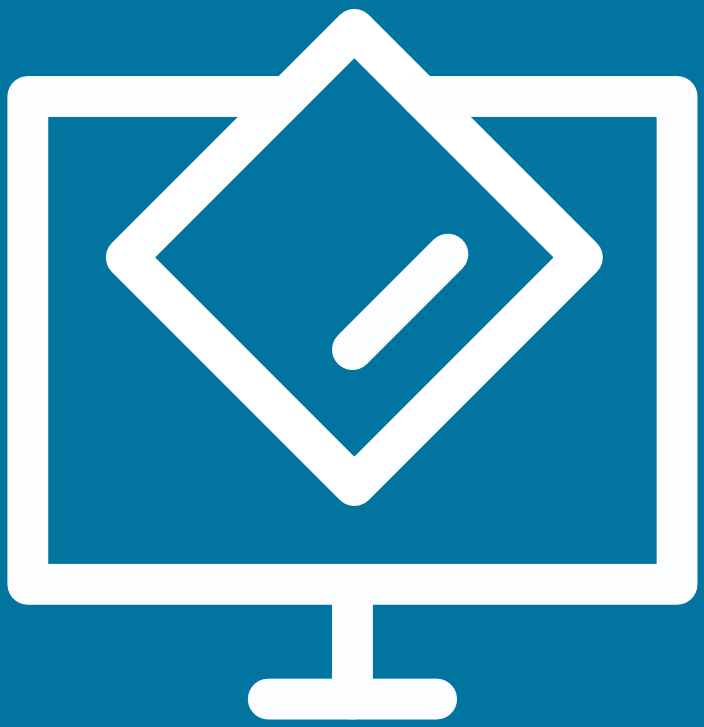
NOZOMI NETWORKS



Arc
Administrator Guide

Arc v2.7.0 — 2026-05-11

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Chapter 1. Introduction

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

Operating Systems (OS)

Arc sensors are endpoint executables that run on hosts on these *operating system (OS)s*:

- Microsoft Windows
- Linux
- Apple macOS

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 and protect endpoints
- Automatically deploy sensors across thousands of devices
- Use a low-impact process to scan air-gapped networks
- Deploy with *mobile device management (MDM)* 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 Networks 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.

Threat prevention

Starting with v2.0, Arc enforces actions to prevent threats in addition to monitoring.

Architecture

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

You can connect Arc:

- To Guardian
- To Vantage

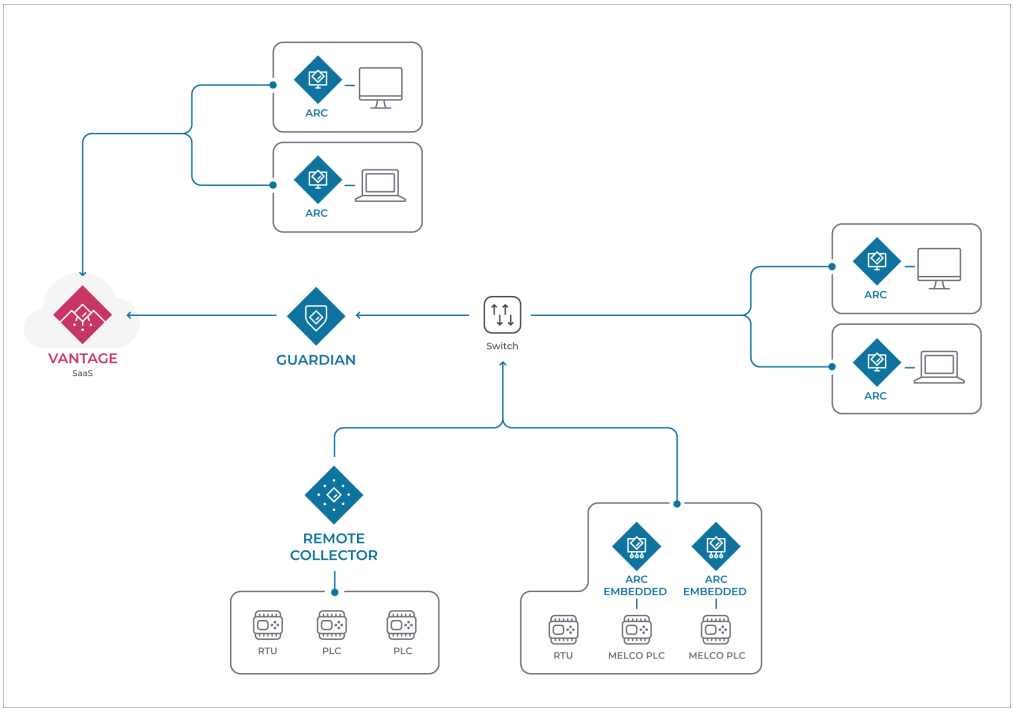


Figure 1. Arc architecture example

Arc in Vantage

*The **Sensors** page shows all the Arc sensors in the network. It also lets you connect an Arc sensor.*

Vantage Sensors page

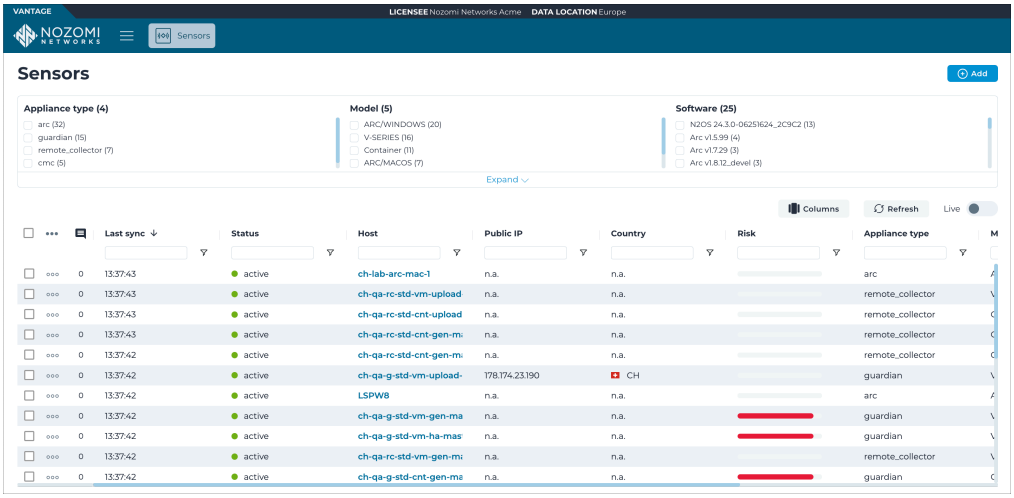


Figure 2. Vantage Sensors page

All Arc sensors in the network will show in the table on the **Sensors** page. The **Add new** button gives you access to the **Make connections** page. When you select **Arc**, you will see a list of Arc packages to download. This lets you select the correct Arc package for your *OS* and architecture.

Make connections page

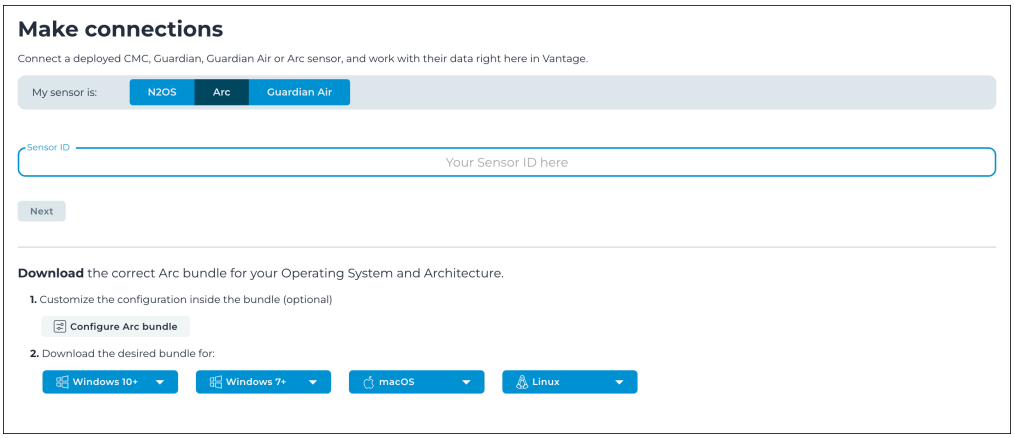


Figure 3. Make connections page

Configure an Arc sensor

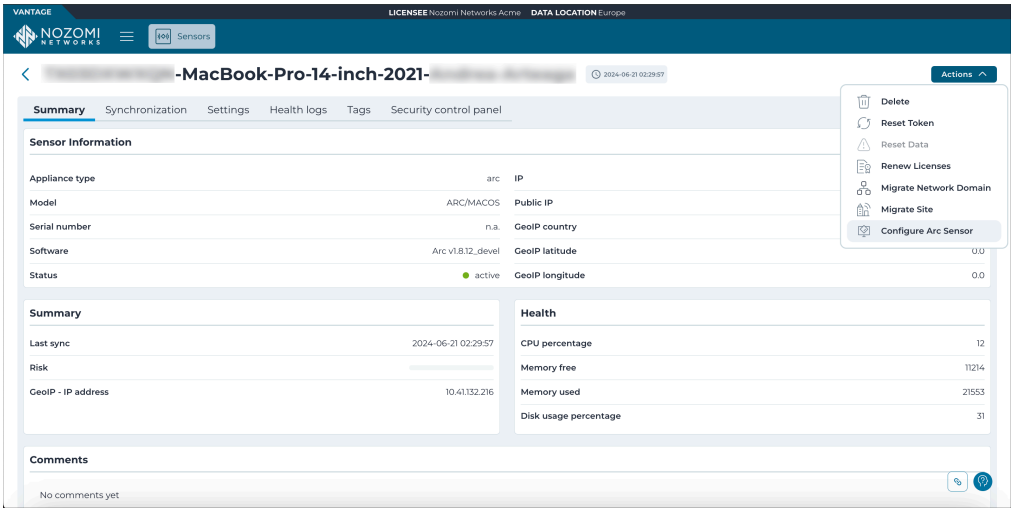


Figure 4. Actions menu in sensor details page

You can configure an individual Arc sensor directly from Vantage. To do this, in the details page for the related Arc sensor, select **Actions > Configure Arc Sensor**.

Configure multiple Arc sensors

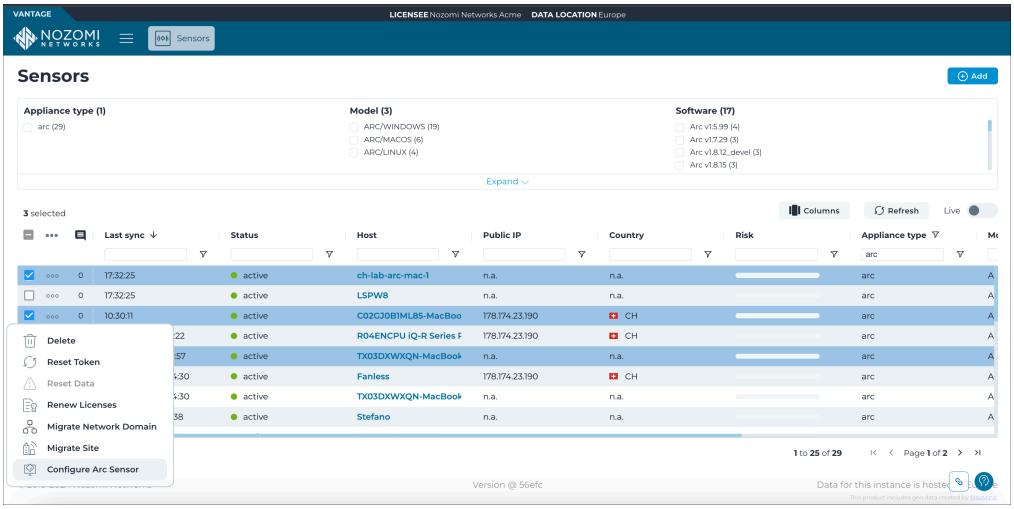


Figure 5. Configure multiple Arc sensors

You can configure multiple Arc sensors at the same time. To do this, select multiple Arc sensors in the table, then select ••• **> Configure Arc Sensor**.

Arc in Guardian

*The **Arc** button in the Guardian Web UI lets you access the different pages for Arc.*

Figure 6. Arc button in Guardian Web UI

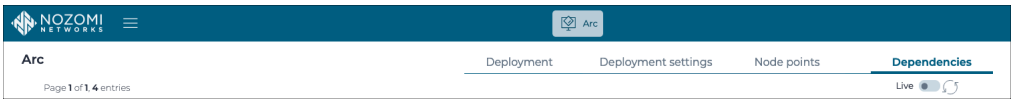


Figure 7. Arc button in Guardian Web UI (not connected to Vantage)

When you select **Arc** in the Guardian Web *user interface (UI)*, you get access to these pages:

- **Deployment**
- **Deployment settings**
- **Node points**
- **Dependencies** (only for Guardians that are not connected to Vantage)

Configure an Arc sensor

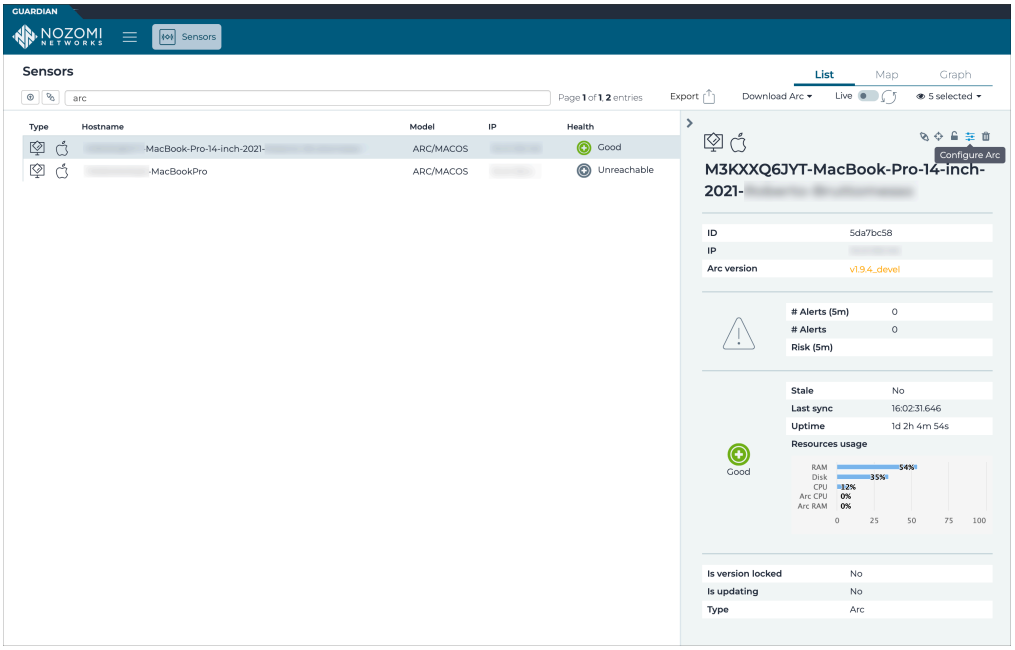


Figure 8. Configure an Arc sensor

You can configure an individual Arc sensor directly from Guardian. To do this, you can select the applicable Arc sensor from the **Sensors** list, and select the icon.

Deployment

*The **Deployment** page shows a table of all the devices available for Arc deployment.*

The table only shows machines which have an *OS* that matches one that Arc supports.

As Guardian detects the installed *OS*, the correct Arc package will be automatically deployed.

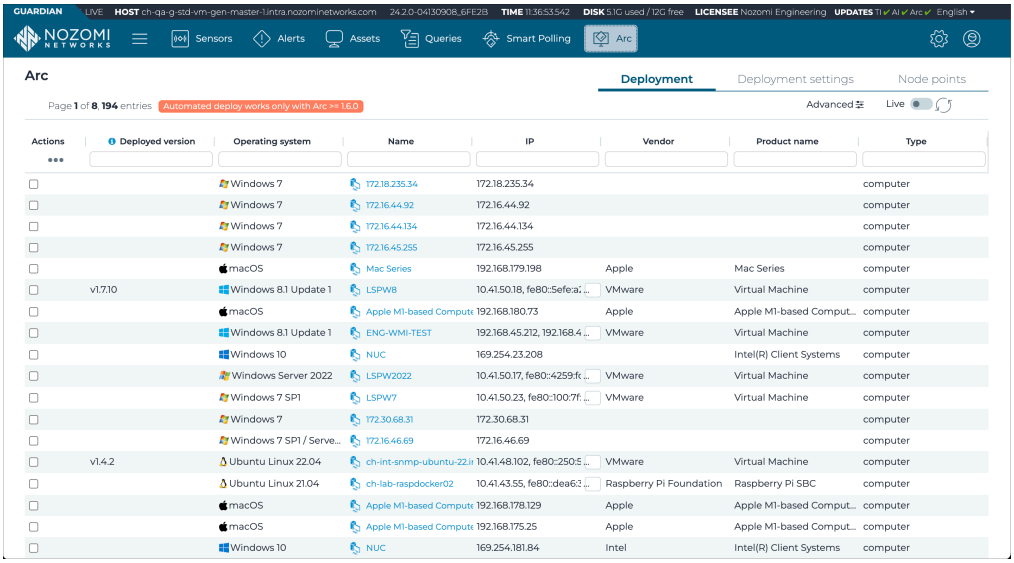


Figure 9. Deployment page

Advanced

The **Advanced** button lets you access the **Advanced** page. For more details, see Advanced (on page 15).

Execution details

The **Execution details** lets you access the **Activity Log**. For more details, see Execution details (on page 16).

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.

Actions

The **ACTIONS** column has a checkbox for each row in the table. This lets you select multiple nodes before you then apply an action to them.

The **ACTIONS** menu icon ••• gives you access to these options:

- Select all in current page
- Select none in current page
- Invert selection in current page
- Deploy Service mode: this installs Arc in Service mode for the selected devices
- Remove Service mode: this removes the Arc previously installed in Service mode for the selected devices
- Execute One-shot: this executes a One-shot run for the selected devices, which are left clean after an execution. Arc self destroys after its execution

Operating System

The **OPERATING SYSTEM** column shows the *OS* for each of the Arc sensors in the table. The field at the top of the column lets you use the *OS* to filter the table.

IP

The **IP** column shows the *internet protocol (IP)* for each of the Arc sensors in the table. The field at the top of the column lets you use the *IP* to filter the table.

Vendor

The **VENDOR** column shows the vendor name for each of the Arc sensors in the table. The field at the top of the column lets you use the vendor name to filter the table.

Product name

The **PRODUCT NAME** column shows the product name for each of the Arc sensors in the table. The field at the top of the column lets you use the product name to filter the table.

Type

The **TYPE** column shows the device type for each of the Arc sensors in the table. The field at the top of the column lets you use the device type to filter the table.

Advanced

*The **Advanced** page lets you interact with nodes that have no operating system (OS) detected, or do not show on the same page in the table.*

The default table view only shows nodes that have had their *OS* detected. Also, if you select multiple nodes, actions will only be applied to a single page of nodes. To overcome these limitations, you can use the **Advanced** button to go to the **Advanced** page. This will let you interact with a:

- Set of nodes that cannot be shown on a single page
- Set of nodes that have no *OS* detected

Figure 10. Advanced page

Strategy

Automatic: This selection will use the *OS* that has been detected on the node to automatically choose a deployment strategy. You can select multiple nodes that have a different *OS*. This strategy will ignore a host if it has no *OS*.

WinRM: This selection will force the *Windows Remote Management (WinRM)* strategy, regardless of the *OS*, and deploy the correct Arc package for Windows.

SSH (Windows): This selection will force the *secure shell (SSH)* strategy, regardless of the *OS*, and deploy the correct Arc package for Windows.

SSH (Linux): This selection will force the *SSH* strategy, regardless of the *OS*, and deploy the correct Arc package for Linux.

SSH (macOS): This selection will force the *SSH* strategy, regardless of the *OS*, and deploy the correct Arc package for macOS.

Query

This field lets you create and execute queries on the nodes. This lets you filter and selectively install packages.

Timeout (seconds)

The **Timeout** dropdown lets you set the amount of time that Arc will try to communicate with a host machine before it skips it and goes to the next one.

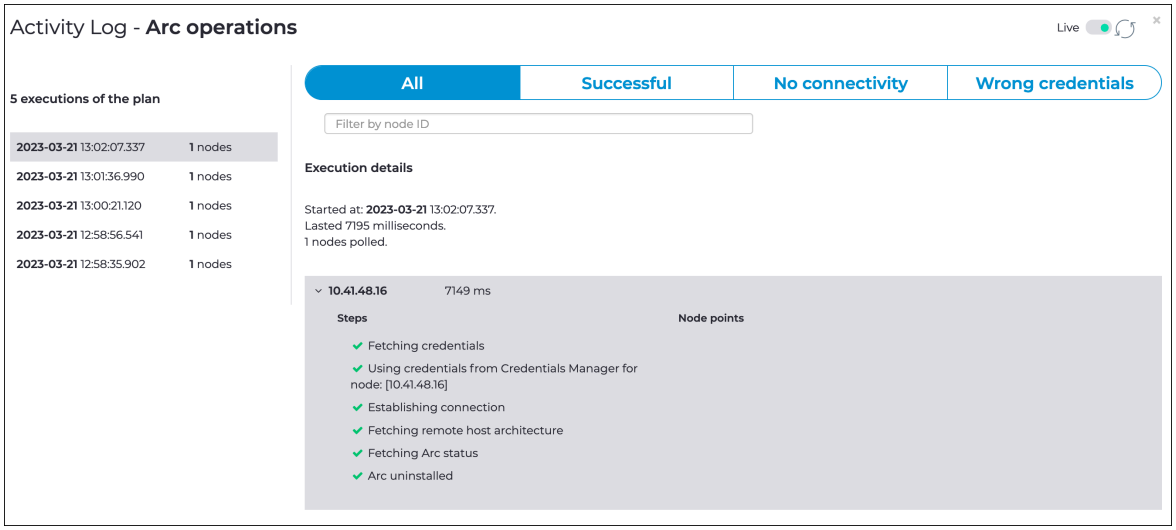
Execution details

*The **Execution details** button gives you access to the **Activity Log**.*

The **Activity Log** lets you troubleshoot the results of the executed deployments. When you select an execution on the left side of the page, you can analyze the selection.

You can use the **Filter by node ID** to focus on a single issue, such as:

- Credential missing, or
- Wrong credentials



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.

Deployment settings

Configure Arc deployment parameters that will be included in downloaded Arc bundles. These settings define how Arc will behave when deployed from Guardian.

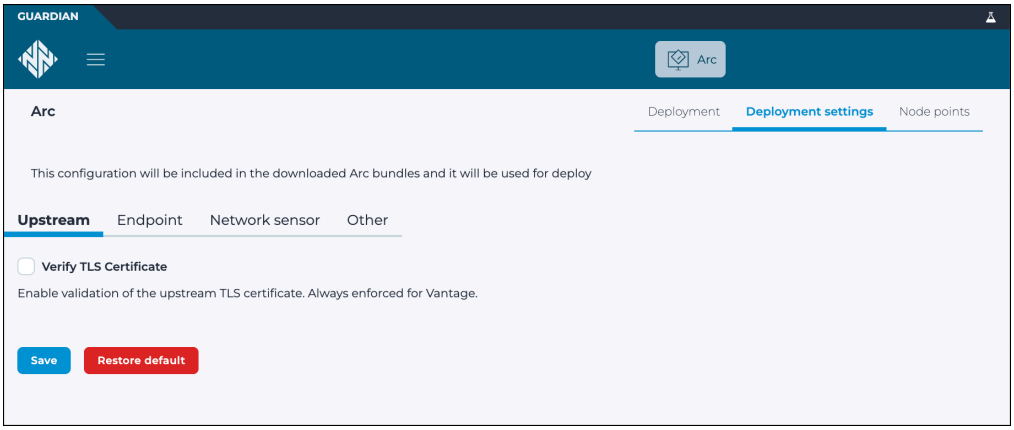


Figure 11. Deployment settings page

The **Deployment settings** page has these tabs:

- Upstream (on page 18)
- Endpoint (on page 19)
- Network sensor (on page 21)
- Other (on page 23)

Restore default

Once the settings have been saved, you can use this button to restore the default configuration.

Upstream

*The **Upstream** page lets you configure the settings for your Arc deployment.*

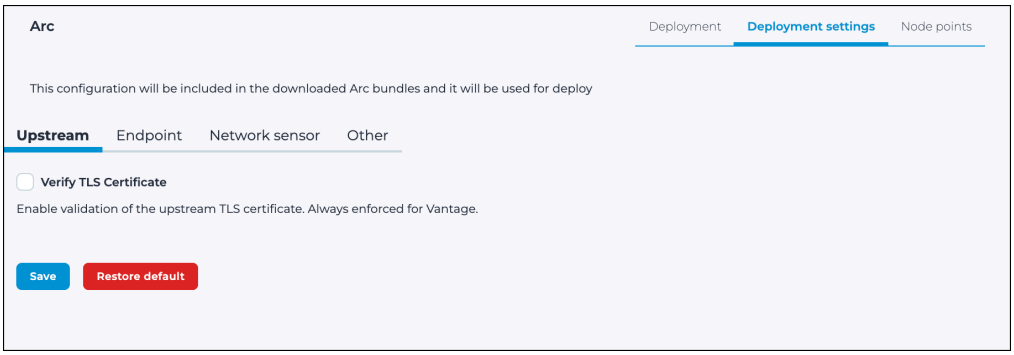


Figure 12. Upstream page

Verify TLS Certificate

Select this option to enforce verification of the upstream *transport layer security (TLS)* certificate when connecting to Guardian. When using Vantage, *TLS* certificate validation is always enforced, regardless of this setting.

