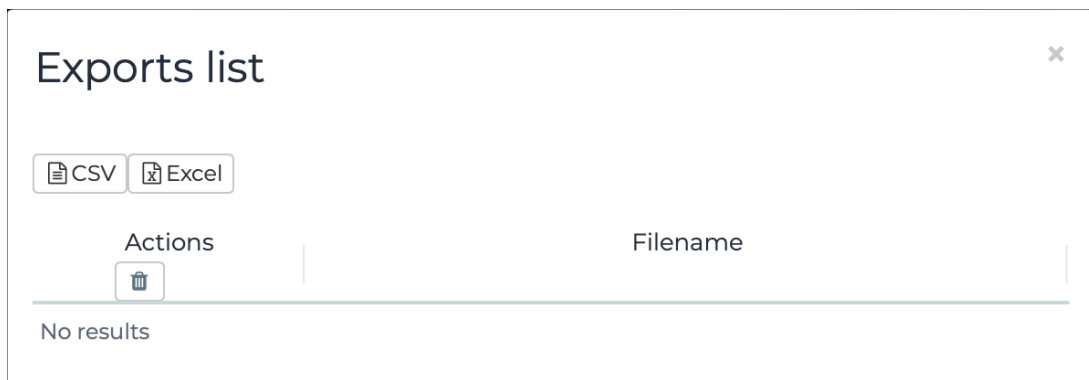
2. In the top right section, select **Export**.

Result: A dialog shows.

3. Choose an export format:

Choose from:

- Select **CSV** to create a **CSV** file
- Select **Excel** to create a Microsoft Excel file



Result: The file is created and a **Exported** message shows.

4. To download the file, in the bottom-left of the dialog, select 



Results

The exported file has been downloaded.

Upload a map

The **Map** page lets you upload a map of your sensors in your environment.

Procedure

1. In the top navigation bar, select **Sensors**.
Result: The **Sensors** page opens.
2. In the top right section, select **Map**.
Result: The **Map** page opens.
3. In the top right section, select **Upload map**.
4. Select the image file that you want to upload.

Results

The map is uploaded.



Chapter 3. Alerts



Alerts

The **Alerts** page shows all the latest alerts in the system. It lets you view the alerts in different modes, and carry out actions on the alerts.



Important:

To perform actions on alerts, the user must belong to a group with admin permissions. Non-admin users can access alerts only if at least one of the groups that they belong to has alerts permission enabled.

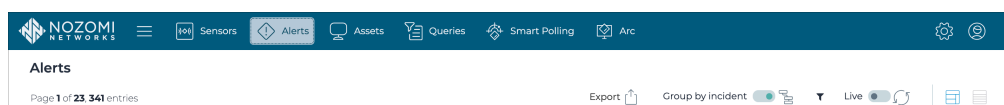




Figure 7. Alerts page menu

The top right section of the **Alerts** page has two icons that let you change between these two options:

- Standard mode (on page 30) 
- Expert mode (on page 31) 

Standard mode

You can view alerts in standard mode to give you an overview of the latest anomalies.

The screenshot displays the NOZOMI Alerts interface. At the top, there is a navigation bar with icons for Sensors, Alerts, Assets, Queries, Smart Polling, and Arc. Below the navigation bar, the 'Alerts' section is active, showing 'Page 1 of 1.3 entries'. The main area contains a table with the following data:

RISK	TIME	NAME	DESCRIPTION
7	2023-08-14 14:00:22.620	Malformed traffic	The IP layer has no data.
7	2023-08-07 09:43:38.648	Malformed traffic	The IP layer has no data.
7	2023-08-02 14:30:45.633	Malformed traffic	Invalid IP packet: IP header length is smaller than the expected size

On the right side, a detailed view of the selected alert is shown. The title is 'Malformed traffic' with a risk level of 7. The status is 'open' and the time is '2023-08-14 14:00:22.620'. The source information includes MAC '72zcf04-75d3b3' and Zone '01:00:5e:00:00:fb'. The security status is 'true' and the protocol is 'unknown'. The 'What happened?' section states 'The IP layer has no data.' The 'Possible cause' section explains that an L7 malformed packet has been detected, which can target known issues in devices or software versions. The 'Suggested solution' is to investigate the protocol implementation and the possible presence of malicious actors. An 'Open details >' button is located at the bottom right of the detailed view.

Figure 8. Standard mode

Risk

This shows the risk associated to each alert or incident.

Time

The time related to each event.

Name

The name category of the event.

Description

This shows a detailed description of the related event.

Analysis

If you can select a row, this pane will show a more detailed analysis of the alert.

Expert mode

You can view alerts in expert mode to give you a detailed view of the alerts in the system. This lets you filter, sort, and analyze the information in detail.


Expert mode shows a comprehensive table layout, with details on the alerts and incidents listed, which include:

- Addresses
- Labels
- The roles of the involved nodes, zones, protocol, and ports used in the involved transactions, and more


ACTIONS ...	RISK	TIME	ID	TYPE ID	COUNT...	DESCRIPTION	PROTOC...	IP SRC	IP DST
...	7	2023-08-14 14:00:22.620	963c82ca	SIGNMALFORMED-TRAFFIC	1	The IP layer has no data.			
...	7	2023-08-07 09:43:38.648	29f83285	SIGNMALFORMED-TRAFFIC	1	The IP layer has no data.			
...	7	2023-08-02 14:30:45.633	8a34431b	SIGNMALFORMED-TRAFFIC	1	Invalid IP packet: IP header length is small...			

Figure 9. Expert mode

Export

The **Export**  icon lets you export the current list in either [CSV](#) or Microsoft Excel format.


Group by incident

The **Group by incident**  icon lets you group alerts by incident. This will show incidents, and hide all the alerts that belong to it.

Filter

The filter  icon opens a list of items that you let you filter the results.

Live

The **Live**  toggle lets you change live view on, or off. When live mode is on, the page will refresh periodically.

Refresh

The **Refresh**  icon lets you immediately refresh the current view.

Count by field

The **Σ Count by field** dropdown lets you select a data field on which to group and count the alerts.

Column selection

The columns selection  icon lets you choose which columns to show or hide.

View alerts in standard mode

You can view alerts in standard mode to give you an overview of the latest anomalies.

Procedure

1. In the top navigation bar, select **Alerts**.

Result: The **Alerts** page opens.

2. In the top right corner, select the standard mode  icon.

Result: The [Standard mode \(on page 30\)](#) view opens.

View alerts in expert mode

You can view alerts in expert mode to give you a detailed view of the alerts in the system. This lets you filter, sort, and analyze the information in detail.

Procedure

1. In the top navigation bar, select **Alerts**.

Result: The **Alerts** page opens.

2. In the top right corner, select the expert mode  icon.

Result: The [Expert mode \(on page 31\)](#) view opens.

Closing alerts

When you close an alert, or incident, a dialog lets you select a reason, and specify the learning process.

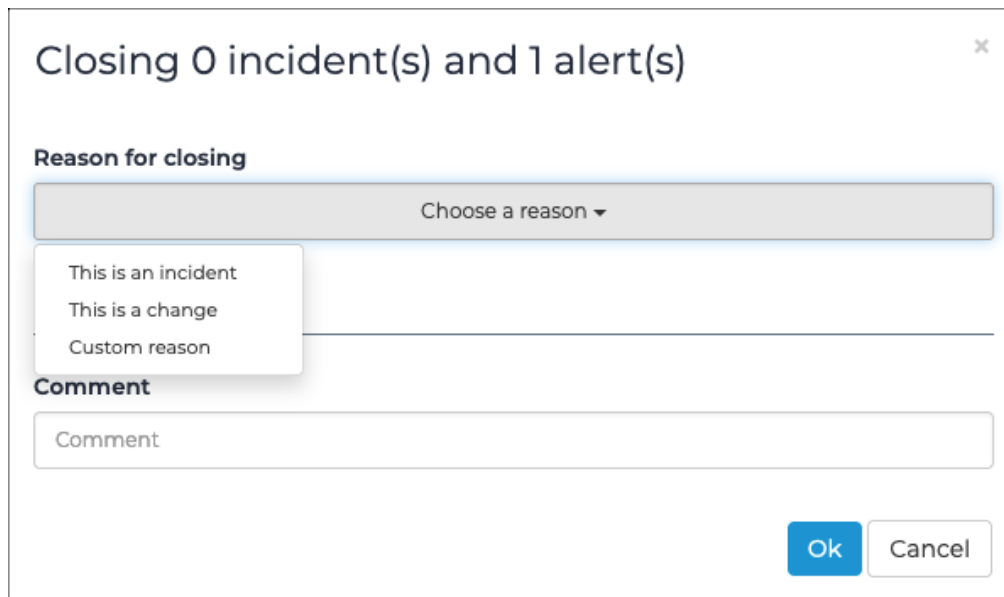


Figure 10. Alerts closing dialog

The **Reason for closing** dropdown has these options:

- **This is a change:** If the cause of the alert is an intended change to the network, such as:
 - A new computer being attached
 - New communication between two nodes that were not previously communicating

Guardian can learn the change that has been detected as part of the environment baseline. When you close an alert in this way, the *intrusion detection system (IDS)* is instructed to learn the related objects. For example, when a VI:NEW-NODE alert is closed as a change, Guardian registers that the corresponding node is part of the environment and will not raise subsequent VI:NEW-NODE alerts about the same node.

- **This is a change:** If the cause of the alert is an intended change to the network, such as a new computer being attached, or a new communication between two nodes that were not talking before, the change detected by Guardian can be learned as part of the environment baseline. When closing an alert in this way, the IDS is instructed to learn the corresponding objects. For example, when a VI:NEW-NODE alert is closed as a change, Guardian registers that the corresponding node is part of the environment and will not raise subsequent VI:NEW-NODE alerts about the same node.

- **This is an incident:** If the cause of the alert is a configuration error, an attack, a malfunctioning device, or other security incident, the change is not learned as part of the environment baseline. When closing an alert in this way, the IDS is instructed to delete the corresponding objects. For example, a new node entering the network for the first time causes a VI:NEW-NODE alert. If an alert closes as an incident, reference to the new node is deleted. The VI:NEW-NODE alert is raised again in subsequent communication involving the same node.
- **Custom reason:** This lets you write a custom reason for closing an alert. You can enter a text string as the closing reason, with a request to apply one of the two described behaviors.

You are about to close 0 incident(s) and 1 alert(s)

Reason for closing

Custom reason ▼

Custom reason

New controller installed

Treat as incident
New incidents/alerts will be generated if a similar event happens again.

Learn
Learn the change, no new incidents/alerts will be generated if a similar event happens again.

Comment

Team C will be responsible for the maintenance

Ok Cancel

Figure 11. Closing alert for custom reason with comment

You can add a comment so that it shows in the **alert audit** log.

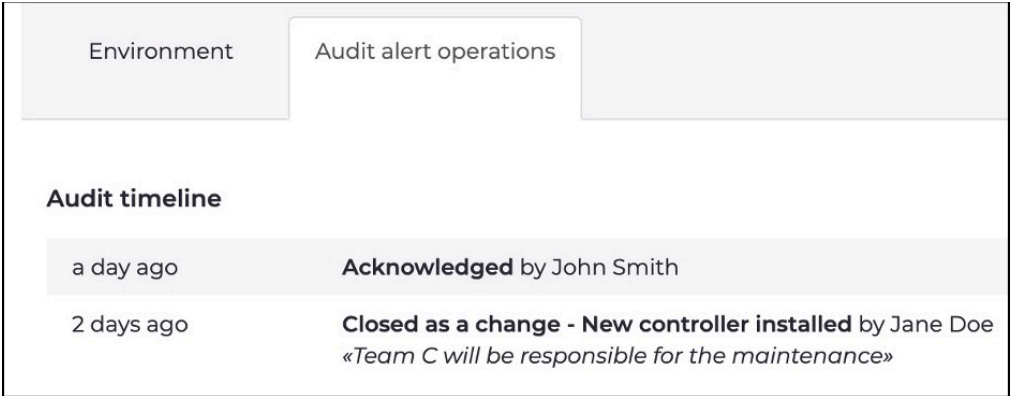


Figure 12. Audit alert operations

Edit a playbook associated with an alert

A playbook associated with an alert can be modified. A change you make on the playbook only affects the playbook related to that specific alert.

About this task

You can edit a playbook associated with an alert from the **Playbook** tab in the **Alerts** page.

Procedure

1. In the top navigation bar, select **Alerts**.

Result: The **Alerts** page opens.

2. Find the alert on which to edit the assigned playbook.
3. Select the alert, then select **Playbook** at the bottom of the screen.
4. To edit the playbook, select **Edit**.

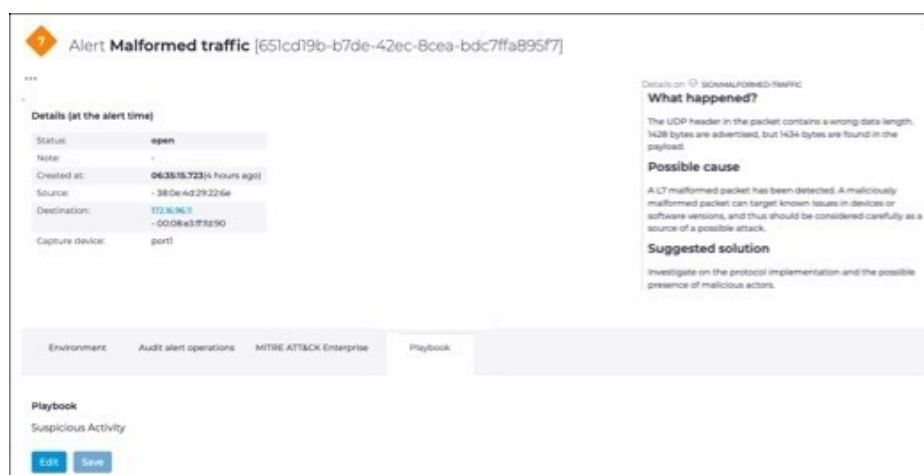


Figure 13. Playbook tab

5. Edit the playbook as necessary.
6. Select **Save**.



Note:

The playbook template from which the alert playbook was generated remains unchanged, as do all other alert playbooks generated from the same playbook template.

Chapter 4. Assets



Assets

The **Assets** page shows all the physical components and systems in the local network environment and their associated details. It also lets you perform actions on those assets. Depending on the nodes and components involved, assets can range from a simple personal computer to an operational technology (OT) device.

The top right section of the **Assets** page has these two tabs:

- [List \(on page 39\)](#)
- [Diagram \(on page 41\)](#)

List

The **List** page shows all the assets in table format.

ACTIONS	CAPTURE DEVI...	NAME	TYPE	OS/FIRMWARE
<input type="checkbox"/>	eml	iPhone-67.local	-	192.168.68.116
<input type="checkbox"/>	eml	iPad-7.local	-	192.168.0.142
<input type="checkbox"/>	eml	Surface_Pro_8.local	-	fe80:e2bb:a057b9d
<input type="checkbox"/>	eml	CHPS-AirPort-Express.local	-	[multiple]
<input type="checkbox"/>	eml	192.168.69.51	-	192.168.69.51
<input type="checkbox"/>	eml	BRWA8934A93B2DC.local	-	fe80:aa93:4aff:fe93t
<input type="checkbox"/>	eml	fe80:1ccb:5916:8319:7142	-	fe80:1ccb:5916:8319:
<input type="checkbox"/>	eml	Naymis-iPhone.local	-	10.0.1.18
<input type="checkbox"/>	eml	Craigs-Mac-Studio.local	-	fe80:48bc:97a:b04e
<input type="checkbox"/>	eml	iPad.local	-	fe80:14ab:4e7:4c9d
<input type="checkbox"/>	eml	Craigs-iPhone-13-mini.local	-	192.168.69.12
<input type="checkbox"/>	eml	iPad.local	-	fe80:1cd4:a715:cb4
<input type="checkbox"/>	eml	192.168.68.69	-	192.168.68.69
<input type="checkbox"/>	eml	Craigs-Mac-Studio.local	computer	10.0.1.9
<input type="checkbox"/>	eml	192.168.68.58	-	192.168.68.58
<input type="checkbox"/>	eml	Naymis-iPhone.local	-	fe80:106bc3d1a01a
<input type="checkbox"/>	eml	DESKTOP-QIASE9Q.local	-	fe80:1b07:ebc0:307z
<input type="checkbox"/>	eml	MACBOOKPRO-CACB	computer	Windows XP [multiple]

Export

The **Export** icon lets you export the current list in either [CSV](#) or Microsoft Excel format.

Confirmed MACs only

The **Confirmed MACs only** toggle lets you select only assets that have a confirmed [media access control \(MAC\)](#) address.

Live

The **Live** toggle lets you change live view on, or off. When live mode is on, the page will refresh periodically.

Refresh

The **Refresh** icon lets you immediately refresh the current view.

Column selection

The columns selection  icon lets you choose which columns to show or hide.

Diagram

The **Diagram** page uses the Purdue model format to display the assets. Assets are shown in separate rows, according to their level.

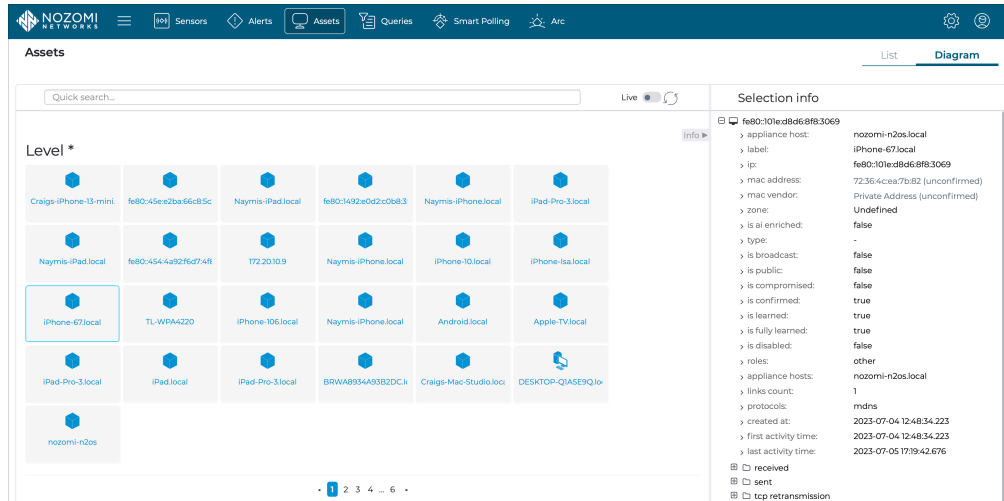


Figure 14. Diagram page

Search bar

The search bar lets you search for a specific item.

Live

The live toggle lets you immediately refresh the graph.

Refresh

The refresh  icon lets you immediately refresh the graph.

Levels section

The levels section shows an icon for each asset, and shows on which level of the Purdue model it is.

Selection info

When you select the link below an asset's icon, the **Selection info** pane shows more details for the selected asset.

Details window

The details window lets you view more detailed information for an assets.

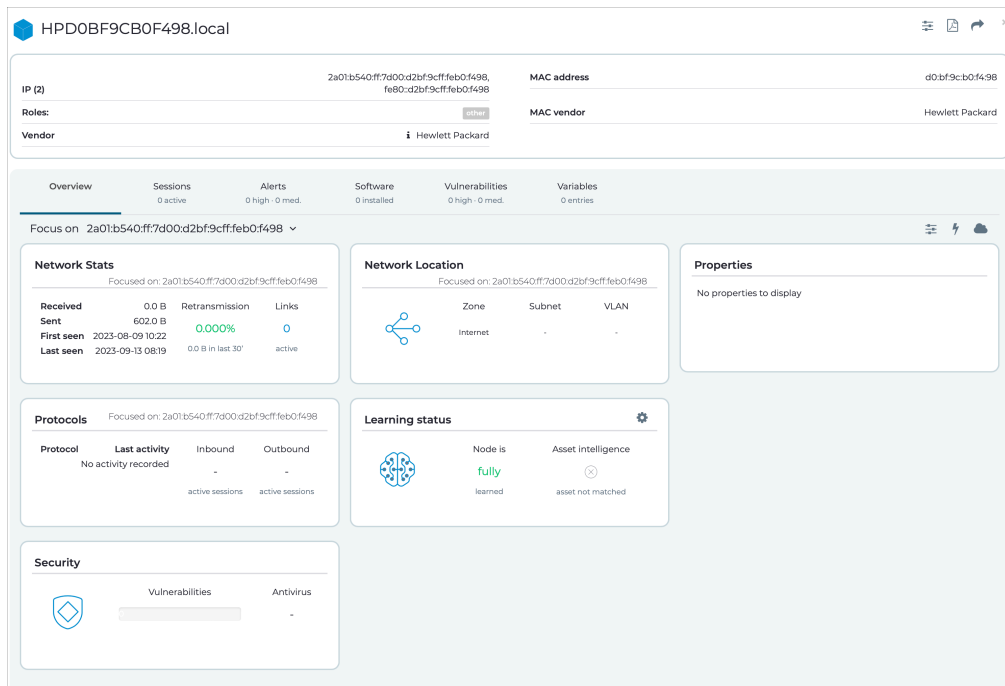


Figure 15. Asset details window

This details window shows more details for an asset.

