

Arc

Administrator Guide

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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

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

- Microsoft Windows
- Linux
- Apple macOS
- Embedded devices (that run one of the above [operating system \(OS\)](#)s). For more information, see

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

Use cases and deployment scenarios

Arc lets you:

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

Arc Embedded

This version of Arc can be embedded directly on programmable logic controllers (PLCs).

Arc Embedded is an innovative way to deploy Arc not only on computers, but also on devices used specifically in [operational technology \(OT\)](#) and [Internet of Things \(IoT\)](#) networks. For more details about supported vendors, see [Arc Embedded detection information \(on page 28\)](#).

**Important:**

Arc Embedded requires a separate license from the standard version of Arc.

**Note:**

Arc Embedded requires [Nozomi Networks Operating System \(N2OS\)](#) v24.4.0, or later.

Architecture

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

You can connect Arc:

- To Guardian
- To Vantage

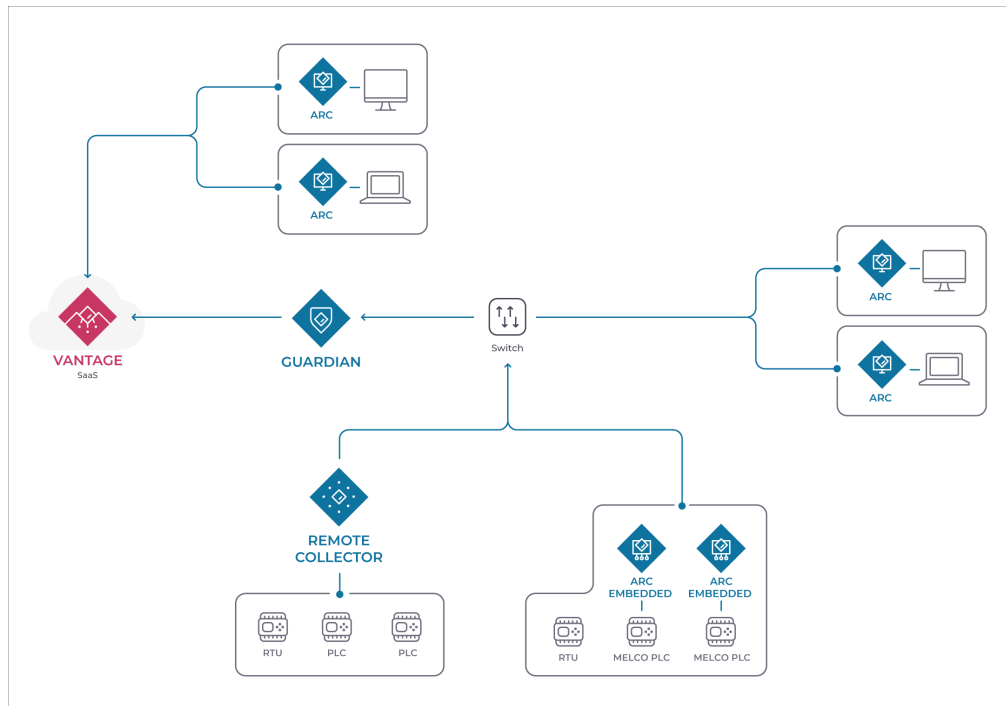


Figure 1. Arc architecture example

Arc in Guardian

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



Figure 2. Arc button in Guardian Web UI



Figure 3. 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

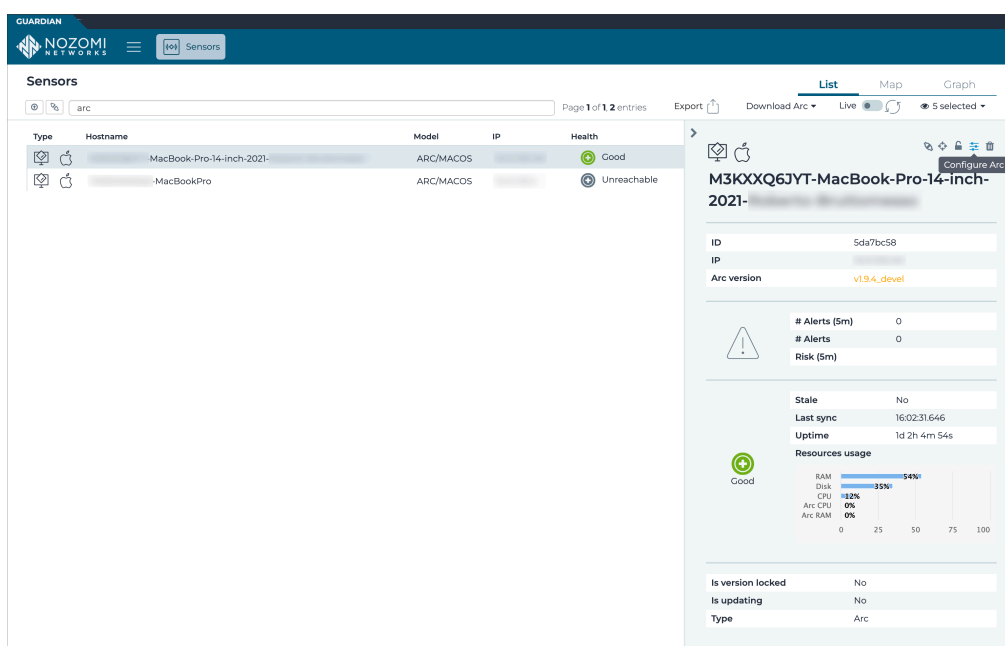


Figure 4. Configure an Arc sensor

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.

Arc in CMC

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

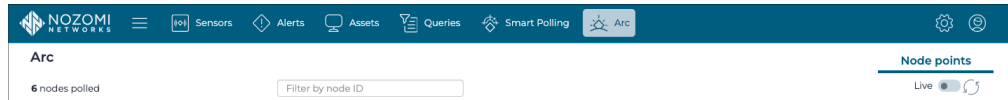


Figure 5. Arc button in CMC Web UI

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

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.