Restore default

Once the settings have been saved, you can use this button to restore the default configuration.

Endpoint

*The **Endpoint** page lets you configure the settings for your Arc deployment.*

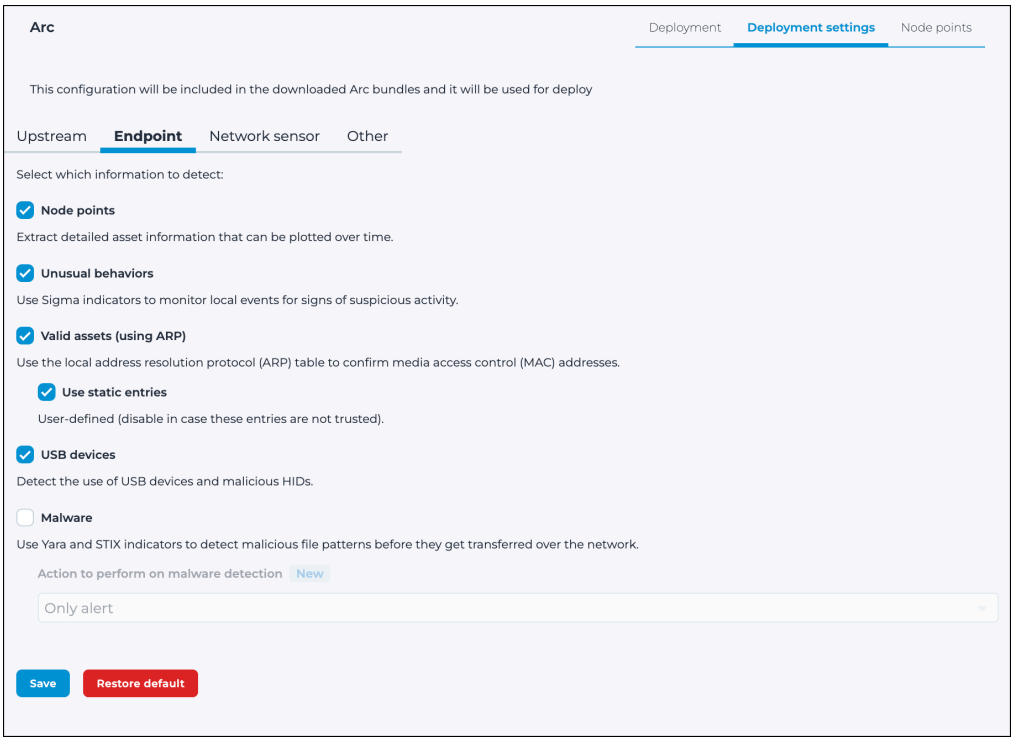


Figure 13. Endpoint page

Node points

Enable this option to extract detailed asset information as node points. These can be plotted over time to visualize endpoint activity.

Unusual behaviors (Windows only)

This lets you enable/disable Sigma rules for local behavior analysis.

Valid assets (using ARP)

Enable this option to use the local *address resolution protocol (ARP)* table to confirm *media access control (MAC)* addresses for connected assets.

Enable **Use static entries** to include user-defined static *ARP* table entries in the validation. Only enable this if the static entries are trusted.

USB devices (Windows only)

This lets you enable/disable *USB* detections.

Malware (Windows only)

The **Malware** checkbox lets you enable protection mode and select from the **Action to perform on malware detection** dropdown. This lets you set the action that Arc will take when it finds a malicious file.

You can choose from these options:

- **Only alert**: Receive an alert with no further action
- **Quarantine**: Move the malicious file to the `quarantine` folder, which is located in the Arc installation folder
- **Delete**: Immediately delete the malicious file. Once deleted, the files cannot be recovered

You can also use the **Directory exclusions** feature to exclude specific directories from malware scanning. Select + to open a file browser and select a directory. You can add as many directories as needed. Arc skips the selected directories when scanning for malware.

Restore default

Once the settings have been saved, you can use this button to restore the default configuration.

Network sensor

*The **Network sensor** page lets you configure the settings for your Arc deployment.*

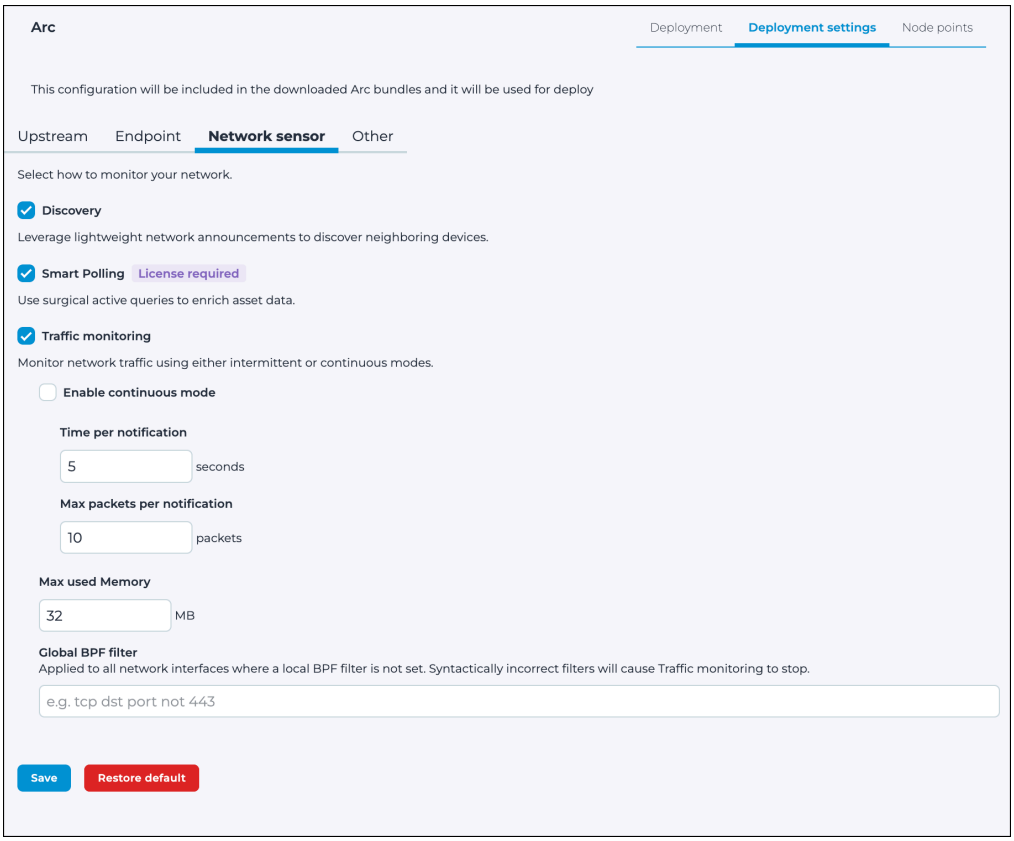


Figure 14. Endpoint page

Discovery

When enabled, this sends out unsolicited lightweight network announcements to discover neighboring nodes.

Discovery uses lightweight protocol-specific broadcast messages to identify network devices. These messages trigger a response from the devices, which includes identity information. The process is repeated at predefined intervals. At each interval, the sensor will identify the suitable network interfaces and send broadcast messages through them to discover devices on each subnetwork connected to the sensor.

Smart Polling

This lets you enable/disable the execution of Smart Polling strategies from Arc. When enabled, this sends out Smart Polling queries following remote requests coming from Guardian to poll assets that Arc can reach, or assets that have been identified with Discovery.

> **Note:**
>
> **Smart Polling** requires that a Smart Polling license is enabled upstream.

To force Smart Polling from a specific Arc sensor, even when Guardian was the first to monitor a node, you can use a *command-line interface (CLI)* command such as: `vi node 192.168.1.1 capture_device arc[1e6a174c]` In this example, `192.168.1.1` is an *IP* address of a node you want to poll from a specific Arc sensor. `1e6a174c` are the first eight characters of the Arc sensor *identifier (ID)* that you want to poll the node with. To find that sensor *ID*, you can select the Arc sensor from the **Sensors** page of your Guardian and read the **ID** field in the right pane. To reset the behavior, you can set the `capture_device` back to the value of the Guardian interface.

Traffic monitoring

When enabled, this checkbox lets you enable/disable traffic monitoring.

Enable continuous mode

This checkbox lets you enable/disable continuous mode. For more details, see **Continuous mode**.

Arc uses two different methods for traffic monitoring:

- Intermittent mode
- Continuous mode

Intermittent mode: This is the default mode, the traffic is monitored, or sniffed, for a duration of 10 seconds at each notify. The purpose of this limitation is to preserve the resources of the host machine, which prevents excessive memory, or *central processing unit (CPU)*, spikes. You can configure these options:

Continuous mode: This mode sniffs traffic continuously from the host's network interface controllers. Depending on the amount of sniffed traffic, continuous mode might utilize more *CPU* and memory on the host. As the traffic is processed upstream, the performance of the remote endpoint is also affected. You can configure:

- **Time [s] per notification**
- **Max packets per notification**
- **Max used Memory (MB)**: this value can be tuned to allow more or less traffic buffering in case the traffic to process exceeds the Arc and network capacity to send it out

Global BPF filter

This field lets you set a Global BPF filter to apply to all the network interfaces. Filters that are applied to single interfaces will take precedence over the global one.

Network interface

This dropdown lets you select a network interface to configure. Each network interface can then be enabled, and be tuned with a monitoring filter.

If you add, remove, or edit the network interfaces on the host, Arc does not automatically add it to the list of sniffing interfaces. For example, if you add a new network card, to enable Arc to use it, you should stop Arc, and then start it again.

Restore default

Once the settings have been saved, you can use this button to restore the default configuration.

Other

*The **Other** page lets you configure the settings for your Arc deployment.*

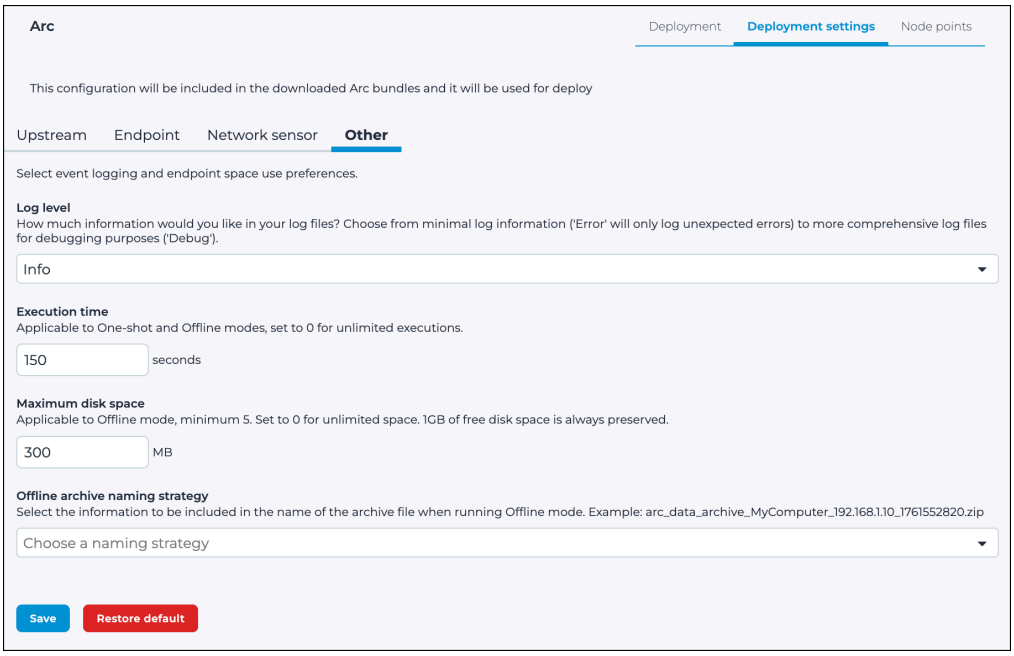


Figure 15. Other page

Log level

This dropdown lets you select the verbosity level for the log files. The options are:

- Debug
- Info
- Warning
- Error

The logging system options have an increasing level of verbosity, from the least verbose to the most verbose. Error < Warning < Info < Debug.

- Error: Creates a minimalistic log, only unexpected errors are logged
- Warning: Creates extra errors that might show on some *OS*s, but that are generally considered as acceptable
- Info: Logs relevant successful events, it shows the program's progress (recommended)
- Debug: Logs extra events that are normally useful for debugging purposes. Given its verbosity it is best to activate it only when debugging activities are involved

Execution time

This field lets you set the time that Arc will run to collect data. This is applicable for One-shot and Offline modes.

> **Note:**
> When this is set to 0, the execution time is interpreted as infinite.

Maximum disk space

This field lets you control the maximum amount of disk space in *megabyte (MB)* that will be used for Offline mode.

Offline archive naming strategy

This lets you select the information that will be included in the name of archive files created while running Offline mode.

Restore default

Once the settings have been saved, you can use this button to restore the default configuration.

Node points

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

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.

Dependencies

*The **Dependencies** page shows the status of the dependencies. When a dependency is missing, you can use the upload icon in the **Actions** column to upload it.*

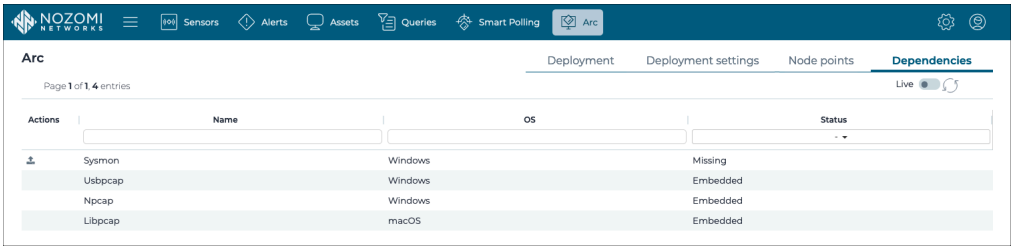


Figure 16. Dependencies page in Guardian (not connected to Vantage)

Arc in CMC

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

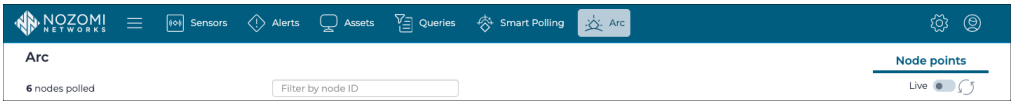


Figure 17. Arc button in CMC Web UI

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

Viewing data from Arc

The data Arc acquires can be viewed in different places, and in different formats.

Nodes discovered

You can view nodes by their capture device:

- In **Network view > Nodes**, check that the **capture_device** field contains `arc`
- In **Queries**, with the term: `nodes | where capture_device include? arc`

Asset view information sources

When Arc asset detections populate a field, an Arc dedicated source is used. When Arc uses network monitoring to discover nodes, the source will show as passive. See Nodes discovered (on page 27).

Node points

When Smart Polling is not enabled, all node points come from Arc. When both Arc and Smart Polling are active in Guardian, you can find nodes that are from Arc:

- In **Arc > Node points**
- In **Queries**, with the term: `node_points | where source.type == arc`

Dedicated alerts

In addition to the standard alerts, the alerts shown below come only from Arc:

- `SIGN:SIGMA-RULE`
- `SIGN:MALICIOUS-HID`
- `SIGN:USB-DEVICE`
- `SIGN:USB-FILE-TRANSFER`
- `SIGN:BOOT-SECURITY-ERROR`
- `SIGN:SD-CARD`
- `SIGN:FIRMWARE:CHANGE`
- `SIGN:LOGIN`

Users field in alerts

Alerts that are generated from Arc, or involve a node hosting Arc, include information about the logged users. In case of SIGN:SIGMA-RULE alerts, the user associated to the process triggering the Sigma rule is used.

Security measures

A description of the security measures that Arc uses.

Management

Admin/root users should manage Arc and should do the:

- Install
- Uninstall
- Execution

Digital signature

Nozomi Networks signs all delivered executable files for Windows and macOS.

Obfuscation

Executable files are subject to obfuscation.

Unidirectional communication

It is not possible for an external host to establish communication to Arc to use it as an attack vector to the machine hosting it.

Communication

Arc uses *TLS* 1.2/1.3 communication to the upstream machine.

Data availability

If the communication link between Arc and Vantage/Guardian becomes unavailable, Arc keeps the collected information locally. Once the communication link is available again, the information will be sent. The maximum amount of collected information depends on the resource usage limits that have been set.

Detection information

The information that Arc detects. The table shows two types of **License***:* **sensor** *and* **endpoint***. When the* **License** *is listed as* **sensor***, it means that the detection is based on information that has been extracted from the sensor. When the* **License** *is listed as* **endpoint***, it means that the detection is based on information that has been extracted from the endpoint.*

Table 1. Detection information

License	Information	Windows	macOS	Linux	Configuration option
sensor	Discovery	✓	✓	✓	Discovery
sensor	Smart Polling	✓	✓	✓	Smart Polling
sensor	Traffic monitoring	✓	✓	✓	Traffic monitoring
endpoint	Antivirus	✓	✗	✗	node points
endpoint	*CPU*	✓	✓	✓	node points
endpoint	*CPU* usage	✓	✓	✓	node points
endpoint	Disk partitions	✓	✓	✓	node points
endpoint	Disk usage	✓	✓	✓	node points
endpoint	*domain name server (DNS)*	✓	✓	✓	node points
endpoint	Hardware components	✓	✗	✓	always on
endpoint	Hotfixes	✓	✗	✗	node points
endpoint	Installed software	✓	✗	✓	node points

Table 1. Detection information (continued)

License	Information	Windows	macOS	Linux	Configuration option
endpoint	*IP* addresses	✓	✓	✓	always on
endpoint	Label/host name	✓	✓	✓	always on
endpoint	Local *ARP* table	✓	✓	✓	Local *ARP* table
endpoint	Log4j detection	✓	✓	✓	node points
endpoint	Logged in users	✓	✓	✓	node points
endpoint	*MAC* addresses	✓	✓	✓	always on
endpoint	Malware detection	✓	✗	✗	malware
endpoint	Memory usage	✓	✓	✓	node points
endpoint	Network interfaces	✓	✓	✓	node points
endpoint	*OS*	✓	✓	✓	always on
endpoint	Processes and ports	✓	✓	✓	node points
endpoint	Product name	✓	✓	✓	always on
endpoint	Serial number	✓	✓	✓	always on
endpoint	Sigma rules	✓	✗	✗	Sigma rules
endpoint	*USB* detections	✓	✗	✗	*USB* detections
endpoint	*USB* interfaces	✓	✗	✗	node points

Table 1. Detection information (continued)

License	Information	Windows	macOS	Linux	Configuration option
endpoint	User accounts	✓	✓	✓	node points
endpoint	Vendor	✓	✓	✓	always on

Chapter 2. Requirements

Endpoint operating system requirements

To operate Arc, you will need to make sure that you have the correct operating system (OS) installed on the endpoint.

Operating System	Architecture	Version
Windows	x86, x86_64	Windows 7 (Service Pack 1), or later
		Windows Server 2008 RC2 (Service Pack 1) or later
macOS	x86_64, arm64	macOS 10.10 Yosemite, or later
Linux	x86_64, arm, arm64	AlmaLinux OS 8, or later
		CentOS 7, or later
		Debian Jessie, or later
		Raspbian Jessie, or later
		RedHat Linux Enterprise 7.3, or later
		Suse Linux Enterprise Server 15, or later
		Ubuntu 16.04, or later

Endpoint hardware requirements

The resource requirements for Arc will depend on the traffic loads and other options.

A baseline installation of Arc, with no traffic monitoring, requires:

- Up to 100 MB of free disk space
- Up to 80 MB of free RAM

Both the options that are activated, and the traffic load on the machine, will affect the resource consumption of both the *CPU* and the *random-access memory (RAM)*.

Supported web browsers

The Nozomi Networks software supports recent versions of these browsers:

Google Chrome

Chromium

Safari (for macOS)

Firefox

Microsoft Edge
Opera

Important:
Microsoft Internet Explorer is not supported.

Nozomi Networks software requirements

For a successful deployment, your Nozomi Networks software must meet the minimum requirements.

To use Arc, your other software must meet these minimum requirements:

- Vantage, or
- Guardian v23.1.0, or later

To deploy Arc automatically from Guardian, you need Guardian v24.4.0, or later.

Federal Information Processing Standards (FIPS) on Linux

Arc for Linux FIPS is available as an additional bundle, and that has been tested on Debian 12 configured as FIPS. It may work out-of-the-box on other Linux distributions configured in FIPS mode.

Table 2. Software version requirements for *Federal Information Processing Standards (FIPS)*-compliance

Software	Version
Linux	Debian 12, or higher

Federal Information Processing Standards (FIPS) on Microsoft Windows

For Arc to be deployed successfully on FIPS-enabled Windows machines, the versions of both Arc and Microsoft Windows must be correct. Only Windows 10 and higher are FIPS-compliant.

Microsoft Windows versions that are earlier than Windows 10 are not supported. It is the *OS* that provides the cryptographic functions that you need to use, and they need to be dynamically loaded from the *OS*.

Earlier versions of Microsoft Windows have cryptographic functions that are now obsolete, and they are not *FIPS*-compliant. It is possible to have an executable file with updated cryptographic functions, but it would not be *FIPS*-compliant.

Table 3. Software version requirements for *FIPS*-compliance

Software	Version
Arc	1.6.0, or higher
Windows	10, or higher

Further requirements

All software in the Nozomi Networks installation must be *FIPS*-compatible. Therefore, all these conditions must be met:

- The complete upstream chain of Nozomi machines (Vantage, *CMC*, or Guardian) need to be *FIPS*-enabled
- An Arc *FIPS* executable needs to be installed on the endpoint

> **Note:**
> The correct *FIPS* executable files are made available once the previous condition is met.

- *FIPS* must be enabled on the endpoint before hosting Arc, for more details, see Enable FIPS on Microsoft Windows (on page 40)

Enable FIPS on Microsoft Windows

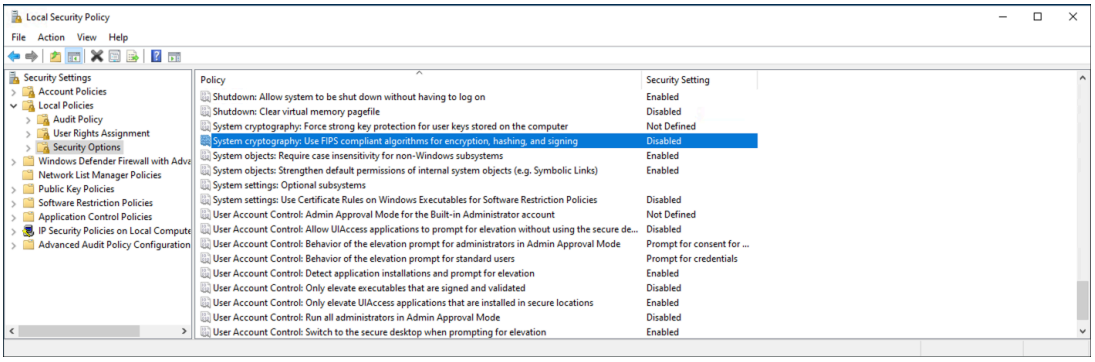
*Before you can use Arc in FIPS-compliant mode, you must enable FIPS in the **Local Security Policy** of Microsoft Windows.*

About this task

Arc *FIPS* works with Microsoft Windows 10, or higher.

Procedure

1. Right-click the Windows icon.
2. Go to **Control Panel > Administrative Tools**
3. Double-click **Local Security Policy**
4. Select **Local Policies > Security Options**.



5. Set **System cryptography: Use FIPS compliant algorithms for encryption, hashing and signing** to **Enabled**.

Results

Microsoft Windows is now enabled for *FIPS*.

Chapter 3. Preparation

Arc licenses

Before you can deploy and use Arc, you will need to buy a license. How Arc licenses are installed will depend on the existing installation that you have. Arc and Arc Embedded require separate licenses.

License types

There are two types of Arc license:

- Endpoint
- Sensor

For more details, see Detection information (on page 29).

Guardian

If you buy an Arc license for a Guardian installation, you will need to install the license. The Arc license enabled in Guardian provides for the Arc sensors that are downstream.

When the licensed Arc sensors are all connected and allowed, additional sensors can be added, but in a disallowed state. Disallow some sensors to allow the new ones.

Arc will be automatically updated when a new version is released. When the latest version of Arc is installed, a green tick will show adjacent to the **Arc** in the **UPDATES** section of the Web *UI*.

Without the update service, you will need to download the new package from the Support Portal and install the update manually.

Vantage

If you buy an Arc license for a Vantage installation, Vantage will act as a license server, and no other action is necessary. As soon as this license is active, Vantage is ready to accept incoming Arc sensor connections. All Arc updates will happen automatically, through any combination of *CMC* and Guardian sensors downstream.

When the licensed Arc sensors are all connected, in order to connect more sensors you will need to buy additional licenses.

CMC

If you buy an Arc license for a *CMC* installation, you will need to install the license. The Arc license enabled in *CMC* provides for the Arc sensors that are downstream, either through one Guardian, or multiple Guardian sensors.

Install a license in Guardian or CMC

Before you can use Arc you must install the applicable license.

Before you begin

If you are installing an additional license, make sure that you have installed a base license first.

Procedure

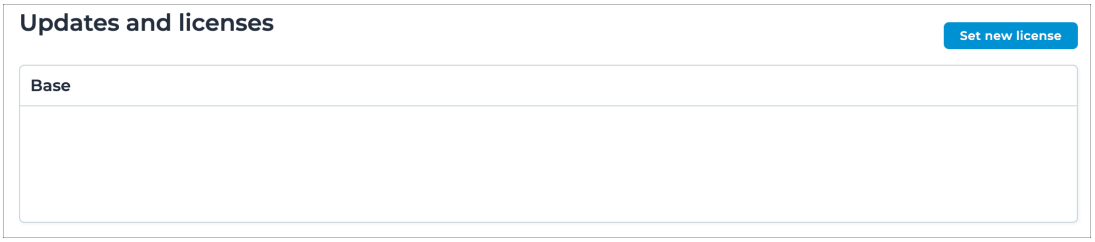
1. In the top navigation bar, select ⚙

   Result: The administration page opens.