The top section of the screen contains generic data. You can hover your mouse over the information **i** icon to display the source, granularity and confidence of the corresponding piece of data. Data includes:

- [internet protocol \(IP\)](#) (address)
- Roles
- Vendor
- [MAC](#) address
- [MAC](#) vendor

The details window has these tabs:

- [Overview](#) (on page 48)
- [Sessions](#) (on page 49)
- [Alerts](#) (on page 50)
- [Software](#) (on page 51)
- [Vulnerabilities](#) (on page 54)
- [Variables](#) (on page 55)

Information icon

When you hover over the **i** icon, you can see information for:

- Source
- Granularity
- Confidence

Source

Information source	Description
manual	Information that is manually added from the configuration
imported data	Imported information
passive detection	Information from deep packet inspection
asset-kb	Information from Asset Intelligence
smart-polling	Information from Smart Polling

Granularity

Level of detailed information	Description
manual-or-import	Information manually added or imported
complete	Detailed information that has been extracted
partial	Detailed, but not complete information
generic	A family/generic value is found, but it is not detailed
unknown	Unknown

Confidence

Level of confidence in information	Description
manual-or-import	Information manually added or imported, with the highest level of confidence at this level
high	High level of confidence
good	Good level of confidence
low	Low level of confidence
unknown	Unknown confidence


Configure an asset

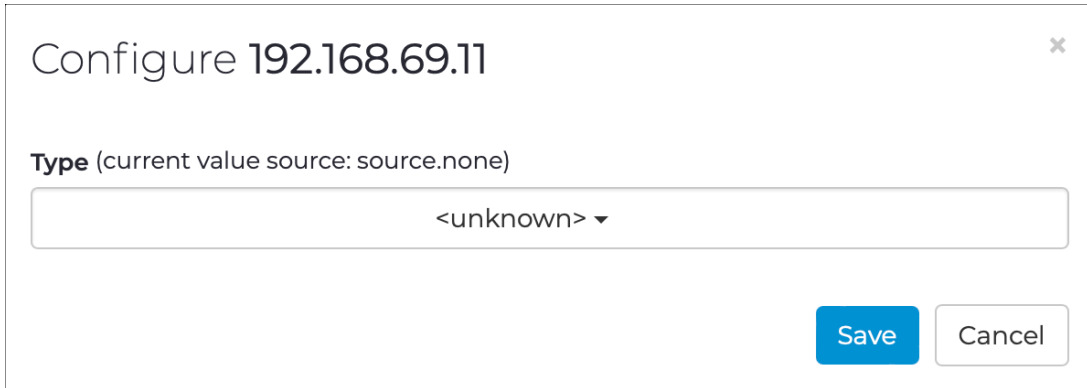
The **Lists** page lets you configure assets.

Procedure

1. In the top navigation bar, select **Assets**.

Result: The **Assets** page opens.

2. In the Actions column, to the left of the applicable asset, select the  icon.



Configure 192.168.69.11

Type (current value source: source.none)

<unknown> ▼

Save Cancel

3. From the dropdown, select the applicable type.
4. Select **Save**.

Results

The asset has been configured.


Generate a PDF report of an asset

The **Lists** page lets you generate a report in portable document format (PDF).

Procedure

1. In the top navigation bar, select **Assets**.

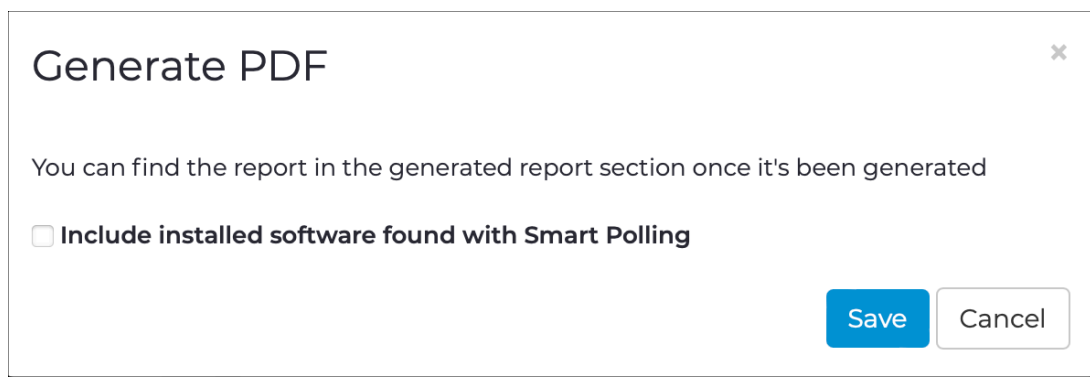
Result: The **Assets** page opens.

2. In the Actions column, to the left of the applicable asset, select the  icon.

Result: A dialog shows.

3. **Optional:**

If necessary, select the **Include installed software found with Smart Polling** checkbox.



Generate PDF ✕

You can find the report in the generated report section once it's been generated

Include installed software found with Smart Polling

Save **Cancel**

4. Select **Save**.

Result: The *portable document format (PDF)* file generates in the background. When it is ready, you can view it on the **Reports** page.

5. To view the report, go to **Reports > Generated**.

Navigate from an asset

The **Lists** page lets you use hyperlinks to navigate to entities that are related to an asset.

Procedure

1. In the top navigation bar, select **Assets**.

Result: The **Assets** page opens.

2. In the Actions column, to the left of the applicable asset, select the  icon.

Result: A list of related entities shows.

3. Select the hyperlink that you want to navigate to.

Go to [fe80::14ab:4e17:4c9d:84e9](#) [Node]

Go to [mdns](#) [Protocol]

Go to [fe80::14ab:4e17:4c9d:84e9 / Any / Any](#) [Link]

Go to [Any / fe80::14ab:4e17:4c9d:84e9 / Any](#) [Link]

Go to [fe80::14ab:4e17:4c9d:84e9](#) [Vulnerabilities]

Go to [fe80::14ab:4e17:4c9d:84e9 / Any / Any](#) [Sessions]

Go to [Any / fe80::14ab:4e17:4c9d:84e9 / Any](#) [Sessions]

Results

The entity shows in the applicable page.

View more details for an asset

Both the **Lists** and **Diagrams** pages lets you view more details for a specific asset.

Procedure

1. In the top navigation bar, select **Assets**.

Result: The **Assets** page opens.

2. In the top right section, select either **List** or **Diagram**
3. Choose a method to view more details for an asset:

Choose from:

- If you chose the **List** page, in the **NAME** column for the applicable asset, select the hyperlink
- If you chose the **Diagram** page, below the applicable asset, select the hyperlink

Results

The [Details window \(on page 42\)](#) for the asset shows.

Overview

The **Overview** page shows a general overview of information for items such as network statistics and location, protocols, and learning status for the related assets.

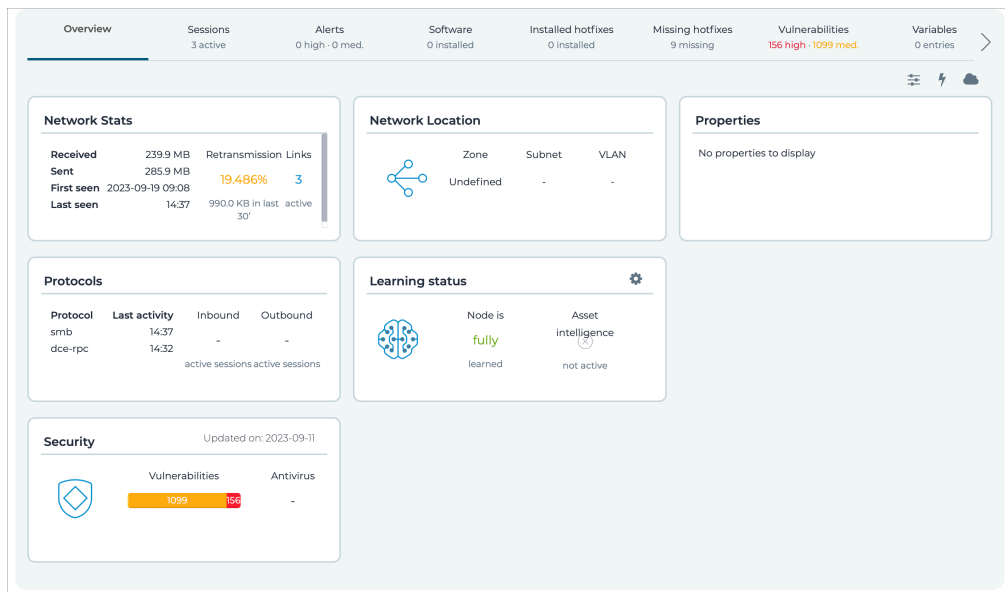


Figure 16. Overview tab

Network Stats

This shows useful statistics for the network activity for the related device.

Network Location

This shows information for the location for the related device on the network.

Properties

This shows additional information for the related device.

Protocols

This shows information for the different protocols that the related device uses.

Learning status

This shows the learning status of the related asset.

Security

This shows the security status of the related asset.

Sessions

The **Sessions** page shows detailed information for communication sessions between devices.

ACTI...	STATUS	FROM	TO	PROTOC...	TRANSPORT PROT...	FROM POR...	TO PORT	THROUGHHP...	TRANSFERRED B...	TRANSFERRED PAC...	FIRST ACTIVITY	LA
	ACTIVE	172.16.7.11	172.18.252.169	smb	tcp	36542	445	0.0 b/s	1.2 KB	2 pp	10:09:09.669	10:
	ACTIVE	172.18.252.169	172.16.36.79	smb	tcp	55330	445	30.3 Kb/s	10.1 MB	63 Kpp	09:02:06.541	10:
	SYN	172.16.7.11	172.18.252.169	smb	tcp	36044	445	0.0 b/s	1.3 KB	4 pp	10:08:18.106	10:
	CLOSED	172.16.7.11	172.18.252.169	smb	tcp	36044	445	0.0 b/s	1.3 KB	4 pp	09:47:19.366	09:
	CLOSED	172.16.7.11	172.18.252.169	smb	tcp	35894	445	0.0 b/s	1.7 KB	8 pp	09:51:27.466	09:
	CLOSED	172.16.7.11	172.18.252.169	smb	tcp	35636	139	0.0 b/s	66.0 B	1 pp	09:49:11.662	09:

Figure 17. Sessions tab

Export

The **Export** icon lets you export the current list in either [CSV](#) or Microsoft Excel format.

Live / refresh

The **Live** icon lets you change live view on, or off. When live mode is on, the page will refresh approximately every five seconds.

Column selection

The columns selection icon lets you choose which columns to show or hide.

Alerts

The **Alerts** page shows detailed information for all the alerts that have been raised for the related assets.

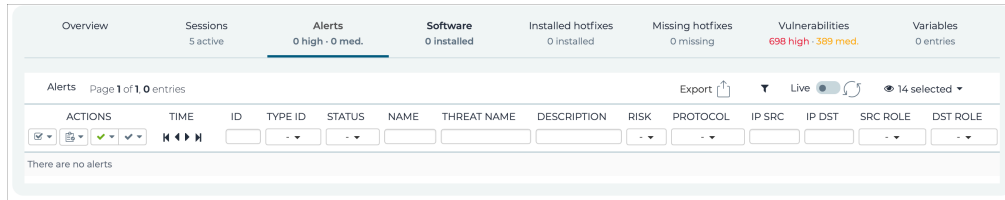





Figure 18. Alerts tab


Export

The **Export**  icon lets you export the current list in either [CSV](#) or Microsoft Excel format.

Live / refresh

The **Live**   icon lets you change live view on, or off. When live mode is on, the page will refresh approximately every five seconds.

Column selection

The columns selection  icon lets you choose which columns to show or hide.

Software

The **Software** page shows a list of software applications that are installed on the related assets.

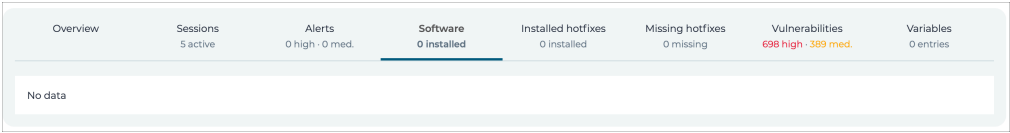


Figure 19. Software tab

Installed hotfixes

The **Installed hotfixes** page shows a list of hotfixes that are installed on the related assets.

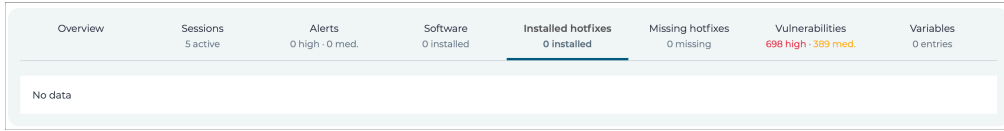


Figure 20. Installed hotfixes tab

Missing hotfixes

The **Missing hotfixes** page shows a list of hotfixes that could be installed on the related assets to resolve the related vulnerabilities.

Overview	Sessions 2 active	Alerts 0 high · 0 med.	Software 0 installed	Installed hotfixes 0 installed	Missing hotfixes 9 missing	Vulnerabilities 156 high · 1099 med.	Variables 0 entries
Page 1 of 19 entries					Live <input checked="" type="checkbox"/>	Node, Missing Patch, CVEs ▾	
NODE	MISSING PATC...						
172.18.252.169 KB5029318	CVE-2018-8271	CVE-2018-8330	CVE-2018-8330	CVE-2018-8332	CVE-2018-8333	CVE-2018-8332	CVE-2018-8333
172.18.252.169 KB5029259	CVE-2016-0141	CVE-2017-11830	CVE-2017-11831	CVE-2017-11842	CVE-2017-11849	CVE-2017-11850	CVE-2017-11851
172.18.252.169 KB5029247	CVE-2018-8454	CVE-2018-8492	CVE-2018-8497	CVE-2018-8506	CVE-2018-8547	CVE-2018-8612	CVE-2018-8626
172.18.252.169 KB5029312	CVE-2018-8455	CVE-2019-1060	CVE-2019-1311	CVE-2019-1325	CVE-2019-1334	CVE-2019-1343	CVE-2019-1347
172.18.252.169 KB5010345	CVE-2018-0743	CVE-2018-0745	CVE-2018-0809	CVE-2018-0823	CVE-2018-0827	CVE-2018-0843	CVE-2018-0964
172.18.252.169 KB4532820	CVE-2019-1316						
172.18.252.169 KB5029242	CVE-2018-0826	CVE-2018-0831	CVE-2018-0877	CVE-2018-0880	CVE-2018-0890	CVE-2018-0926	CVE-2018-0961
172.18.252.169 KB5029332	CVE-2019-0887	CVE-2020-0655					
172.18.252.169 KB5006672	CVE-2018-8566						

Figure 21. Missing hotfixes tab

Live / refresh

The **Live** icon lets you change live view on, or off. When live mode is on, the page will refresh approximately every five seconds.

Column selection

The columns selection icon lets you choose which columns to show or hide.


Vulnerabilities

The **Vulnerabilities** page shows a list of vulnerabilities that are present on the related asset.


ACTIONS	CVE	NODE	SCORE	CWE	CWE NAME	CVE CREATION DATE	DISCOVERY DATE
<input type="checkbox"/>	CVE-2019-13659	172.16.44.216	4.3	20	Improper Input Validation	2019-11-25 16:15:00.000	2023-09-11 12:19:41.251
<input type="checkbox"/>	CVE-2019-13660	172.16.44.216	5.3	20	Improper Input Validation	2019-11-25 16:15:00.000	2023-09-11 12:19:41.252
<input type="checkbox"/>	CVE-2019-13661	172.16.44.216	4.3	20	Improper Input Validation	2019-11-25 16:15:00.000	2023-09-11 12:19:41.253
<input type="checkbox"/>	CVE-2019-13662	172.16.44.216	6.5	276	Incorrect Default Permissions	2019-11-25 16:15:00.000	2023-09-11 12:19:41.254
<input type="checkbox"/>	CVE-2019-13663	172.16.44.216	4.3	20	Improper Input Validation	2019-11-25 16:15:00.000	2023-09-11 12:19:41.255
<input type="checkbox"/>	CVE-2019-13664	172.16.44.216	6.5	346	Origin Validation Error	2019-11-25 16:15:00.000	2023-09-11 12:19:41.256
<input type="checkbox"/>	CVE-2019-13665	172.16.44.216	6.5	732	Incorrect Permission Assignment for Critical Resource	2019-11-25 16:15:00.000	2023-09-11 12:19:41.257
<input type="checkbox"/>	CVE-2019-13666	172.16.44.216	7.4	203	Observable Discrepancy	2019-11-25 16:15:00.000	2023-09-11 12:19:41.258
<input type="checkbox"/>	CVE-2019-13668	172.16.44.216	7.4	281	Improper Preservation of Permissions	2019-11-25 16:15:00.000	2023-09-11 12:19:41.259

Figure 22. Vulnerabilities tab



Export

The **Export**  icon lets you export the current list in either **CSV** or Microsoft Excel format.


Only unresolved

The **Only unresolved**  toggle lets you filter the column to only show unresolved vulnerabilities.

Live / refresh

The **Live**   icon lets you change live view on, or off. When live mode is on, the page will refresh approximately every five seconds.

Column selection

The columns selection  icon lets you choose which columns to show or hide.


Variables

The **Variables** page shows detailed information for the variables hosted by the related asset.


ACTIONS	HOST	HOST LABEL	NAMESPACE	NAME	LABEL	TYPE	VALUE	LAST VALUE	# CHANGES	# REQUESTS	LAST FC	LAST FC INFO	LAST ACTIVITY
There are no variables													

Figure 23. Variables tab

Export

The **Export**  icon lets you export the current list in either **CSV** or Microsoft Excel format.

Live / refresh

The **Live**  icon lets you change live view on, or off. When live mode is on, the page will refresh approximately every five seconds.

Column selection

The columns selection  icon lets you choose which columns to show or hide.



Chapter 5. Queries



Queries

You can use the Nozomi Networks Query Language (N2QL) syntax to create complex data processes to obtain, filter, and analyze lists of information from the Nozomi Networks software.

In [Nozomi Networks Query Language \(N2QL\)](#), queries consist of:

- [Data sources \(on page 61\)](#)
- [Commands \(on page 66\)](#)
- [Functions \(on page 74\)](#)

Data sources

Queries start by calling a data source. For example:

```
nodes | sort received.bytes desc | head
```

This query will show, in table format, the first 10 nodes that received the most bytes. If you add the `pie` command at the end of the query, the results will show in a pie chart format, where each slice has `node id` as the label and the `received.bytes` field as data.

For example:

```
nodes | sort received.bytes desc | head | pie ip received.bytes
```

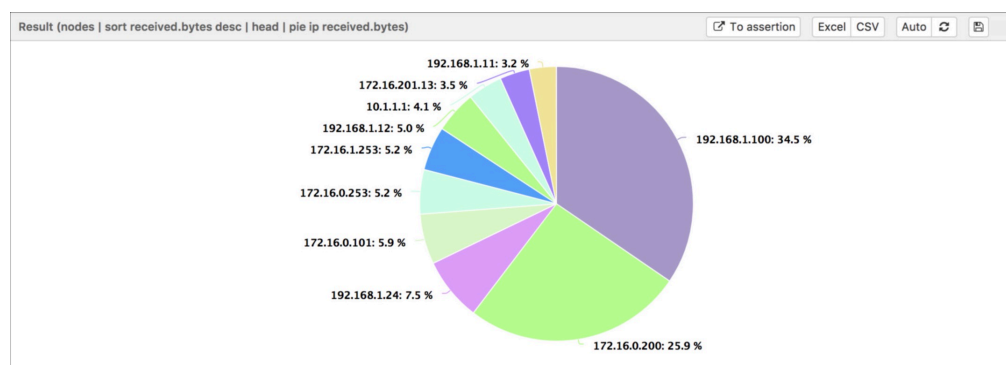


Figure 24. Queries example

Functions

You might not achieved your desired result just using queries. Consequently, query syntax supports functions. With functions, you can apply calculations to the fields and use the results as a new temporary field. For example, the query:

```
nodes | sort sum(sent.bytes,received.bytes) desc | column ip
sum(sent.bytes,received.bytes)
```

uses the `sum` function to sort on the aggregated parameters, which produces a chart with the columns representing the sum of the `sent` and `received` bytes.