| Actions | Deployed version | Operating system | Name | IP | Vendor | Product name | Type |
|--------------------------|------------------|--------------------------|----------------------------|------------------------------|-------------------------|--------------------------|----------|
| <input type="checkbox"/> | | Windows 7 | 172.18.235.34 | 172.18.235.34 | | | computer |
| <input type="checkbox"/> | | Windows 7 | 172.16.44.92 | 172.16.44.92 | | | computer |
| <input type="checkbox"/> | | Windows 7 | 172.16.44.134 | 172.16.44.134 | | | computer |
| <input type="checkbox"/> | | Windows 7 | 172.16.45.255 | 172.16.45.255 | | | computer |
| <input type="checkbox"/> | | macOS | Mac Series | 192.168.179.198 | Apple | Mac Series | computer |
| <input type="checkbox"/> | v1.710 | Windows 8.1 Update 1 | LSPW8 | 10.41.50.18, fe80::5efea3... | VMware | Virtual Machine | computer |
| <input type="checkbox"/> | | macOS | Apple M1-based Computr | 192.168.180.73 | Apple | Apple M1-based Comput... | computer |
| <input type="checkbox"/> | | Windows 8.1 Update 1 | ENG-WMI-TEST | 192.168.45.212, 192.168.4... | VMware | Virtual Machine | computer |
| <input type="checkbox"/> | | Windows 10 | NUC | 169.254.23.208 | | Intel(R) Client Systems | computer |
| <input type="checkbox"/> | | Windows Server 2022 | LSPW2022 | 10.41.50.17, fe80::4259fc... | VMware | Virtual Machine | computer |
| <input type="checkbox"/> | | Windows 7 SP1 | LSPW7 | 10.41.50.23, fe80::100:7f... | VMware | Virtual Machine | computer |
| <input type="checkbox"/> | | Windows 7 | 172.30.68.31 | 172.30.68.31 | | | computer |
| <input type="checkbox"/> | | Windows 7 SP1 / Serve... | 172.16.46.69 | 172.16.46.69 | | | computer |
| <input type="checkbox"/> | v1.4.2 | Ubuntu Linux 22.04 | ch-int-snmp-ubuntu-22.0... | 10.41.48.102, fe80::2505... | VMware | Virtual Machine | computer |
| <input type="checkbox"/> | | Ubuntu Linux 21.04 | ch-lab-raspdocker02 | 10.41.43.55, fe80::dea63... | Raspberry Pi Foundation | Raspberry Pi SBC | computer |
| <input type="checkbox"/> | | macOS | Apple M1-based Computr | 192.168.178.129 | Apple | Apple M1-based Comput... | computer |
| <input type="checkbox"/> | | macOS | Apple M1-based Computr | 192.168.175.25 | Apple | Apple M1-based Comput... | computer |
| <input type="checkbox"/> | | Windows 10 | NUC | 169.254.181.84 | Intel | Intel(R) Client Systems | computer |

Figure 6. Deployment page

Advanced

The **Advanced** button lets you access the **Advanced** page. For more details, see [Advanced \(on page 14\)](#).

Execution details

The **Execution details** lets you access the **Activity Log**. For more details, see [Execution details \(on page 15\)](#).

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 7. 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

Activity Log - Arc operations Live 

5 executions of the plan

| Execution ID | Nodes |
|-------------------------|---------|
| 2023-03-21 13:02:07.337 | 1 nodes |
| 2023-03-21 13:01:36.990 | 1 nodes |
| 2023-03-21 13:00:21.120 | 1 nodes |
| 2023-03-21 12:58:56.541 | 1 nodes |
| 2023-03-21 12:58:35.902 | 1 nodes |

Execution details

Started at: 2023-03-21 13:02:07.337.
Lasted 7195 milliseconds.
1 nodes polled.

10.41.48.16 7149 ms

| Steps | Node points |
|--|-------------|
| ✓ Fetching credentials | |
| ✓ Using credentials from Credentials Manager for node: [10.41.48.16] | |
| ✓ Establishing connection | |
| ✓ Fetching remote host architecture | |
| ✓ Fetching Arc status | |
| ✓ Arc uninstalled | |

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

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

The screenshot displays the 'Arc' configuration page with the 'Deployment settings' tab selected. The page is divided into two main sections: 'Execution Options' and 'Traffic monitoring'. In the 'Execution Options' section, there is a text input for 'Execution time [s]' with the value '1331'. Below this are four checkboxes: 'Sigma rules' (checked), 'Node points' (unchecked), 'Local ARP table' (checked), and 'USB detections' (checked). There is also an unchecked checkbox for 'Smart Polling'. A 'Log level' dropdown menu is set to 'Info'. The 'Traffic monitoring' section has an unchecked 'Enable' checkbox and an unchecked 'Enable continuous mode' checkbox. Below these are three input fields: 'Monitoring time [s] per notification' (10), 'Max packets per notification' (2000), and 'Max used Memory [MB]' (32). At the bottom right, there are two buttons: 'Restore default' and 'Save'.

Figure 8. Deployment settings page

Execution options

Execution time dropdown: This sets 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.

Sigma rules (Windows only): This lets you enable/disable Sigma rules.

USB detections (Windows only): This lets you enable/disable **USB** detections.

Node points: This lets you enable/disable the production of node points.

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

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:**

Node points and **Smart Polling** require that a Smart Polling license is enabled upstream.

Local ARP table: This lets you enable/disable the ability to use the local [address resolution protocol \(ARP\)](#) table to confirm addresses. The **Use static entries** checkbox lets you enable/disable the use of static entries in the [ARP](#) table. Static entries are user-defined. You should only use them if they can be trusted.

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

- Debug
- Info
- Error

Traffic monitoring

Enable checkbox: This lets you enable/disable traffic monitoring.

Enable continuous mode checkbox: This lets you enable/disable continuous mode. For more details, see [Continuous mode \(on page 17\)](#).

Arc uses two different methods for traffic monitoring:

- Intermittent mode
- Continuous mode

Intermittent mode 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:

- **Monitoring 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

Continuous 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:

- **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

Network interface dropdown: This 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.

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 *identifier (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.

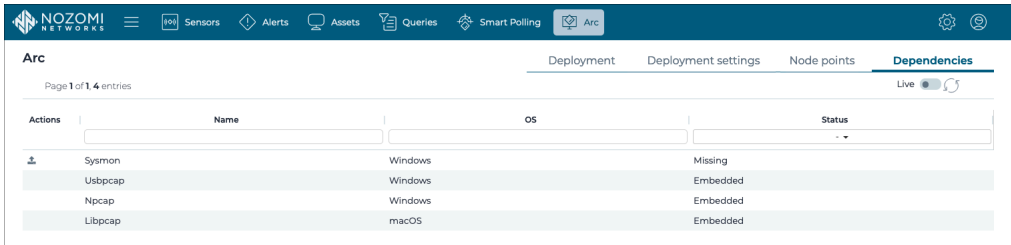
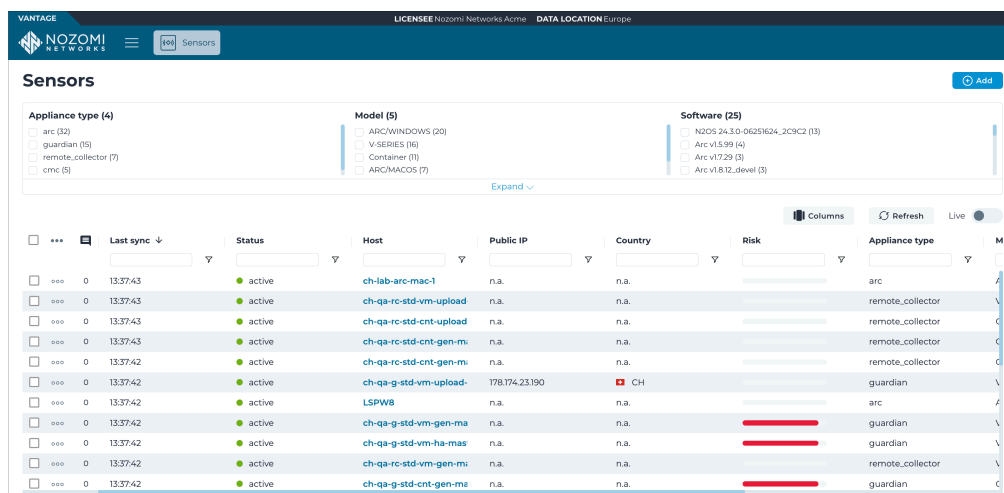