2. In the **System** section, select **Updates and licenses**.

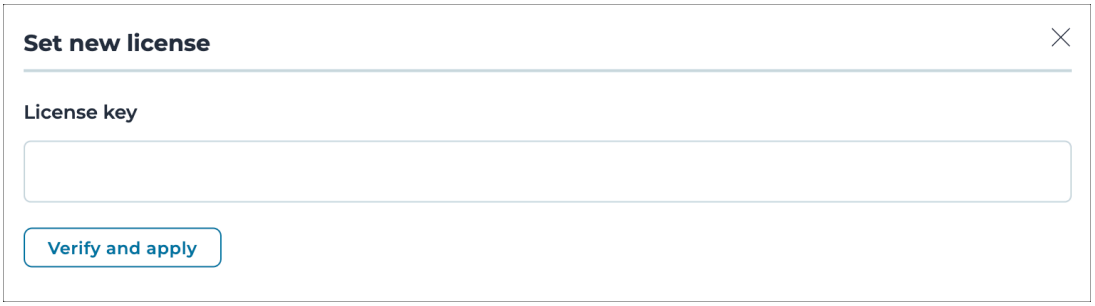
   Result: The **Updates and licenses** page opens.

3. In the top right of the section, select **Set new license**.



   Result: A dialog shows.

4. To copy the **Machine ID**, select **Copy**.



5. Send the machine *ID* to Nozomi Networks with your license request.
6. Wait to receive your license key from Nozomi Networks.
7. In the **License key** field, paste the license key.
8. Select **Verify and apply**.

Results

The license has been installed.

Import Arc through the update service in Guardian or CMC

Before you can deploy Arc, you must import it first. There a two methods you can use to do this, one method is through the Nozomi Networks Update Service. The alternative method is through a manual contents upload.

Procedure

1. In the top navigation bar, select ⚙

   Result: The administration page opens.

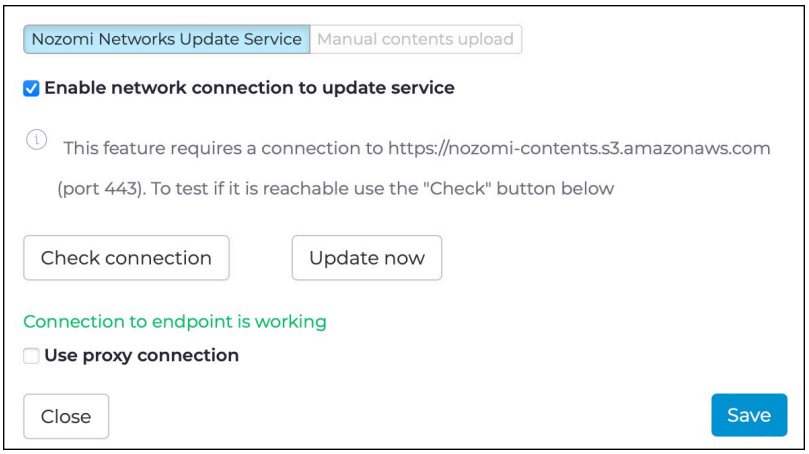
2. In the **System** section, select **Updates and licenses**.

   Result: The **Updates and licenses** page opens.

3. In the top, right corner, select **Update service configuration**.

   Result: A dialog opens.

4. Select **Nozomi Networks Update Service**.



5. To make sure that the connection is okay, select **Check connection**.

   Result: A message shows to confirm that the `Connection to endpoint is working`.

6. Select **Update now** to immediately download the Arc packages.

Import Arc through a manual contents upload in Guardian or CMC

Before you can deploy Arc, you must import it first. There a two methods you can use to do this, one method is through a manual contents upload. The alternative method is through the Nozomi Networks Update Service.

Before you begin

Make sure that you have downloaded the Arc .bin package.

Procedure

1. In the top navigation bar, select ⚙

   Result: The administration page opens.

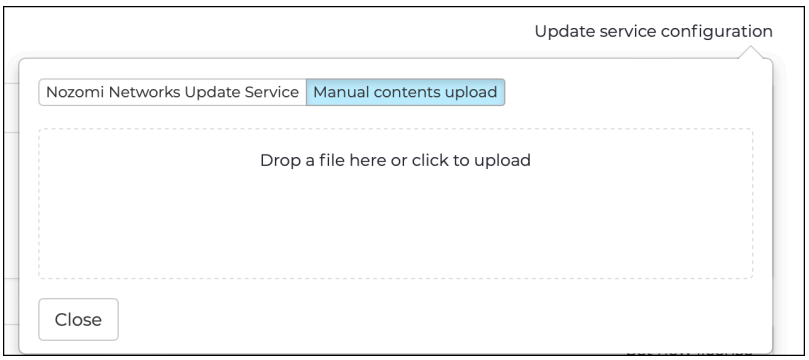
2. In the **System** section, select **Updates and licenses**.

   Result: The **Updates and licenses** page opens.

3. In the top, right corner, select **Update service configuration**.

   Result: A dialog opens.

4. Select the **Manual contents upload** button.



5. Drag and drop the `.bin` Arc package, that you downloaded from the Nozomi Networks support portal, into the upload field.

   Result: A progress bar shows and the update is verified.

6. Select **Close**.

Dependencies

To enable all the functions of Arc, you need to have certain items installed on the host machine.

Table 4. Windows dependencies

Sigma rules	*Sysmon*
	PowerShell-script block-logging
	PowerShell Core-script block-logging
USB detections	*USBPcap*
Traffic monitoring	*Npcap*
Asset details	Not needed
Threat Prevention	*EaseFilter* (optional, for enhanced real-time performance)

Table 5. Linux dependencies

Sigma rules	Not supported
USB detections	Not supported
Traffic monitoring	Not needed
Asset details	*dmidecode*

Table 6. macOS dependencies

Sigma rules	Not supported
USB detections	Not supported
Traffic monitoring	*libpcap*
Asset details	Not needed

During Automatic deployment, dependencies are also installed. To install the dependencies manually, download them and install them individually. Alternatively, you can use a *MDM* tool to install them across the managed network.

Windows

On Windows, you can use the command `install_dependencies` to automatically install these dependencies on the target machine:

- PowerShell-script block-logging
- PowerShell Core-script block-logging
- *USBPcap*
- *Npcap*

> **Attention:**
> For security reasons, since Arc v1.17.0, *WinPcap* is no longer supported. For traffic monitoring, use *Npcap* instead.

For *Sysmon*, the installation is semi-automatic. First, you must upload the latest *Sysmon* bundle to the applicable Guardian page. The bundle is then used for automatic installation during subsequent deployments.

If Arc is connected to Vantage, *Sysmon* is automatically fetched from the original website, and no other actions are required.

> **Note:**
> After you have installed *USBPcap*, you must reboot the host machine to make the dependency active.

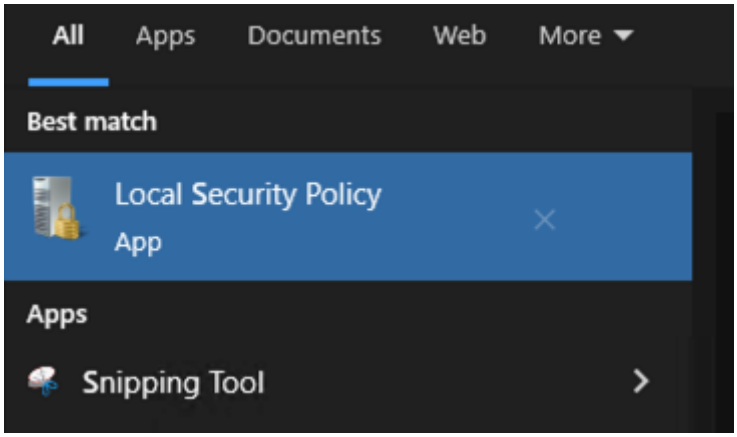
> **Note:**
> After a dependency is installed, you must restart Arc to make it active. When Guardian automatically installs dependencies during deployment, no user actions are necessary.

Enable security log events

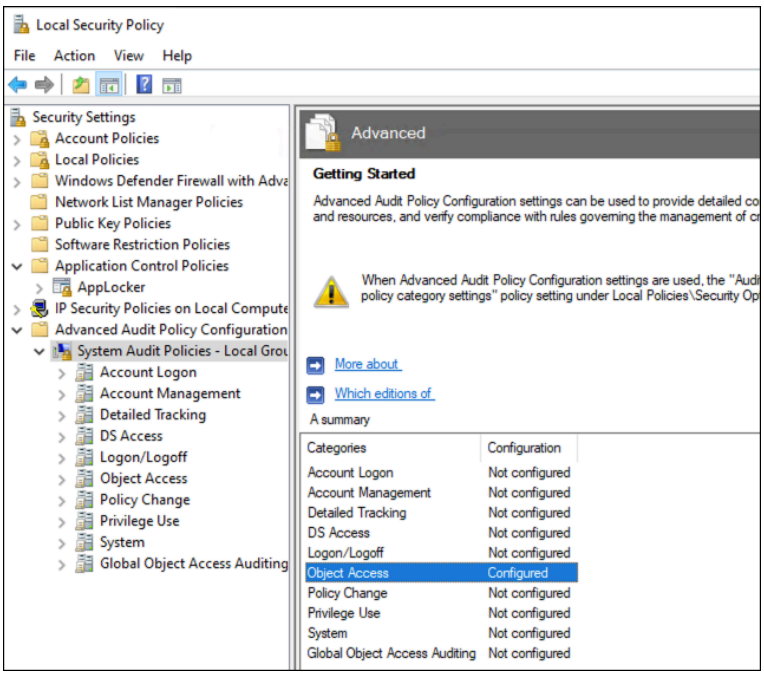
Before you can use Sigma rules related to security log events, you will need to enable them.

Procedure

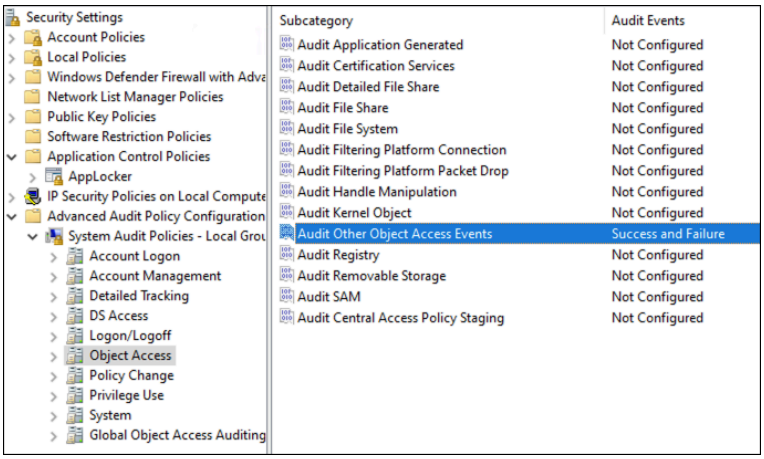
1. Open the Windows **Start** menu and search for the **Local Security Policy** application. Launch the application.



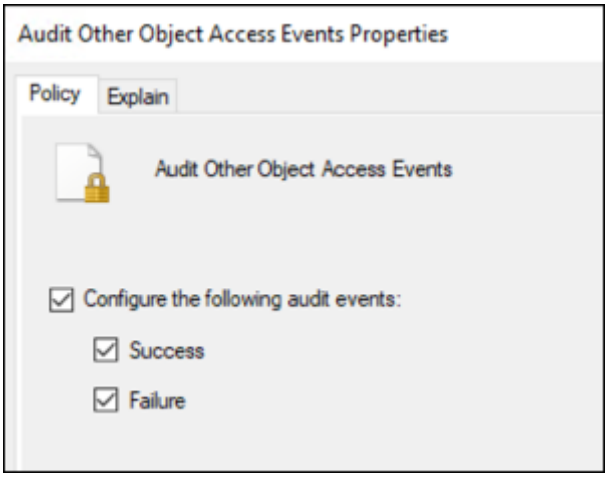
2. Select **Security Settings > System Audit Policies - Local Group**.



3. Select **Object Access > Audit Other Object Access Events**.



4. In the **Policy** tab, select these checkboxes:
   - **Configure the following audit events**
   - **Success**
   - **Failure**



Results

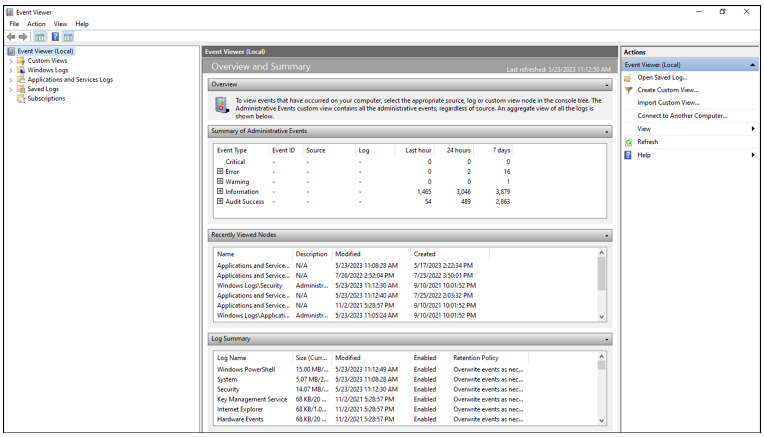
Security log events are now enabled in Windows.

Enable printservice log events

Before you can use Sigma rules related to printservice log events, you will need to enable them.

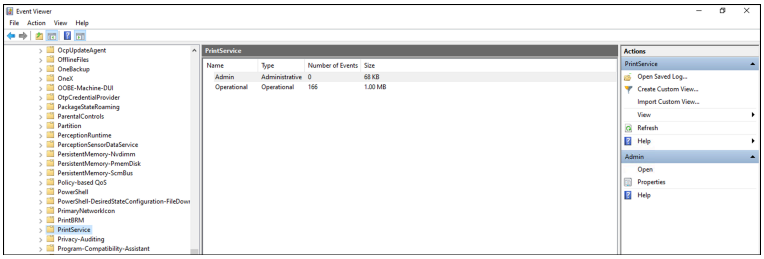
Procedure

1. Open the Windows **Start** menu and search for the **Event Viewer** application. Launch the application.



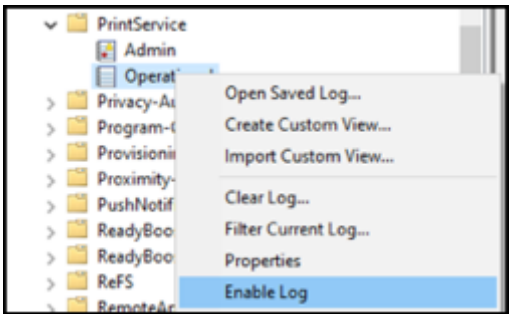
Result: The **Event Viewer** application opens.

2. Select **Windows > PrintService**.



Result: The **PrintService** page opens.

3. Right-click on **Operational** and select **Enable Log**.



Results

Printservice log events are now enabled in Windows.

Install EaseFilter manually

If your Arc installation was updated from an older version, EaseFilter may not have been installed automatically. You can install it manually using the Arc setup wizard.

About this task

EaseFilter is recommended for enhanced threat prevention performance. It is optional: threat prevention can still function if *Sysmon* is installed instead.

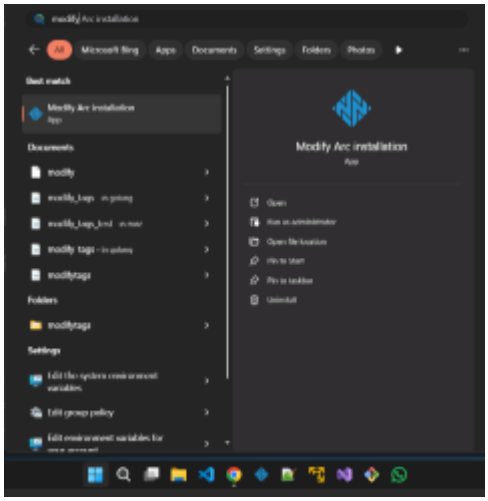
Note:
This procedure applies to Windows installations only.

Procedure

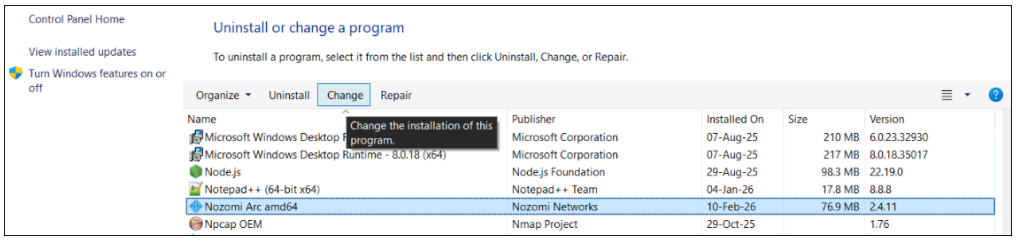
1. Open the Arc setup wizard using one of these methods:

   Choose from:

   - Open the Windows **Start** menu, search for **Modify Arc installation** and launch the result.



   - Open **Control Panel > Programs and Features**, select **Nozomi Arc** from the list of installed programs, and select **Change**.



   Result: The Arc setup wizard opens.

2. Select **Next**.
3. Select **EaseFilter** and complete the installation.

Results

EaseFilter is installed. Restart Arc to make the dependency active.

Local services

It is important to understand the different local services that are necessary for the different operating systems.

Windows

On Windows, you need to enable *WinRM* to deploy Arc automatically through Guardian.

Linux

On Linux, you need the *SSH* service to deploy Arc automatically through Guardian.

macOS

On macOS, you need the *SSH* service to deploy Arc automatically through Guardian.

User permissions

Arc collects a diverse set of information from the hosting machine, and can take control of the network interfaces. To grant full functionality, Administration/root permissions are needed.

To collect system and network data, Arc requires administrative or root permissions on the host system. These permissions enable full control of network interfaces and ensure complete functionality.

Connectivity

Arc connects to Guardian and Vantage through designated protocols and ports.

Arc communicates to Guardian or Vantage through the *hypertext transfer protocol secure (HTTPS)* protocol (*transmission control protocol (TCP)*/443).

Automatic deployment

For automatic deployment, you need:

- *SSH* (*TCP*/22) for Windows, Linux, and macOS
- *server message block (SMB)* (*TCP*/445) for Windows

> **Note:**
> *SMB* is required only for Guardian sensors running versions earlier than *Nozomi Networks Operating System (N2OS)* v25.1.0.

Enable Audit Policy on Microsoft Windows

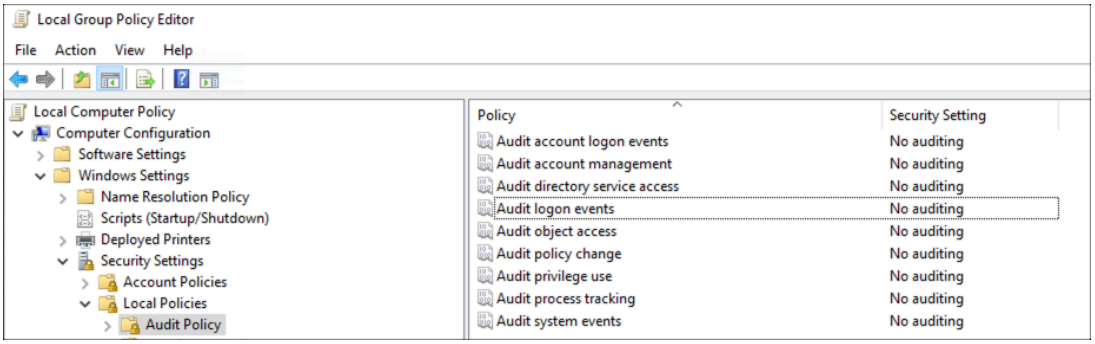
*If you want Arc to detect user logon activities, you must enable **Audit logon events** of Microsoft Windows.*

About this task

If you do not enable Audit Policy, Arc will not detect user logon activities.

Procedure

1. Right-click the Windows icon.
2. Go to **Control Panel > Administrative Tools**
3. Double-click **Local Security Policy**
4. Select **Local Policies > Audit Policy**.



5. Set **Audit logon events** to **Enabled**.

Results

Arc will now detect user logon activities.

Chapter 4. Configuration

Configure an Arc sensor in Guardian

*You can configure an individual Arc sensor in Guardian directly from the **Sensors** details page for the related sensor.*

To configure Arc in Guardian, see **Configure an Arc sensor** in the **Sensors** section of the **Guardian User Guide**.

Configure an Arc sensor in Vantage

*You can configure an individual Arc sensor in Vantage directly from the **Sensors** details page for the related sensor. Arc sensors in Service mode use these settings.*

To configure Arc in Vantage, see **Configure an Arc sensor** in the **Sensors** section of the **Vantage User Guide**.

Local UI

The default method to manage Arc is through the upstream Nozomi Networks product, which applies configurations to all Arc sensors in Service mode. However, it is also possible to manage Arc through a local UI for One-shot and Offline executions.

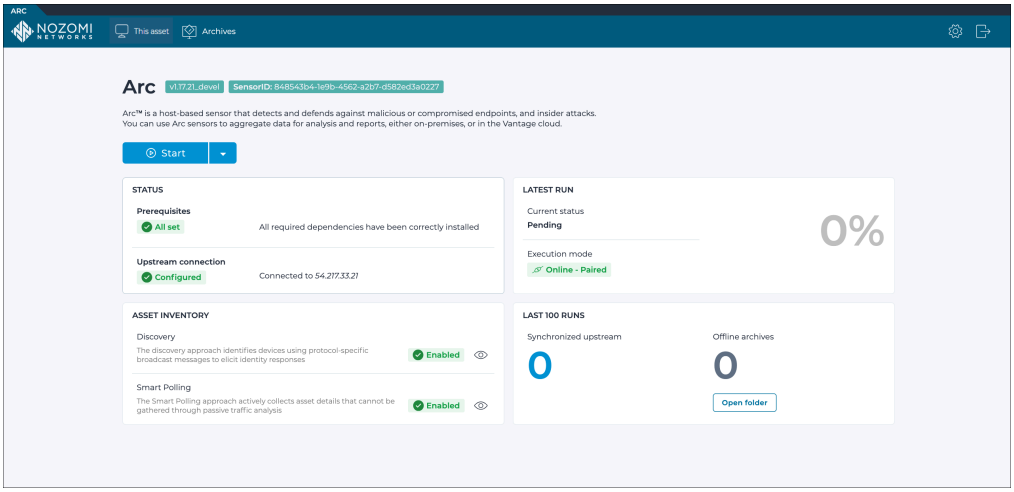


Figure 18. Local UI

The local *UI* has these sections:

Version: This shows the version of Arc that has been deployed.

Sensor ID: This shows the *ID* of the sensor.

Start button: This lets you choose and control a mode. You can choose between:

- Start (in Service mode)
- Start in One-shot mode
- Start in Offline mode

For more details, see Execution modes (on page 135).

- Status (on page 72)
- Latest run (on page 73)
- Asset inventory (on page 74)
- Last 100 runs (on page 75)
- This asset (on page 77)

To access the Offline archives (on page 76) page, you can select the **Archives** icon.

To access the Configuration (on page 62) page, you can select the icon.

To log out, you can select the icon.

The main method to manage Arc is through the system that it connects to. This can be:

- Guardian
- CMC, or
- Vantage

Default settings are set for Arc the moment that it is deployed. However, you can access the local *UI*, which is in the form of a web server, if you need to:

- Check the status of Arc locally
- Change the settings after Arc has been downloaded
- Run it locally during a manual deployment

To get access to the local *UI*, you can:

- Double-click the executable file, or
- From a shell, invoke it from a terminal without a parameter, with a command like `.\arc-windows-amd64.exe`

> **Note:**
> On macOS, before you can open the local *UI*, you might need to enable Arc in **System Preferences > Security & Privacy**.

When you do this, Arc will open a page in your default browser at the address `http://127.0.0.1:4510`

> **Note:**
> If the port 4510 is in use, the first open port above 4510 will be used.

Note:

To open the browser page automatically, you need to consider:

- That the browser will only open when a default browser is installed and configured
- That the double-click action will only work if the application is recognized as an executable. For Linux and macOS, this means that it needs to be associated to the Terminal (shell) application
- For Ubuntu distribution, you can only open the browser when the package `xdg-utils` is installed
- For Linux, the root user cannot open a browser, so you must not open the local *UI* as root
- If the browser does not open for one of the reasons listed above, you can open the browser and page manually

Note:

Closing the browser won't unlock the process. Make sure that you escape from your command line so that you can execute more operations on your executable.

Configuration

*The **Configuration** page lets you define upstream connection settings, execution options, protection preferences, and traffic monitoring parameters for the Arc sensor.*

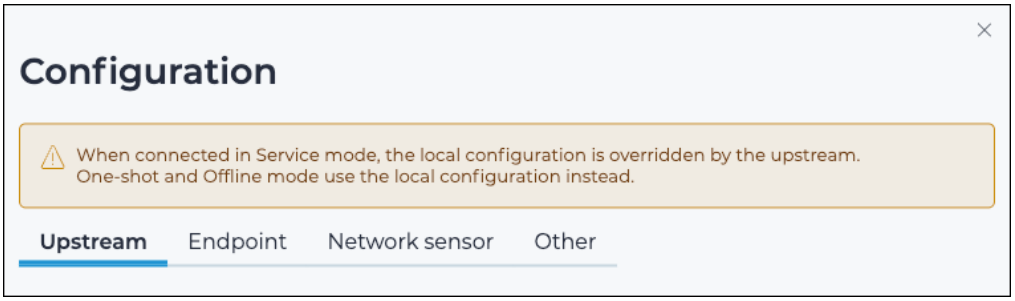


Figure 19. Configuration page

The **Configuration** page has these sections:

- Upstream (on page 63)
- Endpoint (on page 65)
- Network sensor (on page 67)
- Other (on page 70)

Upstream

Configure and verify the connection between the Arc sensor and an upstream endpoint using an IP address and authentication token. The page also displays the sensor ID and optional certificate validation settings.