Prefix

The `$` is a prefix that changes the interpretation of the right hand side (rhs) of a `where` clause. By default, the rhs is interpreted as a string. With the `$` prefix, the interpretation of the rhs changes to a field name.

For example, in a query such as:

```
nodes | where id == 17.179.252.2
```

the right side of the `==` is expected to be a constant. If you create a query such as:

```
nodes | where id == id
```

the query tries to match all of the nodes having `id` equal to the string `id`.

If, however, you use the `$`, the second field is interpreted as a field, not a constant:

```
nodes | where id == $id
```

and returns the full list of records.

Data sources

These are the available data sources with which you can start a query.

alerts	Raised events
appliances	Downstream connected sensors synchronizing data to this, local one
assertions	Assertions saved by the users. An assertion represents an automatic check against other query sources
assets	Identified assets. Assets represent a local (private), physical system to care about, and can be composed of one or more Nodes. Broadcast nodes, grouped nodes, internet nodes, and similar cannot be Assets accordingly
audit_log	System's log for important operational events, e.g., login, backup creation, etc.
captured_files	Files reconstructed for analysis
captured_logs	Logs captured passively over the network
captured_urls	URLs and other protocol calls captured over the network. Access to files, requests to DNS, requested URLs and other are available in this query source
cpe_items	CPE maps definitions
cve_files	CVE definitions
dhcp_leases	IP to Mac bindings due to the presence of DHCP
function_codes	Protocols' function codes used in the environment
health_log	System's Health-related events, e.g. high resource utilization or hardware-related issues or events
link_events	Events that can occur on a Link, like it being available or not
links	Identified links, defined as directional one-to-one associations with a single protocol (i.e. source, destination, protocol)
microsoft_hotfixes	Microsoft hotfix information

node_cpe_changes	Common Platform Enumeration changes identified over known nodes. On the event of update of a CPE (on hardware, operating system and software versions), an entry in this query source is created to keep track of software updates or better detection of software
node_cpes	Common Platform Enumeration identified on nodes (hardware, operating system and software versions)
node_cves	Common Vulnerability Exposures: vulnerabilities associated to identified nodes' CPEs
node_points	Data points extracted over time, via Smart Polling or via Arc, from monitored Nodes
node_points_last	node_points last samples per each included data point
nodes	Identified nodes, where a node is an L2 or L3 (and above) entity able to speak some protocol
packet_rules	Packet rules definitions
protocol_connections	Identified protocol handshakes/connections needed to decode process variables
report_files	Generated report files available for consultation
report_folders	Generated report folders
sessions	Sessions with recent network activity. A Session is a specific application-level connection between nodes. A Link can hold one or more Session at a given time
sessions_history	Archived sessions
sigma_rules	Sigma rules definitions
sp_executions	Executions of Smart Polling plans
sp_node_executions	Results of Smart Polling plans executions per node
stix_indicators	STIX definitions
subnets	Identified network subnets
threat_models	Threat Modeling definitions
trace_requests	Trace requests in processing

variable_history	Process variables' history of values
variables	Identified process variables
yara_rules	Yara rules definitions
zone_links	A list of protocols exchanged by the defined zones
zones	Defined network zones

Basic operators

Operator	(pipe, AND logical operator)
Description	Add a where clause with a logical AND, append it using the pipe character (). For example, the query below returns links that are from 192.168.254.0/24 AND going to 172.217.168.0/24.
Example	<code>links where from in_subnet? 192.168.254.0/24 where to in_subnet? 172.217.168.0/24</code>

Operator	OR
Description	To add a where clause with a logical OR, append it using the OR operator. For example, the query below returns links with either the http OR the https protocols.
Example	<code>links where protocol == http OR protocol == https</code>

Operator	! (exclamation point, NOT logical operator)
Description	Put an exclamation point (!) before a term to negate it. For example, the query below returns links that do NOT (!) belong to 192.168.254.0/24.
Example	<code>nodes where ip !in_subnet? 192.168.254.0/24 count</code>

Operator	->
Description	To change a column name, select it and use the -> operator followed by the new name. It is worth noting that specific suffixes are parsed and used to visualize the column content differently. For example: <ul style="list-style-type: none"> • <code>_time</code> data is shown in a timestamp format (1647590986549 becomes 2022-03-18 09:09:46.549) • <code>_bytes</code> adds KB or MB, as applicable (50 becomes 50.0 B) • <code>_percent</code> adds a percentage sign (50 becomes 50%) • <code>_speed</code> adds a throughput speed in Mb/s (189915 becomes 1.8 Mb/s) • <code>_date</code> converts numbers into a date format (2022-06-22 15:43:31.297 becomes 2022-06-22 14:24:09.280 becomes 2022-06-24 (current day)) • <code>_packets</code> adds pp after the number of packets (50 becomes 50 pp)
Example 1	<code>nodes select created_at created_at->my_integer where my_integer > 946684800000</code>
Example 2	<code>nodes select created_at->my_creation_time</code>

Example 3	<code>nodes select tcp_retransmission.bytes->my_retrans_bytes</code>
------------------	---

Operators	<code>==, =, <, >, <=, and >=</code>
Description	Queries support the mathematical operators listed above.

Operator	" (Quotation marks)
Description	Use quotation marks (") to specify an empty string. Consider these two cases where this technique is useful: <ul style="list-style-type: none"> • Finding non-empty values. Example 1 below returns assets where the <code>os</code> field is not blank. • Specifying that a value in the query is a string (if its type is ambiguous). Example 2 below tells <code>concat</code> to treat the <code>--</code> parameter as a fixed string to use rather than as a field from the <code>alerts</code> table.
Example 1	<code>assets where os != ""</code>
Example 2	<code>alerts select concat(id_src,"--",id_dst)</code>

Operator	<code>in?</code>
Description	<code>in?</code> is only used with arrays; the field <code>type</code> must be an array. The query looks for the text strings you specify using <code>in?</code> and returns arrays that match one of them. The example below uses <code>in?</code> to find any node having <code>computer</code> or <code>printer</code> as elements in the array.
Example	<code>assets where type in? ["computer","printer_scanner"]</code>

Operator	<code>include?</code>
Description	The query looks for the text string you specify using <code>include?</code> and returns strings that match it. The example below uses <code>include?</code> to find assets where the <code>os</code> field contains the string Win .
Example	<code>assets where os include? Win</code>

Commands

Syntax	<code>select <field1> <field2> ... <fieldN></code>
Parameters	<ul style="list-style-type: none"> the list of field(s) to output
Description	The select command takes all the input items and outputs them with only the selected fields

Syntax	<code>exclude <field1> <field2> ... <fieldN></code>
Parameters	<ul style="list-style-type: none"> the list of field(s) to remove from the output
Description	The exclude command takes all the input items and outputs them without the specified field(s)

Syntax	<code>where <field> <=> !=> <> <=> = in? include? start_with? end_with? in_subnet?> <value></code>
Parameters	<ul style="list-style-type: none"> field: the name of the field to which the operator will be applied operator value: the value used for the comparison. It can be a number, a string, or other data type. Advanced operators can use other data types, such as: <ul style="list-style-type: none"> a list (using JSON syntax) when using the in? operator, for example: <code>nodes where ip in? ["172.18.41.44"]</code> another property when using the '\$' symbol, for example: <code>nodes where ip != \$id</code>
Description	The where command will send to the output only the items which fulfill the specified criterion, many clauses can be concatenated using the boolean OR operator
Example	<ul style="list-style-type: none"> <code>nodes where roles include? consumer OR zone == office</code> <code>nodes where ip in_subnet? 192.168.1.0/24</code> <value> can also be another <field>, as in: <code>links where from_zone == \$to_zone select from_zone to_zone</code>

Syntax	<code>sort <field> [asc desc]</code>
Parameters	<ul style="list-style-type: none"> field: the field used for sorting asc desc: the sorting direction

Description	The sort command will sort all the items according to the field and the direction specified, it automatically understands if the field is a number or a string
--------------------	--

Syntax	<code>group_by <field> [[avg sum] [field2]]</code>
Parameters	<ul style="list-style-type: none"> • field: the field used for grouping • avg sum: if specified, the relative operation will be applied on field2
Description	The group_by command will output a grouping of the items using the field value. By default the output will be the count of the occurrences of distinct values. If an operator and a field2 are specified, the output will be the average or the sum of the field2 values

Syntax	<code>head [count]</code>
Parameters	<ul style="list-style-type: none"> • count: the number of items to output
Description	The head command will take the first count items, if count is not specified the default is 10

Syntax	<code>uniq [<field1> <field2> ... <fieldN>]</code>
Parameters	<ul style="list-style-type: none"> • an optional list of fields on which to calculate the uniqueness
Description	The uniq command will remove from the output the duplicated items

Syntax	<code>expand <field></code>
Parameters	<ul style="list-style-type: none"> • field: the field containing the list of values to be expanded
Description	The expand command will take the list of values contained in field and for each of them it will duplicate the original item substituting the original field value with the current value of the iteration

Syntax	<code>expand_recursive <field></code>
Parameters	<ul style="list-style-type: none"> • field: the field to be recursively expanded

Description	The <code>expand_recursive</code> command will recursively parse the content of field , expanding each array or json structure until a scalar value is found. It generates a new row for each array element or json field. For each new row, it duplicates the original item substituting the original field value with the current value of the iteration and adding a new field that represents the current iteration path from the root
--------------------	--

Syntax	<code>sub <field></code>
Parameters	<ul style="list-style-type: none"> • <code>field</code>: the field containing the list of objects
Description	The <code>sub</code> command will output the items contained in field

Syntax	<code>count</code>
Parameters	
Description	The <code>count</code> command outputs the number of items

Syntax	<code>pie <label_field> <value_field></code>
Parameters	<ul style="list-style-type: none"> • <code>label_field</code>: the field used for each slice label • <code>value_field</code>: the field used for the value of the slice, must be a numeric field
Description	The <code>pie</code> command will output a pie chart according to the specified parameters

Syntax	<code>column <label_field> <value_field ...></code>
Parameters	<ul style="list-style-type: none"> • <code>label_field</code>: the field used for each column label • <code>value_field</code>: one or more field used for the values of the columns
Description	The <code>column</code> command will output a histogram; for each label a group of columns is displayed with the value from the specified <code>value_field(s)</code> . The variant <code>column_colored_by_label</code> returns bars of different colors depending on their labels.

Syntax	<code>history <count_field> <time_field></code>
Parameters	<ul style="list-style-type: none"> • <code>count_field</code>: the field used to draw the Y value • <code>time_field</code>: the field used to draw the X points of the time series

Description	The history command will draw a chart representing an historic series of values
--------------------	---

Syntax	<code>distance <id_field> <distance_field></code>
Parameters	<ul style="list-style-type: none"> • <code>id_field</code>: the field used to tag the resulting distances. • <code>distance_field</code>: the field on which distances are computed among entries.
Description	<p>The distance command calculates a series of distances (that is, differences) from the original series of <code>distance_field</code>. Each distance value is calculated as the difference between a value and its subsequent occurrence, and tagged using the <code>id_field</code>.</p> <p>For example, assuming we're working with an <code>id</code> and a <code>time</code> field, entering <code>alerts distance id time</code> returns a table where each distance entry is characterised by the <code>from_id</code>, <code>to_id</code>, and <code>time_distance</code> fields that represent time differences between the selected alerts.</p>

Syntax	<code>bucket <field> <range></code>
Parameters	<ul style="list-style-type: none"> • <code>field</code>: the field on which the buckets are calculated • <code>range</code>: the range of tolerance in which values are grouped
Description	The bucket command will group data in different buckets, different records will be put in the same bucket when the values fall in the same multiple of <code><range></code>

Syntax	<code>join <other_source> <field> <other_source_field></code>
Parameters	<ul style="list-style-type: none"> • <code>other_source</code>: the name of the other data source • <code>field</code>: the field of the original source used to match the object to join • <code>other_source_field</code>: the field of the other data source used to match the object to join
Description	The join command will take two records and will join them in one record when <code><field></code> and <code><other_source_field></code> have the same value

Syntax	<code>gauge <field> [min] [max]</code>
Parameters	<ul style="list-style-type: none"> • <code>field</code>: the value to draw • <code>min</code>: the minimum value to put on the gauge scale • <code>max</code>: the maximum value to put on the gauge scale

Description	The gauge command will take a value and represent it in a graphical way
Syntax	value <field>
Parameters	<ul style="list-style-type: none"> • field: the value to draw
Description	The value command will take a value and represent it in a textual way
Syntax	reduce <field> [sum avg]
Parameters	<ul style="list-style-type: none"> • field: the field on which the reduction will be performed • sum or avg: the reduce operation to perform, it is sum if not specified
Description	The reduce command will take a series of values and calculate a single value
Syntax	size()
Parameters	<ul style="list-style-type: none"> • field: the field to calculate the size of
Description	<p>If the field is an array, then the size function returns the number of entries in the array. If the field contains a string, then the size function returns the number of characters in the string.</p> <p>Note: The size function may only be used on the following data sources: alerts, assets, captured_files, links, nodes, packet_rules, sessions, stix_indicators, subnets, variables, yara_rules, zones, and zone_links.</p>
Example:	assets where size(ip) > 1

Nodes-specific commands reference

Syntax	<code>where_node <field> < == != < > <= >= in? include? exclude? start_with? end_with? > <value></code>
Parameters	<ul style="list-style-type: none"> • field: the name of the field to which the operator will be applied • operator • value: the value used for the comparison. It can be a number, a string or a list (using JSON syntax), the query engine will understand the semantics.
Description	<p>The where_node command will send to the output only the items which fulfill the specified criterion, many clauses can be concatenated using the boolean OR operator. The where_node command is similar to the where command, but the output will also include all the nodes that are communicating directly with the result of the search.</p> <p>Note: This command is only applicable to the nodes table.</p>
Syntax	<code>where_link <field> < == != < > <= >= in? include? exclude? start_with? end_with? > <value></code>
Parameters	<ul style="list-style-type: none"> • field: the name of the links table's field to which the operator will be applied. • operator • value: the value used for the comparison. It can be a number, a string or a list (using JSON syntax) the query engine will understand the semantics.
Description	<p>The where_link command will send to the output only the nodes which are connected by a link fulfilling the specified criterion. Many clauses can be concatenated using the boolean OR operator.</p> <p>Note: This command is only applicable to the nodes table.</p>
Syntax	<pre>graph [node_label:<node_field>] [node_perspective:<perspective_name>] [link_perspective:<perspective_name>]</pre>

Parameters	<ul style="list-style-type: none">• <code>node_label</code>: add a label to the node, the label will be the content of the specified node field• <code>node_perspective</code>: apply the specified node perspective to the resulting graph. Valid node perspective values are:<ul style="list-style-type: none">◦ <code>roles</code>◦ <code>zones</code>◦ <code>transferred_bytes</code>◦ <code>not_learned</code>◦ <code>public_nodes</code>◦ <code>reputation</code>◦ <code>appliance_host</code>• <code>link_perspective</code>: apply the specified link perspective to the resulting graph. Valid link perspectives are:<ul style="list-style-type: none">◦ <code>transferred_bytes</code>◦ <code>tcp_firewalled</code>◦ <code>tcp_handshaked_connections</code>◦ <code>tcp_connection_attempts</code>◦ <code>tcp_retransmitted_bytes</code>◦ <code>throughput</code>◦ <code>interzones</code>◦ <code>not_learned</code>
Description	The graph command renders a network graph by taking some nodes as input.

Link-events-specific commands reference

Syntax	<code>availability</code>
Parameters	
Description	The <code>availability</code> command computes the percentage of time a link is UP. The computation is based on the link events UP and DOWN that are seen for the link.

Syntax	<code>availability_history <range></code>
Parameters	<ul style="list-style-type: none"> • <code>range</code>: the temporal window in milliseconds to use to group the link events
Description	The <code>availability_history</code> command computes the percentage of time a link is UP by grouping the link events into many buckets. Each bucket will include the events of the temporal window specified by the <code>range</code> parameter.

Syntax	<code>availability_history_month <months_back> <range></code>
Parameters	<ul style="list-style-type: none"> • <code>months_back</code>: number of months to go back in regards to the current month to group the link events • <code>range</code>: the temporal window in seconds to use to group the link events
Description	The <code>availability_history</code> command computes the percentage of time a link is UP by grouping the link events into many buckets. Each bucket will include the events of the temporal window specified by the <code>range</code> and <code>months</code> parameters.

Functions

Functions are always used in conjunction with other commands, such as `select`. In the following examples, functions are shown in **bold**:

- Combining functions with `select`: `nodes | select id type color(type)`
- Combining functions with `where`: `nodes | where size(label) > 10`
- Combining functions with `group_by`: `nodes | group_by size(protocols)`

Here is the complete list of functions:

Syntax	<code>abs(<field>)</code>
Parameters	<ul style="list-style-type: none"> • the field on which to calculate the absolute value
Description	The <code>abs</code> function returns the absolute value of the field

Syntax	<code>bitwise_and(<numeric_field>, <mask>)</code>
Parameters	<ul style="list-style-type: none"> • <code>numeric_field</code>: the numeric field on which apply the mask • <code>mask</code>: a number that will be interpreted as a bit mask
Description	The <code>bitwise_and</code> function calculates the bitwise & operator between the <code>numeric_field</code> and the mask entered by the user

Syntax	<code>coalesce(<field1>, <field2>, ...)</code>
Parameters	<ul style="list-style-type: none"> • a list of fields or string literals in the format "<code><chars></code>"
Description	The <code>coalesce</code> function will output the first value that is not null

Syntax	<code>color(<field>)</code>
Parameters	<ul style="list-style-type: none"> • <code>field</code>: the field on which to calculate the color
Description	The <code>color</code> function generates a color in the <code>rgb</code> hex format from a value
Note	Only available for nodes, links, variables and <code>function_codes</code>

Syntax	<code>concat(<field1>, <field2>, ...)</code>
Parameters	<ul style="list-style-type: none"> • a list of fields or string literals in the format "<code><chars></code>"

Description	The concat function will output the concatenation of the input fields or values
--------------------	---

Syntax	date(<time>)
Parameters	<ul style="list-style-type: none"> time defined as unix epoch
Description	The date function returns a date from a raw time

Syntax	day_hour(<time_field>)
Parameters	<ul style="list-style-type: none"> time_field: the field representing a time
Description	The day_hour function returns the hour of the day plus the sensor's local time offset from UTC, i.e. a value in the range 0 through 23. Be careful when accounting for daylight saving time. Use day_hour_utc when absolute precision is desired

Syntax	day_hour_utc(<time_field>)
Parameters	<ul style="list-style-type: none"> time_field: the field representing a time
Description	The day_hour_utc function returns the hour of the day expressed in UTC for the current time field, i.e. a value in the range 0 through 23

Syntax	days_ago(<time_field>)
Parameters	<ul style="list-style-type: none"> time_field: the field representing a time
Description	The days_ago function returns the amount of days passed between the current time and the time field value

Syntax	dist(<field1>, <field2>)
Parameters	<ul style="list-style-type: none"> the two fields to compute the distance on
Description	The dist function returns the distance between field1 and field2, which is the absolute value of their difference

Syntax	div(<field1>, <field2>)
---------------	-------------------------

Parameters	<ul style="list-style-type: none"> field1 and field2: the two field to divide
Description	The div function will calculate the division field1/field2

Syntax	hours_ago(<time_field>)
Parameters	<ul style="list-style-type: none"> time_field: the field representing a time
Description	The hours_ago function returns the amount of hours passed between the current time and the time field value

Syntax	is_empty(field) == true false
Parameters	<ul style="list-style-type: none"> field: the field to check to evaluate whether it is empty or not
Description	The is_empty command takes a field as input and returns only the entries that are either empty / not empty.
Example	nodes where is_empty(label) == false

Syntax	is_recent(<time_field>)
Parameters	<ul style="list-style-type: none"> time_field: the field representing a time
Description	The is_recent function takes a time field and returns true if the time is not farther than 30 minutes

Syntax	minutes_ago(<time_field>)
Parameters	<ul style="list-style-type: none"> time_field: the field representing a time
Description	The minutes_ago function returns the amount of minutes passed between the current time and the time field value

Syntax	mult(<field1>,<field2>,...)
Parameters	<ul style="list-style-type: none"> a list of fields to multiply
Description	The mult function returns the product of the fields passed as arguments

Syntax	round(<field>,[precision])
---------------	----------------------------

Parameters	<ul style="list-style-type: none"> • field: the numeric field to round • precision: the number of decimal places
Description	The round function takes a number and outputs the rounded value

Syntax	<code>seconds_ago(<time_field>)</code>
Parameters	<ul style="list-style-type: none"> • time_field: the field representing a time
Description	The seconds_ago function returns the amount of seconds passed between the current time and the time field value

Syntax	<code>split(<field>,<splitter>,<index>)</code>
Parameters	<ul style="list-style-type: none"> • field: the field to split • splitter: the character used to separate the string and produce the tokens • index: the 0 based index of the token to output
Description	The split function takes a string, separates it and outputs the token at the <index> position

Syntax	<code>sum(<field>,...)</code>
Parameters	<ul style="list-style-type: none"> • a list of fields to sum
Description	The sum function returns the sum of the fields passed as arguments

Examples

Pie chart

An example on how to create a pie chart to understand the media access control (MAC) vendor distribution in a network.