Figure 9. Dependencies page in Guardian (not connected to Vantage)

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



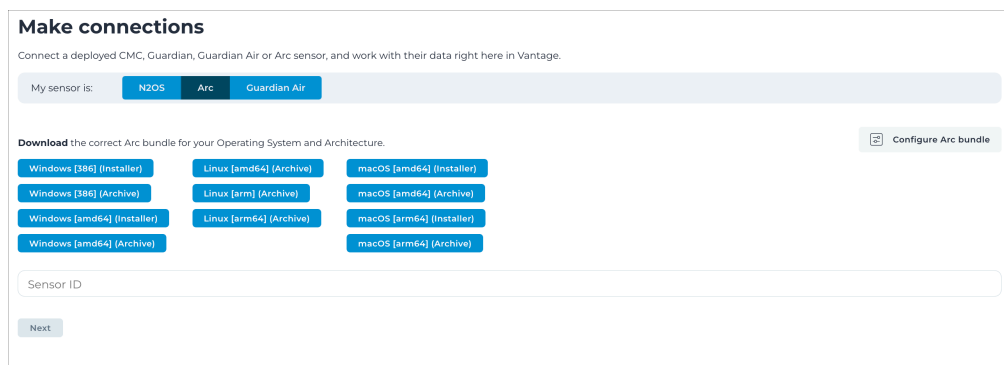
The screenshot shows the Vantage Sensors page. At the top, there's a header with the Vantage logo, a menu icon, and a 'Sensors' button. Below the header, there's a 'Sensors' section with filters for Appliance type (4), Model (5), and Software (25). The main table lists sensors with columns for Last sync, Status, Host, Public IP, Country, Risk, and Appliance type. The table contains 12 rows of sensor data.

| | Last sync | Status | Host | Public IP | Country | Risk | Appliance type |
|--------------------------|------------|--------|-------------------------|----------------|---------|------|------------------|
| <input type="checkbox"/> | 0 13:37:43 | active | ch-lab-arc-mac-1 | n.a. | n.a. | | arc |
| <input type="checkbox"/> | 0 13:37:43 | active | ch-qa-rc-std-vm-upload | n.a. | n.a. | | remote_collector |
| <input type="checkbox"/> | 0 13:37:43 | active | ch-qa-rc-std-cnt-upload | n.a. | n.a. | | remote_collector |
| <input type="checkbox"/> | 0 13:37:43 | active | ch-qa-rc-std-cnt-gen-mi | n.a. | n.a. | | remote_collector |
| <input type="checkbox"/> | 0 13:37:42 | active | ch-qa-rc-std-cnt-gen-mi | n.a. | n.a. | | remote_collector |
| <input type="checkbox"/> | 0 13:37:42 | active | ch-qa-g-std-vm-upload | 178.174.23.190 | CH | | guardian |
| <input type="checkbox"/> | 0 13:37:42 | active | LSPW8 | n.a. | n.a. | | arc |
| <input type="checkbox"/> | 0 13:37:42 | active | ch-qa-g-std-vm-gen-ma | n.a. | n.a. | | guardian |
| <input type="checkbox"/> | 0 13:37:42 | active | ch-qa-g-std-vm-ha-mas | n.a. | n.a. | | guardian |
| <input type="checkbox"/> | 0 13:37:42 | active | ch-qa-rc-std-vm-gen-mi | n.a. | n.a. | | remote_collector |
| <input type="checkbox"/> | 0 13:37:42 | active | ch-qa-g-std-cnt-gen-ma | n.a. | n.a. | | guardian |

Figure 10. 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



The screenshot shows the 'Make connections' page. It has a header 'Make connections' and a sub-header 'Connect a deployed CMC, Guardian, Guardian Air or Arc sensor, and work with their data right here in Vantage.' Below this, there's a 'My sensor is:' section with tabs for 'N2OS', 'Arc', and 'Guardian Air'. The 'Arc' tab is selected. Underneath, there's a 'Download the correct Arc bundle for your Operating System and Architecture.' section with a grid of download links for various OS and architecture combinations. A 'Configure Arc bundle' button is also present. At the bottom, there's a 'Sensor ID' input field and a 'Next' button.

My sensor is: **N2OS** **Arc** Guardian Air

Download the correct Arc bundle for your Operating System and Architecture.

Windows [386] (Installer) Linux [amd64] (Archive) macOS [amd64] (Installer)
Windows [386] (Archive) Linux [arm] (Archive) macOS [amd64] (Archive)
Windows [amd64] (Installer) Linux [arm64] (Archive) macOS [arm64] (Installer)
Windows [amd64] (Archive) macOS [arm64] (Archive)