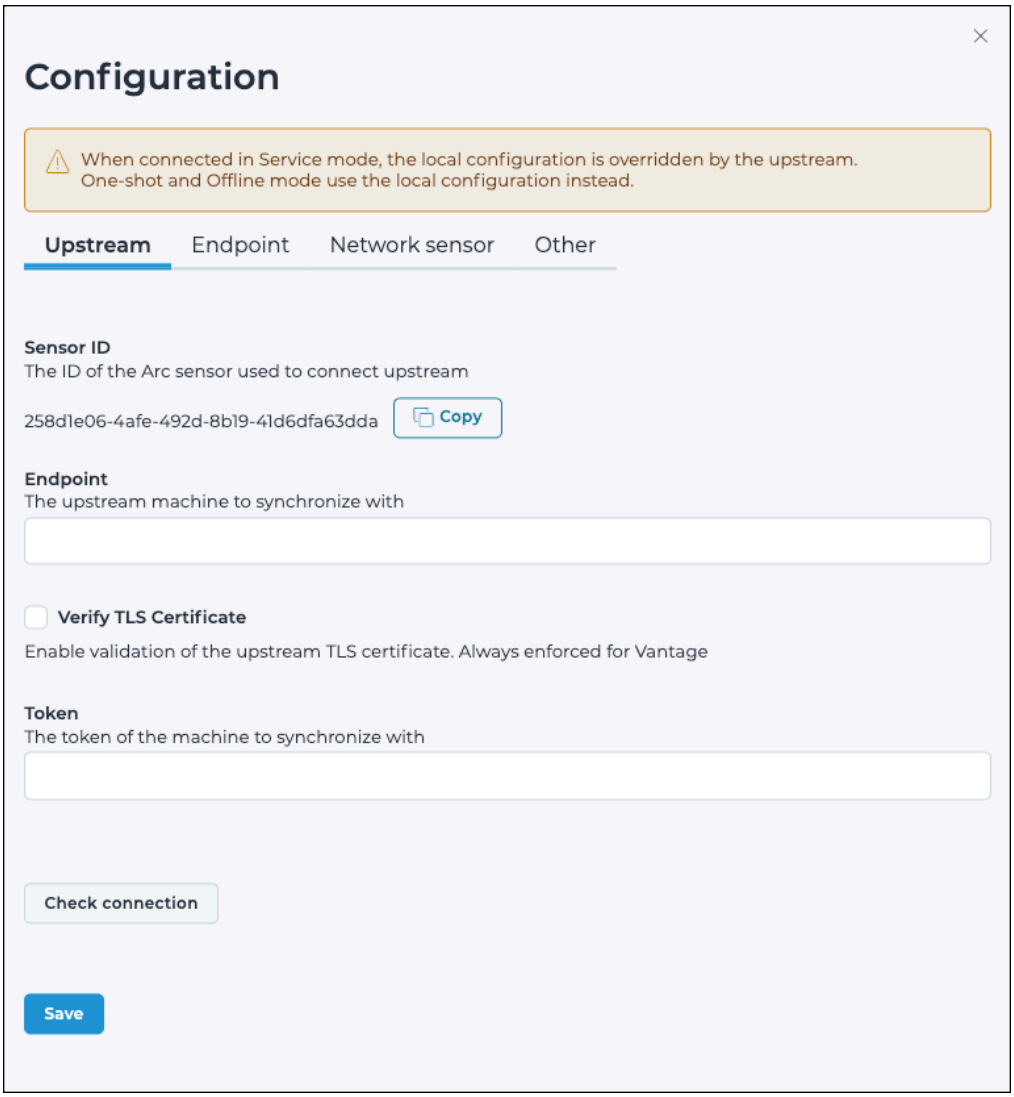


Figure 20. Upstream

Sensor ID

This is the *ID* of the Arc sensor that is used to connect to the upstream sensor.

Endpoint

This shows the *IP* address of the upstream machine that the sensor is connected to.

> **CAUTION:**
> After the endpoint is initially set to a Guardian under the *CMC*, it is not possible to update it to another Guardian under the same *CMC*. You need to reconfigure the endpoint manually. This is best done with the help of Nozomi Networks Customer Support.

Verify TLS Certificate

Select this option to enforce verification of the upstream *TLS* certificate when connecting to Guardian. When using Vantage, *TLS* certificate validation is always enforced, regardless of this setting.

Token

The token Arc needs to authenticate to the Guardian/Vantage endpoint.

Check connection

This button checks if the connection parameters are correct.

Endpoint

Configure detection options for endpoint monitoring in Arc. Features include node point extraction, asset validation using ARP, and malware detection with customizable actions.

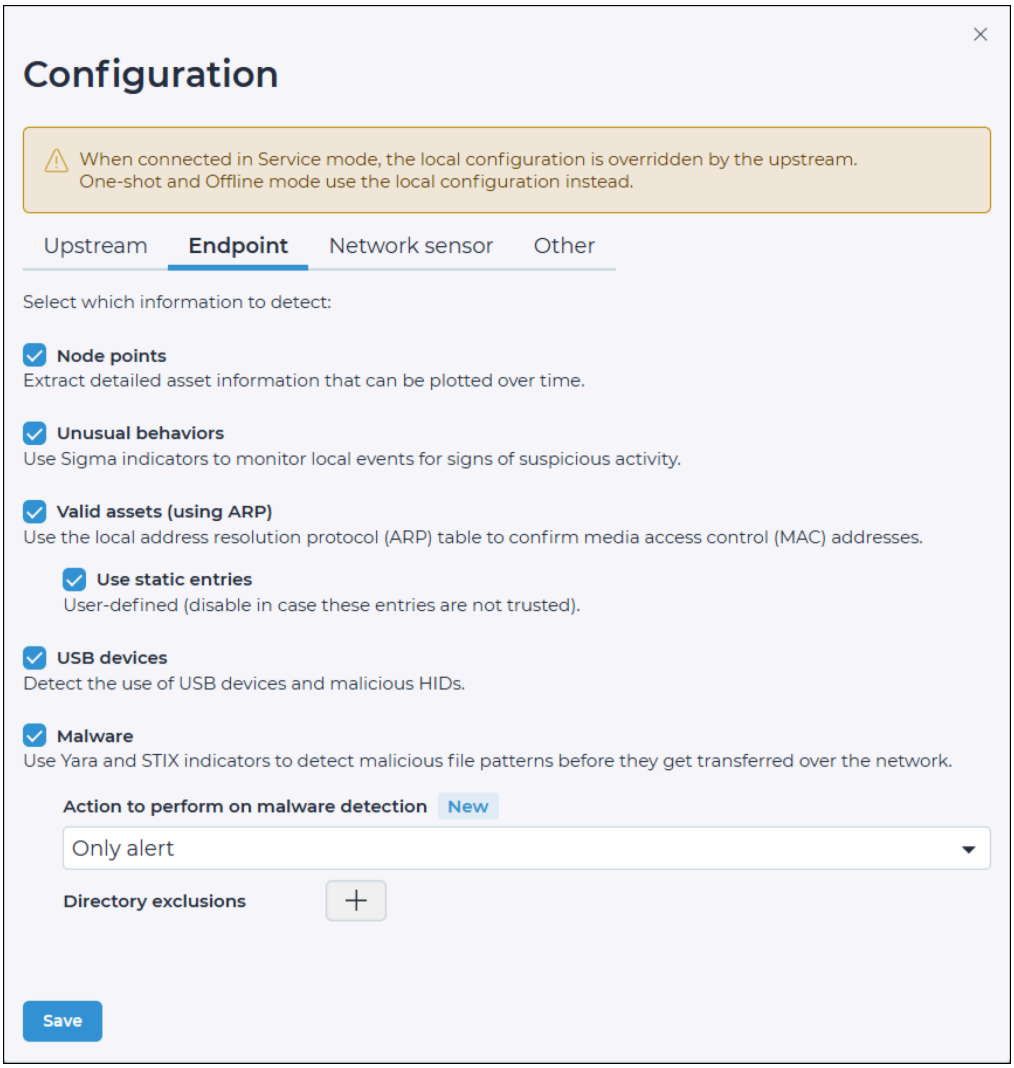


Figure 21. Endpoint

Node points

Enable this option to extract detailed asset information as node points. These can be plotted over time to visualize endpoint activity.

Valid assets (using ARP)

Enable this option to use the local *ARP* table to confirm *MAC* addresses for connected assets.

Enable **Use static entries** to include user-defined static *ARP* table entries in the validation. Only enable this if the static entries are trusted.

Malware (Windows only)

The **Malware** checkbox lets you enable protection mode and select from the **Action to perform on malware detection** dropdown. This lets you set the action that Arc will take when it finds a malicious file.

You can choose from these options:

- **Only alert**: Receive an alert with no further action
- **Quarantine**: Move the malicious file to the `quarantine` folder, which is located in the Arc installation folder
- **Delete**: Immediately delete the malicious file. Once deleted, the files cannot be recovered

You can also use the **Directory exclusions** feature to exclude specific directories from malware scanning. Select + to open a file browser and select a directory. You can add as many directories as needed. Arc skips the selected directories when scanning for malware.

Network sensor

Configure Arc network sensor features such as Discovery, Smart Polling, and traffic monitoring. These options help identify neighboring devices, enrich asset data, and analyze network traffic patterns.

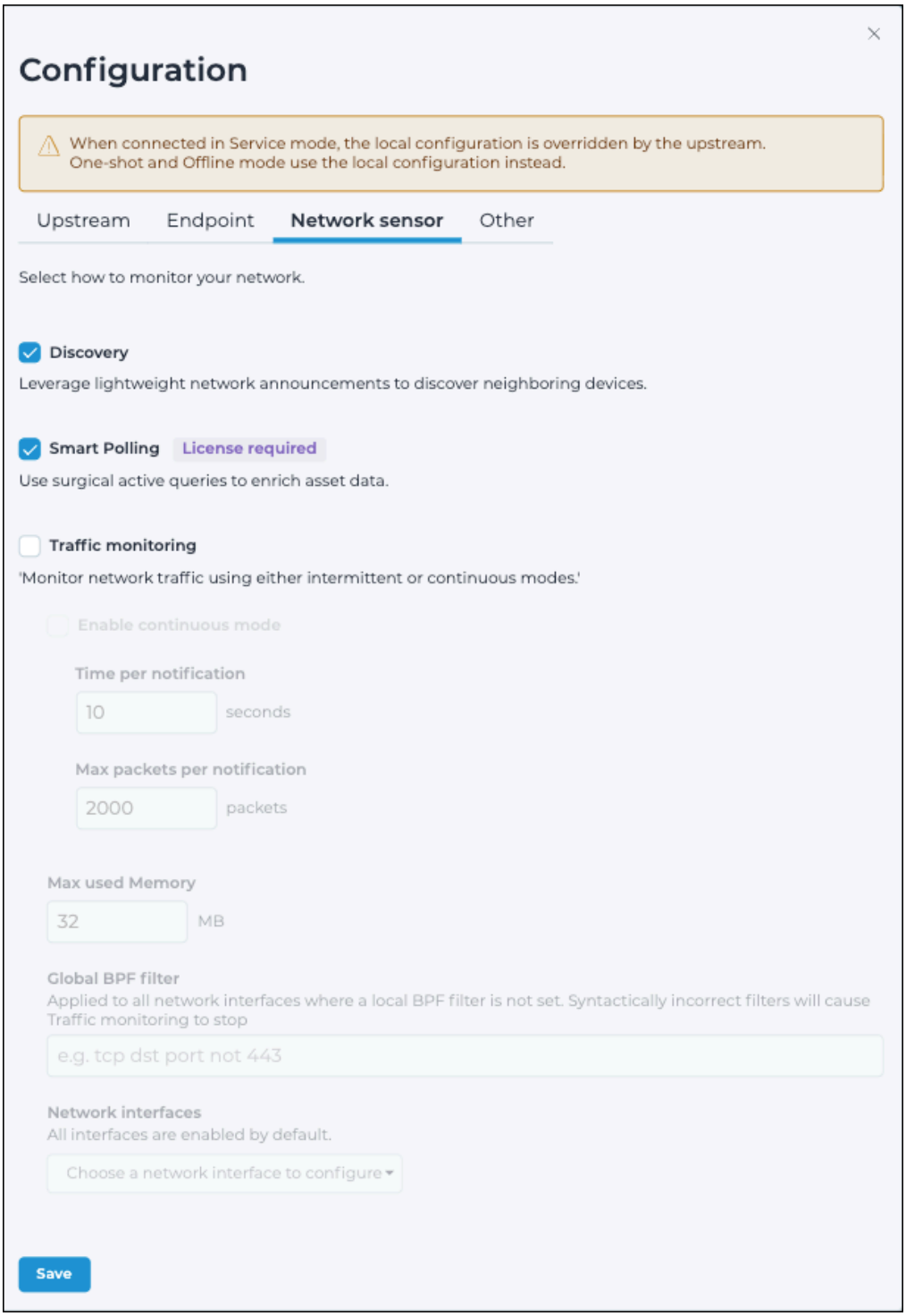


Figure 22. Network sensor

Discovery

When enabled, this sends out unsolicited lightweight network announcements to discover neighboring nodes.

Discovery uses lightweight protocol-specific broadcast messages to identify network devices. These messages trigger a response from the devices, which includes identity information. The process is repeated at predefined intervals. At each interval, the sensor will identify the suitable network interfaces and send broadcast messages through them to discover devices on each subnetwork connected to the sensor.

Smart Polling

This lets you enable/disable the execution of Smart Polling strategies from Arc. When enabled, this sends out Smart Polling queries following remote requests coming from Guardian to poll assets that Arc can reach, or assets that have been identified with Discovery.

> **Note:**
> **Smart Polling** requires that a Smart Polling license is enabled upstream.

To force Smart Polling from a specific Arc sensor, even when Guardian was the first to monitor a node, you can use a *CLI* command such as: `vi node 192.168.1.1 capture_device arc[1e6a174c]` In this example, `192.168.1.1` is an *IP* address of a node you want to poll from a specific Arc sensor. `1e6a174c` are the first eight characters of the Arc sensor *ID* that you want to poll the node with. To find that sensor *ID*, you can select the Arc sensor from the **Sensors** page of your Guardian and read the **ID** field in the right pane. To reset the behavior, you can set the `capture_device` back to the value of the Guardian interface.

Traffic monitoring

When enabled, this checkbox lets you enable/disable traffic monitoring.

Enable continuous mode

This checkbox lets you enable/disable continuous mode. For more details, see **Continuous mode**.

Arc uses two different methods for traffic monitoring:

- Intermittent mode
- Continuous mode

Intermittent mode: This is the default mode, the traffic is monitored, or sniffed, for a duration of 10 seconds at each notify. The purpose of this limitation is to preserve the resources of the host machine, which prevents excessive memory, or *CPU*, spikes. You can configure these options:

Continuous mode: This mode sniffs traffic continuously from the host's network interface controllers. Depending on the amount of sniffed traffic, continuous mode might utilize more *CPU* and memory on the host. As the traffic is processed upstream, the performance of the remote endpoint is also affected. You can configure:

- **Time [s] per notification**
- **Max packets per notification**
- **Max used Memory (MB)**: this value can be tuned to allow more or less traffic buffering in case the traffic to process exceeds the Arc and network capacity to send it out

Global BPF filter

This field lets you set a Global BPF filter to apply to all the network interfaces. Filters that are applied to single interfaces will take precedence over the global one.

Network interface

This dropdown lets you select a network interface to configure. Each network interface can then be enabled, and be tuned with a monitoring filter.

If you add, remove, or edit the network interfaces on the host, Arc does not automatically add it to the list of sniffing interfaces. For example, if you add a new network card, to enable Arc to use it, you should stop Arc, and then start it again.

Other

Set Arc log verbosity, data collection duration, and disk space usage limits for One-shot and Offline modes. These options help manage local resource usage and troubleshoot performance.

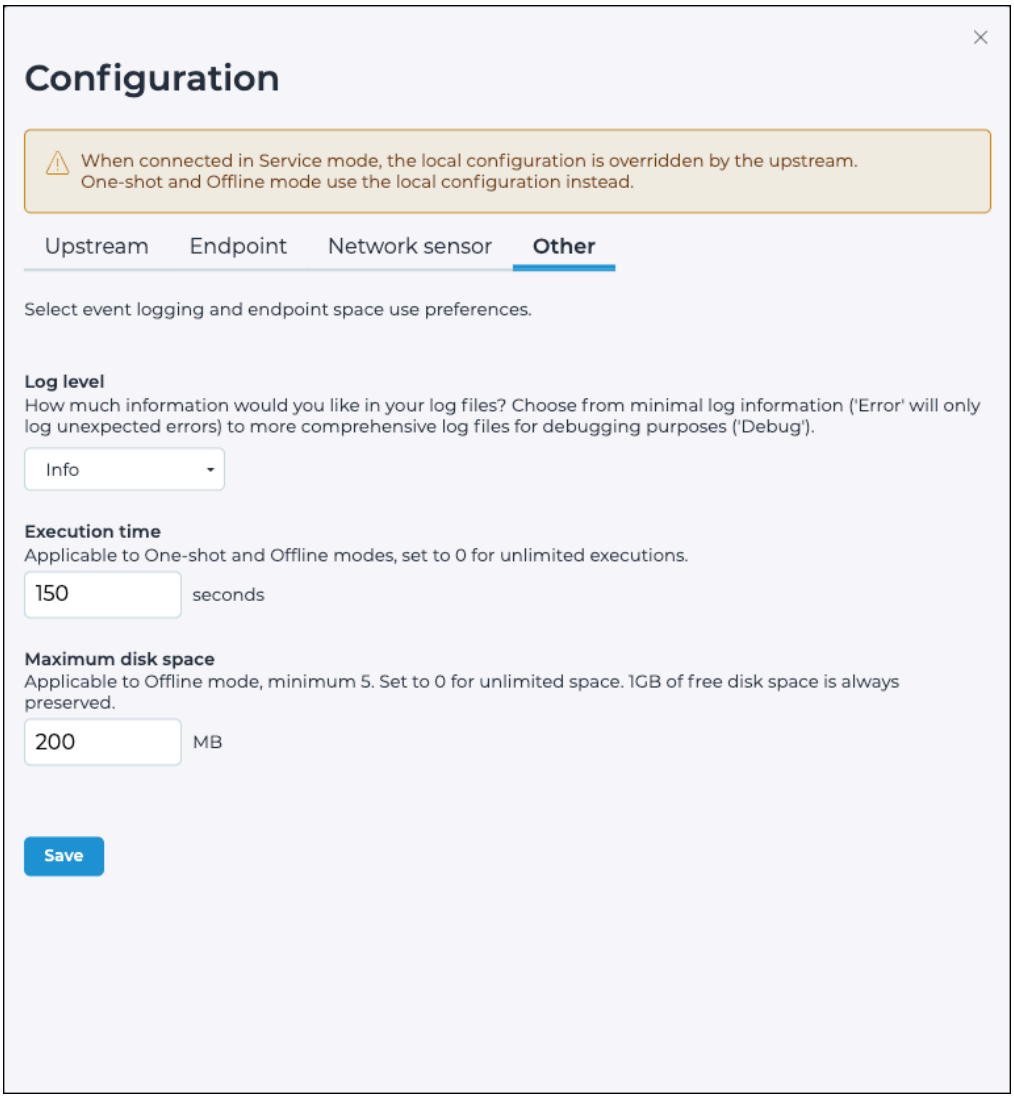


Figure 23. Other

Log level

This dropdown lets you select the verbosity level for the log files. The options are:

- Debug
- Info
- Warning
- Error

The logging system options have an increasing level of verbosity, from the least verbose to the most verbose. Error < Warning < Info < Debug.

- Error: Creates a minimalistic log, only unexpected errors are logged
- Warning: Creates extra errors that might show on some *OS*s, but that are generally considered as acceptable
- Info: Logs relevant successful events, it shows the program's progress (recommended)
- Debug: Logs extra events that are normally useful for debugging purposes. Given its verbosity it is best to activate it only when debugging activities are involved

Execution time

This field lets you set the time that Arc will run to collect data. This is applicable for One-shot and Offline modes.

> **Note:**
> When this is set to 0, the execution time is interpreted as infinite.

Maximum disk space

This field lets you control the maximum amount of disk space in *MB* that will be used for Offline mode.

Status

*The **Status** section shows a list of all the required dependencies for the selected sensor, and the installation status for each dependency.*

Figure 24. Status

Prerequisites

This shows the status of the dependencies. If a dependency is not installed, a warning message will show.

Upstream connection

This shows the status and the *IP* address of the upstream connection.

Latest run

*The **Latest run** section shows the status and mode of the latest run that was executed.*

Figure 25. Latest run

Current status

This shows the current status of the latest run. A percentage value will show.

Execution mode

This shows the current execution mode and connectivity status.

`Not available` - while not running.

`Disconnected` - while in **Offline** mode.

`Sending` - standard behavior, data goes upstream.

`Sending, Buffering` - data is being sent and buffering is happening due to incoming data.

`Sending, Dropping` - data is being sent and dropped because incoming data and buffering limits were reached.

`Disconnected (never connected)` - network was absent before Arc could ever connect to the upstream.

`Buffering (never connected)` - network was absent before Arc could ever connect to the upstream: buffering started due to incoming data.

`Dropping (never connected)` - network was absent before Arc could ever connect to the upstream: dropping started due to reaching buffering limits.

`Disconnected (last connection at dd-mm-yyyy hh:mm:ss)` - network was absent since the indicated time.

`Buffering (last connection at dd-mm-yyyy hh:mm:ss)` - network was absent since the indicated time: buffering started due to incoming data.

`Dropping (last connection at dd-mm-yyyy hh:mm:ss)` - network was absent since the indicated time: dropping started due to incoming data and buffering limits were reached.

Asset inventory

*The **Asset inventory** section displays the status of Discovery and Smart Polling. These features provide visibility into networked devices and asset details.*

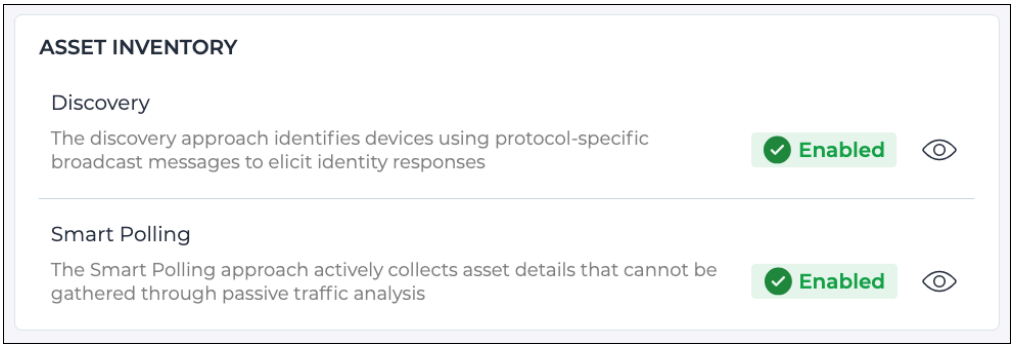


Figure 26. Asset inventory

Discovery

This shows if Discovery mode is enabled or not. The icon shows details of the: Last execution.

Smart Polling

This shows if Smart Polling mode is enabled or not. The icon shows details of the:

- Last execution
- Smart Polling strategies

Last 100 runs

*The **Last 100 runs** section shows the status of the last 100 runs.*

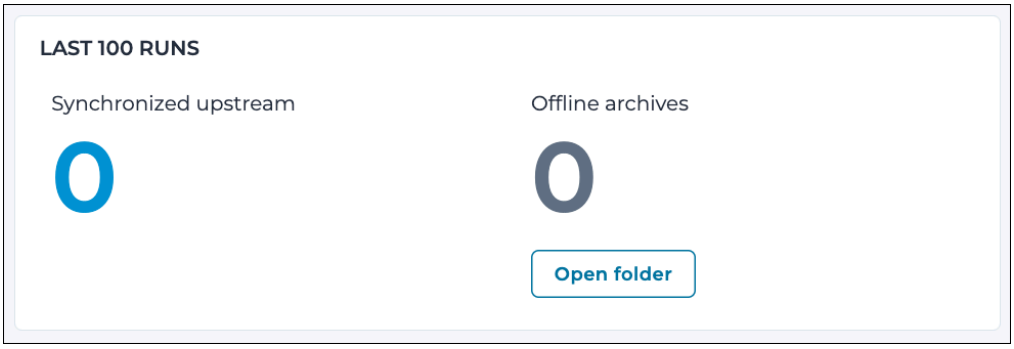


Figure 27. Last 100 runs

Synchronized upstream

The amount of times that Arc has communicated with the upstream since the start of the run.

Offline archives

This shows the amount of offline archives that have been created in the last 100 runs. The **Open folder** button lets you browse and access local archive files using your system's file explorer.