We choose nodes as our query source and we start to group the nodes by mac_vendor:

```
nodes | group_by mac_vendor
```

We can see the list of the vendors in our network associated with the occurrences count. To better understand our data we can use the sort command, so the query becomes:

```
nodes | group_by mac_vendor | sort count desc
```

In the last step we use the pie command to draw the chart with the mac_vendor as a label and the count as the value.

```
nodes | group_by mac_vendor | sort count desc | pie mac_vendor count
```

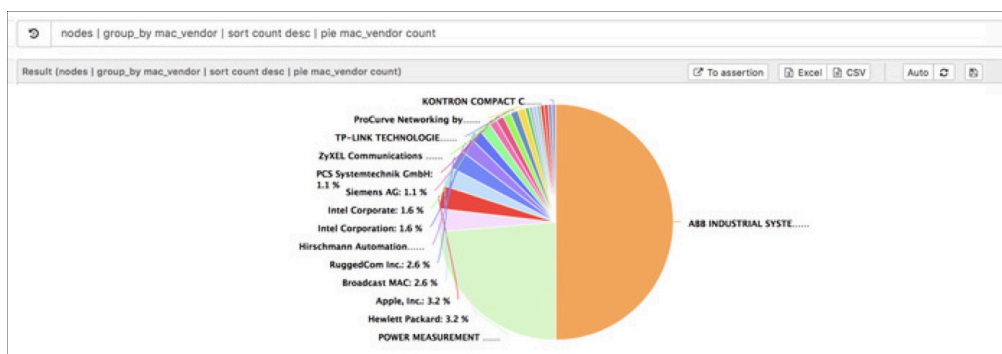


Figure 25. Pie chart example

Column chart

An example on how to create a column chart with the top nodes by traffic.

To start, you need to get the nodes and select the:

- id
- sent.bytes
- received.bytes
- sent.bytes
- received.bytes

To calculate the sum, you need to use the sum function. The query is:

```
nodes | select id sent.bytes received.bytes
sum(sent.bytes, received.bytes)
```

When you execute this query, the sum field has a very long name. You can rename it to be more comfortable with these commands:

```
nodes | select id sent.bytes received.bytes
sum(sent.bytes,received.bytes)->sum
```

To obtain the top nodes by traffic, you can sort and take the first 10:

```
nodes | select id sent.bytes received.bytes
sum(sent.bytes,received.bytes)->sum | sort sum desc | head 10
```

Finally, to display the data in a graphical way, you can use the `column` command:

```
nodes | select id sent.bytes received.bytes
sum(sent.bytes,received.bytes)->sum | sort sum desc | head 10 | column
id sum sent_bytes received_bytes
```



Note:

You can access an inner field of a complex type with the dot syntax, in the example the dot syntax is used on the fields `sent` and `received` to access their bytes sub field.



Note:

After accessing a field with the dot syntax, it will gain a new name to avoid ambiguity; the dot is replaced by an underscore. In the example `sent.bytes` become `sent_bytes`



Figure 26. Column chart example

Where with multiple conditions in OR

An example of a query to get all the nodes with a specific role, in particular all the nodes which are web or domain name server (DNS) servers.

With the `where` command, you can separate many conditions with `OR`



Note:

Because the roles field contains a list of values, you can use the `include?` operator to check if a value was contained in the list.

```
nodes | where roles include? web_server OR roles include? dns_server |
select id roles
```



id	roles
192.168.1.1	["dns_server"]
172.16.0.1	["dns_server"]

Figure 27. Where with multiple conditions in OR example

Bucket and history

An example of a query to calculate the distribution of link events towards an internet protocol (IP) address.

You can filter all the `link_events` with `id_dst` equal to `192.168.1.11`. After this you can sort by time, this is a very important step because bucket and history depend on how the data are sorted.

Then you can use `bucket` to group the data by time. The final step is to use the `history` command to draw a chart, we pass `count` as a value for the Y axis and `time` for the X axis.

The `history` command is particularly suited for displaying a big amount of data, in the image below we can see that there are many hours of data to analyze.

```
link_events | where id_dst == 192.168.1.11 | sort time asc | bucket time
36000 | history count time
```

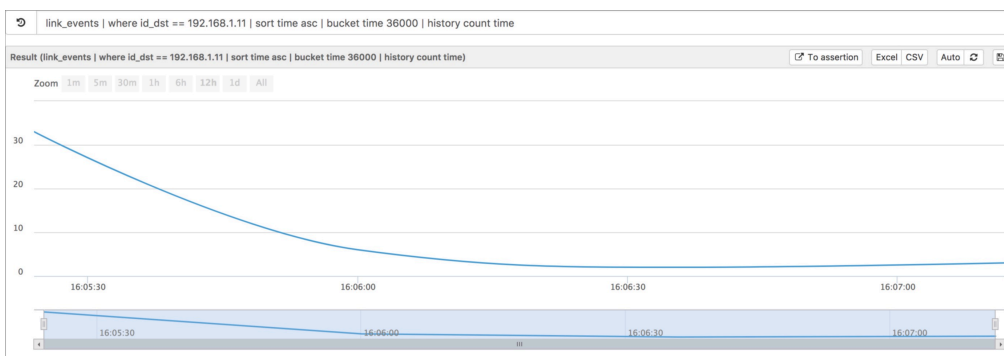


Figure 28. Bucket and history example

Join

An example query to join two data sources to obtain a new data source with more information. In particular, how to list the links with the labels for the source and destination nodes.

You can match the `from` field of the links with the `id` field of the nodes to ask for the links, and join them with the nodes:

```
links | join nodes from id
```

After executing the query above you will get all the links fields, plus a new field called `joined_node_from_id`, it contains the node which satisfies the `link.from == node.id` condition. You can use the dot syntax to access the sub fields of `joined_node_from_id`

Because we also want to get the labels for the `to` field of the links you add another join and exclude the empty labels of the node referred by `to` to get more interesting data:

```
links | join nodes from id | join nodes to id | where
  joined_node_to_id.label != ""
```

This will obtain a huge amount of data, which is difficult to understand. To only get the relevant information, you can use a `select`:

```
links | join nodes from id | join nodes to id | where
  joined_node_to_id.label != "" | select from joined_node_from_id.label to
  joined_node_to_id.label protocol
```

from	joined_node_from_id.label	to	joined_node_to_id.label	protocol
172.16.0.253		172.16.0.148	Modicon M340 BMX P34 2020	modbus
172.16.0.253		172.16.0.149	Modicon M340 BMX P34 2020	modbus
172.16.1.253		172.16.1.149	Modicon M340 BMX P34 2020	modbus
172.16.0.253		172.16.0.156	Modicon M340 BMX P34 2020	modbus
172.16.1.253		172.16.1.156	Modicon M340 BMX P34 2020	modbus
172.16.0.253		172.16.0.146	Modicon M340 BMX P34 2020	modbus
172.16.1.253		172.16.1.146	Modicon M340 BMX P34 2020	modbus
172.16.0.253		172.16.0.153	Modicon M340 BMX P34 2020	modbus
172.16.1.253		172.16.1.153	Modicon M340 BMX P34 2020	modbus
172.16.0.253		172.16.0.143	Modicon M340 BMX P34 2020	modbus

Figure 29. Join example

Compute the availability history

An example query to compute the availability history for a link.

In order to achieve a reliable availability, it is recommended to enable the **Track availability** feature on the desired link.

Start from the `link_events` data source, filtered by source and destination ip in order to precisely identify the target link. Consider also filtering by protocol to achieve a higher degree of precision.

```
link_events | where id_src == 10.254.3.9 | where id_dst == 172.31.50.2
```

The next step is to sort the events by ascending time of creation. Without this step the `availability_history` might produce meaningless results, such as negative values. Then, to compute the `availability_history` with a bucket of 1 minute (60000 milliseconds), you can complete query as follows:

```
link_events | where id_src == 10.254.3.9 | where id_dst == 172.31.50.2 |
  sort time asc | availability_history 60000
```

Queries	
link_events where id_src == 10.254.3.9 where id_dst == 172.31.50.2 sort time asc availability_history 60000	
Result (link_events where id_src == 10.254.3.9 where id_dst == 172.31.50.2 sort time asc avail: To assertion Excel Print)	
availability	time
100	09:01:00.000
34.075	09:02:00.000
21.41167	09:04:00.000
79.805	09:05:00.000
0	09:06:00.000
74.47167	09:08:00.000
25.78833	09:09:00.000
0	09:10:00.000
29.11167	09:11:00.000
71.36167	09:12:00.000

Figure 30. Availability history example



Note:

By default, `link_events` generation is disabled. To enable it, you can use the configuration rule described in **Configure links**.

Complex field types

Single scalar values

To query single scalar values, apply the commands that are explained in this section.

Objects

Objects show in braces: {object}

```
{
  "source": "ARP",
  "likelihood": 1,
  "likelihood_level": "confirmed"
}
```

An example on how to query only confirmed [MAC](#) addresses.



Note:

Possible values are:

- `confirmed`
- `likely`
- `not confirmed`

Since `mac_address:info` is an object, you can access subfields like `mac_address:info.likelihood_level` to apply the `where` condition:

```
nodes | select mac_address:info mac_address:info.likelihood_level | where
mac_address:info.likelihood_level == confirmed
```

Since N2OS 24.1 is possible to access complex objects with a different syntax that is compatible with Vantage, using the `/` operator, the query specified above becomes:

```
nodes | select mac_address:info/likelihood_level | where
mac_address:info.likelihood_level == "confirmed"
```

Note that also the `"confirmed"` literal can now be quoted and the query can be executed in Vantage without any change.

Arrays



Note:

For example, a `parent` in the alerts table.

Arrays show in braces: `{array}`

```
[
"5b867836-2b41-4c15-ab6f-4ae5f0251e30"
]
```

An example on how to only query alerts that have a parent incident, with a known incident id with the value: `d36d0`

Since the `parents` field is an array, you can use `expand` first to get an entry for each parent, then apply your condition:

```
alerts | expand parents | where expanded_parents include? d36d0
```

Object arrays



Note:

For example, `function_codes` in the links table.

Object arrays are a combination of the above examples. Therefore, they show an object included in a `[{..},{..},..]`:

```
[
  {
    "name": "M-SEARCH",
    "is_learned": true,
    "is_fully_learned": true
  }
]
```

An example on how to query learned function codes.

Since `function_codes` is an object array, you can use `expand` first, to get an entry for each function code, then use the `.` operator (`function_code.is_learned`) to apply your `where` condition:

```
links | select from to protocol function_codes | expand function_codes |
where expanded_function_codes.is_learned == true
```

Chapter 6. Smart Polling



Smart Polling in CMC

The **Smart Polling** page gives you a read-only view of Smart Polling.

In the [CMC](#), Smart Polling plans are read-only. Plans created in Guardian can be synchronized, along with the associated data. By default, synchronization is disabled.

Smart Polling has these tabs:

- [Plans \(on page 88\)](#)
- [Node points \(on page 89\)](#)

Plans

The **Plans** page shows a list of Smart Polling plans and lets you manage plans and add new ones.

Smart Polling		Plans	Node points
32 configured plans		Filter by node ID	Live <input checked="" type="checkbox"/>
	> Progressive: EthernetIP	from "ch-lab-sg-nsl-1.intra.nozominetworks.com" ("25379df7-441c-4482-9a12-122d86e12683") 56 Nodes	5 hours ago
	> Progressive: MELSOFT	from "ch-lab-sg-nsl-1.intra.nozominetworks.com" ("25379df7-441c-4482-9a12-122d86e12683") 75 Nodes	5 hours ago
	> Progressive: Modicon Modbus	from "ch-lab-sg-nsl-1.intra.nozominetworks.com" ("25379df7-441c-4482-9a12-122d86e12683") 49 Nodes	5 hours ago
	> Progressive: S7	from "ch-lab-sg-nsl-1.intra.nozominetworks.com" ("25379df7-441c-4482-9a12-122d86e12683") 29 Nodes	5 hours ago
	> Progressive: Dahua DHIP/DVRIP devices	from "ch-lab-sg-nsl-1.intra.nozominetworks.com" ("25379df7-441c-4482-9a12-122d86e12683") 2 Nodes	5 hours ago

Figure 31. Plans page

Filter

The filter field lets you use the node *ID* to filter the page.

Live / refresh

The **Live** icon lets you change live view on, or off. When live mode is on, the page will refresh approximately every five seconds.

Node points

The **Node points** page shows all of the node points.

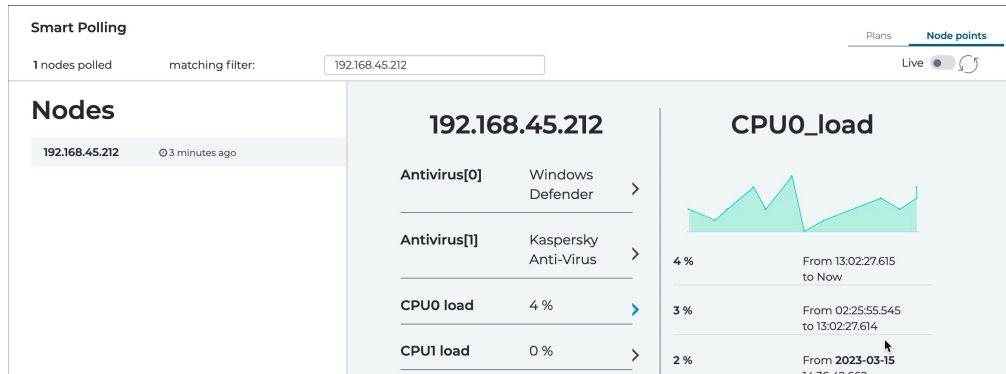


Figure 32. Node points page

View the enriched information history for a node

The **Node points** page lets you view the enriched information history for a node.

Procedure

1. In the top navigation bar, select **Smart Polling**.

Result: The **Smart Polling** page opens.

2. In the top right, select **Node points**.

Result: The **Node points** page opens.

3. In the left column, select a node point.

The screenshot displays the 'Smart Polling' interface. At the top, there are tabs for 'Plans', 'Node points' (selected), 'Settings', and 'Health'. Below the navigation, it shows '1 nodes polled' and a 'matching filter' box containing '192.168.45.212'. A 'Live' toggle is also visible.

The main content area is divided into three columns:

- Nodes:** A list of nodes with '192.168.45.212' selected, indicating it was polled '3 minutes ago'.
- Node Details (192.168.45.212):** A table showing system information:

Antivirus[0]	Windows Defender	>
Antivirus[1]	Kaspersky Anti-Virus	>
CPU0 load	4 %	>
CPU1 load	0 %	>
- CPU0_load:** A line graph showing CPU load over time. The y-axis ranges from 2% to 4%. Three data points are highlighted:

4 %	From 13:02:27.615 to Now
3 %	From 02:25:55.545 to 13:02:27.614
2 %	From 2023-03-15 14:36:47.667

Result: The second and third columns show an increased level of detail for the extracted information for that node point

Chapter 7. Arc



Arc overview

Arc™ is a host-based sensor that detects and defends against malicious or compromised endpoints, and insider attacks. You can use Arc sensors to aggregate data for analysis and reports, either on-premises, or in the Vantage cloud.

General

When detecting cyberthreats, identifying vulnerabilities, or analyzing anomalies in your processes, it is critical to have as much detailed network and system information as possible. More accurate and timely access to data leads to better diagnostics and a faster time to repair.

Arc gives you enhanced endpoint data collection and asset visibility for your networks. This enhanced visibility gives you more:

- Vulnerability assessment capabilities
- Endpoint protection
- Traffic analysis capabilities
- Accurate diagnostics of in-progress threats and anomalies

Arc lets you easily identify compromised hosts that have:

- Malware
- Rogue applications
- Unauthorized [universal serial bus \(USB\)](#) devices
- Suspicious user activity

Arc sensors are endpoint executables that run on hosts on these operating systems:

- Microsoft Windows
- Linux
- Apple macOS
- Embedded devices (that run one of the above OSs). For more information, see

The data that is collected can be sent to either Guardian or Vantage.

Use cases and deployment scenarios

Arc lets you:

- Incorporate air-gapped devices into the analysis and reporting system
- Gain deeper intelligence or insight on critical endpoint devices
- Continuously monitor endpoints
- Automatically deploy sensors across thousands of devices
- Use a low-impact process to scan air-gapped networks
- Deploy with solutions

Continuous monitoring

Because the Arc sensor is on the host, it can monitor traffic continuously, even when the device is not sending or receiving traffic.

User-specific activity monitoring

With more access to endpoint data, Arc lets you connect network traffic and anomalies with specific users. This helps to identify potential insider threats and makes corrective actions both easier and quicker.

Local behavioral analysis (Sigma rules)

Sigma is a common open-source standard that lets you analyze log files to identify malicious events. They are not necessarily related to network artifacts, and as such, would not be detected without residing on a machine. Nozomi Networks Labs curates all the Sigma rules that are loaded into Arc. A *Threat Intelligence (TI)* active license is needed to receive curated rules from the upstream Nozomi endpoint.

Temporary deployment

It is not necessary to keep the Arc executable on a host after you have collected information. This means that you can remove it after data has been collected to conserve host resources, and maintain a clean host environment.

Architecture

It is important to understand the different architecture possibilities that are available with Arc.

You can connect Arc:

- To Guardian
- To Vantage

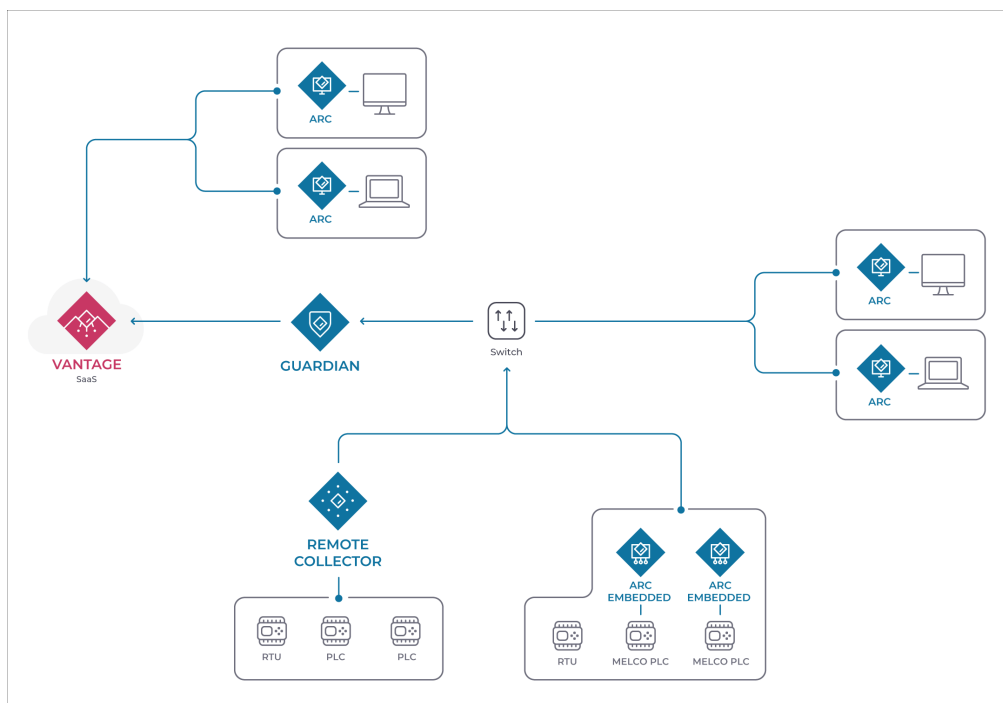


Figure 33. Arc architecture example

Arc in CMC

The **Arc** button in the Central Management Console (CMC) Web UI lets you access the different pages for Arc.