Sensor ID

Next

Figure 11. Make connections page

Configure an Arc sensor

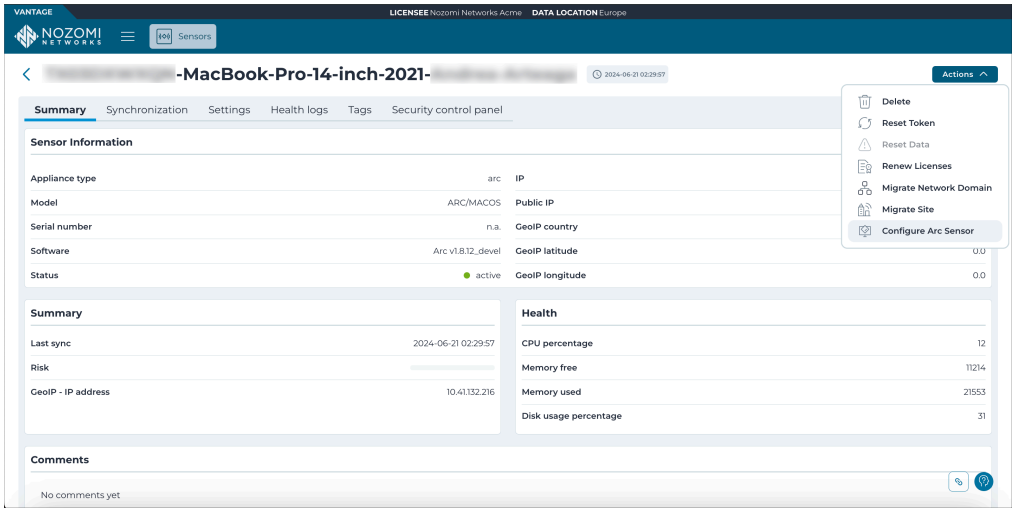


Figure 12. Actions menu in sensor details page

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

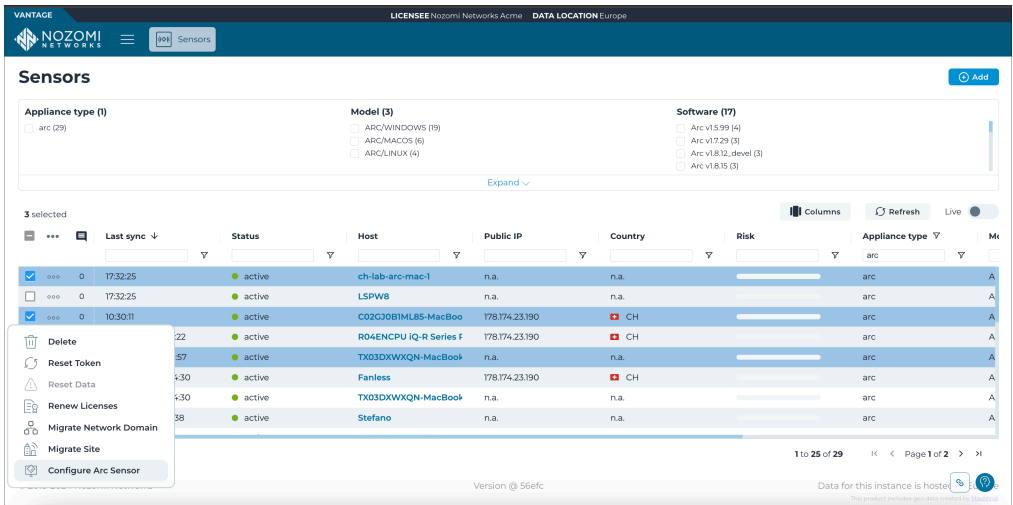


Figure 13. Configure multiple Arc sensors

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**.

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 \(on page 23\)](#).

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

Alerts such as those shown below, come from Arc:

- SIGN:SIGMA-RULE
- SIGN:MALICIOUS-HID
- SIGN:USB-DEVICE
- SIGN:USB-FILE-TRANSFER

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.

Commands syntax







The example commands given in this documentation are for Microsoft Windows. Some of these commands are the same in other operating systems (OS), but when a procedure is specific to a different OS, the correct syntax for that OS is used.

To convert a standard Windows command into a Linux or macOS command, you need to follow the standard [OS](#) syntax rules and apply them to the correct executable name.

The format of the executable name is:

- <arc-os-architecture>.exe (Windows)
- <arc-os-architecture> (Linux and macOS)

Table 1. Command examples

| Command example (for install) | OS | Architecture |
|---------------------------------|---|--------------|
| .\arc-windows-amd64.exe install | Windows  | amd64 |
| ./arc-linux-amd64 install | Linux  | amd64 |
| ./arc-linux-arm64 install | Linux  | arm64 |
| ./arc-linux-arm install | Linux  | arm |
| ./arc-darwin-amd64 install | macOS  | amd64 |
| ./arc-darwin-arm64 install | macOS  | arm64 |

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 [transport layer security \(TLS\)](#) 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, listed for each operating system (OS). The table shows two types of **Category**: **network** and **asset**. When the **Category** is listed as **network**, it means that the detection is based on information that has been extracted from the network. When the **Category** is listed as **asset**, it means that the detection is based on information that has been extracted from the asset.

Table 2. Detection information




























| Category | Information | Windows  | macOS  | Linux  | UI option |
|----------|------------------------|--|--|---|------------------------|
| network | Traffic monitoring | ✓ | ✓ | ✓ | Traffic monitoring |
| network | Smart Polling | ✓ | ✓ | ✓ | Smart Polling |
| asset | addresses | ✓ | ✓ | ✓ | always on |
| asset | <i>IP</i> addresses | ✓ | ✓ | ✓ | always on |
| asset | Product name | ✓ | ✓ | ✓ | always on |
| asset | Vendor | ✓ | ✓ | ✓ | always on |
| asset | Label/host name | ✓ | ✓ | ✓ | always on |
| asset | <i>OS</i> | ✓ | ✓ | ✓ | always on |
| asset | Serial number | ✓ | ✓ | ✓ | always on |
| asset | Local <i>ARP</i> table | ✓ | ✓ | ✓ | Local <i>ARP</i> table |
| asset | Sigma rules | ✓ | | | Sigma rules |
| asset | <i>USB</i> detections | ✓ | ✓ | ✓ | <i>USB</i> detections |
| asset | <i>CPU</i> usage | ✓ | ✓ | ✓ | node points |
| asset | Memory usage | ✓ | ✓ | ✓ | node points |

Table 2. Detection information (continued)

| Category | Information | Windows  | macOS  | Linux  | UI option |
|----------|---------------------------------|--|--|--|-------------|
| asset | Disk usage |  |  |  | node points |
| asset | Installed software |  | |  | node points |
| asset | Hotfixes |  | | | node points |
| asset | Antivirus |  | | | node points |
| asset | Log4j detection |  |  |  | node points |
| asset | User accounts |  | | | node points |
| asset | Logged in users |  | | | node points |
| asset | <i>USB</i> interfaces |  | | | node points |
| asset | Network interfaces |  | | | node points |
| asset | Processes and ports |  | | | node points |
| asset | Disk partitions |  |  |  | node points |
| asset | <i>domain name server (DNS)</i> |  |  |  | node points |
| asset | <i>CPU</i> |  | | | node points |

Arc Embedded detection information

Each Arc Embedded implementation inherits all the detected information from its architecture as shown in **Detection information**, and then adds vendor specific detections.