Offline archives

*The **Offline archives** page shows a list of the offline archives created on the host.*

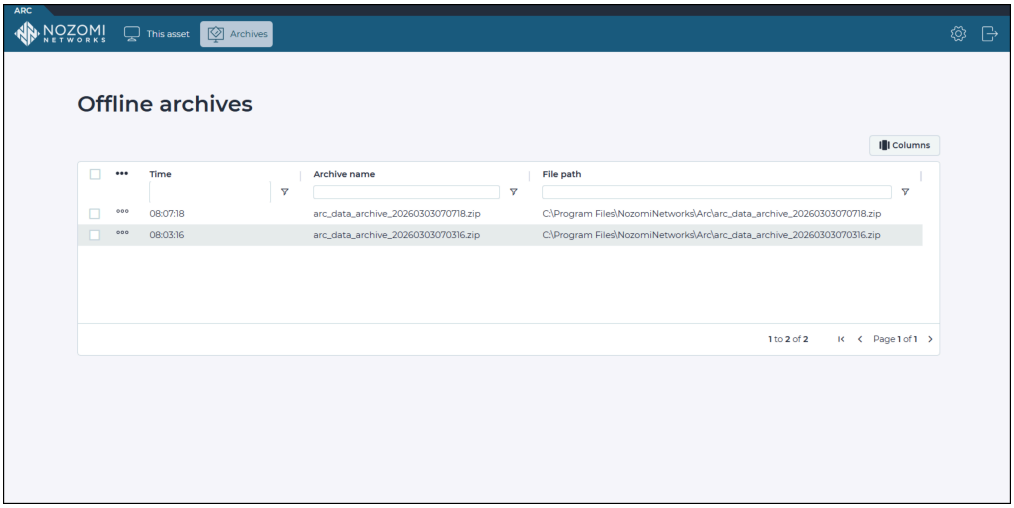


Figure 28. Offline archives page

The **Offline archives** page lists the offline archives available on the host. Each entry includes the following columns:

Time

The date and time at which the archive was created.

Archive name

The file name of the archive.

File path

The full path to the archive file on the host.

This asset

*The **This asset** tab displays information about the host on which Arc is running, across several tabs.*

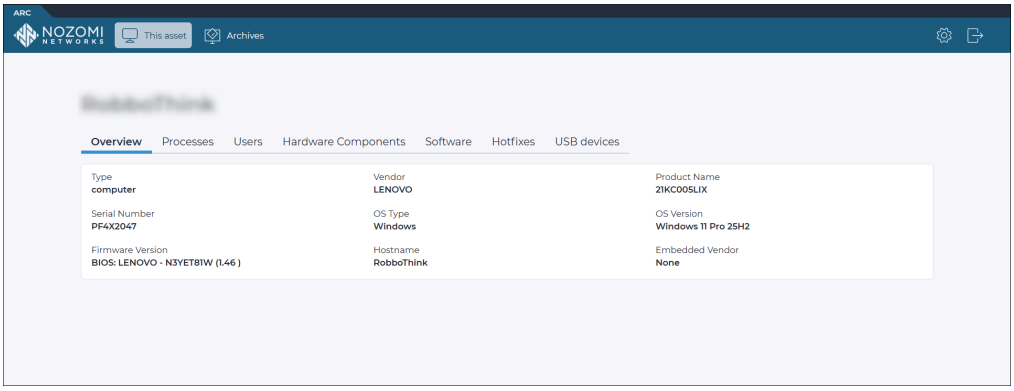


Figure 29. This asset tab

The **This asset** tab provides the following tabs:

- Overview (on page 78)
- Processes (on page 79)
- Users (on page 80)
- Hardware components (on page 81)
- Software (on page 83)
- Hotfixes (on page 84)
- USB devices (on page 86)

Related information

Local UI (on page 59)

Overview

*The **Overview** tab shows identity and system information about the host on which Arc is running.*

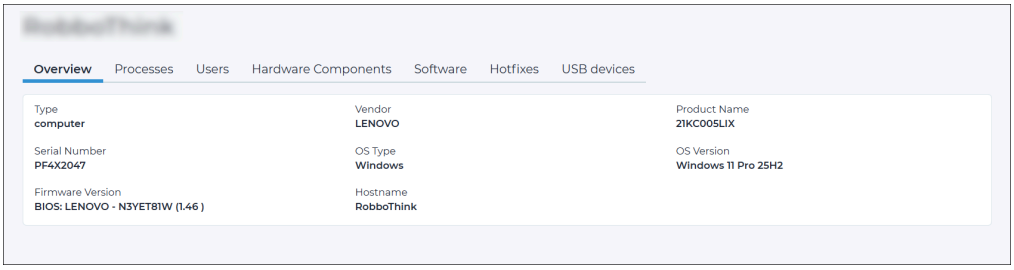


Figure 30. Overview

The **Overview** tab displays identity and system information about the host on which Arc is running. The tab shows the following fields:

Type
The device type, for example, `Computer`.

Vendor
The hardware vendor of the device.

Product name
The product name of the device.

Serial number
The serial number of the device.

OS type
The *OS* running on the host, for example, `Windows`.

OS version
The version of the *OS* running on the host.

Firmware version
The firmware version of the device.

Hostname
The network hostname of the device.

Processes

*The **Processes** tab shows the list of active processes on the host that have open ports.*

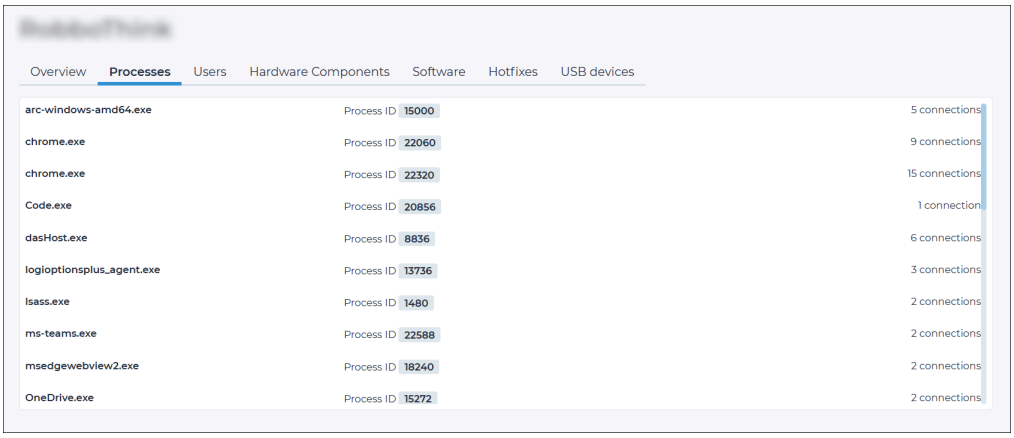


Figure 31. Processes

The **Processes** tab displays the list of active processes on the host that have open ports. The list includes the following columns:

Name

The executable name of the process.

Process ID

The unique numeric identifier assigned to the process by the *OS*.

Connections

The number of active network connections associated with the process.

Users

*The **Users** tab shows the list of users on the host.*

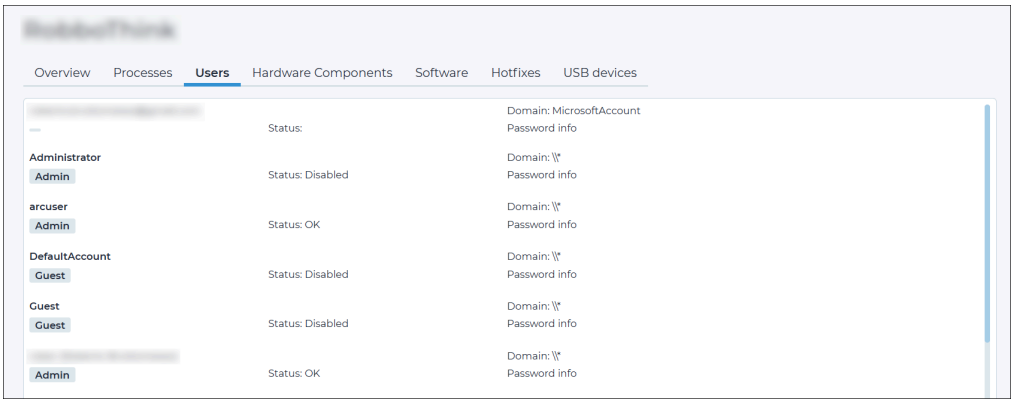


Figure 32. Users

The **Users** tab displays the list of user accounts on the host. The list includes the following columns:

Name
The username of the account, including the full name in parentheses where available.

Description
A brief description of the account.

Account type
The type of the account, for example, a local or domain account.

Domain
The domain to which the account belongs.

Password changeable
Indicates whether the account password can be changed.

Password required
Indicates whether a password is required for the account.

Password expires
Indicates whether the account password expires.

Lockout
Indicates whether the account is locked out.

Status
The current status of the account.

Hardware components

*The **Hardware components** tab shows the list of hardware devices connected to the host.*

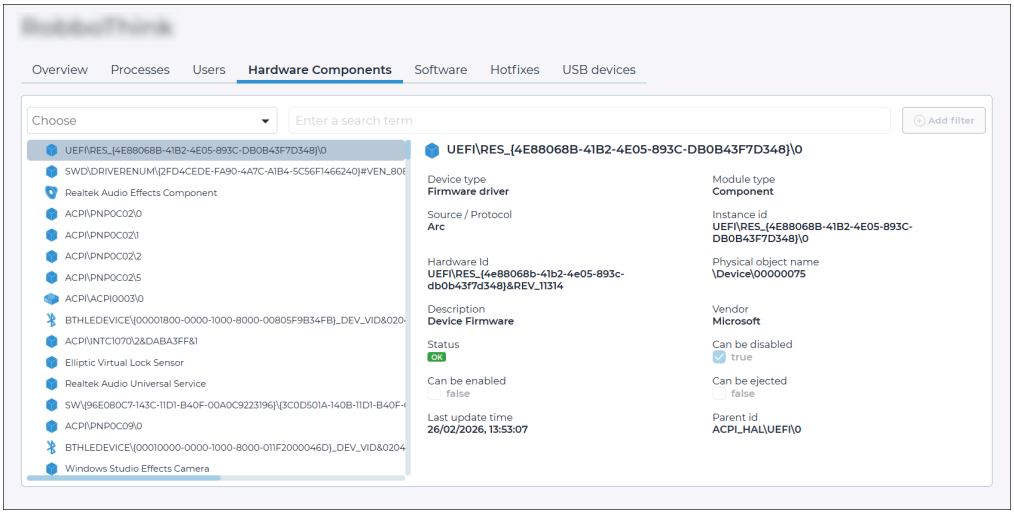


Figure 33. Hardware components

The **Hardware components** tab displays the hardware devices detected on the host. Selecting a device in the list shows its detailed properties in the detail panel, which includes the following fields:

Friendly name
The human-readable name of the device.

Device type
The category of the device, for example, `Disk drives` or `Network adapters`.

Description
A description of the device as reported by the *OS*.

Vendor
The manufacturer of the device.

Hardware ID
The hardware identifier string used by the *OS* to match the device against drivers.

Physical object name
The physical object name of the device in the kernel namespace.

Status
The operational status of the device.

Can be disabled
Indicates whether the device can be disabled.

Can be enabled
Indicates whether the device can be enabled.

Can be ejected
Indicates whether the device can be safely ejected.

Parent ID
The instance identifier of the parent device in the hardware tree.

Location information
A text string identifying the physical location of the device as reported by the bus driver, for example, `Port_#0001.Hub_#0002` for *USB* devices.

Location paths
One or more structured paths that trace the device's position through the Windows device tree, from the *peripheral component interconnect (PCI)* root down to the specific port. For example, `PCIROOT(0)#PCI(1400)#USBROOT(0)#USB(1)`.

Related information

USB devices (on page 86)

Software

*The **Software** tab shows the list of software installed on the host.*

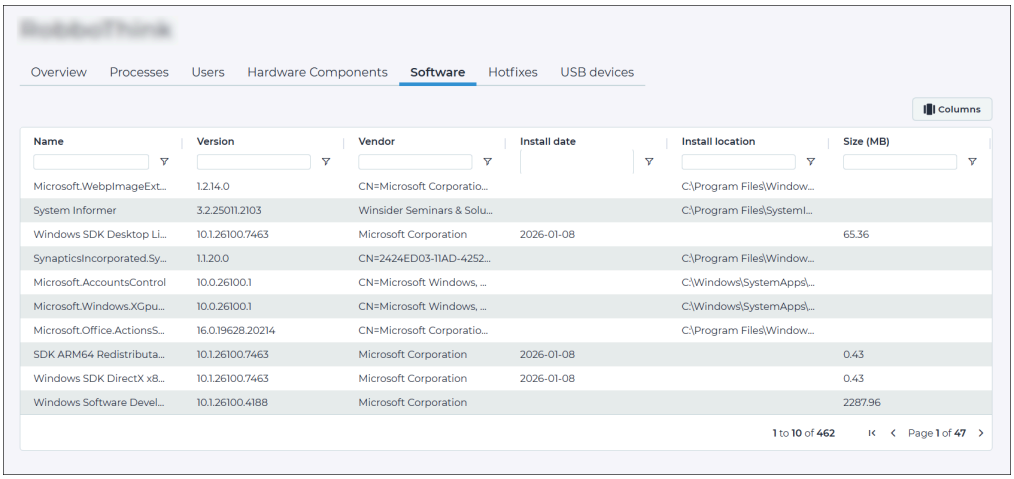


Figure 34. Software

The **Software** tab displays the list of software installed on the host. The list includes the following columns:

Name
The name of the installed software.

Version
The version of the installed software.

Vendor
The vendor or publisher of the software.

Install date
The date on which the software was installed.

Install location
The directory path where the software is installed.

Install source
The source path or medium from which the software was installed.

Size
The disk space used by the installed software, in *MB*.

Related information

Hotfixes (on page 84)

Hotfixes

*The **Hotfixes** tab shows the list of Windows hotfixes installed on the host.*

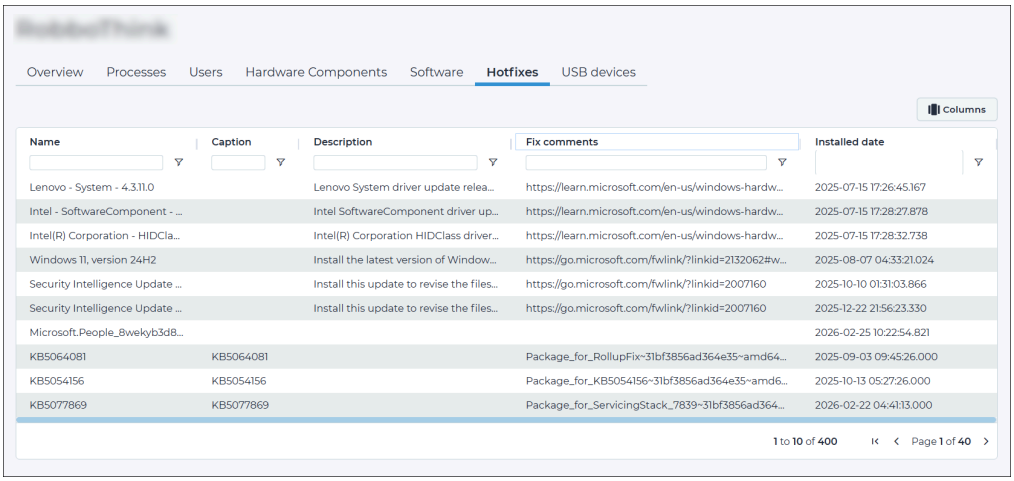


Figure 35. Hotfixes

The **Hotfixes** tab displays the list of Windows hotfixes installed on the host. The list includes the following columns:

Name
The *knowledge base (KB)* article identifier for the hotfix, for example, `KB5017264`.

Computer name
The name of the computer system on which the hotfix is recorded.

Caption
A link to the support article for the hotfix.

Description
The type of update, for example, `Update` or `Security Update`.

Fix comments
Additional notes or comments about the hotfix.

Installed by
The user account that installed the hotfix.

Installed date
The date on which the hotfix was installed.

Status
The current status of the hotfix.

Service pack in effect
The service pack that was in effect when the hotfix was installed.

Related information

Software (on page 83)

USB devices

*The **USB devices** tab shows a tree-like presentation of the USB hardware devices connected to the host.*

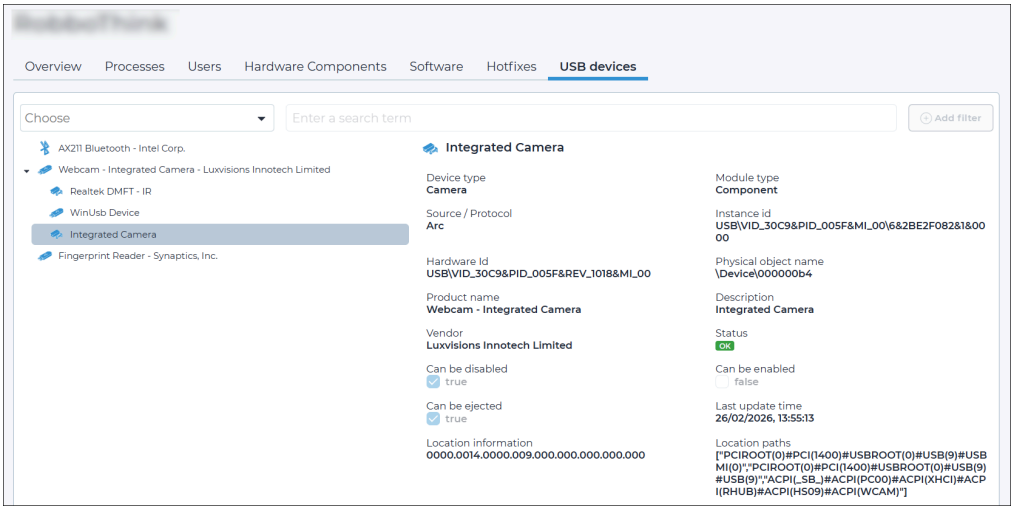


Figure 36. USB devices

The **USB devices** tab displays a hierarchical tree of the *USB* devices connected to the host. Selecting a device in the tree shows its detailed properties in the detail panel, which includes these fields:

Choose
A dropdown for selecting the field to filter the tree by.

Search field
A text field for entering the filter value.

Add filter
Applies the selected field and entered value as a filter to the tree.

Friendly name
The human-readable name of the *USB* device.

Product name
The product name resolved from the *USB* vendor and product ID database.

Vendor
The vendor resolved from the *USB* vendor ID database.

Device type
The category of the USB device, for example, `Universal Serial Bus controllers` or `Human Interface Devices`.

Description
A description of the device as reported by the *OS*.

Physical object name
The physical object name of the device in the kernel namespace.

Hardware ID
The hardware identifier string, including the *USB* vendor ID (VID) and product ID (PID), used by the *OS* to match the device against drivers.

Status
The operational status of the device, for example, `OK`.

Can be disabled
Indicates whether the device can be disabled.

Can be enabled
Indicates whether the device can be enabled.

Can be ejected
Indicates whether the device can be safely ejected.

Parent ID
The instance identifier of the parent device in the hardware tree.

Location information
A text string identifying the port and hub where the device is connected, for example, `Port_#0001.Hub_#0002`.

Location paths
One or more structured paths that trace the device's position through the Windows device tree, from the *PCI* root down to the specific *USB* port. For example, `PCIROOT(0)#PCI(1400)#USBROOT(0)#USB(1)#USB(3)`.

Related information

Hardware components (on page 81)

Open the local UI

*The local UI lets you manage Arc without the use of a parent system software. It gives you access to the **Status** page to monitor the status of Arc executions, and the **Configuration** page to configure Arc executions. You can double-click the executable file to open it, or use the command-line interface (CLI).*

Before you begin

Before you do this procedure, make sure that you have downloaded the correct Arc package for your *OS*.

About this task

You can use either one of the two different methods given below to open the local *UI*.

> **Note:**
> On macOS, before you can open the local *UI*, you might need to enable Arc in **System Preferences > Security & Privacy**.

Procedure

1. Double-click the Arc package that you downloaded for your *OS* and architecture.

   Result: In the Terminal that you used to launch Arc, a one-time password has been generated, and a dialog shows in the web *UI*.

2. Alternatively, open a Terminal and enter a command, without a parameter. For example: `.\arc-windows-amd64.exe`

   Result: In the Terminal that you used to launch Arc, a one-time password has been generated, and a dialog shows in the web *UI*.

3. Copy the password from the Terminal.
4. In the **Enter the password** field, paste the password.
5. Select **Log in**.

Results

The local *UI* is now open.

Shell commands

A list of available shell commands.

Table 7. Shell commands - Linux

Command	Function	Note
`./arc-linux-arm install`	Install Arc as an OS-service, ready to be started. On reboot Arc is automatically started.	1
`./arc-linux-arm start`	Start the Arc service.	
`./arc-linux-arm stop`	Stop the Arc service.	
`./arc-linux-arm restart`	Restart the Arc service.	
`./arc-linux-arm uninstall`	Uninstall Arc.	1
`./arc-linux-arm version`	Return the Arc version.	
`./arc-linux-arm status`	Return the Arc service status.	
`./arc-linux-arm oneshot`	Start Arc in One-shot mode.	
`./arc-linux-arm offline`	Start Arc in Offline mode.	
`./arc-linux-arm`	Launch the local configuration *UI*.	
`./arc-linux-arm install_dependencies`	Trigger the dependencies installation.	1

Table 8. Shell commands - Windows

Command	Function	Note
`.\arc-windows-amd64.exe install`	Install Arc as an OS-service, ready to be started. On reboot Arc is automatically started.	1
`.\arc-windows-amd64.exe start`	Start the Arc service.	
`.\arc-windows-amd64.exe stop`	Stop the Arc service.	
`.\arc-windows-amd64.exe restart`	Restart the Arc service.	
`.\arc-windows-amd64.exe uninstall`	Uninstall Arc.	1
`.\arc-windows-amd64.exe version`	Return the Arc version.	
`.\arc-windows-amd64.exe status`	Return the Arc service status.	
`.\arc-windows-amd64.exe oneshot`	Start Arc in One-shot mode.	
`.\arc-windows-amd64.exe offline`	Start Arc in Offline mode.	
`.\arc-windows-amd64.exe`	Launch the local configuration *UI*.	
`.\arc-windows-amd64.exe install_dependencies`	Trigger the dependencies installation.	1

Table 9. Shell commands - macOS

Command	Function	Note
`./arc-darwin-amd64 install`	Install Arc as an OS-service, ready to be started. On reboot Arc is automatically started.	1
`./arc-darwin-amd64 start`	Start the Arc service.	
`./arc-darwin-amd64 stop`	Stop the Arc service.	
`./arc-darwin-amd64 restart`	Restart the Arc service.	
`./arc-darwin-amd64 uninstall`	Uninstall Arc.	1
`./arc-darwin-amd64 version`	Return the Arc version.	
`./arc-darwin-amd64 status`	Return the Arc service status.	
`./arc-darwin-amd64 oneshot`	Start Arc in One-shot mode.	
`./arc-darwin-amd64 offline`	Start Arc in Offline mode.	
`./arc-darwin-amd64`	Launch the local configuration *UI*.	
`./arc-darwin-amd64 install_dependencies`	Trigger the dependencies installation.	1

Chapter 5. Deployment

Deployment is defined as the process which results in one Arc sensor, or multiple Arc sensors, running on the chosen target machine(s).

Preparation

The preparation steps that you need to do will depend on the deployment option that you choose. The different options are:

- A deployment-ready Guardian
- Downloading the Arc package from the Nozomi Networks support portal
- Downloading the Arc package from Vantage

MDM deployment

When *MDM* software is in use in the applicable network, you can use it to automatically deploy Arc.

To use this method, you can use software such as:

- Microsoft Intune
- Microsoft Endpoint Configuration Manager

When you use this method to deploy Arc, you need to:

- Download the applicable Arc package
- Compile the *Microsoft Software Installer (MSI)* file
- Deploy the *MSI* file

Manual deployment

When you deploy Arc manually, you need to download the applicable Arc package first.

Manual deployment to run Service mode on Windows

If you want to run Arc in Service mode on Windows, you need to choose the provided *MSI* package. You can install and uninstall the software with the *MSI* package. You can also uninstall the application from the **Control Panel**. This can be run from any location.

Manual deployment for all other cases

1. Put the applicable Arc package on the target machine.
2. Run the Arc package locally.

Automatic deployment with Guardian

When connectivity to the target machine and their credentials can be granted to one or multiple Guardian, this can be also used to automatically deploy Arc.

Updates

Starting from v1.7.0, the Arc update mechanism no longer supports the update of an Arc that is installed outside of: `C:\Program Files\NozomiNetworks\Arc`

If you have Arc sensors that have previously been manually deployed outside of this path, you must manually uninstall them, and install them again.

Antivirus software

Arc is security software. It does not contain malicious behavior. If your antivirus software detects Arc as malware, treat it as a false positive. If this happens, please contact our Customer Support team.

Automatically

Deploy Arc automatically from Guardian on Windows

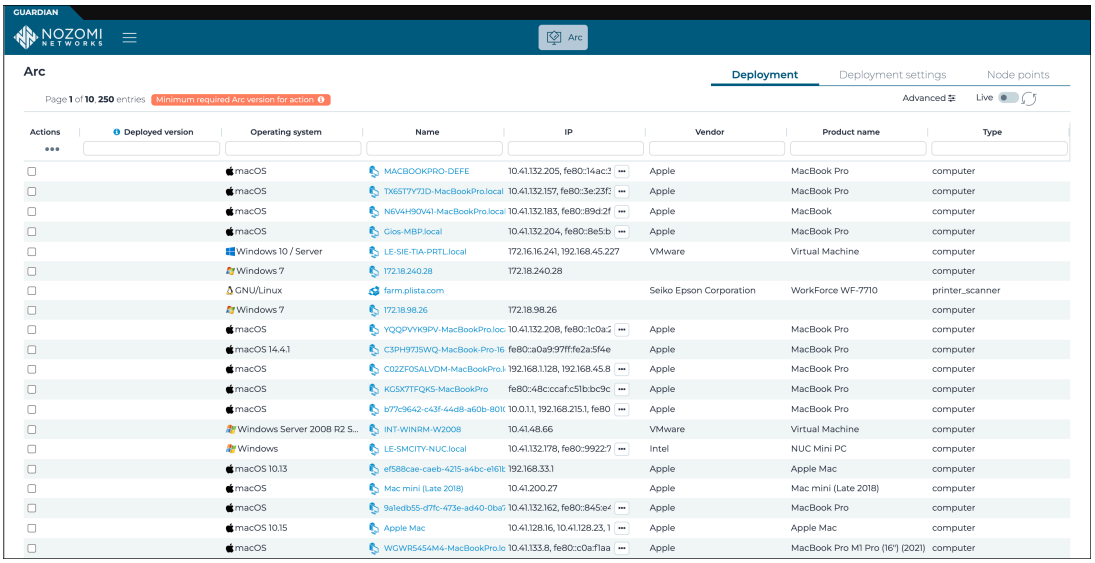
You can use the Windows Remote Management (WinRM) or Secure Shell (SSH) services to deploy Arc at scale for target machines that are reachable from Guardian.