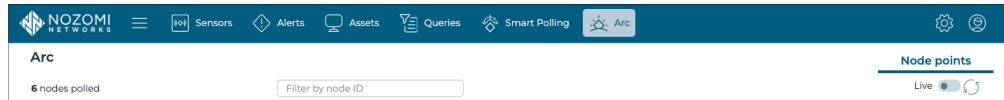


Figure 34. Arc button in CMC Web UI

When you select **Arc** in the *CMC Web user interface (UI)*, you get access to the **Node points** page.

Node points

The **Node points** page shows data points that are collected over time, and represent the state of the target machine.

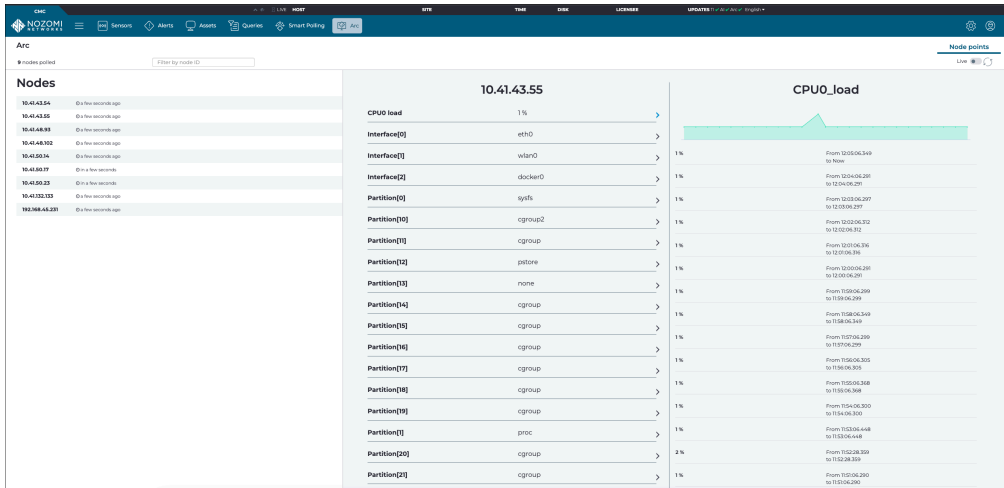


Figure 35. Node points page in CMC

Node points count

This shows the number of the nodes polled.

Filter by node ID

This field lets you use the node *ID* to filter the nodes.

Live toggle

The **Live** toggle lets you change live view on, or off. When live mode is on, the page will refresh periodically.

Refresh

The  icon lets you immediately refresh the current view.

Nodes

The list of nodes that show at least one node point.

Chapter 8. Reports



Reports

The **Reports** page lets you manage, generate, schedule and view reports.

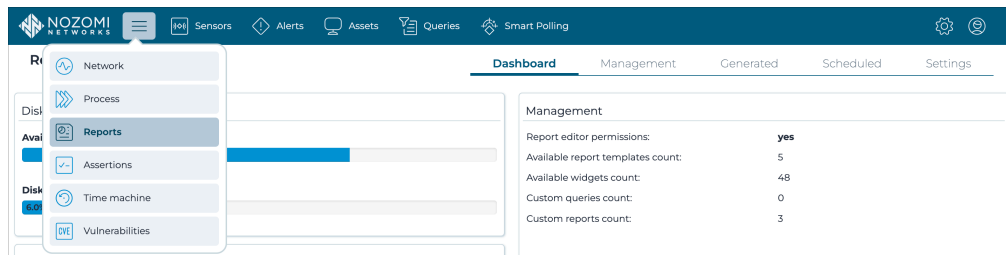


Figure 36. Reports page

The **Reports** page has these tabs:

- [Dashboard](#) (on page 100)
- [Management](#) (on page 101)
- [Generated](#) (on page 104)
- [Scheduled](#) (on page 105)
- [Settings](#) (on page 106)

Dashboard

The Dashboard page shows an overview of information related to reports, which includes disk availability, report settings, generated reports, report management, and scheduled reports.

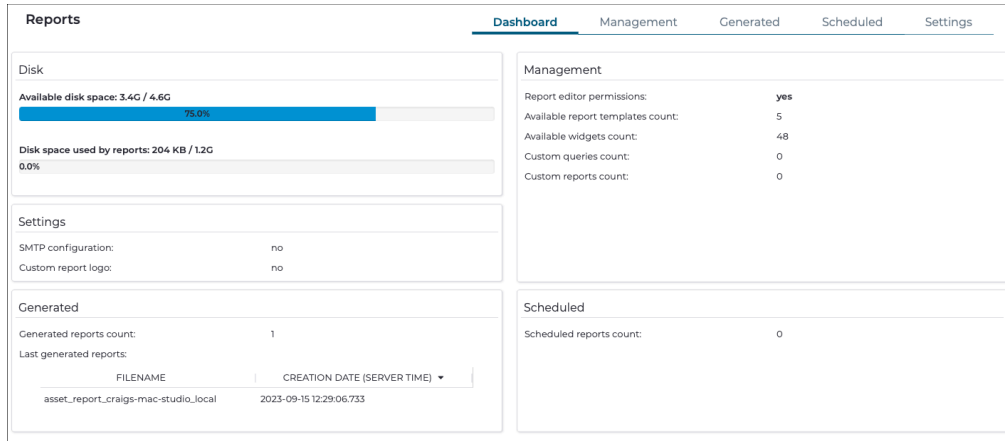


Figure 37. Dashboard page

Disk

This section shows:

- Available disk space
- Disk space used by reports

Management

This section shows a summary of information from the [Management \(on page 101\)](#) page.

Settings

This section shows a summary of information from the [Settings \(on page 106\)](#) page.

Generated

This section shows a summary of information from the [Generated \(on page 104\)](#) page.

Scheduled

This section shows a summary of information from the [Scheduled \(on page 105\)](#) page.

Management

The **Management** page lets you manage all your reports.

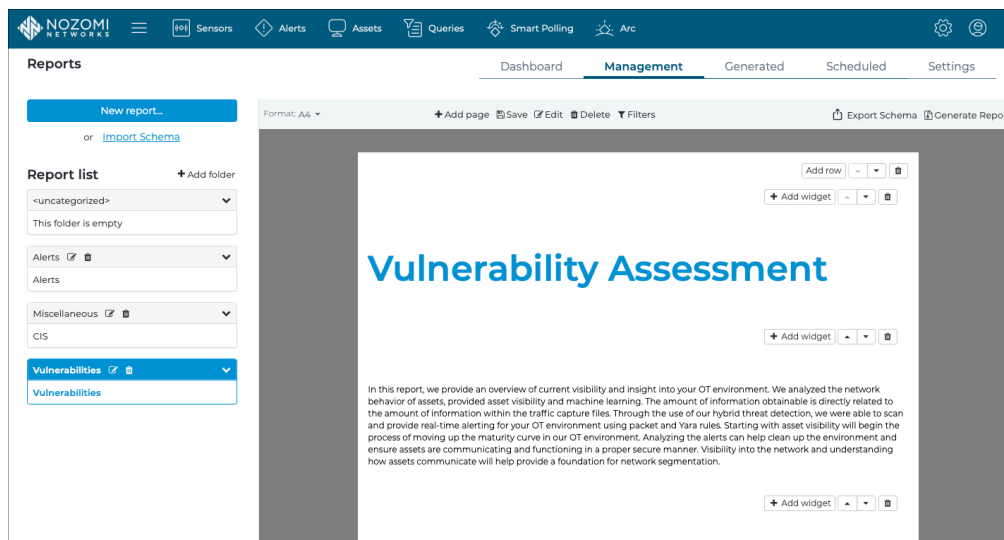


Figure 38. Management page

New report

This button lets you [Create a report \(on page 107\)](#).

Import schema

This button lets you [Import a schema \(on page 114\)](#).

Report list

This section shows a list of created and saved reports. You can [add folders \(on page 112\)](#) to group the reports in.

Add page

This button lets you add a page to the bottom of the current report.

Save

This button lets you save the changes to the current report.

Edit

This button lets you edit the current report.

Delete

This button lets you delete the current report.

Filters

This button lets you filter the contents of the current report.

Edit filters for report 'Alerts'

Filter on assets

Filter on alerts

Filter on nodes

Filter on node_cpes

Filter on links

Filter on node_cves

Filter on captured_urls

Filter on captured_logs

ⓘ These filters will not work on the widgets: CISControl_7, CISControl_12, Vulnerability scoring overview, Evidences, Vendors, Vulnerability key findings


Ok **Cancel**

Figure 39. Filter dialog

Export schema

This button lets you [export a schema \(on page 115\)](#) for the current report in *JavaScript Object Notation (JSON)* format.

Generate report

The generate report  icon lets you [generate a report \(on page 109\)](#) in one of these formats:

- [PDF](#)
- [CSV](#)
- Microsoft Excel

Generated

The **Generated** page lets you view, download, edit, and delete generated reports.

ACTIONS	FILENAME	CREATION DATE (SERVER TIME)
	asset_report_craigs-mac-studio_local	2023-09-15 12:29:06.733

Figure 40. Generated page

Live / refresh

The **Live** icon lets you change live view on, or off. When live mode is on, the page will refresh approximately every five seconds.

Column selection

The columns selection icon lets you choose which columns to show or hide.

Scheduled

The **Scheduled** page lets you view, download, edit, and delete scheduled reports.

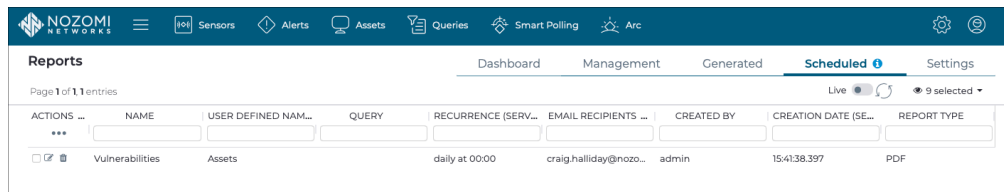


Figure 41. Scheduled page

Live / refresh

The **Live** icon lets you change live view on, or off. When live mode is on, the page will refresh approximately every five seconds.

Column selection

The columns selection icon lets you choose which columns to show or hide.

Settings

The **Settings** page lets you change report settings, upload custom logos, and configure simple mail transfer protocol (SMTP) settings.

Reports

Dashboard Management Generated Scheduled **Settings**

Custom logo

Report custom logo not yet uploaded.

Drop an image here or click to upload

Supported formats: JPG, PNG and GIF. Logo ideal sizes: 360x90 or bigger. Logo ideal ratio: 4:1 or similar

SMTP Server

An SMTP server is required to send scheduled reports by email at each recurrence (if the 'Email recipients' field is set)

ON OFF

To URI

HOST[:PORT]/[AD]

Sender

STARTTLS

Authentication Mechanism: PLAIN LOGIN

Username

Password

Save

Figure 42. Settings page

Custom logo

This section lets you [upload a custom logo \(on page 116\)](#) that will show in your reports.

SMTP server

If you want to send emails that contain scheduled reports, you need to [configure \(on page 118\)](#) the *simple mail transfer protocol (SMTP)* server settings.

Create a report

The **Management** page lets you create a new report.

Procedure

1. In the top navigation bar, select  icon > **Reports**.

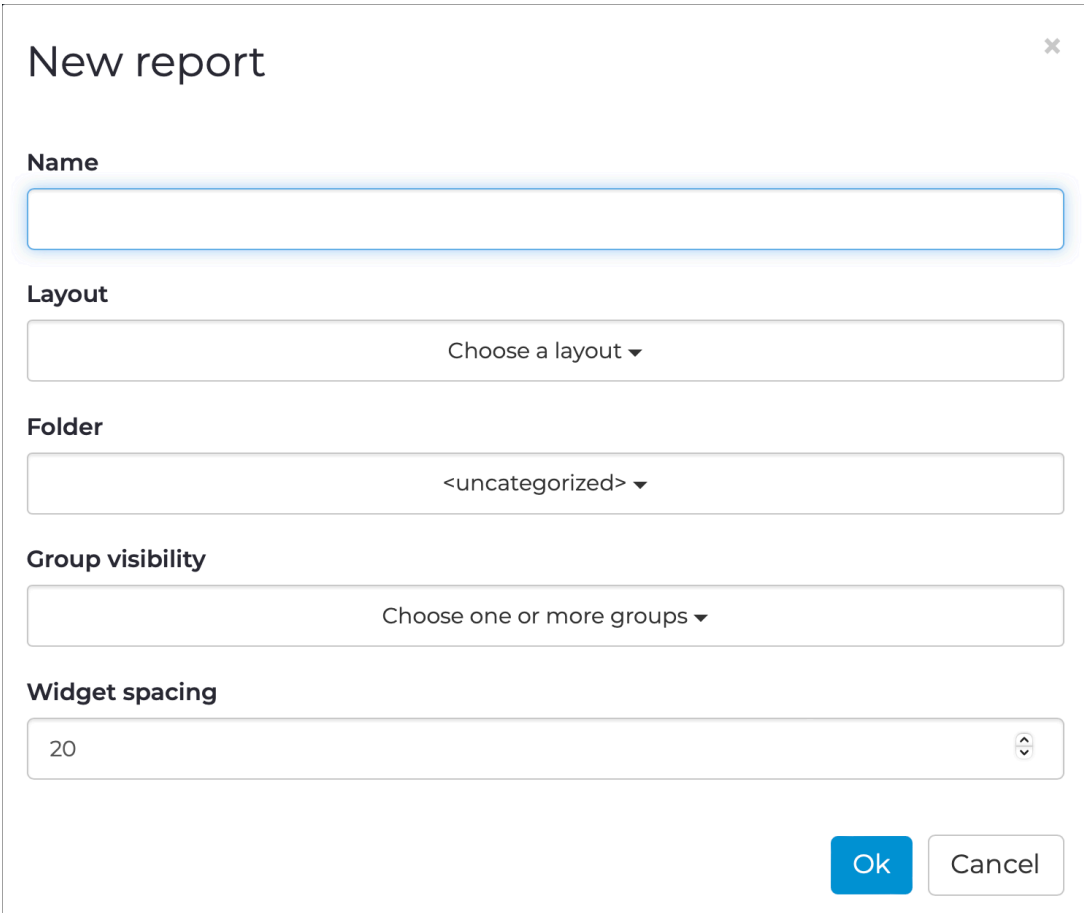
Result: The **Reports** page opens.

2. Select **Management**.

3. In the section on the left, select **New report**.

Result: A dialog shows.

4. In the **Name** field, enter a name for the report.



New report ✕

Name

Layout

 ▼

Folder

 ▼

Group visibility

 ▼

Widget spacing

 ⌵

Ok **Cancel**

5. From the **Layout** dropdown, select a layout for the report.
6. From the **Folder** dropdown, select a folder for the report.
7. From the **Group visibility** dropdown, select the group(s) that will be able to view the report.
8. From the **Widget spacing** dropdown, enter a value.
9. Select **Ok**.

Results

The report has been created.

Generate a report

You can generate both scheduled, or on-demand, reports, in multiple file formats.

Procedure

1. In the top navigation bar, select  icon > **Reports**.

Result: The **Reports** page opens.

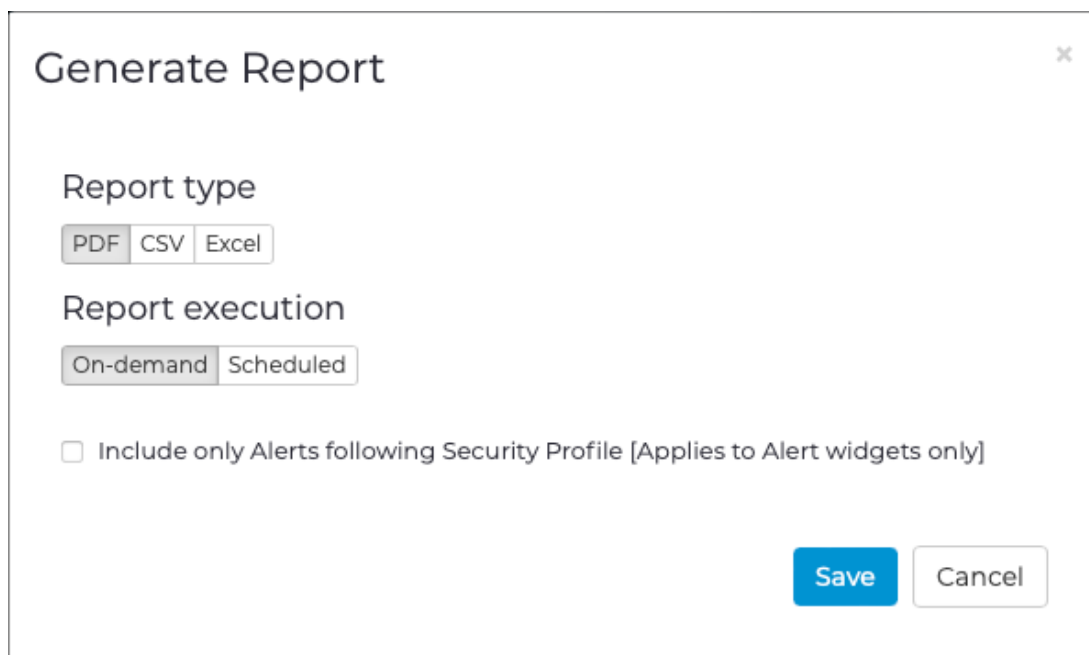
2. Select **Management**.
3. In the section on the left, select the report that you want to generate.
4. In the top right, select **Generate Report**.

Result: A dialog shows.

5. In the **Report type** section, choose a format for the report:

Choose from:

- [PDF](#)
- [CSV](#)
- Excel



Generate Report ×

Report type

PDF CSV Excel

Report execution

On-demand Scheduled

Include only Alerts following Security Profile [Applies to Alert widgets only]

Save Cancel

6. In the **Report execution** section, choose the type of execution:

Choose from:

- On-demand
- Scheduled

7. If you chose **On-demand**, select **Save**.

Result: The report starts to generate. When the generation is complete, the report will show in the [Generated \(on page 104\)](#) page.

8. If you chose **Scheduled**, do the steps below.

a. In the **Recurrence (server time)** section, enter the settings that you want.

Generate Report ✕

Report type

PDF CSV Excel

Report execution

On-demand Scheduled

Schedule report creation

Recurrence (server time)

Daily Weekly Monthly

Hours Minutes

ⓘ Schedule occurrences will be relative to server time (current server time: 13:40:14.751 [-2 hours])

User defined name

Email recipients (comma separated)

Include only Alerts following Security Profile [Applies to Alert widgets only]

b. **Optional:** In the **User defined name** field, enter a name for the report.

c. **Optional:** In the **Email recipients (comma separated)** field, enter the email addresses of the people that you would like to receive the reports.

d. **Optional:** If necessary, select the **Include only Alerts following Security Profile [Applies to widgets only]** checkbox.



Results

The report has been generated, or scheduled, as applicable.

Download a report

The **Generated** page lets you download reports.

Procedure

1. In the top navigation bar, select  **icon > Reports**.
Result: The **Reports** page opens.
2. Select **Generated**.
3. To the left of the applicable report, select the download  icon.
Result: The download starts.



Results

The report has been downloaded to your downloads folder.

Delete a report

The **Generated** page lets you delete generated reports.

Procedure

1. In the top navigation bar, select  **icon > Reports**.
Result: The **Reports** page opens.
2. Select **Generated**.
3. To the left of the applicable report, select the download  icon.