Table 3. Mitsubishi Electric

| | |
|---------------------------|--|
| Architecture | Linux |
| Supported by | MELSEC iQ-R series with RD55UP12-V intelligent function module. |
| Information | Hardware components / backplane information, local state. |
| Recommended configuration | The RD55UP12-V module has two network interfaces. Arc uses one of these to connect to the upstream. It is recommended to use the second network interface to monitor and have it connected to a switch SPAN port to get all the data from the <i>CPU</i> module. |

Chapter 2. Requirements



Operating System requirements

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

| Operating System | Architecture | Version |
|------------------|--------------------|---|
| Windows | x86, x86_64 | Windows 7 (Service Pack 1), or later |
| | | Windows Server 2012, or later |
| macOS | x86_64, arm64 | macOS 10.10 Yosemite, or later |
| Linux | x86_64, arm, arm64 | Ubuntu 16.04, or later |
| | | Debian Jessie, or later |
| | | CentOS 7, or later |
| | | Raspbian Jessie, or later |
| | | RedHat Linux Enterprise 9.3, or later |
| | | Suse Linux Enterprise Server 15, or later |

Resource requirements

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

A baseline installation of Arc, with no traffic monitoring or Sigma rules, 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 \(RAM\)](#).

Local permissions

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

Windows

On Windows, you need to enable [server message block \(SMB\)](#) and [WinRM](#) to deploy Arc automatically through Guardian.

Linux and macOS

On Linux and macOS, you need the [SSH](#) service to deploy Arc automatically through Guardian.

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:

- [SMB](#) ([TCP](#)/445) for Windows
- [SSH](#) ([TCP](#)/22) for Windows, Linux, and macOS

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.

Software requirements

For Arc to be deployed successfully, your other software must meet the minimum requirements.

Guardian v23.1.0 is the minimum requirement for the successful deployment of Arc.

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 [Federal Information Processing Standards \(FIPS\)](#)-compliant. It is possible to have an executable file with updated cryptographic functions, but it would not be [FIPS](#)-compliant.

Table 4. 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 \(on page 35\)](#)


Enable Audit Policy on Microsoft Windows

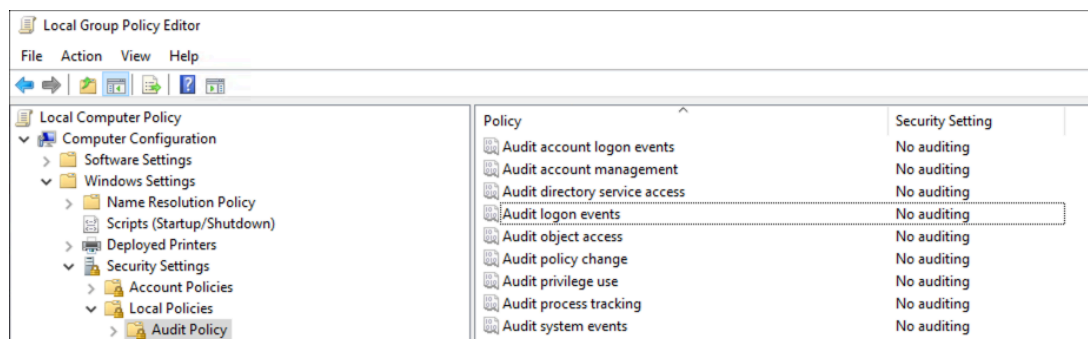
If you want Arc to detect user logon activities, you must enable **Audit logon events** of Microsoft Windows.

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.

Enable FIPS on Microsoft Windows

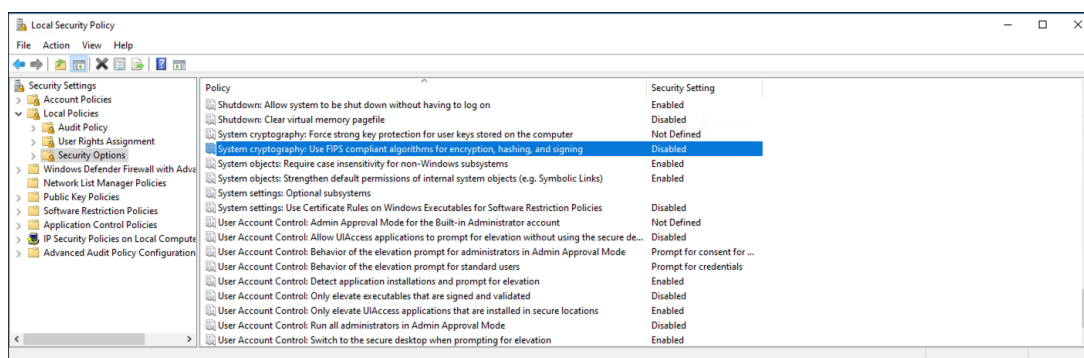
Before you use can Arc in [FIPS](#)-compliant mode, you must enable [FIPS](#) in the **Local Security Policy** of Microsoft Windows.

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.

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.

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.

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.

Updates

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.



UPDATES TI ✓ AI ✓ Arc ✓

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

Install a license

Before you can use a product, 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

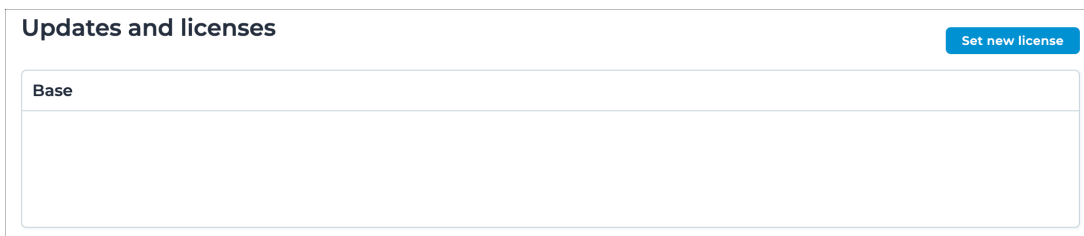
1. In the top navigation bar, select 

Result: The administration page opens.

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

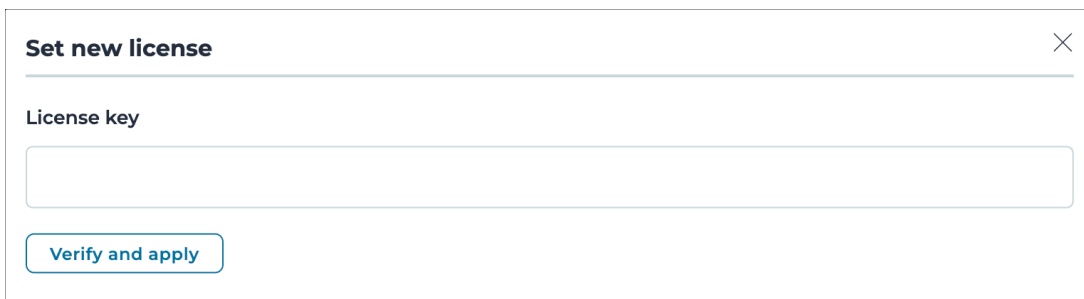
Result: The **Updates and licenses** page opens.