Before you begin

- Credentials of the target machines are stored into the Credentials Manager
- An Administrator user is granted to access the target machine and to be used by Guardian in the process
- If you want to deploy with *WinRM*:
  - *WinRM* is enabled locally and accepting incoming connections from the Guardian machine(s) used for deployment
  - *SMB* is enabled locally and accepting incoming connections from the Guardian machine(s) used for deployment
  - Connectivity is granted for the services above, namely *TCP*/5985 and *TCP*/445
- If you want to deploy with *SSH* (Windows):
  - *SSH* is enabled locally and accepting incoming connections from the Guardian machine(s) used for deployment
  - Connectivity is granted for the services above, namely *TCP*/22

Procedure

1. In the Web UI, go to **Arc > Deployment**.



Result: A list of machines that are suitable for Arc deployment shows.

2. Select **Deployment settings** and configure the sensors to be deployed. For more details, see Local UI (on page 59).

3. Select the machine(s) to deploy Arc on, and choose from the available Arc deployment options.
4. If Guardian has not yet identified an *OS*, you can use the **Advanced options** to manually specify the deployment scope via a query, and the deployment strategy.

Deploy Arc automatically from Guardian on Linux/macOS

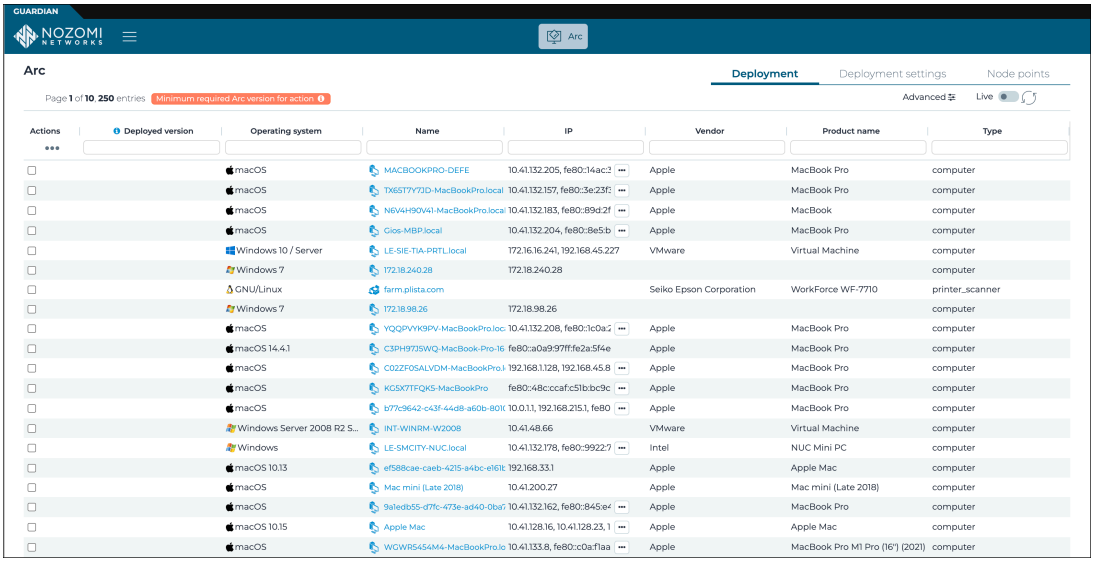
You can use Secure Shell (SSH) services to deploy Arc at scale for target machines that are reachable from Guardian.

Before you begin

- Credentials of the target machines are stored into the Credentials Manager
- An Administrator user is granted to access the target machine and to be used by Guardian in the process
- To deploy with *SSH* (Linux/macOS):
  - *SSH* is enabled locally and accepting incoming connections from the Guardian machine(s) used for deployment
  - Connectivity is granted for the services above, namely *TCP*/22

Procedure

1. In the Web UI, go to **Arc > Deployment**.



   Result: A list of machines that are suitable for Arc deployment shows.

2. Select **Deployment settings** and configure the sensors to be deployed. For more details, see Local UI (on page 59).
3. Select the machine(s) to deploy Arc on, and choose from the available Arc deployment options.
4. If Guardian has not yet identified an *OS*, you can use the **Advanced options** to manually specify the deployment scope via a query, and the deployment strategy.

Deploy Arc with MDM (Windows)

Download an Arc package

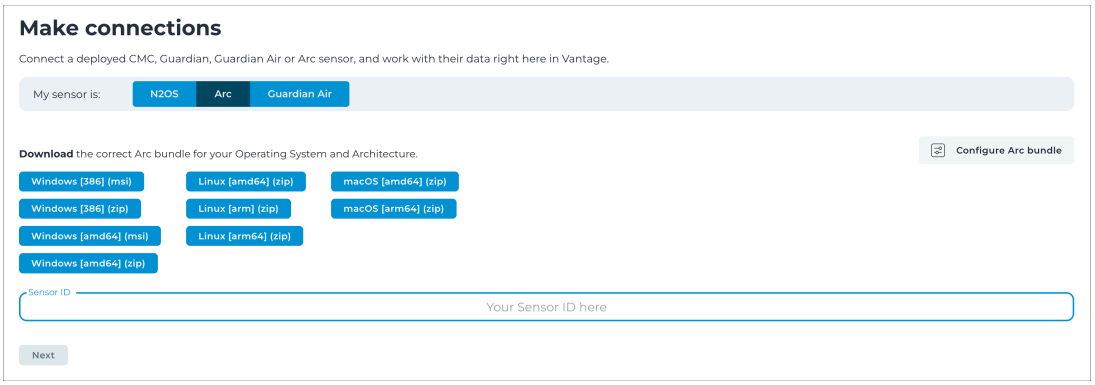
Download an Arc package from Vantage

Before you can deploy Arc manually, or through a mobile device management (MDM) system, you must download the correct package for your operating system (OS). You can do that from Vantage.

Procedure

1. In the navigation bar, go to **Sensors**.
2. In the top-right corner of the Web UI, click **Add new**.

   Result: The **Make connections** page opens.



3. In the **My sensor is:** section, click **Arc**.
4. Download the applicable package for your *OS* and architecture.

   Result: The package downloads to your computer.

Download an Arc package from Guardian

Before you can deploy Arc manually, or through a mobile device management (MDM) system, you must download the correct package for your operating system (OS). You can do that from Guardian.

Procedure

1. In Guardian, go to **Sensors > Download Arc**.

macOS - amd64 (Installer)
macOS - amd64 (Archive)
macOS - arm64 (Installer)
macOS - arm64 (Archive)
Linux - amd64 (Archive)
Linux - arm (Archive)
Linux - arm64 (Archive)
Windows 7+ - 386 (Installer)
Windows 7+ - 386 (Archive)
Windows 7+ - amd64 (Installer)
Windows 7+ - amd64 (Archive)
Windows 10+ - 386 (Installer)
Windows 10+ - 386 (Archive)
Windows 10+ - amd64 (Installer)
Windows 10+ - amd64 (Archive)

2. Download the applicable package for your *OS* and architecture.

> **Note:**
> When available, the *MSI* file is a user friendly option to install Arc. The archive file for Windows is still available to use for offline executions without installing Arc.

> **Note:**
> Two separate packages are available for Windows.
> - For Windows 7 or later, but < 10, download the Windows7+ package
> - For Windows 10 or later, download the Windows10+ package

Result: The package downloads to your computer.

Download an Arc package from the Nozomi Networks support portal

Before you can deploy Arc manually, or through a mobile device management (MDM) system, you must download the correct package for your operating system (OS). You can do this from the Nozomi Networks support portal.

Procedure

1. Go to https://nozominetworks.my.site.com/support/s/article/Arc-Release-Package
2. Download the applicable package for your *OS* and architecture.

   Result: The package downloads to your computer.

Deploy Arc to run in Service mode

MSI file configuration from a shell

A description of how to execute a Microsoft Software Installer (MSI) from a shell.

The Microsoft Documentation describes how to execute an *MSI* from a shell:

- Install Arc: `msiexec /i "arc.windows.amd64.msi" /L*v "installer.log"`
- Uninstall Arc: `msiexec /x "arc.windows.amd64.msi" /L*v "installer.log"`

To execute `msiexec` from PowerShell preserving arguments, use `--%`. For example: `msiexec --% /i "arc.windows.amd64.msi" /L*v "installer.log"`

You can pass custom arguments to the setup installer by setting the `ARGS` property. For example: `msiexec /i "arc.windows.amd64.msi" /L*v "installer.log" ARGS="--mode=silent"`

MSI installer parameters

The following table describes all supported parameters for the Arc *MSI* installer.

Parameter	Valid values	Default	Description
`--mode`	`gui`, `silent`	`gui`	Select the setup mode.
`--acceptLicense`	`true`, `false`	`false`	Set the license as accepted. Mandatory for silent mode.
`--endpoint`	endpoint address	—	Set the connection endpoint.
`--token`	token string	—	Set the connection token.
`--verifyCertificate`	`true`, `false`	`false`	Enable validation of the upstream *TLS* certificate. Always enforced for Vantage. Uses the value from the `arc.json` configuration file if not set.
`--installDeps`	`all`, `easefilter`, `npcap`, `pscorescriptblocklogging`, `psscriptblocklogging`, `usbpcap`, `sysmon`	`all`	Set the list of dependencies to install. Separate multiple values with a comma. Set `all` to install all dependencies.

Parameter	Valid values	Default	Description
`--uninstallDeps`	`all`, `easefilter`, `npcap`, `pscorescriptblocklogging`, `psscriptblocklogging`, `usbpcap`, `sysmon`	`''` (empty)	Set the list of dependencies to uninstall. Separate multiple values with a comma. Set `all` to uninstall all dependencies.
`--sysmonPath`	file path	—	Set the path to the `sysmon.zip` installer archive. If not set, Sysmon is downloaded from Guardian, Vantage, or Microsoft.
`--rebootIfRequired`	`true`, `false`	`true`	Reboot the system automatically if required.
`--createShortcutIcon`	`true`, `false`	`true`	Create a desktop shortcut icon.
`--startService`	`true`, `false`	`true`	Start the Arc service automatically after installation.
`--configFile`	file path	—	Specify an `arc.json` file to use for configuration.
`--removeLogs`	`true`, `false`	—	Remove Arc logs during cleanup.
`--preserveConfig`	`true`, `false`	—	Preserve the `arc.json` configuration during uninstallation.

Deploy Arc with Microsoft Intune

Upload an Arc package to Microsoft Intune

If you manage your network with mobile device management (MDM), you can use it to deploy Arc.

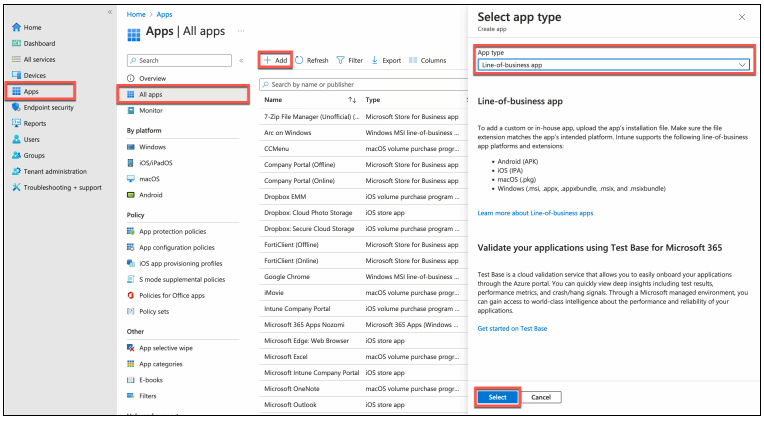
Before you begin

Before you do this procedure, make sure that you have:

- Downloaded the correct Arc package for your *OS*
- Compiled the *MSI* file

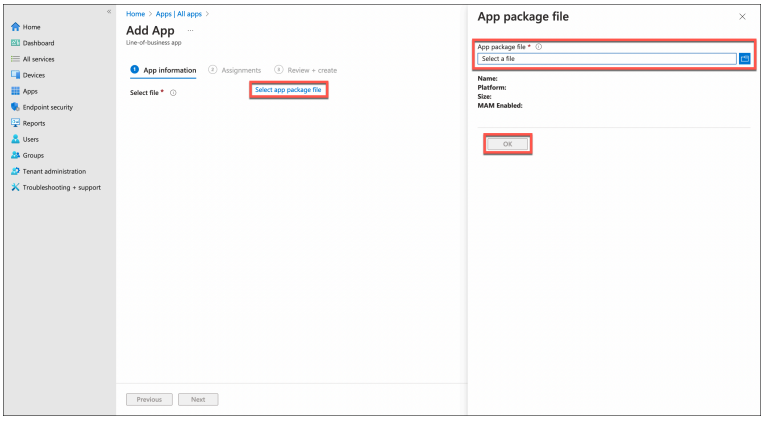
Procedure

1. In Microsoft Intune, go to **Apps > All apps**.
2. Select **Add**.
3. In the **Select app type** section on the right side, open the **App type** dropdown. Select **Line-of-business app**.
4. Select the **Select** button.



5. In the **Add App** section, select **Select app package file.**
6. In the **App package file** section on the right side, open the **App package file** dropdown. Select the Arc package file from the folder on your computer.

7. Select **OK**.



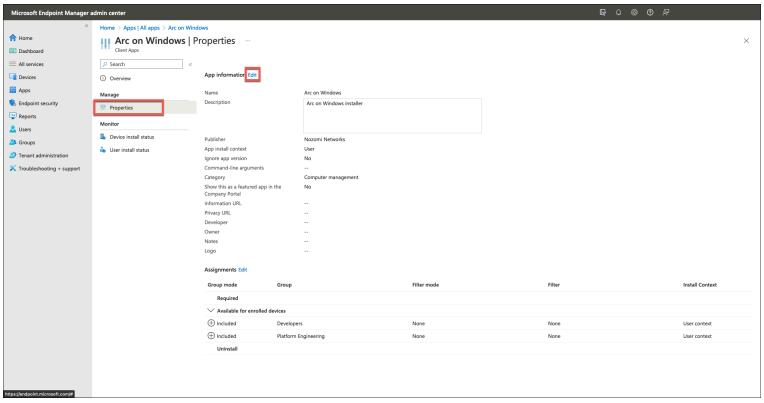
8. Go to **Apps > All apps**.
9. In the search bar on the right side, enter the first part of the name of the package that you just uploaded, and select **Enter**.
10. Select the name of the correct file.

    Result: The details for the app show.

11. Select **Properties**.

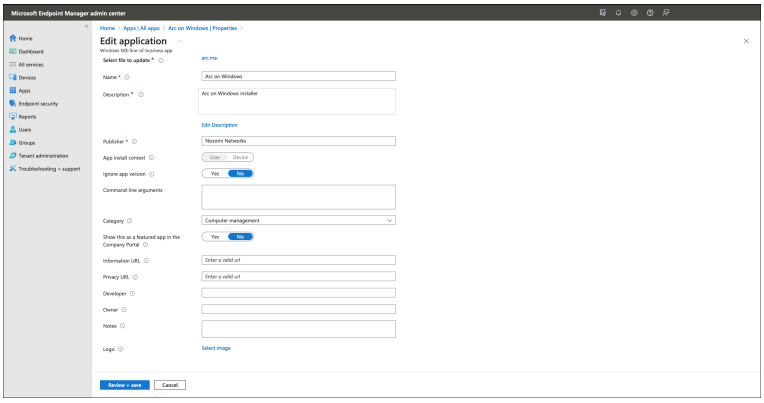
    Result: The information for the app shows on the right.

12. To the right of the **App information** title, select **Edit**.

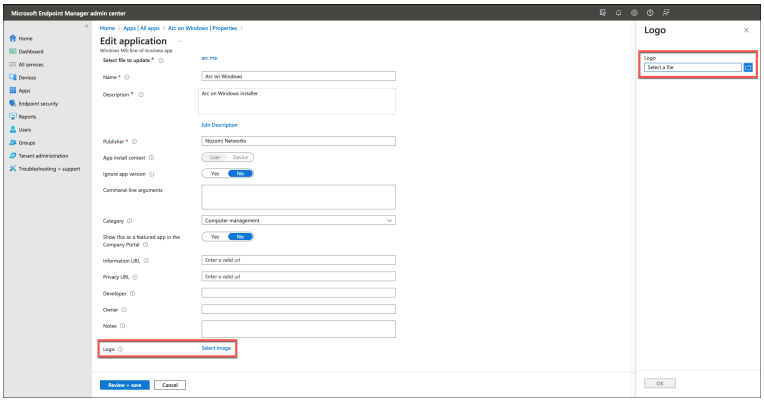


13. Enter the information as necessary.

> **Note:**
> Because this information will show in the system later, Nozomi Networks recommends that you enter as much useful information as possible.



14. If you want to assign a logo to the Arc app, go to the right of **Logo**, and select **Select image**.



15. In the **Logo** section on the right side, open the **Select a file** dropdown, and select the applicable file.
16. When you have added all the information, select **Review + save**.

Assign an Arc package with Microsoft Intune

Once you have uploaded the Arc package, you need to assign it to designated groups or computers for deployment.

Before you begin

Before you can assign an Arc package, you must Upload an Arc package to Microsoft Intune (on page 104).

About this task

You can assign the Arc package with one of these options:

- **Required** - Installed automatically on enrolled devices.
- **Available for enrolled devices** - Made available in the **Company Portal** app for users to optionally install.

Procedure

1. Go to **Apps > All apps**.
2. Search for the Arc on Windows application.

   Note:
   The name will depend on what was assigned previously.

3. Select **Properties**.
4. To the right of the **Assignments** title, select **Edit**.

   Result: The **Assignments** tab shows.

5. Select the **Required** section, and/or the **Available for enrolled devices** section as applicable.
6. Select the group, users or devices, as necessary.

   Note:
   You can select from:
   - **Add group**
   - **Add all users**
   - **Add all devices** (**Required** section only)

7. Select **Review + save**.

   Result: If you selected the **Required** option, no further action is necessary.

8. If you selected the **Available for enrolled devices** option, continue with the steps that follow.
9. In the *OS* of your device, open the local application **Company Portal**.

10. In the search bar, enter the name of the Arc package and select **Enter**.

    Result: The Arc package shows.

11. Select the **Install** button.

    Result: The Arc package is now installed.

Deploy Arc with Microsoft Endpoint Configuration Manager

If you manage your network with Microsoft Endpoint Manager, you can use it to deploy Arc.

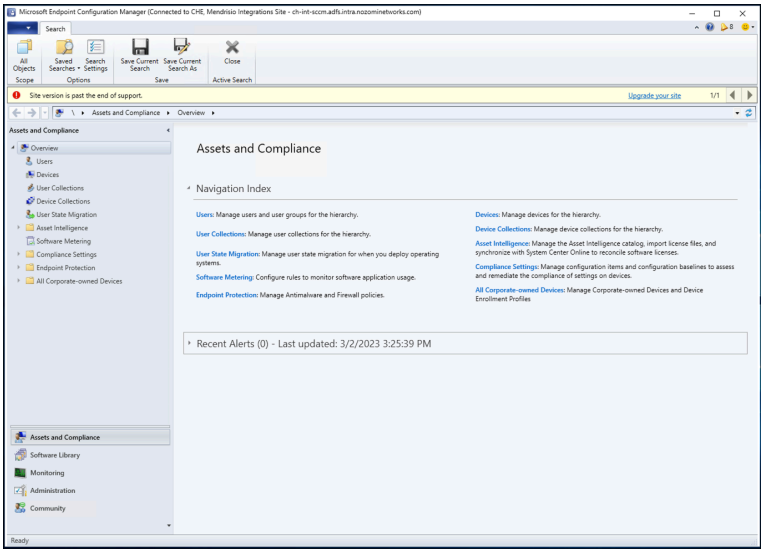
Before you begin

Before you do this procedure, make sure that you have:

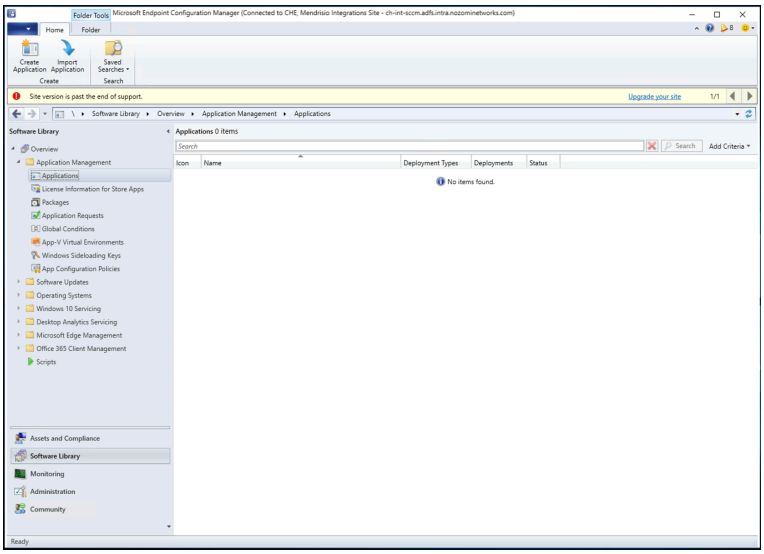
- Downloaded the correct Arc package for your *OS*
- Compiled the *MSI* file

Procedure

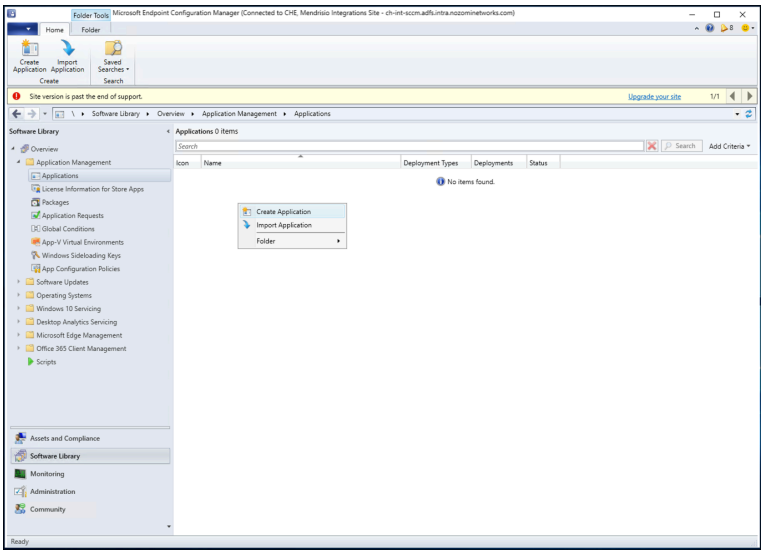
1. Open **Microsoft Endpoint Configuration Manager**.



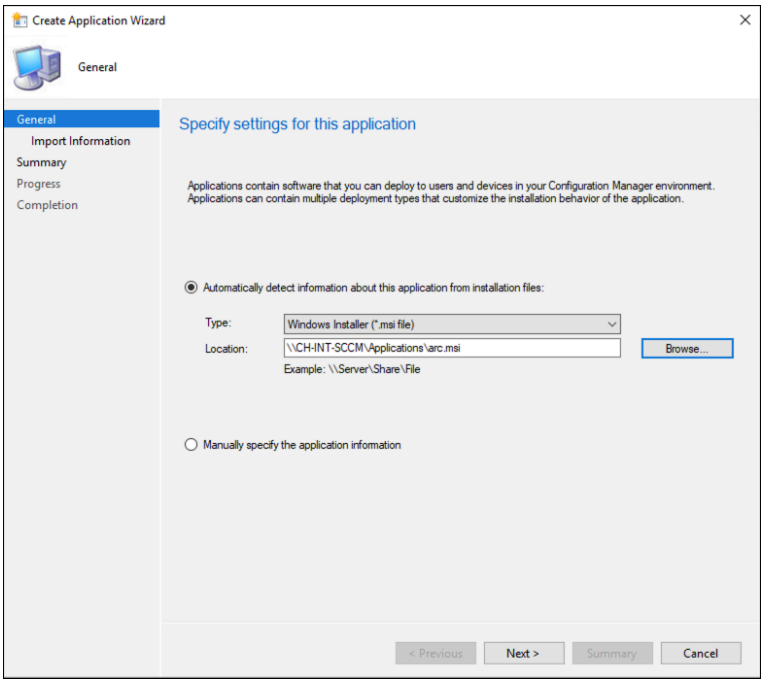
2. Go to **Software Library > Overview > Application Management > Applications**.