Results

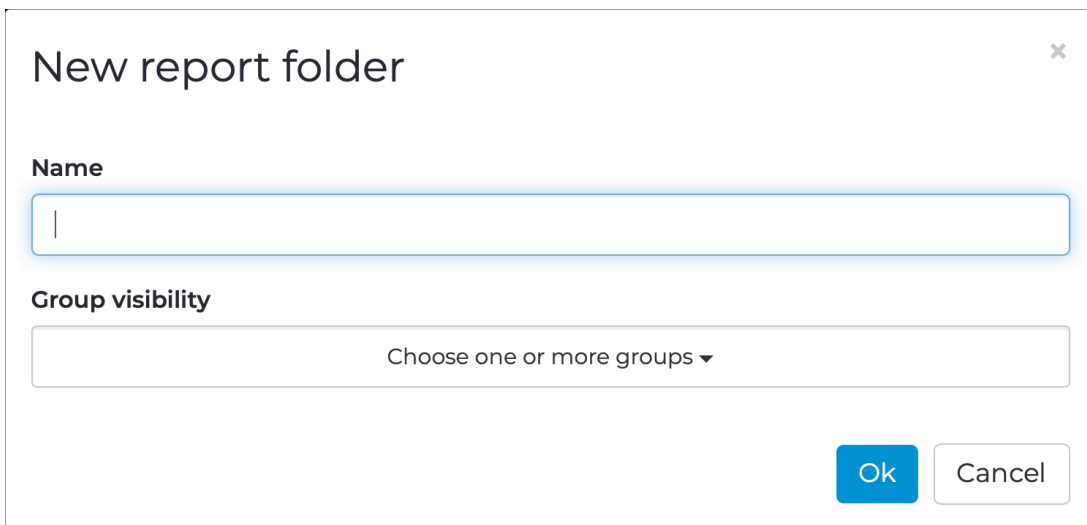
The report has been deleted.

Add a folder

The **Management** page lets you add folders for you to organize your reports.

Procedure

1. In the top navigation bar, select  icon > **Reports**.
Result: The **Reports** page opens.
2. Select **Management**.
3. In the **Reports list** section on the left, select **Add folder**.
Result: A dialog shows.
4. In the **Name** field, enter a name for the folder.



New report folder ✕

Name

Group visibility

Choose one or more groups ▼

Ok **Cancel**

5. From the **Group visibility** dropdown, select the group(s) that will be able to view the reports.
6. Select **Ok**.

Results

The folder has been added.

Edit a folder


The **Management** page lets you delete reports.

Procedure

1. In the top navigation bar, select  icon > **Reports**.

Result: The **Reports** page opens.

2. Select **Management**.

3. In the section on the left, to the right of the applicable folder's name, select the download  icon.

Result: A dialog shows.

4. **Optional:**

If necessary, in the **Name** field, edit the name of the folder.



Dialog box titled "Edit report folder 'Miscellaneous'".

Fields:

- Name:** Miscellaneous
- Group visibility:** guests

Buttons: Ok, Cancel

5. **Optional:** If necessary, in the **Group visibility** field, edit the visibility of the folder.
6. Select **Ok**.



Results

The report has been edited.

Delete a folder

The **Management** page lets you delete reports.

Procedure

1. In the top navigation bar, select  icon > **Reports**.
Result: The **Reports** page opens.
2. Select **Management**.
3. In the section on the left, to the right of the applicable folder's name, select the download  icon.


Results

The report has been deleted.

Import a schema

The **Management** page lets you import a schema that has previously been exported.

Procedure

1. In the top navigation bar, select  icon > **Reports**.
Result: The **Reports** page opens.
2. Select **Management**.
3. In the section on the left, select **Import Schema**.
4. Select the schema to import.

Results

The schema has been imported.

Export a schema

The **Management** page lets you export a schema.

Procedure

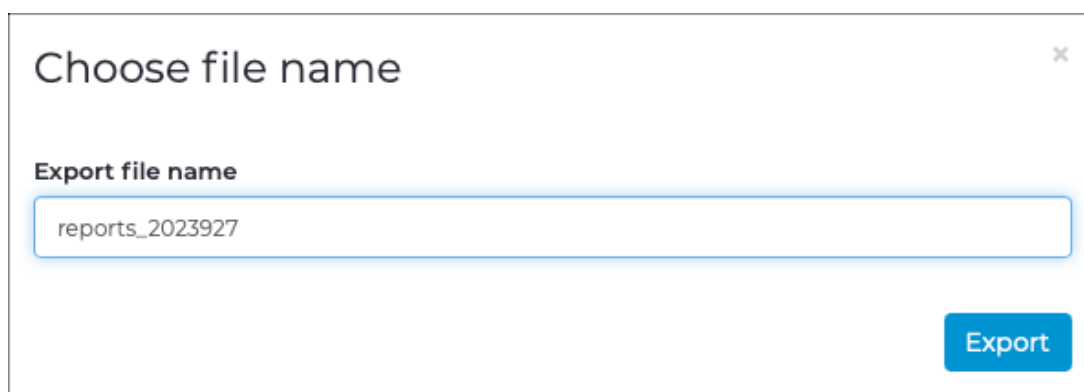
1. In the top navigation bar, select  icon > **Reports**.

Result: The **Reports** page opens.

2. Select **Management**.
3. In the top right, select **Export Schema**.

Result: A dialog shows.

4. In the **Export file name** field, enter a name for the schema.



Choose file name ×

Export file name

reports_2023927

Export

5. Select **Export**.


Results

The schema has been exported in **JSON** format.

Upload a custom logo

You can add a custom logo that will show in your reports.

Procedure

1. In the top navigation bar, select  icon > **Reports**.

Result: The **Reports** page opens.

2. Select **Settings**.

Result: The [Settings \(on page 106\)](#) page opens.

3. Choose a method to upload a custom logo:

Choose from:

- Drag your image file into the **Drop an image here or click to upload** field
- Click in the **Drop an image here or click to upload** field

4. If you chose the second method, select the correct file to upload.



Note:

Logos should be 360x90 pixels or bigger, with an ideal aspect ratio of 4:1, or similar.



Note:

Supported formats are:

- *graphics interchange format (GIF)*
- *joint photographic experts group (JPEG)*
- *portable network graphics (PNG)*

5. Wait for the file to upload.
6. Select **Save**.

Results

Your custom logo will now be added to your reports.

Configure SMTP settings

If you want to send emails that contain scheduled reports, you need to configure the simple mail transfer protocol (SMTP) server settings.

Procedure

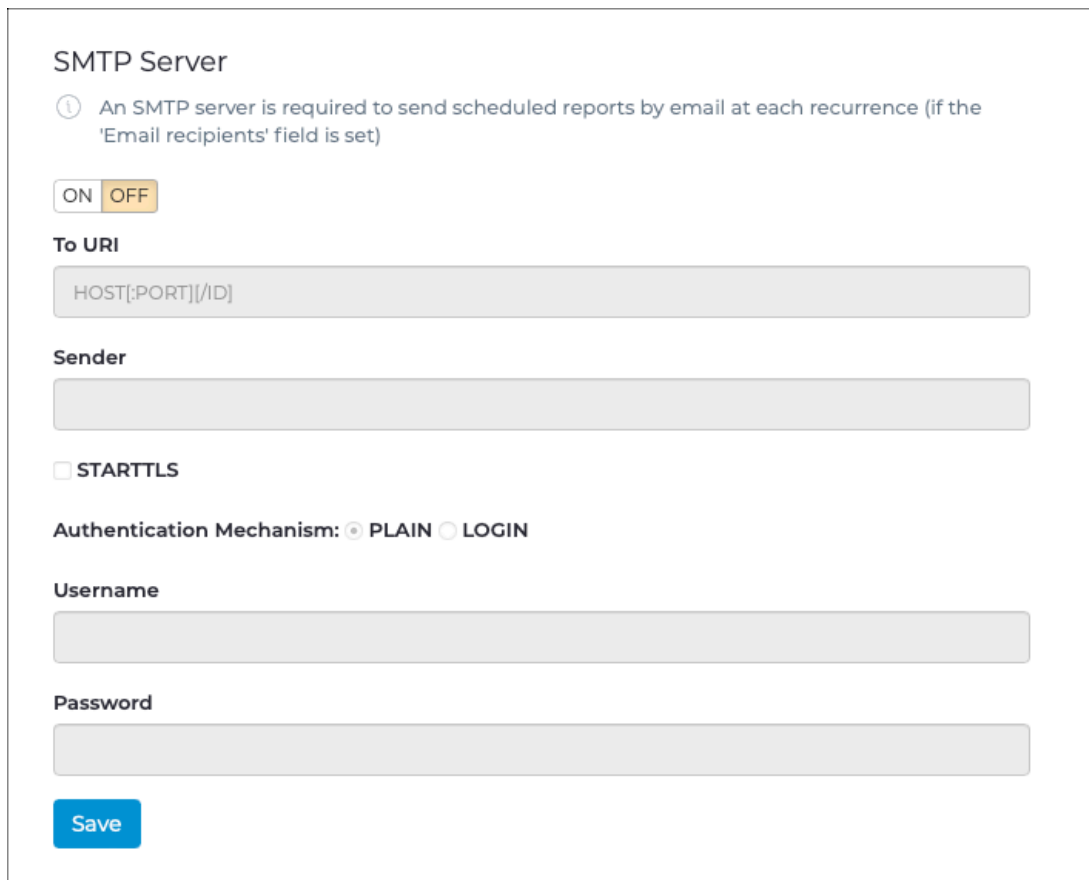
1. In the top navigation bar, select  icon > **Reports**.

Result: The **Reports** page opens.

2. Select **Settings**.

Result: The [Settings \(on page 106\)](#) page opens.

3. In the **SMTP Server** section, set the toggle to **ON**.



The screenshot shows the 'SMTP Server' configuration page. At the top, there is a title 'SMTP Server' and a warning icon with the text: 'An SMTP server is required to send scheduled reports by email at each recurrence (if the 'Email recipients' field is set)'. Below this is a toggle switch currently set to 'OFF'. The form contains several input fields: 'To URI' with a placeholder 'HOST[:PORT]][/ID]', 'Sender', 'STARTTLS' (unchecked checkbox), 'Authentication Mechanism' with radio buttons for 'PLAIN' (selected) and 'LOGIN', 'Username', and 'Password'. A blue 'Save' button is located at the bottom left of the form.

4. In the **To URI** field, enter the host URI information. For example, `HOST[:PORT]][/ID]`

5. In the **Sender** field, enter the sender identification information.

6. To use encryption, select the **STARTTLS** checkbox.

**Note:**

If you do not select this option, reports will be sent without encryption.

7. To start the authentication process, choose an Authentication Mechanism:

Choose from:

- **PLAIN**
- **LOGIN**

**Note:**

The default setting is **PLAIN**.

8. If you chose **LOGIN**, enter your credentials.

- a. In the **Username** field, enter your username.
- b. In the **Password** field, enter your password.

9. Select **Save**.


Results

Emails for scheduled reports that have email recipients will now be sent at the next scheduled occurrence.

Filter a report globally

You can filter a report globally, which is the default filter. This lets you use a specific category to apply filters to the entire report.

Procedure

1. In the top navigation bar, select  **icon > Reports**.

Result: The **Reports** page opens.

2. Select **Management**.

Result: The [Management \(on page 101\)](#) page opens.

3. In the top section, select  **Filters**.

Result: A dialog shows.

4. Select the category on which to filter, then enter your filter query in the related field.

Edit filters for report 'Alerts' ✕

Filter on assets

Filter on alerts

Filter on nodes

Filter on node_cpes

Filter on links

Filter on node_cves

Filter on captured_urls

Filter on captured_logs

ⓘ These filters will not work on the widgets: CISControl_7, CISControl_12, Vulnerability scoring overview, Evidences, Vendors, Vulnerability key findings

5. Select **Ok**.



Note:

At the bottom of the dialog is a list of widgets on which filters will not work.


Results

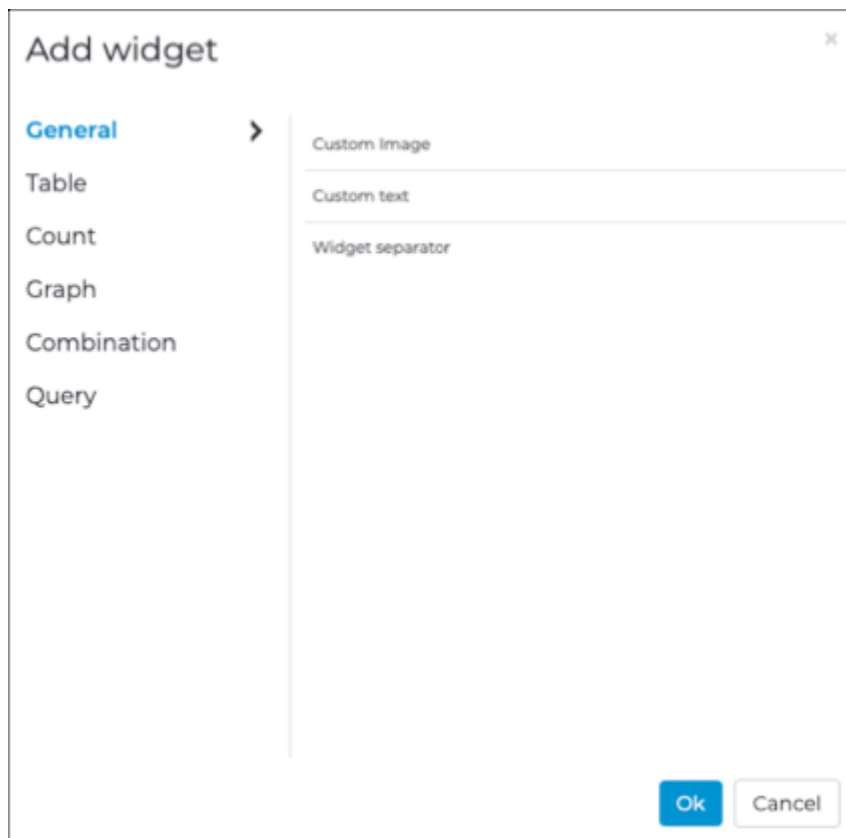
The filter(s) has (have) been applied to the report.

Add a widget to a report

The **Management** page lets you add widgets to reports.

Procedure

1. In the top navigation bar, select  icon > **Reports**.
Result: The **Reports** page opens.
2. Select **Management**.
Result: The [Management \(on page 101\)](#) page opens.
3. In the **Reports list** section on the left, select the applicable report.
Result: The report opens.
4. On the right side of the report, choose the section that you want to add the widget to. Select **Add widget**.
Result: A dialog shows.
5. In the left pane, choose the type of widget that you want to add.



6. From the list, select the widget that you want.

Results

The widget has been added to the report.

Filter a report with a widget

You can use widgets to filter a report.

Procedure

1. In the top navigation bar, select  icon > **Reports**.

Result: The **Reports** page opens.

2. Select **Management**.

Result: The [Management \(on page 101\)](#) page opens.

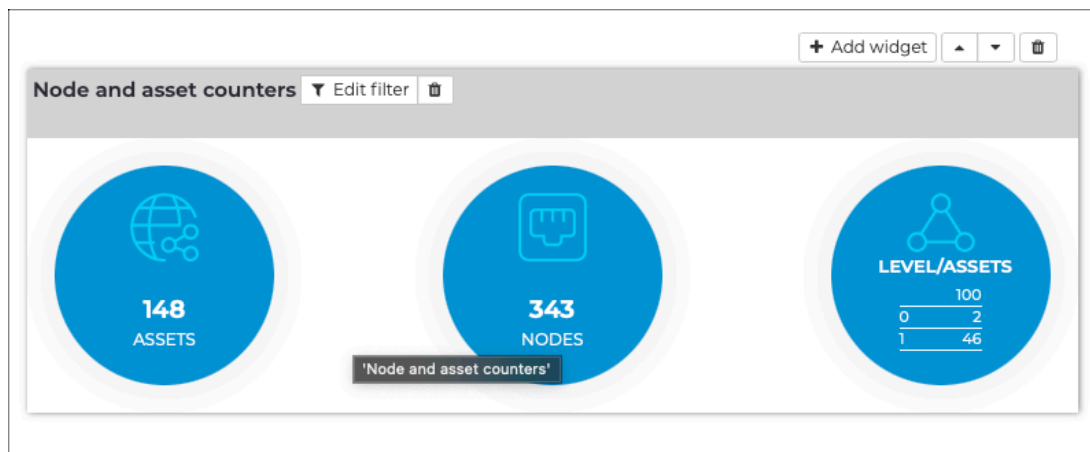
3. In the **Reports list** section on the left, select the applicable report.

Result: The report opens.

4. Find the widget that you would like to use and hover your mouse over it.

Result: At the top of the widget, more buttons show.

5. Select **Edit filter**.




6. Select the category on which to filter, then enter your filter query in the related field.

Edit filters for widget 'Node and asset counters' ✕

Filter on assets

Filter on nodes

 These filters will not work on the widgets: CISControl_7, CISControl_12, Vulnerability scoring overview, Evidences, Vendors, Vulnerability key findings

7. Select **Ok**.

**Note:**

At the bottom of the dialog is a list of widgets on which filters will not work.

Results

The filter(s) has (have) been applied to the report.

Chapter 9. Assertions



Assertions

The **Assertions** page shows all the assertions and lets you configure them.

A valid assertion is a normal query with a special command appended at the end. Assertions can be saved in a specific order and can be continuously executed in the system.

Queries are based on the [N2QL](#), which you can use to ensure that certain conditions are met on the observed system. An assertion is typically either an empty value, or a specific value. When an unexpected value appears, or when the value is different than the expected, the system alerts the user.

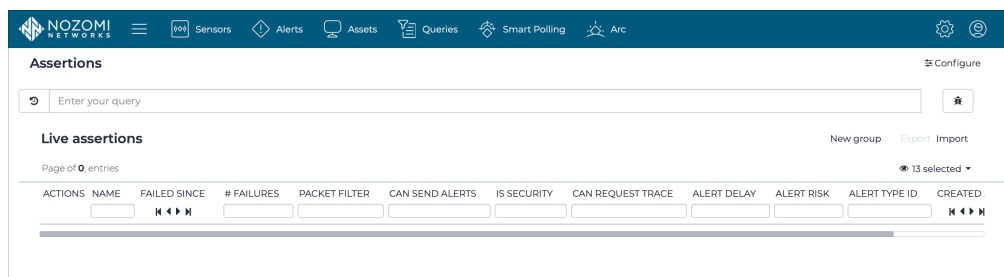


Figure 43. Assertions page

Configure

This lets you configure the execution interval in seconds.

History button

This button shows a history of the previous queries that have been entered in the query field.

Query field

This field is where you enter your query.

Debug button

Because assertions with logical operators and brackets can quickly become complex, the debug icon decomposes the query, and executes each part to show intermediate results.

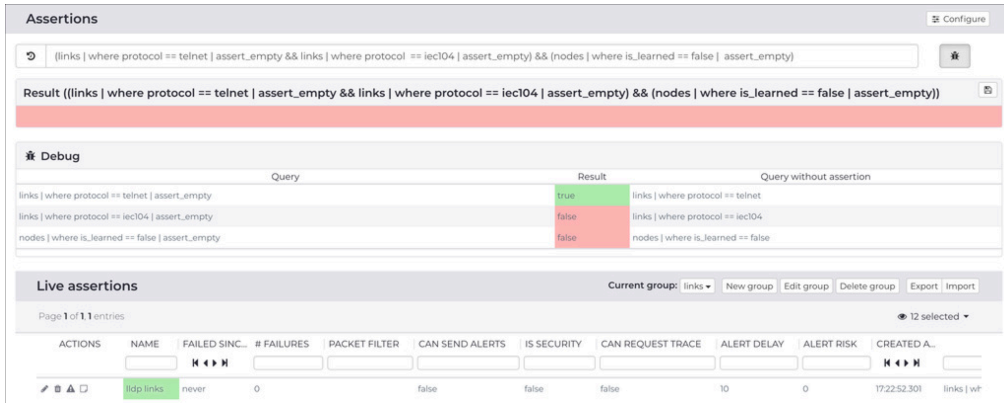


Figure 44. Complex assertion being debugged

New group

This lets you create a group to combine assertions to make viewing and management easier.

Export

This lets you export assertion groups in *JSON* format.

Import

This lets you import assertion groups in *JSON* format.

Assertion operators


Table 5. Assertion operators

Operator	Description
<code>assert_all <field> <op> <value></code>	The assertion is satisfied when each element in the query result set matches the given condition.
<code>assert_any <field> <op> <value></code>	The assertion is satisfied when at least one element in the query result set matches the given condition.
<code>assert_empty</code>	The assertion is satisfied when the query returns an empty result set.
<code>assert_not_empty</code>	The assertion is satisfied when the query returns a non-empty result set.

Save an assertion

You can save assertions to have them continuously executed in the system.

Procedure

1. In the top navigation bar, select  icon > **Assertions**.

Result: The **Assertions** page opens.

2. In the query field, enter a query.
3. Select **Enter**.
4. To save the assertion, select **Save**.

Result: A dialog shows.