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

Before you can deploy Arc, you must import it first. There are 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.

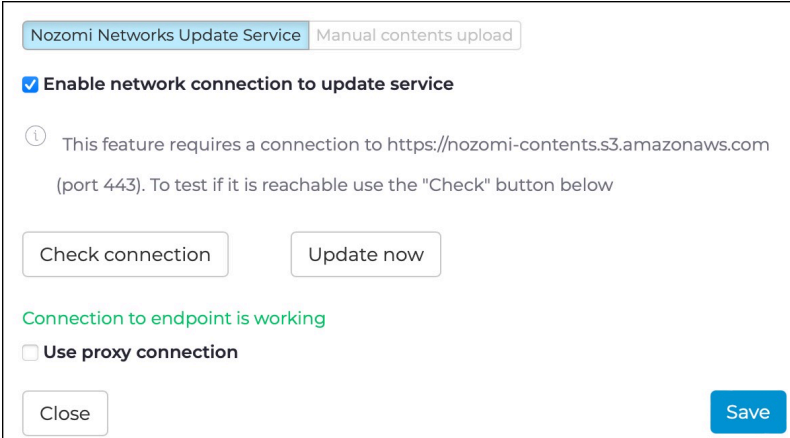
2. In the **System** section, select **Updates and licenses**.

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**.



Nozomi Networks Update Service Manual contents upload

☒ Enable network connection to update service

 This feature requires a connection to <https://nozomi-contents.s3.amazonaws.com> (port 443). To test if it is reachable use the "Check" button below

Check connection Update now

Connection to endpoint is working

☐ Use proxy connection

Close Save

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

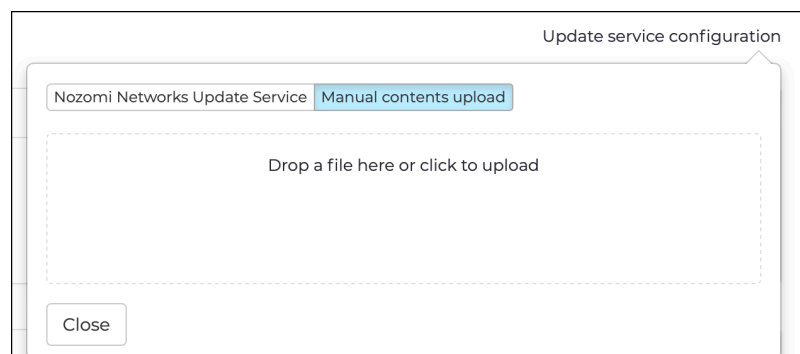
Before you can deploy Arc, you must import it first. There are two methods you can use to do this, one method is through a manual contents upload. The alternative method is through the Nozomi Networks Update Service.

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 5. Dependencies

| Feature | Windows  | Linux  | macOS  |
|--------------------|--|--|--|
| Sigma rules | Sysmon | Not supported | Not supported |
| | PowerShell-script block-logging | | |
| | PowerShell Core-script block-logging | | |
| USB detections | USBPcap | Not supported | Not supported |
| Traffic monitoring | WinPcap or Npcap | Not needed | libpcap |
| Asset details | Not needed | dmidecode | Not needed |

Users have to install dependencies. 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](#)

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:**

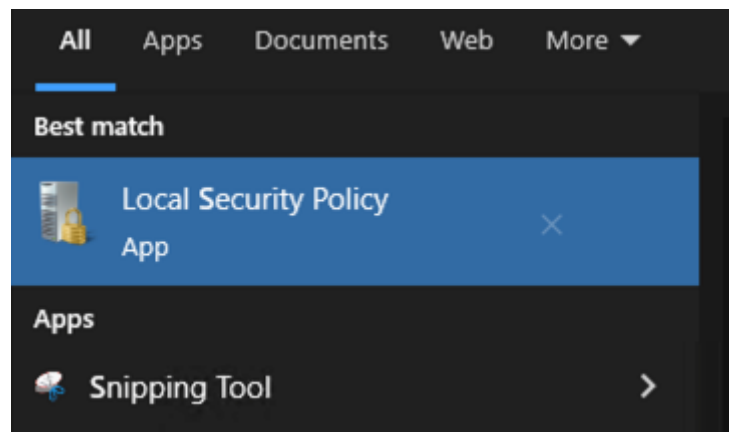
After a dependency is installed, you must restart Arc to make it active. When Guardian automatically installs dependencies during deployment, no user actions are necessary.

Enable security log events

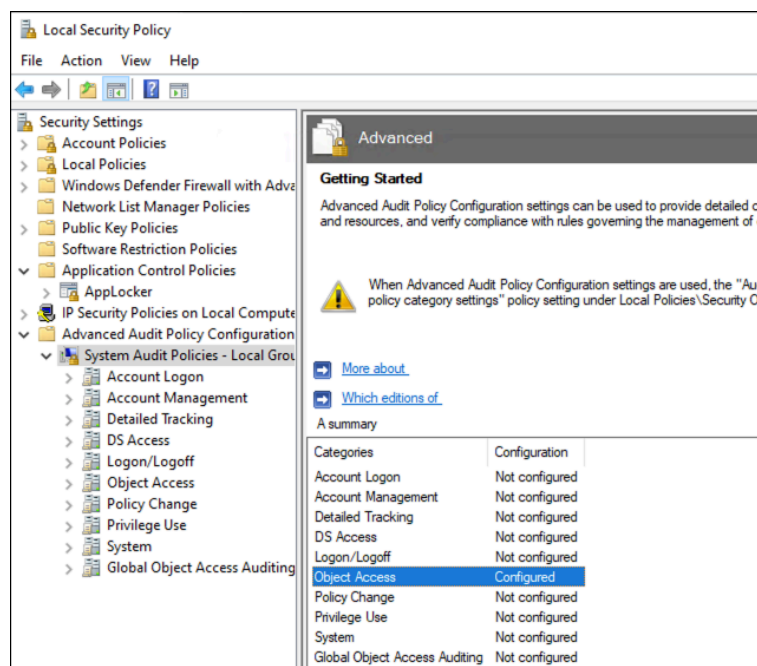
Before you can use Sigma rules related to security log events, you will need to enable them.