3. Right-click and select **Create Application**.

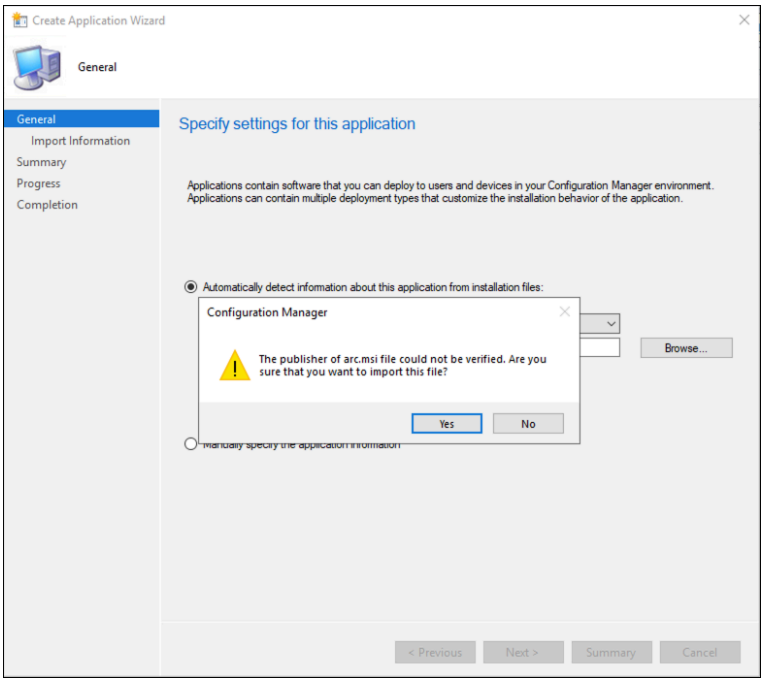


4. Browse and select the location of the *MSI* file, and then select **Next**.

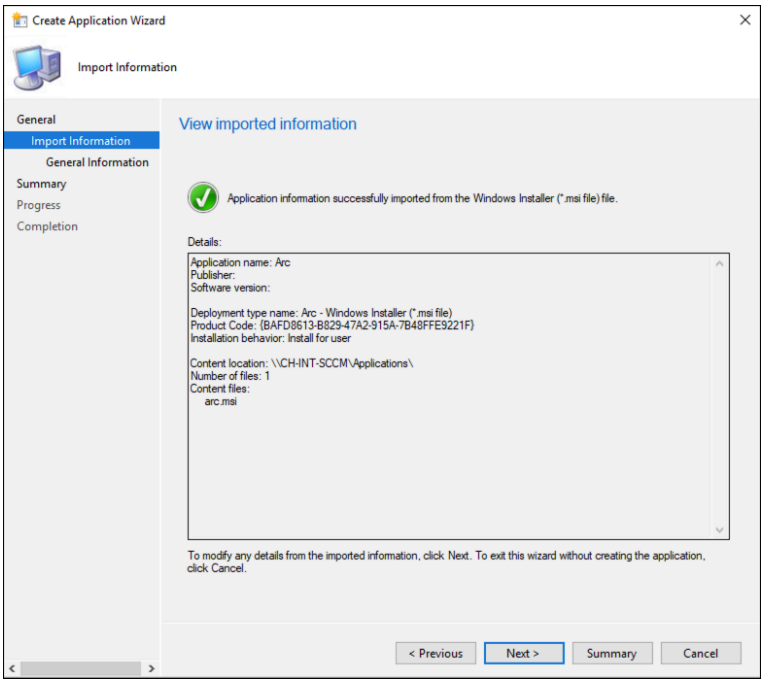


Result: A dialog shows.

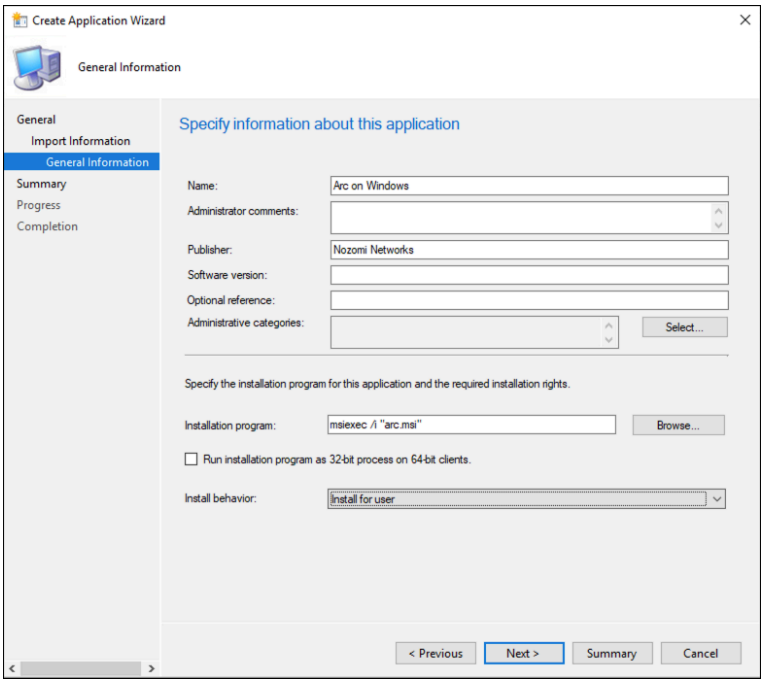
5. To confirm the import of the package, select **Yes**.



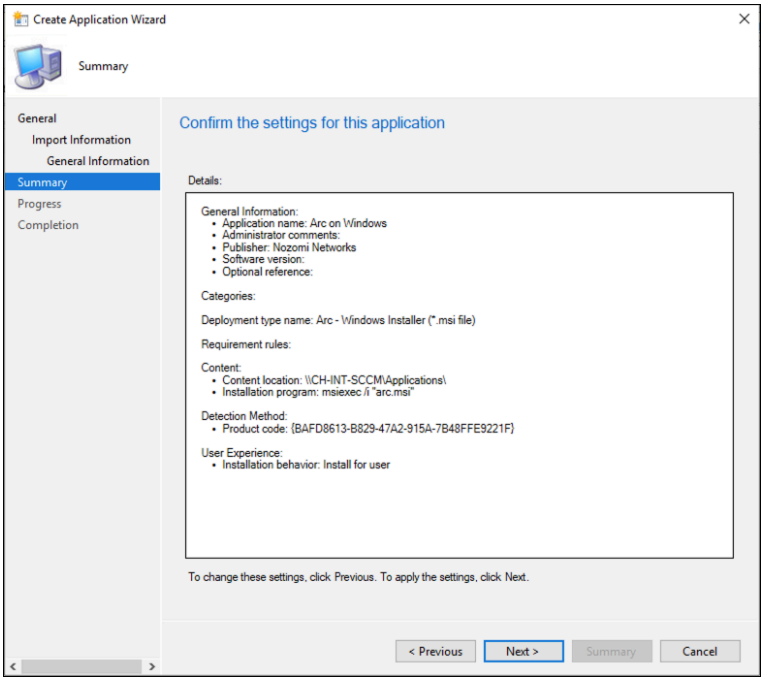
6. Make sure that the file has been imported successfully, and then select **Next**.



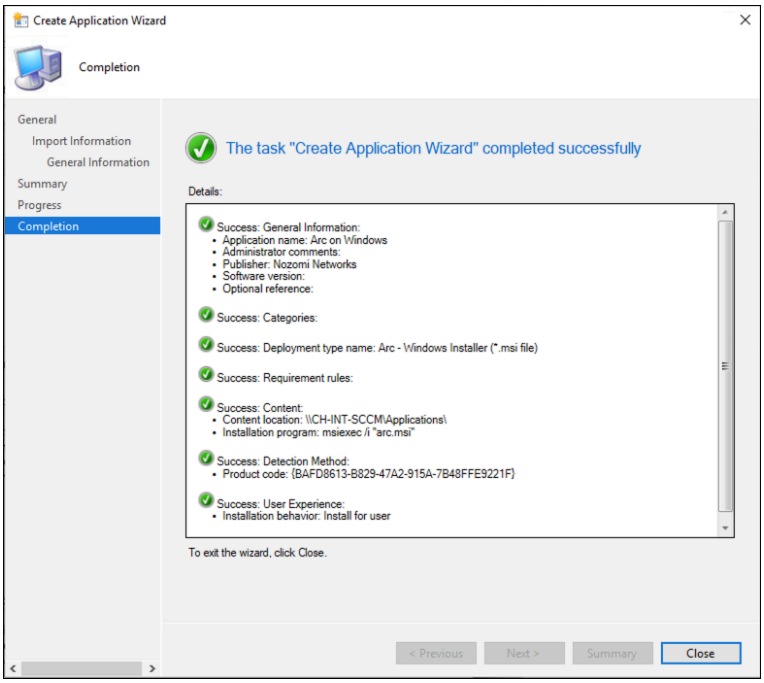
7. On the **General Information** page, enter details in the fields as necessary. Select **Next**.



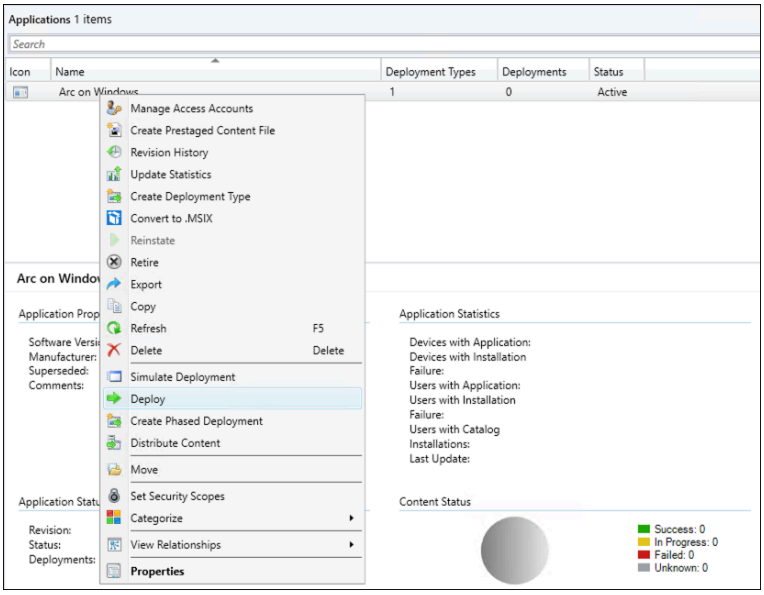
8. Review the settings, and then select **Next**.



9. Make sure that the application has been created successfully, and then select **Close**.

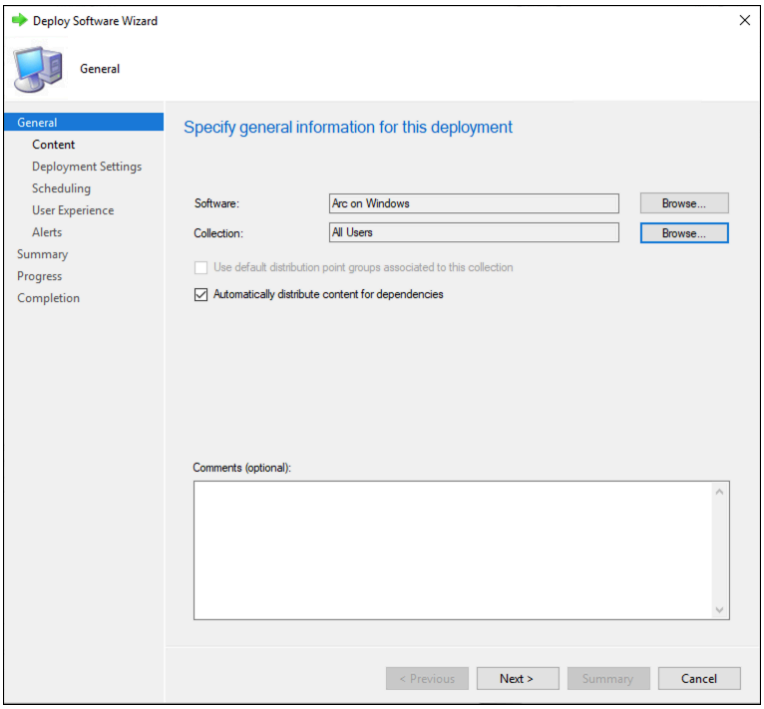


10. Right-click on the application and select **Deploy**.

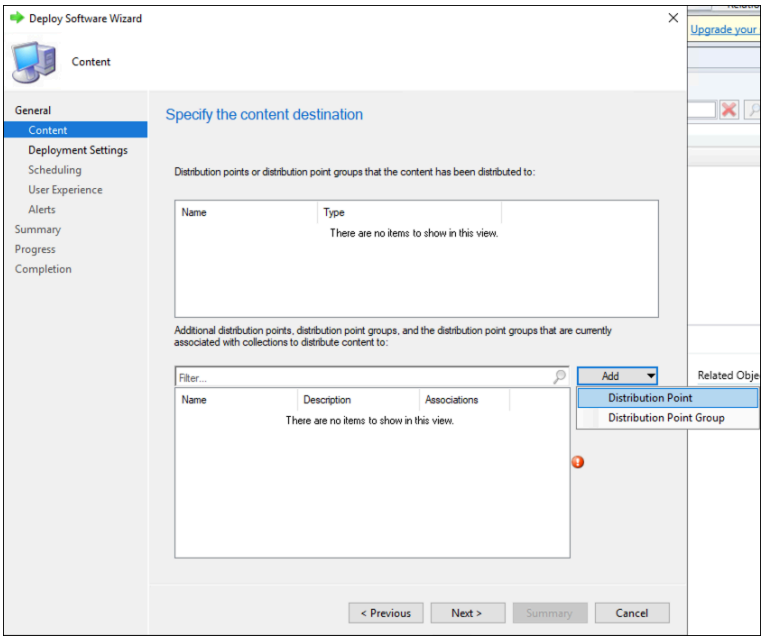


Result: The **Deploy Software Wizard** shows.

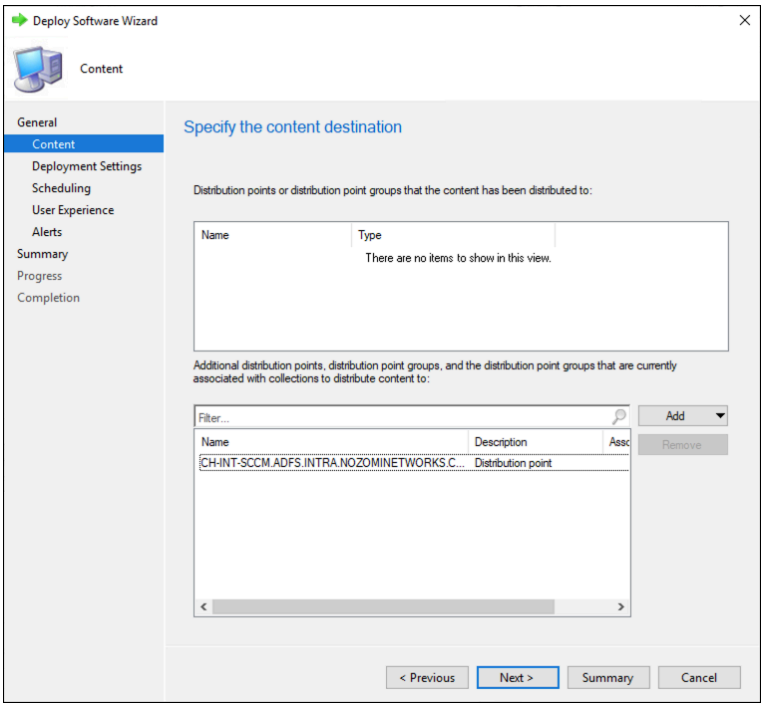
11. On the **General** page, open the **Collection** dropdown and choose the type of deployment. Select **Next**.



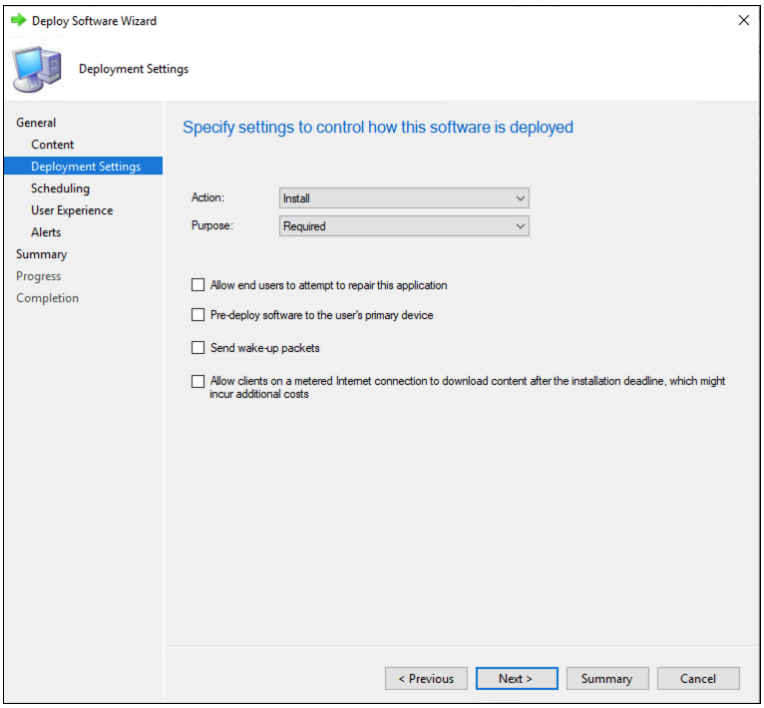
12. On the **Content** page, open the **Add** dropdown and select the type of distribution. Select **Next**.



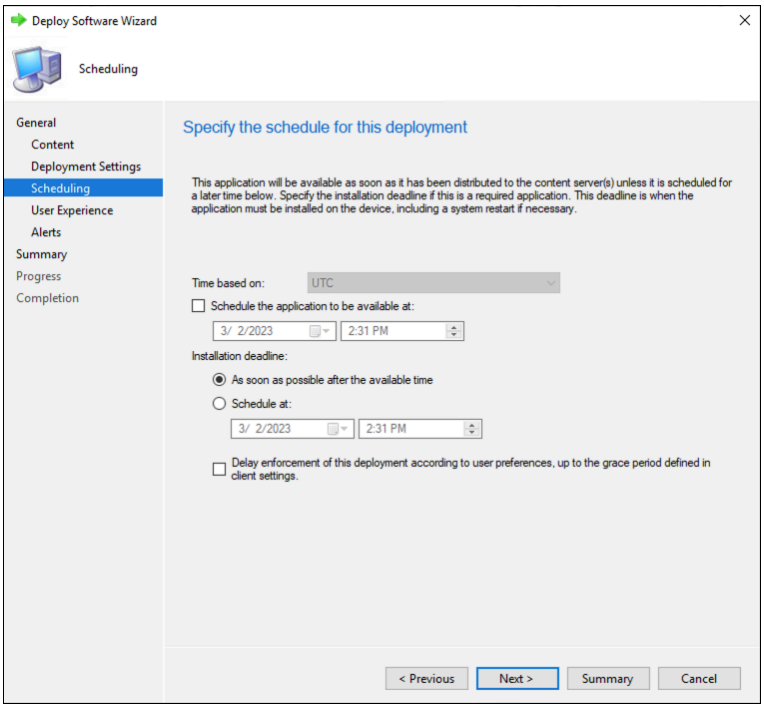
13. Make sure that the distribution point shows in the list, and select **Next**.



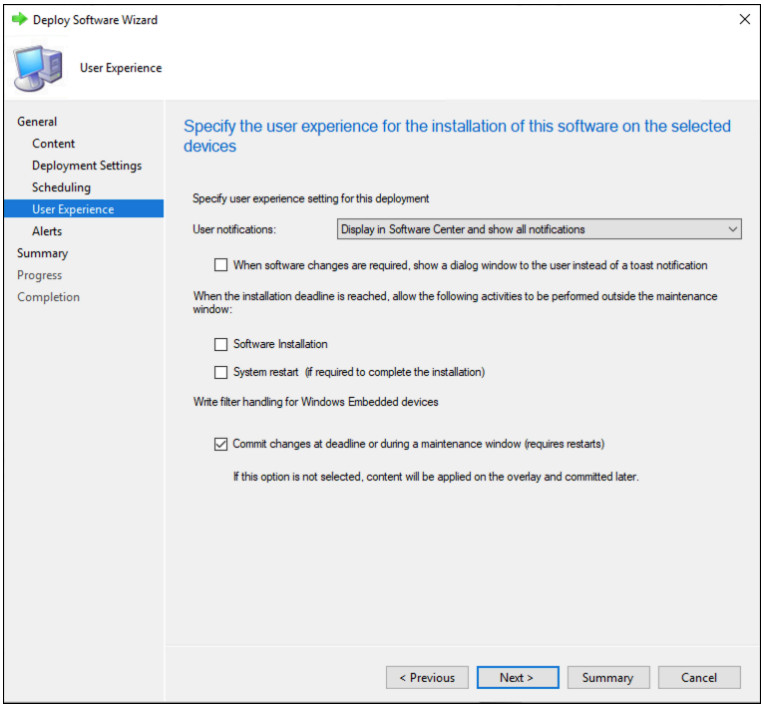
14. On the **Deployment Settings** page, open the **Purpose** dropdown and select **Required**. Select **Next**.



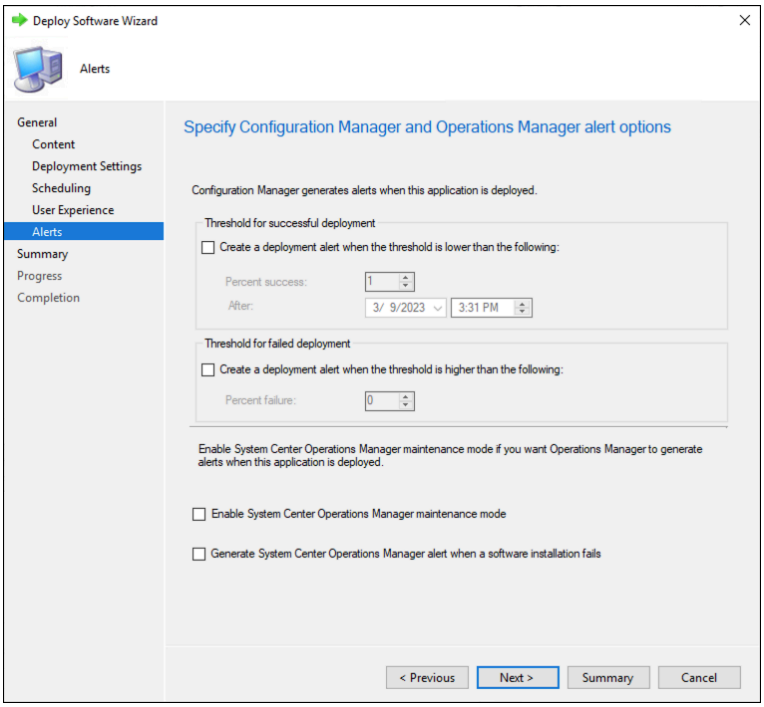
15. On the **Scheduling** page, set the desired schedule settings, and then select **Next**.



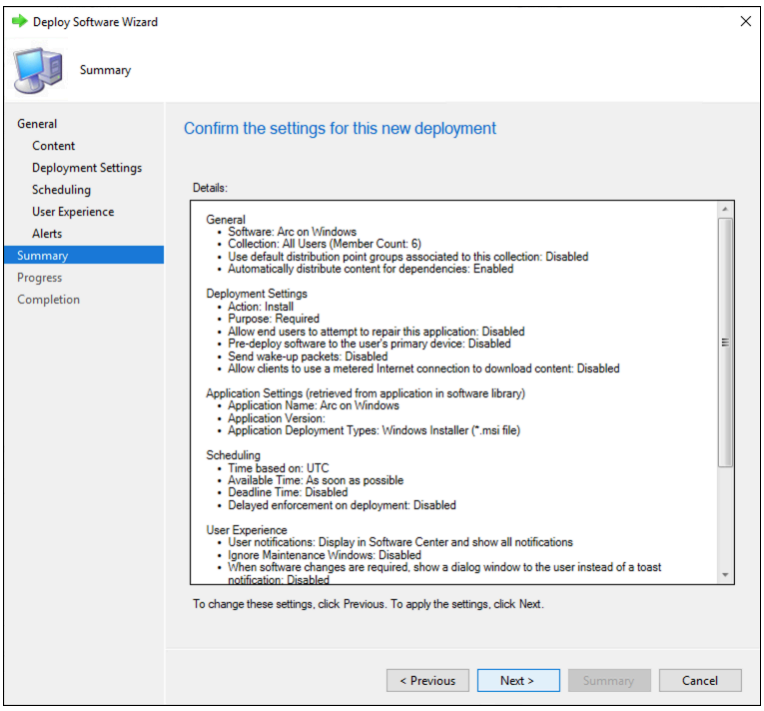
16. On the **User Experience** page, select the desired settings, and then select **Next**.



17. On the **Alerts** page, select the desired settings, and then select **Next**.



18. On the **Summary** page, review the settings.



19. If the settings are correct, select **Next** to start the deployment.

Results

The deployment starts.

Deploy Arc manually

Download an Arc package

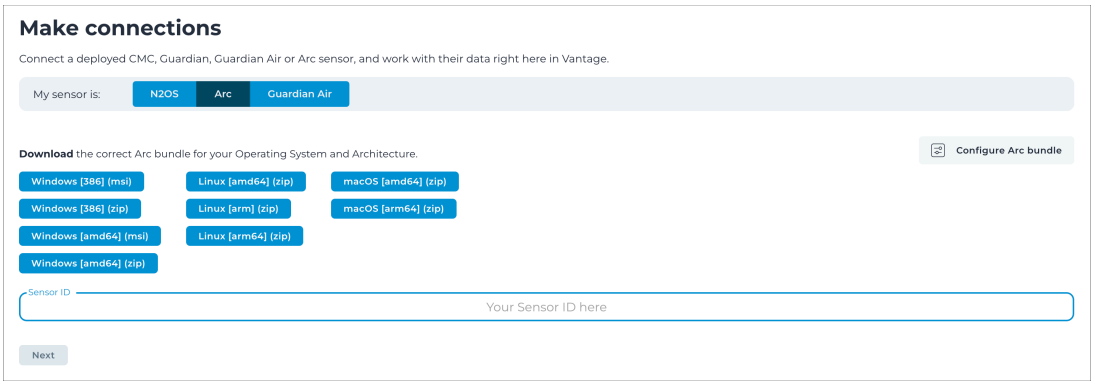
Download an Arc package from Vantage

Before you can deploy Arc manually, or through a mobile device management (MDM) system, you must download the correct package for your operating system (OS). You can do that from Vantage.