5. In the **Name** field, enter a name for the query.

Save assertion ✕

Name

Description

Note

Group New group

Choose a group... ▾

Is security ?

Is operational ?

Assertion Check Interval

10

Can send alerts

Choose the asserted table's specific fields to include in the Description

Choose fields to include... ▾

Query

links | where protocol == telnet | assert_empty

Save **Cancel**

6. In the **Description** field, enter a description.

7. To assign the assertion to a group, in the **Group** field, select one of the following
 - a. From the dropdown menu, select an existing group.
 - b. Select **Save**.
 - c. To create a new group, select **New group**.
Result: A dialog shows.
 - d. In the **Group name** field, enter a group name for the assertion.
 - e. Select **Save**.

8. Choose from one of these options:

Choose from:

- **Is security ?**
- **Is operational ?**

9. In the **Assertion Check Interval** field, choose the interval in seconds at which the assertion will be rechecked.



Note:

You can select an interval between 10 seconds and 1 day.


10. **Optional:** If you want the assertion to trigger an alert, select the **Can send alerts** checkbox.
11. From the **Choose the asserted table's specific fields to include in the Description** dropdown, select the fields to include in the assertion description.
12. In the **Query** field, enter the assertion query.
13. Select **Save**.

Result: The saved assertion will be listed at the bottom of the page with a green or red color to indicate the result.

Edit an assertion

This lets you edit the details for an existing assertion.

Procedure

1. In the top navigation bar, select  icon > **Assertions**.

Result: The **Assertions** page opens.

2. In the query field, enter a query.
3. To execute the query, elect **Enter**.



Note:

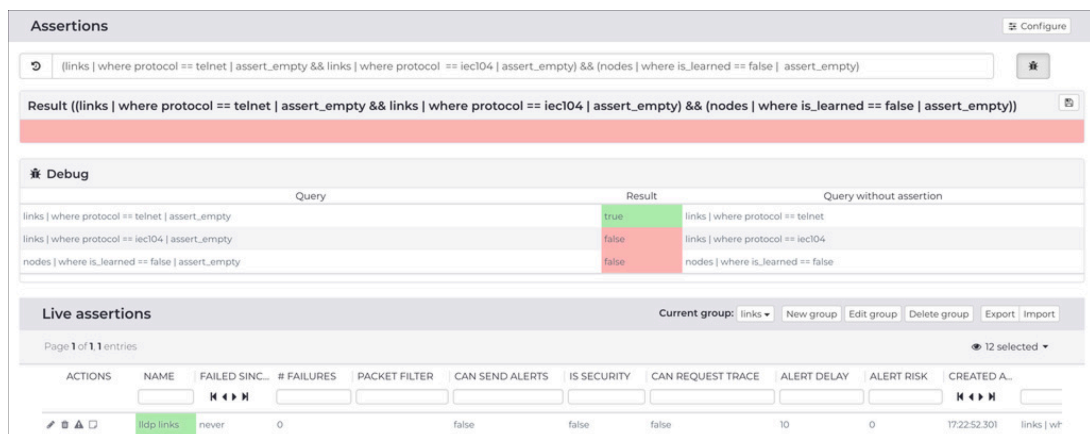
You can use the logical operators && (and) and || (or) to combine multiple assertions. Round brackets () change the logical grouping as in a mathematical expression.

4. **Optional:** To the right of the query field, select the debug  icon.



Note:

Because assertions with logical operators and brackets can quickly become complex, the debug icon decomposes the query, and executes each part to show intermediate results.



Assertions Configure

🔍 ((links | where protocol == telnet | assert_empty && links | where protocol == iec104 | assert_empty) && (nodes | where is_learned == false | assert_empty))

Result ((links | where protocol == telnet | assert_empty && links | where protocol == iec104 | assert_empty) && (nodes | where is_learned == false | assert_empty))

Debug

Query	Result	Query without assertion
links where protocol == telnet assert_empty	true	links where protocol == telnet
links where protocol == iec104 assert_empty	false	links where protocol == iec104
nodes where is_learned == false assert_empty	false	nodes where is_learned == false

Live assertions Current group: links | New group | Edit group | Delete group | Export | Import

Page 1 of 1 entries 12 selected


ACTIONS	NAME	FAILED SYNC	# FAILURES	PACKET FILTER	CAN SEND ALERTS	IS SECURITY	CAN REQUEST TRACE	ALERT DELAY	ALERT RISK	CREATED A..
	tdp links	never	0		false	false	false	10	0	17:22:52.301 links wh

Result: The debug section shows.

Configure an assertion

This lets you configure the execution interval of the assertions, in seconds.

Procedure

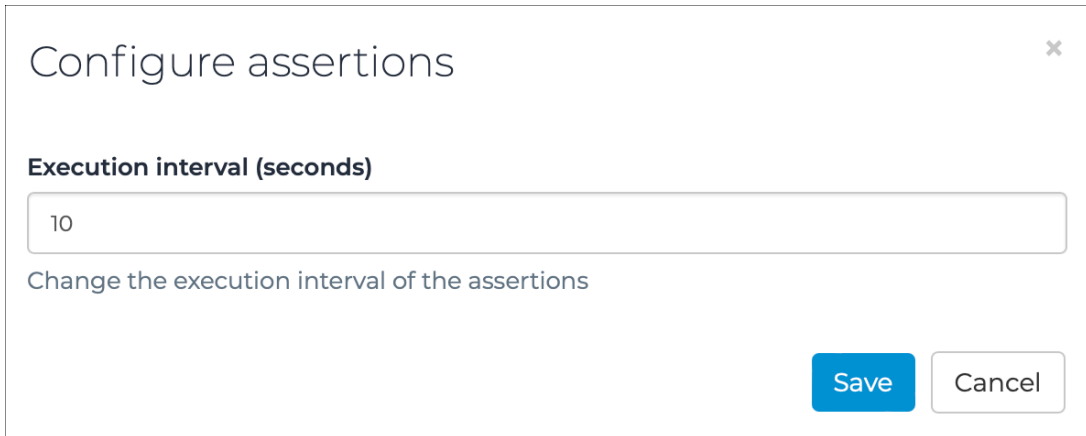
1. In the top navigation bar, select  icon > **Assertions**.

Result: The **Assertions** page opens.

2. In the top right, select **Configure**.

Result: A dialog opens.

3. In the **Execution interval (seconds)** field, enter an interval.



Configure assertions ✕

Execution interval (seconds)

Change the execution interval of the assertions

Save **Cancel**

4. Select **Save**.

Configure an assertion on links

This lets you configure the scope of the assertion for the related links.

Procedure

1. In the top navigation bar, select  icon > **Network**.

Result: The **Network** page opens.

2. Select **Links**.

Result: The **Links** page opens.

3. To the left of the applicable link, select the configure  icon.

Result: A dialog opens.

4. **Optional:**

Select **Is persistent**.

Configure 192.168.68.52-255.255.255.255/other ✕

Is persistent
Raise an alert when a new TCP handshake is detected on this link

Alert on SYN
Raise an alert when a TCP SYN packet is detected on this link

Track availability (seconds)

Notify the link events when the link communication is interrupted or resumed

Last activity check (seconds)

Raise an alert when the link become inactive for more than the specified amount of seconds



Note:

When selected, this check raises a new alert whenever a [transmission control protocol \(TCP\)](#) handshake is successfully completed on the link.

5. **Optional:** Select **Alert on SYN**.



Note:

When selected, this check raises a new alert whenever a client sends a TCP SYN on the link.

6. **Optional:** Select **Track availability (seconds)**.



Note:

When selected, a link is considered non-functioning if it is unresponsive for the specified time.

7. **Optional:** Select **Last activity check (seconds)**.



Note:

When selected, this check raises an alert when the link is not receiving data for more than the specified time.

8. Select **Save**.

Results

The assertion has been configured.

Configure an assertion on variables

This lets you configure the scope of the assertion for the related variables.

Procedure

1. In the top navigation bar, select  icon > **Process**.

Result: The **Process** page opens.

2. Select **List**.

Result: The **List** page opens.

3. To the left of the applicable link, select the configure  icon.

Result: A dialog opens.

4. Optional:

In the **Label** field, enter a label for the assertion.

Configure 10.168.1.54/1/ir9
✕

Label

History size

Set the variable history size. When size is 0, history is disabled. When is higher than 0, it is enabled and the size value suggests the system how many values should be kept, according to resources availability.

Last activity check

Raise an alert when the variable is not updated for more than the specified amount of seconds

Invalid quality check

Raise an alert when the variable keeps the invalid quality for more than the specified amount of seconds

Disallowed qualities check

Raise an alert when the variable has one of the specified qualities. Possible values are: invalid, not topical, blocked, substituted, overflow, reserved, questionable, out of range, bad reference, oscillatory, failure, inconsistent, inaccurate, test. Multiple values can be separated by comma.

5. Optional: In the **History size** field, enter a value.



Note:

This sets the [variable](#) history size. When the size is 0, history is disabled. When it is higher than 0, it is enabled, and the size value suggests how many values that the system should keep, depending on the available resources.

6. **Optional:** In the **Last activity check** field, enter a value.

**Note:**

When selected, this check raises an alert when the **Variable** is either not measured or is changed for more than the specified number of seconds.

7. **Optional:** In the **Invalid quality check** field, enter a value.

**Note:**

When selected, this check raises an alert when the **Variable** maintains an invalid quality for more than the specified amount of seconds.

8. **Optional:** In the **Disallowed quality check** field, enter a value.

**Note:**

When selected, this check raises an alert when the **Variable** gains one of the specified qualities.

9. Select **Save**.

Results

The assertion has been configured.



Chapter 10. Vulnerabilities



Vulnerabilities

The Nozomi Networks software continuously discovers vulnerabilities in monitored assets.

The Nozomi Networks software continuously discover vulnerabilities. To do this, it matches the [Common Platform Enumeration \(CPE\)](#) of a device with the [National Vulnerability Database](#), and other data sources.

The Vulnerabilities page has these tabs:

- [Assets \(on page 146\)](#)
- [List \(on page 147\)](#)
- [Stats \(on page 148\)](#)

Assets

The **Assets** page shows a list of assets with known vulnerabilities, along with a summary of the severity of the vulnerability.

ASSET	TYPE	OS/FIRMWARE	COUNT	SCORE DISTRIBUTION	SCORE GROUPS
172.18.252.169	computer	Windows 10	1263	1099	156
172.16.44.144	computer	Windows 7	1089	389	698
172.16.44.150	computer	Windows 7	1089	389	698
172.16.44.186	computer	Windows 7	1089	389	698
172.16.44.216	computer	Windows 7	1089	389	698
172.16.44.85	computer	Windows 7	1089	389	698
172.16.45.62	computer	Windows 7	1089	389	698
172.16.46.16	computer	Windows 7	1089	389	698
172.17.50.95	computer	Windows 10	1484	1262	215
172.18.66.27	computer	Windows 7	1089	389	698

Figure 45. Assets page

Only most likely


This toggle lets you filter the view to show only the assets that match the criteria that you have set for likelihood threshold.

Likelihood threshold settings

Likelihood threshold is a value between 0.1 and 1.0 where 1.0 represents the maximum likelihood of the *Common Vulnerabilities and Exposures (CVE)* to be present. Likelihood is the confidence of the software's correct assignment of a *CPE* to the hardware of the monitored asset. The higher the likelihood, the higher the software's confidence that the vulnerabilities assigned to an asset are in fact relevant to that asset. **Likelihood threshold** is the minimum likelihood a vulnerability needs in order for it to be shown in this page when the **Only most likely** toggle is set to on. As a guideline, we suggest that you use:

- 0.8 for a high level of confidence
- 0.5 for a medium level of confidence
- 0.3 for a low level of confidence

Live / refresh

The **Live**  icon lets you change live view on, or off. When live mode is on, the page will refresh approximately every five seconds.

List

The **List** page shows a comprehensive list of vulnerabilities in the environment. This lets you perform global, in-depth analysis.

ACTIONS	CVE	NODE	SCORE	CWE	CWE NAME	CVE CREATION DATE	DISCOVERY DATE	
	CVE-2003-0904	172.16.37.24	6	200	Exposure of Sensitive Information to an Unauthorized Actor	2004-01-20 06:00:00.000	2023-09-11 12:20:20.513	cpe/lon
	CVE-2004-0119	172.16.37.24	7.5	476	NULL Pointer Dereference	2004-06-01 06:00:00.000	2023-09-11 12:20:20.799	cpe/lon
	CVE-2004-0840	172.16.37.24	10	20	Improper Input Validation	2004-11-03 06:00:00.000	2023-09-11 12:20:20.805	cpe/lon
	CVE-2005-1987	172.16.37.24	7.5	120	Buffer Copy without Checking Size of Input ('Classic Buffer Overflow')	2005-10-13 12:02:00.000	2023-09-11 12:20:20.802	cpe/lon
	CVE-2005-3921	6c:41:6a:60:99:23	2.6	79	Improper Neutralization of Input During Web Page Generation ('Cross-site Scripting')	2005-11-30 12:03:00.000	2023-09-11 12:17:58.491	cpe/loc
	CVE-2006-4950	6c:41:6a:60:99:23	10	20	Improper Input Validation	2006-09-23 12:07:00.000	2023-09-11 12:17:58.491	cpe/loc
	CVE-2007-0066	172.16.37.24	7.1	20	Improper Input Validation	2008-01-08 21:46:00.000	2023-09-11 12:20:20.510	cpe/lon
	CVE-2007-0199	6c:41:6a:60:99:23	5	20	Improper Input Validation	2007-01-11 12:28:00.000	2023-09-11 12:17:58.496	cpe/loc
	CVE-2007-2587	6c:41:6a:60:99:23	6.3	20	Improper Input Validation	2007-05-10 02:19:00.000	2023-09-11 12:17:58.497	cpe/loc
	CVE-2007-3034	172.16.37.24	9.3	189	Numeric Errors	2007-08-14 23:17:00.000	2023-09-11 12:20:20.512	cpe/lon
	CVE-2007-3898	172.16.37.24	6.4	16	Configuration	2007-11-14 02:46:00.000	2023-09-11 12:20:20.796	cpe/lon
	CVE-2007-5133	172.16.37.24	7.1	189	Numeric Errors	2007-09-27 23:17:00.000	2023-09-11 12:20:20.511	cpe/lon
	CVE-2008-1436	172.16.37.24	9	264	Permissions, Privileges, and Access Controls	2008-04-21 19:05:00.000	2023-09-11 12:20:20.486	cpe/lon
	CVE-2008-1441	172.16.37.24	5.4	20	Improper Input Validation	2008-06-12 04:32:00.000	2023-09-11 12:20:20.803	cpe/lon
	CVE-2008-1464	172.16.37.24	9.4	20	Improper Input Validation	2008-07-09 01:41:00.000	2023-09-11 12:20:20.551	cpe/lon
	CVE-2008-2249	172.16.37.24	9.3	189	Numeric Errors	2008-12-10 15:00:00.000	2023-09-11 12:20:20.552	cpe/lon
	CVE-2008-2250	172.16.37.24	7.2	264	Permissions, Privileges, and Access Controls	2008-10-15 02:12:00.000	2023-09-11 12:20:20.552	cpe/lon
	CVE-2008-2261	172.16.37.24	7.2	399	Resource Management Errors	2008-10-15 02:12:00.000	2023-09-11 12:20:20.553	cpe/lon

Figure 46. List page

Export

The **Export** icon lets you export the current list in either **CSV** or Microsoft Excel format.

Only resolved

This lets you show only **Unresolved** vulnerabilities. Vulnerability status options are:

- Unresolved
- Mitigated
- Accepted

Mitigated and Accepted lead to a resolution status that equals true.

Live / refresh

The **Live** icon lets you change live view on, or off. When live mode is on, the page will refresh approximately every five seconds.

Column selection

The columns selection icon lets you choose which columns to show or hide.

Stats

The **Stats** page shows high level information in a graphical format that shows the top common platform enumerations (CPEs), common vulnerabilities and exposures (CVEs), and common weakness enumerations (CWEs).

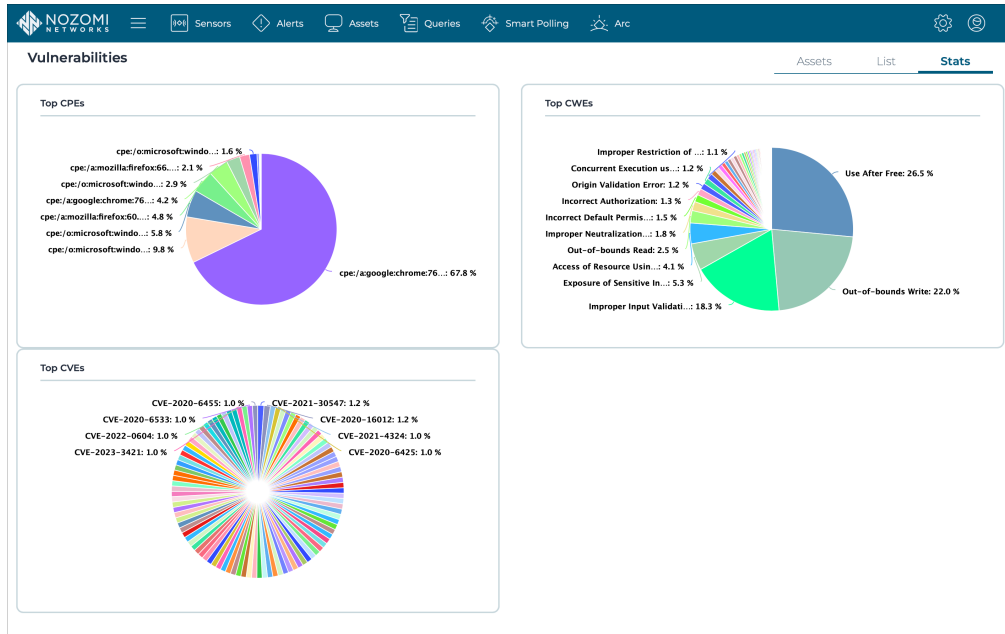


Figure 47. Stats page

Top CPEs

This section shows the:

- Title of vulnerability
- Percentage of the total vulnerabilities
- Actual count of that vulnerability

Top CWEs

This section shows the:

- Title of vulnerability
- Percentage of the total vulnerabilities
- Actual count of that vulnerability

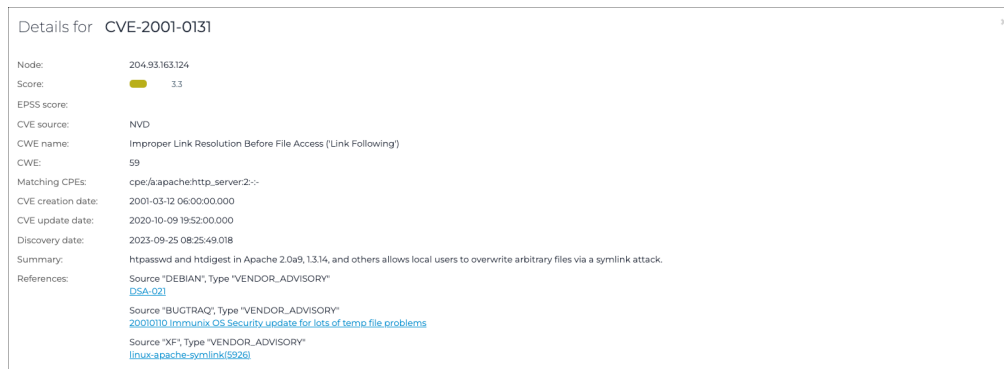
Top CVEs

This section shows the:

- Title of vulnerability
- Date of vulnerability type
- Percentage of the total vulnerabilities
- Actual count of that vulnerability

Details page

The details page shows you all the details for the related vulnerability.



Details for CVE-2001-0131


Node:	204.93.163.124
Score:	 3.3
EPSS score:	
CVE source:	NVD
CWE name:	Improper Link Resolution Before File Access (Link Following)
CWE:	59
Matching CPEs:	cpe:/a/apache/http_server2:-
CVE creation date:	2001-03-12 06:00:00.000
CVE update date:	2020-10-09 19:52:00.000
Discovery date:	2023-09-25 08:25:49.018
Summary:	htpasswd and htdigest in Apache 2.0a9, 1.3.14, and others allows local users to overwrite arbitrary files via a symlink attack.
References:	Source "DEBIAN", Type "VENDOR_ADVISORY" DSA_021 Source "BUGTRAQ", Type "VENDOR_ADVISORY" 2001010 immunix OS Security update for lots of temp file problems Source "XF", Type "VENDOR_ADVISORY" linux.apache-symlink(5926)

Figure 48. Details page



Chapter 11. Administration



Administration page

The administration page lets a user with administrator privileges configure settings and do other tasks.