Procedure

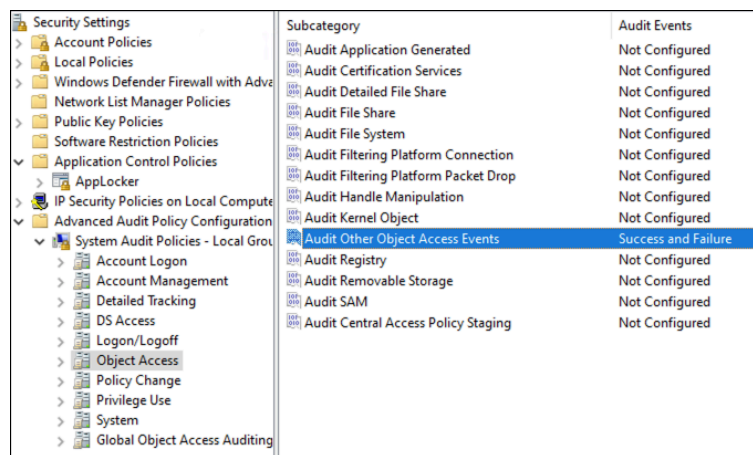
1. Open the Windows **Start** menu and search for the **Local Security Policy** application. Launch the application.



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

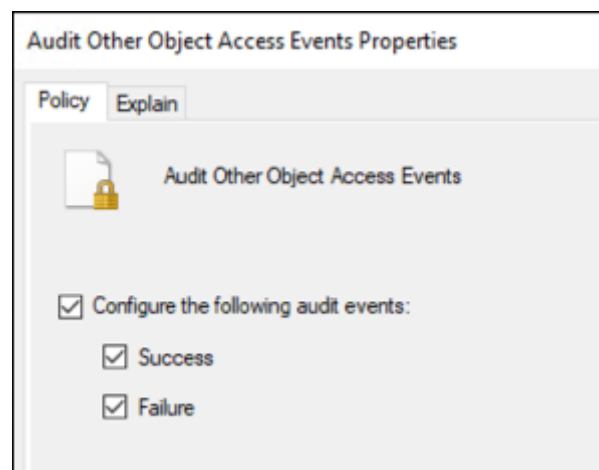


3. Select **Object Access > Audit Other Object Access Events**.



4. In the **Policy** tab, select these checkboxes:

- **Configure the following audit events**
- **Success**
- **Failure**



Results

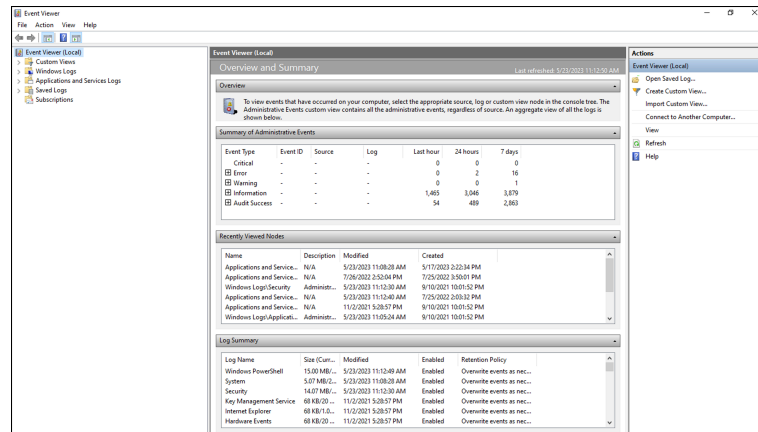
Security log events are now enabled in Windows.

Enable printservice log events

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

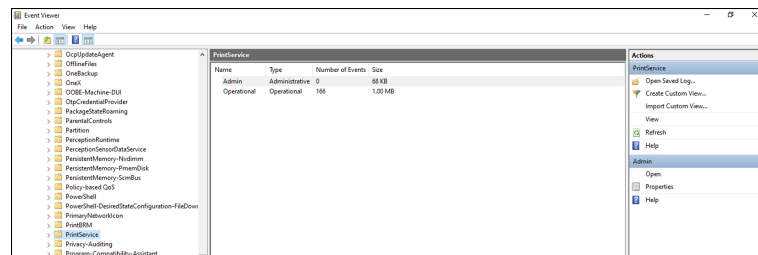
Procedure

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



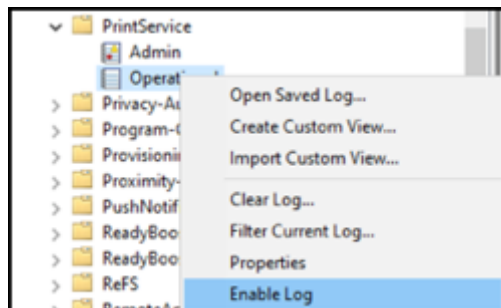
Result: The **Event Viewer** application opens.

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.

Chapter 4. Configuration



Local configuration UI

The default method to manage Arc is through the parent system software. However, it is also possible to manage Arc through a local configuration UI.

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 configuration [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 configuration [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 configuration [UI](#), you might need to enable Arc in **System Preferences > Security & Privacy**.

**Note:**

To use the commands `install` and `uninstall`, you must run the local configuration [UI](#) with admin rights. When you double-click the executable file, a request for admin rights will be made. In Windows, an additional prompt will show when you do this. To have full control, use the shell.

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

The local configuration [UI](#) has these two pages:

- [Status \(on page 53\)](#)
- [Configuration \(on page 55\)](#)

**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 configuration [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.

Status

The **Status** page of the local configuration UI shows the status of sensors, dependencies, and the execution of Arc.