Procedure

1. In the navigation bar, go to **Sensors**.
2. In the top-right corner of the Web UI, click **Add new**.

   Result: The **Make connections** page opens.



3. In the **My sensor is:** section, click **Arc**.
4. Download the applicable package for your *OS* and architecture.

   Result: The package downloads to your computer.

Download an Arc package from Guardian

Before you can deploy Arc manually, or through a mobile device management (MDM) system, you must download the correct package for your operating system (OS). You can do that from Guardian.

Procedure

1. In Guardian, go to **Sensors > Download Arc**.

macOS - amd64 (Installer)
macOS - amd64 (Archive)
macOS - arm64 (Installer)
macOS - arm64 (Archive)
Linux - amd64 (Archive)
Linux - arm (Archive)
Linux - arm64 (Archive)
Windows 7+ - 386 (Installer)
Windows 7+ - 386 (Archive)
Windows 7+ - amd64 (Installer)
Windows 7+ - amd64 (Archive)
Windows 10+ - 386 (Installer)
Windows 10+ - 386 (Archive)
Windows 10+ - amd64 (Installer)
Windows 10+ - amd64 (Archive)

2. Download the applicable package for your *OS* and architecture.

> **Note:**
> When available, the *MSI* file is a user friendly option to install Arc. The archive file for Windows is still available to use for offline executions without installing Arc.

> **Note:**
> Two separate packages are available for Windows.
> - For Windows 7 or later, but < 10, download the Windows7+ package
> - For Windows 10 or later, download the Windows10+ package

Result: The package downloads to your computer.

Download an Arc package from the Nozomi Networks support portal

Before you can deploy Arc manually, or through a mobile device management (MDM) system, you must download the correct package for your operating system (OS). You can do this from the Nozomi Networks support portal.

Procedure

1. Go to https://nozominetworks.my.site.com/support/s/article/Arc-Release-Package
2. Download the applicable package for your *OS* and architecture.

   Result: The package downloads to your computer.

Deploy Arc to run in Service mode

Windows

Install Arc with Microsoft Software Installer (MSI)

You can manually deploy Arc to run in Service mode.

Procedure

1. Double-click the *ZIP* file to extract these files:
   - An *MSI* file
   - A *batch file (.bat)*

2. To install Arc, choose from one of these options:

   Choose from:
   - Double-click the *MSI* file
   - Run the *.bat*

   > **Note:**
   > The *.bat* will pre-fill the *MSI* with the parameters that you have set in the **Configuration** page.

   > **Note:**
   > When you try to install Arc on a Windows machine that does not have OpenGL, the installation will fail. When this happens, this error message will show:
   >
   > `There is a problem with this Windows Installer package...`
   >
   > If this happens, do step 3 (on page 121) below.

3. If you received the error message above, in a PowerShell, enter these commands:

```
$global:ProgressPreference = "SilentlyContinue"

$params = '/i', 'arc.windows.amd64.msi', '/QN', '/L*v',
 'installer.log', 'ARGS="--mode=silent --acceptLicense=true
 --endpoint=test.endpoint --token=test.token
 --rebootIfRequired=false"'

Start-Process 'msiexec.exe' -ArgumentList $params -NoNewWindow -Wait
 -PassThru
```

4. Wait for the **User Account Control** dialog to show.
5. Select **Yes**.

   Result: The **Arc setup wizard** shows.

6. Follow the steps in the wizard.

Results

The installer:

- Starts a new installation process if Arc is not installed, or if a previous version is detected
- Starts a modify installation process, if the same version of Arc is detected

Related information

MSI file configuration from a shell (on page 102)

Linux

Deploy Arc manually in Service mode with a local UI

You can manually deploy Arc to run in Service mode with a local user interface (UI).

Before you begin

Make sure that you have downloaded an Arc package.

Procedure

1. Use an administrator account to extract the *ZIP* file to your machine.
2. Go to `/usr/local/sbin` and create a folder called `arc`
3. Open the local UI (on page 88).
4. In the **Configuration** page of the local *UI*, set these parameters:
   a. **Endpoint**: This is automatically populated with the Guardian instance that you used to download the package. Change this only if it is necessary.
   b. **Token**: This is automatically populated with the Guardian instance that you used to download the package. Change this only if it is necessary.
   c. **Execution options**: Tune these options as necessary.
5. Select **Install**.

   Result: The **Service status** changes from **Not installed** to **Stopped**.
6. Select **Run**.

   Result: The **Execution status** changes from **Stopped** to **Running as service**. The **Connectivity status** changes from **Disconnected** to **Connected**.

Results

The Arc sensor is now running from `/usr/local/sbin/arc` and you can view collected data in Guardian or Vantage.

Deploy Arc manually in Service mode without a local UI

You can manually deploy Arc to run in Service mode without a local user interface (UI).

Before you begin

Make sure that you have downloaded an Arc package.

Procedure

1. Use *SSH* to log in to the target machine.
2. If the folder `/usr/local/sbin` does not exist, create it.

> **Important:**
> You can choose a different location, but make sure that only administrator accounts have write access. This is to prevent standard users from modifying the folder's contents.

3. Copy the Arc *ZIP* package into the folder `/usr/local/sbin/arc`
4. Extract the contents of the *ZIP* archive into the folder `/usr/local/sbin/arc`
5. To register Arc as a service (daemon), enter this command: `./arc-linux-arm install`

> **Note:**
> This example assumes that the Arc package you downloaded is `arc-linux-arm`

6. To start Arc, enter the command: `./arc-linux-arm start`

Results

The Arc sensor is now running from `/usr/local/sbin/arc` and you can view collected data in Guardian or Vantage.

macOS

Deploy Arc manually in Service mode on macOS

You can manually deploy Arc to run in Service mode.

Before you begin

Make sure that you have downloaded an Arc package.

Procedure

1. Use an administrator account to extract the *ZIP* file to your machine.
2. Choose a folder where you will copy the folder containing the Arc files.
3. To install Arc, run the *package file (.pkg)* file.

   Result: A dialog shows.

4. Follow the steps on screen.
   When you connect the Arc sensor to Vantage, you should start the **Add Sensor** procedure from Vantage to be able to connect it.

Results

The Arc sensor is now running from `/usr/local/sbin/arc` and you can view collected data in Guardian or Vantage.

Deploy Arc to run in One-shot or Offline mode

Windows

Deploy Arc manually with a local UI

You can manually deploy Arc to run in One-shot or Offline mode.

Before you begin

Make sure that you have downloaded an Arc package.

Procedure

1. Use an administrator account to extract the *ZIP* file to your machine.
2. Go to `C:\Program Files\` and create a folder called `NozomiNetworks\Arc`
3. Open the local UI (on page 88).
4. Choose a mode:

   Choose from:

   - For One-shot mode, in the **Status** page of the local configuration UI, select the **One-shot** checkbox.
   - For Offline mode, in the **Status** page of the local configuration UI, select the **Offline** checkbox.
5. In the **Configuration** page of the local configuration *UI*, set these parameters:
   a. **Endpoint** (One-shot only): This is automatically populated with the Guardian instance that you used to download the package. Change this only if it is necessary.
   b. **Token** (One-shot only): This is automatically populated with the Guardian instance that you used to download the package. Change this only if it is necessary. Take the value shown in the image above.
   c. **Execution options**: Tune these options as necessary.
6. Select **Run**.

   One-shot mode only: When you connect the Arc sensor to Vantage, you should start the **Add Sensor** procedure from Vantage to be able to connect it.

   > **Note:**
   > A counter will show the execution time that remains.

Results

The Arc sensor is now running from `C:\Program Files\NozomiNetworks\Arc` and you can view collected data in Guardian or Vantage.

Linux

Deploy Arc manually in One-shot mode with a local UI

You can manually deploy Arc to run in One-shot mode.

Before you begin

Make sure that you have downloaded an Arc package.

Procedure

1. Use an administrator account to extract the *ZIP* file to your machine.
2. Go to `/usr/local/sbin` and create a folder called `arc`
3. Open the local UI (on page 88).
4. In the **Configuration** page of the local *UI*, set these parameters:
   a. **Endpoint**: This is automatically populated with the Guardian instance that you used to download the package. Change this only if it is necessary.
   b. **Token**: This is automatically populated with the Guardian instance that you used to download the package. Change this only if it is necessary.
   c. **Execution options**: Tune these options as necessary.
5. In the **Execution Info** page of the local UI, select the **One-shot** checkbox.
6. Select **Run**.

   When you connect the Arc sensor to Vantage, you should start the **Add Sensor** procedure from Vantage to be able to connect it.

   > **Note:**
   > A counter will show the execution time that remains.

Results

The Arc sensor is now running from `/usr/local/sbin/arc` and you can view collected data in Guardian or Vantage.

Deploy Arc manually in Offline mode with a local UI

You can manually deploy Arc to run in Offline mode.

Before you begin

Make sure that you have downloaded an Arc package.

Procedure

1. Use an administrator account to extract the *ZIP* file to your machine.
2. Go to `/usr/local/sbin` and create a folder called `arc`
3. Open the local UI (on page 88).
4. In the **Configuration** page of the local *UI*, configure the **Execution options** as necessary.
5. In the **Execution Info** page of the local UI, select the **Offline** checkbox.
6. Select **Run**.

> **Note:**
> A counter will show the execution time that remains.

7. Wait for the execution to finish.
8. Import the generated offline archive into Guardian or Vantage.

Results

You can now view the collected data in Guardian or Vantage.

Deploy Arc manually in One-shot mode without a local UI

You can manually deploy Arc in One-shot mode without a local user interface (UI).

Before you begin

Make sure that you have downloaded an Arc package.

Procedure

1. Use *SSH* to log in to the target host.
2. If the folder `/usr/local/sbin` does not exist, create it.
3. Copy the Arc *ZIP* package into the folder `/usr/local/sbin/arc`
4. Extract the *ZIP* package.
5. Enter this command: `./arc-linux-arm oneshot`

Results

The Arc sensor is now running from `/usr/local/sbin` and you can view collected data in Guardian or Vantage.

Deploy Arc manually in Offline mode without a local UI

You can manually deploy Arc in Offline mode without a local user interface (UI).

Before you begin

Make sure that you have downloaded an Arc package.

Procedure

1. Use *SSH* to log in to the target host.
2. If the folder `/usr/local/sbin` does not exist, create it.
3. Copy the Arc *ZIP* package into the folder `/usr/local/sbin/arc`
4. Extract the *ZIP* package.
5. Enter this command: `./arc-linux-arm offline`
6. Wait for the execution to finish.
7. Import the generated offline archive into Guardian or Vantage.

Results

You can now view the collected data in Guardian or Vantage.

macOS

Deploy Arc manually in One-shot mode with a local UI

You can manually deploy Arc to run in One-shot mode.

Before you begin

Make sure that you have downloaded an Arc package.

Procedure

1. Use an administrator account to extract the *ZIP* file to your machine.
2. Choose a folder where you will copy the folder containing the Arc files.

> **Note:**
> On macOS, due to security protection, do not put the Arc folder on the **Desktop**, or in the **Downloads** folder. Choose a folder like: `/Users/<user_name>`

3. Open the local UI (on page 88).
4. In the **Configuration** page of the local *UI*, set these parameters:
   a. **Endpoint**: This is automatically populated with the Guardian instance that you used to download the package. Change this only if it is necessary.
   b. **Token**: This is automatically populated with the Guardian instance that you used to download the package. Change this only if it is necessary.
   c. **Execution options**: Tune these options as necessary.
5. In the **Execution Info** page of the local UI, select the **One-shot** checkbox.
6. Select **Run**.

   When you connect the Arc sensor to Vantage, you should start the **Add Sensor** procedure from Vantage to be able to connect it.

> **Note:**
> A counter will show the execution time that remains.

Results

The Arc sensor is now running from `/usr/local/sbin/arc` and you can view collected data in Guardian or Vantage.

Deploy Arc manually in Offline mode with a local UI

You can manually deploy Arc to run in Offline mode.

Before you begin

Make sure that you have downloaded an Arc package.

Procedure

1. Use an administrator account to extract the *ZIP* file to your machine.
2. Choose a folder where you will copy the folder containing the Arc files.

> **Note:**
> On macOS, due to security protection, do not put the Arc folder on the **Desktop**, or in the **Downloads** folder. Choose a folder like: `/Users/<user_name>`

3. Open the local UI (on page 88).
4. In the **Configuration** page of the local *UI*, configure the **Execution options** as necessary.
5. In the **Execution Info** page of the local UI, select the **Offline** checkbox.
6. Select **Run**.

> **Note:**
> A counter will show the execution time that remains.

7. Wait for the execution to finish.
8. Import the generated offline archive into Guardian or Vantage.

Results

You can now view the collected data in Guardian or Vantage.

Chapter 6. Execution

Execution modes

Arc has three different execution modes: Service, One-shot, and Offline. It is important to understand the different modes, and how they can be used.

You can either set the execution modes manually, through the local *UI*, or they will be set when you deploy Arc from Guardian.

Service mode

This is the standard mode, where Arc monitors and reports data back to Guardian or Vantage. In this mode, Arc is installed as a service/daemon, and runs automatically when a machine is booted.

This mode is recommended for:

- Continuous monitoring
- Users who can host Arc for a longer time than with the two modes below
- Networks where Arc can be granted connectivity to Guardian or Vantage

Arc sensors periodically synchronize data to Guardian or Vantage. The frequency of transmitted data that can be received will vary, depending on the type and number of sensors. As more Arc sensors are connected, the communication interval is increased to protect Guardian or Vantage. In particular, because the default notification period is every 1 [minute], it holds as long as the number of Arc sensors is below the thresholds shown in the tables below.

For example, if more than 400 Arc sensors are connected to an NSG-HS sensor, the notification period will be increased to > 1 (minute). This is to make sure that the limit for this type of sensor, 400 (notifications per minute), is not exceeded.

Table 10. Elastic notification values - physical sensors

Sensor	Value (notifications per minute)
NSG-HS	400
NSG-H	300
NSG-M N750R1 N750R2 N1000R1 N1000R2	200
NSG-L NG-500R	60
P550 P500	30
NSG-R50 NSG-R150	6

Table 11. Elastic notification values - virtual sensors

Sensor (memory size in gigabytes)	Value (notifications per minute)
≥ 64	300

Table 11. Elastic notification values - virtual sensors (continued)

Sensor (memory size in gigabytes)	Value (notifications per minute)
≥ 48 — < 64	250
≥ 32 — < 48	200
≥ 24 — < 32	150
≥ 16 — < 24	100
≥ 12 — < 16	60
≥ 10 — < 12	30
< 10	6

One-shot mode

In this mode, Arc runs as a portable application, that collects the data in a single execution. After it has been executed, you can then delete it from the target machine.

This mode is recommended for:

- Users who cannot run Arc continuously due to compliance reasons
- Networks where Arc can be granted connectivity to Guardian, or Vantage

Offline mode

In this mode, Arc runs as a portable application, and it is not installed on the target machine. This mode is similar to One-shot mode because Arc is used for a single execution, but the data is collected locally and then exported in an archive file from the machine. The archive file can then be manually imported into Guardian or Vantage.

Chapter 7. Troubleshooting

Sigma rule alerts do not show

Possible cause

Sysmon has not been installed.

> **Note:**
> If *Sysmon* is installed and working correctly:
> - You can use the Windows **Event Viewer** to view Sysmon-generated events. (You can find these in: **Applications and Services Logs > Microsoft > Windows > Sysmon > Operational**.)
> - You should get a message similar to this in the log file:
>
> ```
> … Sysmon Event Generator | Events added 45, events discarded 0, in 1715 ms
> ```

Procedure

1. Download and install *Sysmon*.
2. Restart Arc to make sure that *Sysmon* is active.
3. Make sure that **Sigma rules** is enabled in the local configuration *UI*.

Possible cause

You do not have **Sigma rules** enabled in the local configuration *UI*.

Procedure

1. Open the local UI (on page 88).
2. Select **Configuration**.

   Result: The **Configuration** page opens.
3. Select the **Sigma rules** checkbox.
4. Select **Save**.
5. Check to see if Sigma rule alerts now show.

Possible cause

You have *Sysmon* installed and enabled, but you do not get a message similar to this in the log file:

```
… Matcher for EventID 1 | Matches found 1, in 0 ms
```

Procedure

> **Note:**
> This is not an error. It means that an event that would trigger an alert has not been detected yet.

Wait for Arc to show an alert that is based on Sigma rules.

Possible cause

You have *Sysmon* installed and enabled, but you do not get a message similar to this in the log file:

```
… Matcher for EventID 1 | Sending 1 alert rules 200 OK
```

Procedure

> **Note:**
> This can mean that the host was too busy to communicate.

> **Note:**
> If a different result than 200 (204 on Vantage) is obtained, then the alert might have been produced, but there was a communication failure when it was sent to Guardian.

Wait for Arc to make another attempt to communicate with the host.

If none of the previous solutions work, please contact our Customer Support team.

Traffic monitoring does not work

Possible cause

Npcap is not installed.

> **Note:**
> If *Npcap* is installed, and traffic monitoring is enabled in the local configuration *UI*, you should get a message similar to this in the log file:
>
> ```
> LiveCapture(\Device\NPF_{5CFC7BFE) | Setting filter not (host
> 10.41.43.129 and port 443)
> LiveCapture(\Device\NPF_{026414DD) | Capture completed after
> sniffing 2000 packets, 208675 bytes
> LiveCapture(\Device\NPF_{026414DD) | Sending packets: 200 OK
> ```

Procedure

1. Download and install *Npcap*.
2. Restart Arc to make sure that *Npcap* is active.
3. Make sure that **Traffic monitoring** is enabled in the local configuration *UI*.

Possible cause

You do not have **Traffic monitoring** enabled in the local configuration *UI*.

Procedure

1. Open the local UI (on page 88).
2. Select **Configuration**.

   Result: The **Configuration** page opens.
3. Select the **Traffic monitoring** checkbox.
4. Select **Save**.
5. Check to see if traffic monitoring now works.

If none of the previous solutions work, please contact our Customer Support team.

USB detections do not work

Possible cause

USBPcap is not installed.

> **Note:**
> If *USBPcap* is installed, and **USB detections** is enabled, in the local configuration *UI*, you should get a message similar to this in the log file:
>
> ```
> … 10 total usb detections
> … 10 usb alerts to send
> … Sent 10 usb alerts 200 OK
> ```

Procedure

1. Download and install *USBPcap*.
2. Restart Arc to make sure that *USBPcap* is active.
3. Make sure that **USB detections** is enabled in the local *UI*.

Possible cause

You do not have **USB detections** enabled in the local *UI*.

Procedure

1. Open the local UI (on page 88).
2. Select **Configuration**.

   Result: The **Configuration** page opens.
3. Select the **USB detections** checkbox.
4. Select **Save**.
5. Check to see if the *USB* detection feature now works.

If none of the previous solutions work, please contact our Customer Support team.

Arc does not update to the latest version

Possible cause

Guardian only: The expected version has not been imported into Guardian.

Procedure

1. In the Web UI, go to ⚙ > **System** > **Updates & Licenses**.
2. Import Arc through the update service in Guardian or CMC (on page 45).
3. Alternatively, Import Arc through a manual contents upload in Guardian or CMC (on page 46).

Possible cause

Guardian only: The Arc sensor has not been allowed in the Guardian.

Procedure

1. The Arc sensor is not accessible as it is being used by another process.
2. Find and select the applicable Arc sensor.
3. In the top-right corner of the Web UI, click the icon.

   Result: The icon changes to and the sensor is now allowed.

Possible cause

The Arc sensor is not accessible as it is being used by another process.

> **Note:**
> If this is the case, you will see a message similar to this in the update.log file:
>
> ```
> 04/13/2023 10:19:56 The process cannot access the file
> 'C:\Users\Nozomier\arc\arc-windows-amd64.exe' because it is
> being used by another process.
> ```

Procedure

1. Close the local *UI*.
2. If Arc is running in One-shot or Offline mode, wait for it to finish.
3. In the top-left corner of the **Sensors** page, click the icon to force the update.

If none of the previous solutions work, please contact our Customer Support team.

Log files

Log files are produced to help you with troubleshooting. The Arc installation method, and the execution mode, will affect the name and location of the logs files.

Location

If you install Arc through Guardian, logs will be created in:
`users/administrator/arc/logs`

This location might be different if Arc was installed:

- Manually
- Through Microsoft Intune
- Through Microsoft Endpoint Manager

> **Note:**
> When Arc is installed with one of the methods above, the user can decide the location of the logs folder.

Log name

When the log file is created in Service mode, the log file will have the name:
`arc_service.log.txt`

When the log file is created in One-shot or Offline mode, the log file will have the name:
`arc.log.txt`

Limits

The maximum file size of a log is 10 MB. Once this limit is reached, the log file is archived with a numerical suffix, such as `arc.log.txt.1`. This will continue up to `arc.log.txt.9`

After this, rotation is applied, and the `.1` suffix is used again. A maximum of nine archived logs will be retained.

Glossary

.pkg

A .pkg file is a package file used on macOS to distribute and install software, containing all files needed for installation and scripts to guide the process.

Address Resolution Protocol

ARP is a communication protocol that is used to discover the link layer address, such as a *MAC* address, that is associated with a given internet layer address. This is typically an IPv4 address.

Batch file

A batch file is a script file containing a series of commands executed by a command-line interpreter, typically on Windows. It automates routine tasks and manages system operations, stored with a .bat or .cmd extension.

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 a similar way as on the sensor.

Central Processing Unit

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

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.

curl

curl is a command-line tool and library used to transfer data to or from a server. It supports many protocols, including HTTP, HTTPS, FTP, and more. In API contexts, curl is commonly used to test and interact with endpoints by sending requests and receiving responses.

cURL

Desktop Window Manager

DWM is a A Windows service that enables visual effects on the desktop, such as transparent windows and 3D window transitions.

dmidecode

dmidecode is a Linux command-line tool that retrieves detailed hardware information from the system's DMI/SMBIOS tables, including BIOS, processor, memory, and motherboard details, requiring root access.

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.

Dynamic Link Library

A DLL is a Microsoft Windows system file that contains code, data, and resources used by multiple programs simultaneously. It enables code sharing and reuse, enhancing efficiency and reducing software size by allowing on-demand code execution.

EaseFilter

EaseFilter is a software library that provides file system filter driver solutions for real-time file monitoring, control, and encryption. It enables developers to intercept, inspect, or block file I/O operations in Windows environments.

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.

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.

Industrial Control Systems

An ICS is an electronic control system and related instrumentation that is used to control industrial processes.

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.

Knowledge Base

A Microsoft knowledge base article provides information about a software update, hotfix, or security patch, identified by a unique article number prefixed with KB.

Libpcap

Libpcap is a portable C/C++ library for network traffic capture that provides a common interface across various OS-specific backends like BPF, netfilter, packet filter, netfilter, and NPF.

Light-emitting Diode

An LED (Light Emitting Diode) is an electronic component that emits light when an electric current passes through it, offering energy-efficient, long-lasting illumination for displays, indicators, and lighting applications.

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.

Microsoft Software Installer

MSI files are database files used by the Microsoft Software Installer (MSI). The files contain information about an application, which is divided into features and components, such as shortcuts, files, and registry data.

Mobile Device Management

This is the administration of mobile devices, such as tablet computers, laptops, and smartphones. It is often implemented with a third-party product with features for specific vendors of mobile devices.

Nozomi Networks Operating System

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

Npcap

Npcap is the Nmap Project's packet capture (and sending) library for Microsoft Windows. It implements the open Pcap API using a custom Windows kernel driver alongside a Windows build of the libpcap library.

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.

Peripheral Component Interconnect

Peripheral component interconnect (PCI) is a hardware bus standard for connecting peripheral devices to a computer's motherboard.

Portable Executable

PE is a file format used by Windows operating systems (OS) for executable files, object code, and dynamic link libraries (DLLs). PE files contain the code and resources needed to run programs on Windows.

Programmable Logic Controller

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

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.

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.

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.

Sysmon

System Monitor (Sysmon) is a Windows system service and device driver that is installed on a system to monitor and log system activity and write it to the Windows event log. Once installed, it remains across system reboots. It provides detailed information about changes to file creation time,network connections, and process creations. It uses SIEM or Windows Event Collection agents to collect the events it generates and then analyzes them to identify anomalous or malicious activity to help you understand how intruders and malware operate on a network.

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.

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.

USBPcap

USBPcap is an open-source *USB* sniffer for Windows.

User Interface

An interface that lets humans interact with machines.

User-Mode Font Driver

A Windows component that handles font rendering in user mode, separate from the kernel.

Windows Remote Management

Is a Microsoft implementation of Web Services-Management in Windows which lets systems access or exchange management information across a common network. You can utilize the built-in command line tool, or scripting objects, WinRM can be used with remote computers that may have baseboard management controllers (BMCs) to acquire data.

Windows Server Update Services

WSUS is a Microsoft tool that enables centralized management and deployment of software updates and patches for Windows operating systems and other Microsoft products. It helps organizations enhance security by automating patch management, ensuring compliance, and reducing vulnerabilities.

WinPcap

WinPcap is a freeware tool for link-layer network access in Windows environments. It lets applications capture and transmit network packets bypassing the protocol stack, and including kernel-level packet filtering, a network statistics engine and support for remote packet capture.

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.