For more details, see the CMC **Administrator Manual**.



Chapter 12. Personal settings



Personal settings

The personal settings page lets you do actions that are specific to your profile.

General

You can select the  icon to access the personal settings menu.

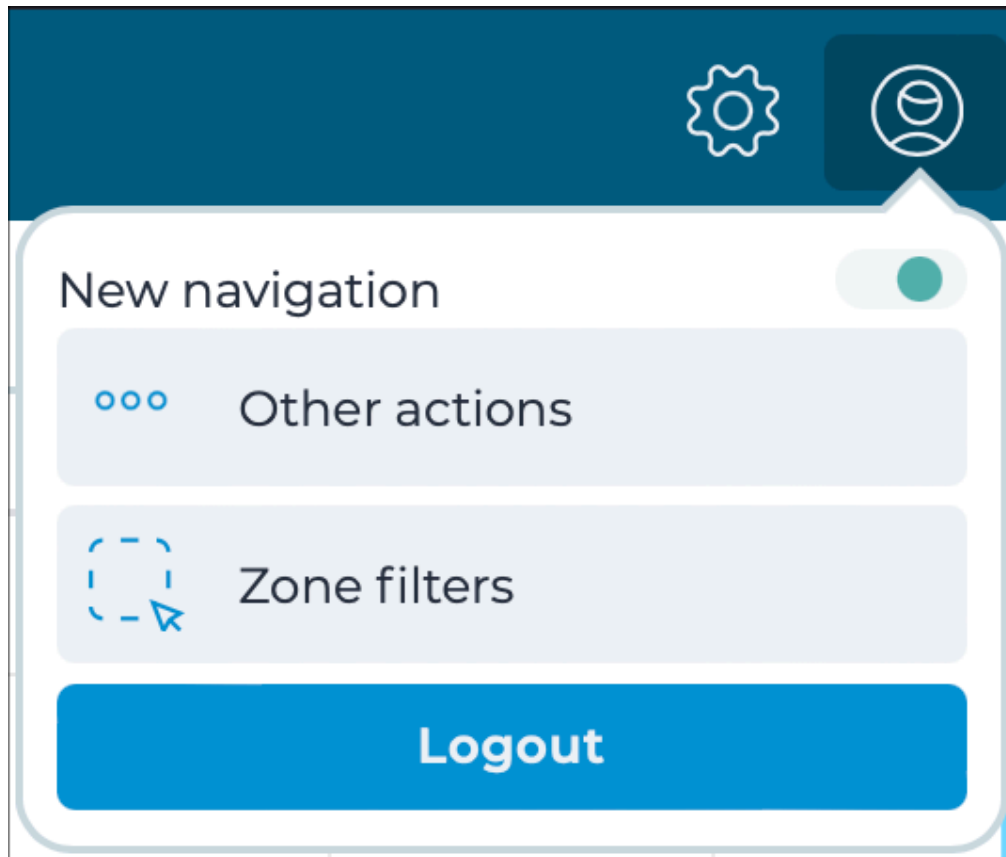


Figure 49. Personal settings menu

The personal settings page lets you [Clear your personal settings \(on page 158\)](#)

Logout

A button in the personal settings menu lets you log out of the software.

Clear your personal settings

The profile settings menu lets you clear your personal settings that are stored in the local browser local.

Procedure

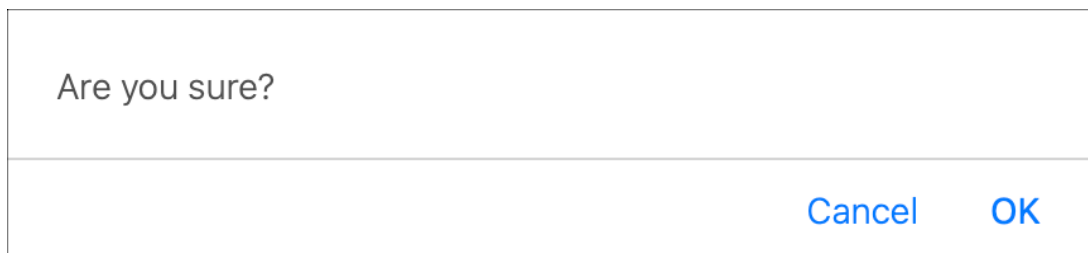
1. In the top navigation bar, select 

Result: A menu shows.

2. Select **Other actions**.
3. Select **Clear personal settings**.

Result: A dialog shows.

4. Select **OK**.



A confirmation dialog box with a white background and a thin border. The text "Are you sure?" is centered in the upper portion. At the bottom right, there are two buttons: "Cancel" and "OK", both in blue text.

Results

Your personal settings have been cleared from the local browser.

Chapter 13. Troubleshooting



Troubleshooting

A list of the most useful troubleshooting tips for the Central Management Console (CMC).

If the sensor is not appearing at all in the [CMC](#):

- Make sure that firewall(s) between the sensor and the [CMC](#) permit traffic on [TCP/443](#) port ([hypertext transfer protocol secure \(HTTPS\)](#)), with the sensor as **Source** and the [CMC](#) as the **Target**
- Make sure that the tokens are correctly configured both in the sensor and the [CMC](#)
- Make sure that in the `/data/log/n2os/n2osjobs.log` file for connection errors

The **Sensor ID** is stored in the `/data/cfg/.appliance-uuid` file. Do not edit this file after the sensor is connected to the Vantage, or the [CMC](#), since it is the unique identifier of the sensor inside Vantage and the [CMC](#). In case a forceful change of the **Appliance ID** is needed, you will need to remove the old data from Vantage or the [CMC](#) by removing the old **Appliance ID** entry.

If an issue occurs during the setup of a sensor, you should:

- Delete the sensor, or
- Clear the sensor's data from Vantage or the [CMC](#)



Glossary



Amazon Machine Image

An AMI is a type of virtual appliance that is used to create a virtual machine for the Amazon Elastic Compute Cloud (EC2), and is the basic unit of deployment for services that use EC2 for delivery.

Amazon Web Services

AWS is a subsidiary of the Amazon company that provides on-demand cloud computing platforms governments, businesses, and individuals on a pay-as-you-go basis.

Application Programming Interface

An API is a software interface that lets two or more computer programs communicate with each other.

Assertion Consumer Service

An ACS is a version of the SAML standard that is used to exchange authentication and authorization identities between security domains.

Asset Intelligence™

Asset Intelligence is a continuously expanding database of modeling asset behavior used by N2OS to enrich asset information, and improve overall visibility, asset management, and security, independent of monitored network data.

Berkeley Packet Filter

The BPF is a technology that is used in some computer operating systems for programs that need to analyze network traffic. A BPF provides a raw interface to data link layers, permitting raw link-layer packets to be sent and received.

Central Management Console

The Central Management Console (CMC) is a Nozomi Networks product that has been designed to support complex deployments that cannot be addressed with a single sensor. A central design principle behind the CMC is the unified experience, that lets you access information in the similar method to the sensor.

Central Processing Unit

The main, or central, processor that executes instructions in a computer program.

Certificate Authority

A certificate, or certification authority (CA) is an organization that stores, signs, and issues digital certificates. In cryptography, a digital certificate certifies the ownership of a public key by the named subject of the certificate.

Classless Inter-Domain Routing

CIDR is a method for IP routing and for allocating IP addresses.

Command-line interface

A command-line processor uses a command-line interface (CLI) as text input commands. It lets you invoke executables and provide information for the actions that you want them to do. It also lets you set parameters for the environment.

Comma-separated Value

A CSV file is a text file that uses a comma to separate values.

Common Event Format

CEF is a text-based log file format that is used for event logging and information sharing between different security devices and software applications.

Common Platform Enumeration

CPE is a structured naming scheme for information technology (IT) systems, software, and packages. CPE is based on the generic syntax for Uniform Resource Identifiers (URI) and includes a formal name format, a method for checking names against a system, and a description format for binding text and tests to a name.

Common Vulnerabilities and Exposures

CVEs give a reference method information-security vulnerabilities and exposures that are known to the public. The United States' National Cybersecurity FFRDC maintains the system.

Common Weakness Enumeration

CWE is a category system for software and hardware weaknesses and vulnerabilities. It is a community project with the aim to understand flaws in software and hardware and create automated tools that can be used to identify, fix, and prevent those flaws.

Configuration file

A CFG file is a configuration, or config, file. They are files that are used to configure the parameters and initial settings for a computer program.

Domain Name Server

The DNS is a distributed naming system for computers, services, and other resources on the Internet, or other types of Internet Protocol (IP) networks.

ESXi

VMware ESXi (formerly ESX) is an enterprise-class, type-1 hypervisor developed by VMware for deploying and serving virtual computers. As a type-1 hypervisor, ESXi is not a software application that is installed on an operating system (OS). Instead, it includes and integrates vital OS components, such as a kernel.

Extensible Markup Language

XML is a markup language and file format for the storage and transmission of data. It defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

Federal Information Processing Standards

FIPS are publicly announced standards developed by the National Institute of Standards and Technology for use in computer systems by non-military American government agencies and government contractors.

File Transfer Protocol

FTP is a standard communication protocol that is used for the transfer of computer files from a server to a client on a computer network. FTP is built on a client-server model architecture that uses separate control and data connections between the client and the server.

Fully qualified domain name

An FQDN is a complete and specific domain name that specifies the exact location in the hierarchy of the Domain Name System (DNS). It includes all higher-level domains, typically consisting of a host name and domain name, and ends in a top-level domain.

Gigabit per second

Gigabit per second (Gb/s) is a unit of data transfer rate equal to: 1,000 Megabits per second.

Gigabyte

The gigabyte is a multiple of the unit byte for digital information. One gigabyte is one billion bytes.

Graphical User Interface

A GUI is an interface that lets humans interact with electronic devices through graphical icons.

Graphics Interchange Format

GIF is a bitmap image format that is widely used on the internet.

High Availability

High Availability is a mode that permits the CMC to replicate its own data on another CMC.

Host-based intrusion-detection system

HIDS is an internal Nozomi Networks solution that uses sensors to detect changes to the basic firmware image, and record the change.

Hypertext Transfer Protocol

HTTP is an application layer protocol in the Internet protocol suite model for distributed, collaborative, hypermedia information systems. HTTP is the foundation of data communication for the World Wide Web, where hypertext documents include hyperlinks to other resources that the user can easily access, for example by a mouse click or by tapping the screen in a web browser.

Hypertext Transfer Protocol Secure

HTTPS is an extension of the Hypertext Transfer Protocol (HTTP). It is used for secure communication over a computer network, and is widely used on the Internet. In HTTPS, the communication protocol is encrypted using Transport Layer Security (TLS) or, formerly, Secure Sockets Layer (SSL). The protocol is therefore also referred to as HTTP over TLS, or HTTP over SSL.

Identifier

A label that identifies the related item.

Identity Provider

An IdP is a system entity that creates, maintains, and manages identity information. It also provides authentication services to applications within a federation, or a distributed network.

Internet Control Message Protocol

ICMP is a supporting protocol in the internet protocol suite. Network devices use it to send error messages and operational information to indicate success or failure when communicating with another IP address. ICMP differs from transport protocols such as TCP and UDP in that it is not typically used to exchange data between systems.

Internet of Things

The IoT describes devices that connect and exchange information through the internet or other communication devices.

Internet Protocol

An Internet Protocol address, or IP address, identifies a node in a computer network that uses the Internet Protocol to communicate. The IP label is numerical.

Intrusion Detection System

An intrusion detection system (IDS), which can also be known as an intrusion prevention system (IPS) is a software application, or a device, that monitors a computer network, or system, for malicious activity or policy violations. Such intrusion activities, or violations, are typically reported either to a system administrator, or collected centrally by a security information and event management (SIEM) system.

JavaScript Object Notation

JSON is an open standard file format for data interchange. It uses human-readable text to store and transmit data objects, which consist of attribute–value pairs and arrays.

Joint Photographic Experts Group

JPEG, or JPG, is a method of lossy compression that is used for digital images. The degree of compression can be adjusted, allowing a selectable tradeoff between storage size and image quality.

Lightweight Directory Access Protocol

LDAP is an open, vendor-neutral, industry standard application protocol that lets you access and maintain distributed directory information services over an internet protocol (IP) network.

Lightweight Directory Access Protocol Secure

LDAP over SSL or Secure LDAP is the secure version of LDAP.

Managed Security Service Provider

In computing, MSSP are network security services that have been outsourced to a service provider. A company that provides this type of service is known as an MSSP.

Media Access Control

A MAC address is a unique identifier for a network interface controller (NIC). It is used as a network address in network segment communications. A common use is in most IEEE 802 networking technologies, such as Bluetooth, Ethernet, and Wi-Fi. MAC addresses are most commonly assigned by device manufacturers and are also referred to as a hardware address, or physical address. A MAC address normally includes a manufacturer's organizationally unique identifier (OUI). It can be stored in hardware, such as the card's read-only memory, or by a firmware mechanism.

Megabyte

The megabyte is a multiple of the unit byte for digital information. One megabyte is one million bytes.

Network Address Translation

NAT is a method of mapping an internet protocol (IP) address space into another one. This is done by modifying network address information in the IP header of packets while in transit across a traffic routing device.

Network Interface Controller

A network interface controller (NIC), sometimes known as a network interface card, is a computer hardware component that lets a computer connect to a computer network.

Network Time Protocol

The NTP is a networking protocol to synchronize clocks between computer systems over variable-latency, packet-switched data networks.

Nozomi Networks Operating System

N2OS is the operating system that the core suite of Nozomi Networks products runs on.

Nozomi Networks Query Language (N2QL)

N2QL is the language used in queries in Nozomi Networks software.

Open Virtual Appliance

An OVA file is an open virtualization format (OVF) directory that is saved as an archive using the .tar archiving format. It contains files for distribution of software that runs on a virtual machine. An OVA package contains a .ovf descriptor file, certificate files, an optional .mf file along with other related files.

Operating System

An operating system is computer system software that is used to manage computer hardware, software resources, and provide common services for computer programs.

Operational Technology

OT is the software and hardware that controls and/or monitors industrial assets, devices and processes.

Packet Capture

A pcap is an application programming interface (API) that captures live network packet data from the OSI model (layers 2-7).

Packet Capture Next Generation

A pcapNg is the latest version of a pcap file, an application programming interface (API) that captures live network packet data from the OSI model (layers 2-7).

Portable Document Format

PDF is a Adobe file format that is used to present documents. It is independent of operating systems (OS), application software, hardware.

Portable Network Graphics

PNG is a raster graphics file format that supports lossless data compression.PNG was developed as an improved, non-patented replacement for graphics interchange format (GIF).

Privacy-Enhanced Mail

PEM is a standard file format that is used to store and send cryptographic keys, certificates, and other data. It is based on a set of 1993 IETF standards.

Programmable Logic Controller

A PLC is a ruggedized, industrial computer used in industrial and manufacturing processes.

Protected Extensible Authentication Protocol

PEAP is a protocol that encloses the Extensible Authentication Protocol (EAP) within an encrypted and authenticated Transport Layer Security (TLS) tunnel.

Random-access Memory

Computer memory that can be read and changed in any order. It is typically used to store machine code or working data.

Representational State Transfer

Representational State Transfer (REST) is an architectural style for designing networked applications. It uses stateless, client-server communication via standard HTTP methods (GET, POST, PUT, DELETE) to access and manipulate web resources represented in formats like JSON or XML.

Secure Copy Protocol

SCP is a protocol for the secure transfer of computer files between a local host and a remote host, or between two remote hosts. It is based on the secure shell (SSH) protocol.

Secure Shell

A cryptographic network protocol that let you operate network services securely over an unsecured network. It is commonly used for command-line execution and remote login applications.

Secure Sockets Layer

A secure sockets layer ensures secure communication between a client computer and a server.

Security Assertion Markup Language

SAML is an open standard, XML-based markup language for security assertions. It allows for the exchange of authentication and authorization data different parties such as a service provider and an identity provider.

Security Information and Event Management

SIEM is a field within the computer security industry, where software products and services combine security event management (SEM) and security information management (SIM). SIEMs provide real-time analysis of security alerts.

Server Message Block

Is a communication protocol which provides shared access to files and printers across nodes on a network of systems. It also provides an authenticated interprocess communication (IPC) mechanism.

Simple File Transfer Protocol

SFTP was proposed as an unsecured file transfer protocol with a level of complexity intermediate between TFTP and FTP. It was never widely accepted on the internet.

Simple Mail Transfer Protocol

SMTP is an internet standard communication protocol that is used for the transmission of email. Mail servers and other message transfer agents use SMTP to send and receive mail messages.

Simple Network Management Protocol

SNMP is an Internet Standard protocol for the collection and organization of information about managed devices on IP networks. It also lets you modify that information to change device behavior. Typical devices that support SNMP are: printers, workstations, cable modems, switches, routers, and servers.

Simple Text Oriented Messaging Protocol

STOMP is a simple text-based protocol, for working with message-oriented middleware (MOM). It provides an interoperable wire format that allows STOMP clients to talk with any message broker supporting the protocol.

Structured Threat Information Expression

STIX™ is a language and serialization format for the exchange of cyber threat intelligence (CTI). STIX is free and open source.

Supervisory control and data acquisition

SCADA is a control system architecture which has computers, networked data communications and graphical user interfaces for high-level supervision of processes and machines. It also covers sensors and other devices, such as programmable logic controllers (PLC), which interface with process plant or machinery.

Text-based User Interface

In computing, a text-based (or terminal) user interfaces (TUI) is a retronym that describes a type of user interface (UI). These were common as an early method of human–computer interaction, before the more modern graphical user interfaces (GUIs) were introduced. Similar to GUIs, they might use the entire screen area and accept mouse and other inputs.

Threat Intelligence™

Nozomi Networks **Threat Intelligence™** feature monitors ongoing OT and IoT threat and vulnerability intelligence to improve malware anomaly detection. This includes managing packet rules, Yara rules, STIX indicators, Sigma rules, and vulnerabilities. **Threat Intelligence™** allows new content to be added, edited, and deleted, and existing content to be enabled or disabled.

Transmission Control Protocol

One of the main protocols of the Internet protocol suite.

Transport Layer Security

TLS is a cryptographic protocol that provides communications security over a computer network. The protocol is widely used in applications such as: HTTPS, voice over IP, instant messaging, and email.

Uniform Resource Identifier

A URI is a unique string of characters used to identify a logical or physical resource on the internet or local network.

Uniform Resource Locator

An URL is a reference to a resource on the web that gives its location on a computer network and a mechanism to retrieving it.

Uninterruptible Power Supply

A UPS is an electric power system that provides continuous power. When the main input power source fails, an automated backup system continues to supply power.

Universally unique identifier

A UUID is a 128-bit label that is used for information in computer systems. When a UUID is generated with standard methods, they are, for all practical purposes, unique. Their uniqueness is not dependent on an authority, or a centralized registry. While it is not impossible for the UUID to be duplicated, the possibility is generally considered to be so small, as to be negligible. The term globally unique identifier (GUID) is also used in some, mostly Microsoft, systems.

Universal Serial Bus

Universal Serial Bus (USB) is a standard that sets specifications for protocols, connectors, and cables for communication and connection between computers and peripheral devices.

User Interface

An interface that lets humans interact with machines.

Variable

In the context of control systems, a variable can refer to process values that change over time. These can be temperature, speed, pressure etc.

Virtual DOM

A virtual DOM, or vdom, is a lightweight JavaScript representation of the Document Object Model (DOM). It is used in declarative web frameworks such as Elm, React, and Vue.js. It enables the updating of the virtual DOM is comparatively faster than updating the actual DOM.

Virtual Hard Disk

VHD is a file format that represents a virtual hard disk drive (HDD). They can contain what is found on a physical HDD, such as disk partitions and a file system, which in turn can contain files and folders. They are normally used as the hard disk of a virtual machine (VM). They are the native file format for Microsoft's hypervisor (virtual machine system), Hyper-V.

Virtual Local Area Network

A VLAN is a broadcast domain that is isolated and partitioned in a computer network at the data link layer (OSI layer 2).

Virtual Machine

A VM is the emulation or virtualization of a computer system. VMs are based on computer architectures and provide the functionality of a physical computer.

ZIP

An archive file format that supports lossless data compression. The format can use a number of different compression algorithms, but DEFLATE is the most common one. A ZIP file can contain one or more compressed files or directories.