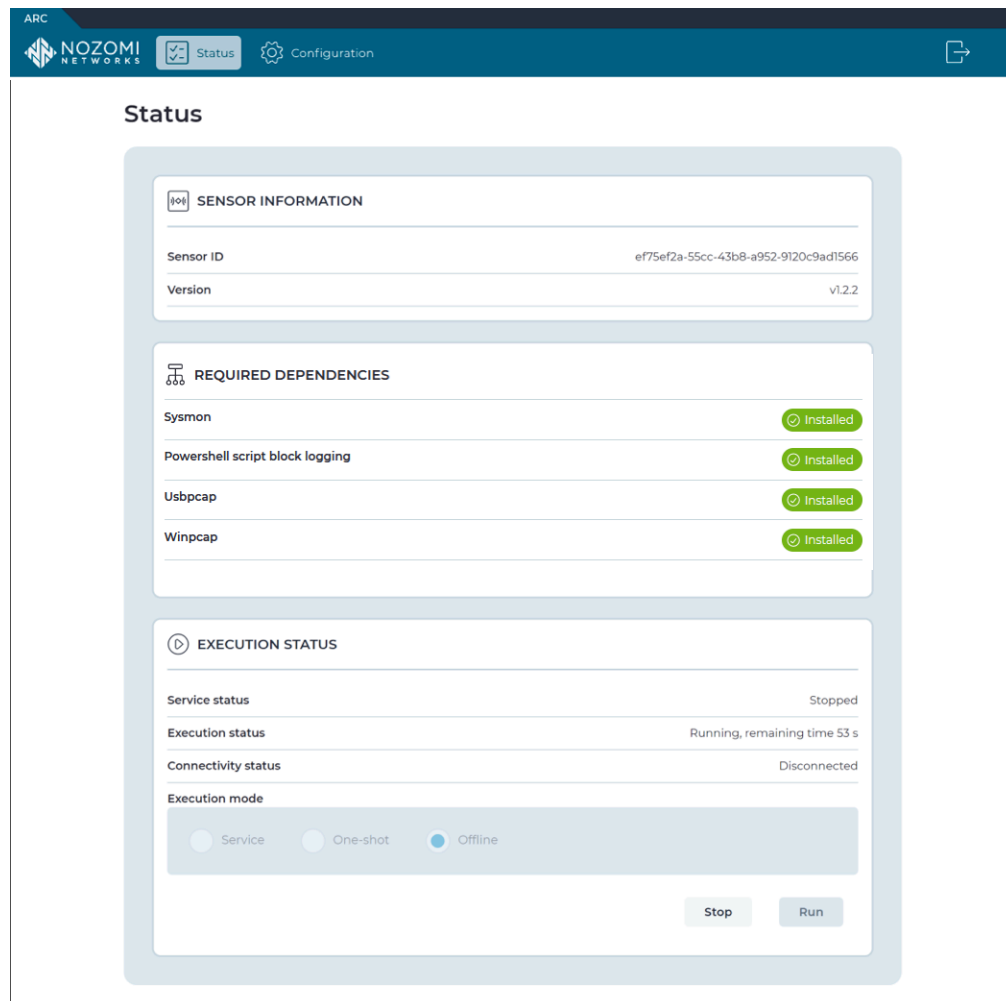


Figure 14. Status page

Sensor information

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

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

Required dependencies

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

Execution status

Service status:

- Not installed
- Stopped

- Running
- Unknown - in case of generic issues

Execution status:

- Running, remaining time XXXX s - in case of **One-shot** or **Offline** executions
- Running as service
- Stopped

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

Execution mode: This shows a radio button for each of the three execution modes:

- Service
- One-shot
- Offline

Run/Stop button: This button lets you:

- Run the Arc process, if it is not currently running
- Stop the Arc process, if it is currently running

**Note:**

You can also stop the Arc process from the terminal with the command: `CTRL+C`.

Configuration

The **Configuration** page of the local configuration UI gives you access to the Arc configuration options.

The screenshot shows the 'Configuration' page of the Arc interface. At the top, there's a header with 'ARC NOZOMI NETWORKS' and tabs for 'Status' and 'Configuration'. A warning message states: 'When connected in Service mode, the local configuration is overridden by the upstream. One-shot and Offline mode use the local configuration instead.' The main content area is divided into three sections: 'UPSTREAM CONNECTION', 'EXECUTION OPTIONS', and 'TRAFFIC MONITORING'. The 'UPSTREAM CONNECTION' section includes fields for 'Endpoint' and 'Token', and a 'Check connection' button. The 'EXECUTION OPTIONS' section features a dropdown for 'Execution time [s]' (set to 180), checkboxes for 'Sigma rules', 'Node points', 'Smart Polling', 'USB detections', 'Discovery', 'Local ARP table', and 'Use static entries', and a 'Log level' dropdown (set to Debug). The 'TRAFFIC MONITORING' section has checkboxes for 'Enable' and 'Enable continuous mode', a 'Max used Memory [MB]' dropdown (set to 32), and a 'Network interface' dropdown (set to 'Choose a network interface'). At the bottom, there are 'Save' and 'Reset' buttons.

Figure 15. Configuration page

Upstream connection

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

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

Check connection button: This checks if the connection parameters are correct.

Execution options

Execution time dropdown: This sets 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.

Sigma rules (Windows only): This lets you enable/disable Sigma rules.

USB detections (Windows only): This lets you enable/disable [USB](#) detections.

Node points: This lets you enable/disable the production of node points.

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

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:

Node points and **Smart Polling** require that a Smart Polling license is enabled upstream.

Local ARP table: This lets you enable/disable the ability to use the local [ARP](#) table to confirm addresses. The **Use static entries** checkbox lets you enable/disable the use of static entries in the [ARP](#) table. Static entries are user-defined. You should only use them if they can be trusted.

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

- Debug
- Info
- Error

Traffic monitoring

Enable checkbox: This lets you enable/disable traffic monitoring.

Enable continuous mode checkbox: This lets you enable/disable continuous mode. For more details, see [Continuous mode \(on page 57\)](#).

Arc uses two different methods for traffic monitoring:

- Intermittent mode
- Continuous mode

Intermittent mode 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:

- **Monitoring 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

Continuous 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:

- **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

Network interface dropdown: This 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.

Open the local configuration UI

The local configuration 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 configuration [UI](#).



Note:

On macOS, before you can open the local configuration [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 configuration [UI](#) is now open.

Shell commands

A list of useful shell commands.

Table 6. Shell commands

| Command | Function | Note |
|---|--|------|
| <code>.\arc-windows-amd64.exe install</code> | Install Arc as an OS-service, ready to be started. On reboot Arc is automatically started. | 1 |
| <code>.\arc-windows-amd64.exe start</code> | Start the Arc service. | |
| <code>.\arc-windows-amd64.exe stop</code> | Stop the Arc service. | |
| <code>.\arc-windows-amd64.exe restart</code> | Restart the Arc service. | |
| <code>.\arc-windows-amd64.exe uninstall</code> | Uninstall Arc. | 1 |
| <code>.\arc-windows-amd64.exe version</code> | Return the Arc version. | |
| <code>.\arc-windows-amd64.exe status</code> | Return the Arc service status. | |
| <code>.\arc-windows-amd64.exe oneshot</code> | Start Arc in One-shot mode. | 2 |
| <code>.\arc-windows-amd64.exe offline</code> | Start Arc in Offline mode. | |
| <code>.\arc-windows-amd64.exe</code> | Launch the local configuration UI . | |
| <code>.\arc-windows-amd64.exe install_dependencies</code> | Trigger the dependencies installation. | 1 |



Note:

1. Requires admin rights.
2. When used as a command, the correct spelling is: `oneshot`.

Configuration in Guardian

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**.

Configuration in Vantage

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.*

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

Chapter 5. Deployment



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.

Automatically

Deploy Arc automatically from Guardian

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

- 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
- An Administrator user is granted to access the target machine and to be used by Guardian in the process
- The Administrator user is granted the Unrestricted Execution Policy for PowerShell scripts
- Credentials of the target machines are stored into the Credentials Manager

Procedure

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

| Arc | | | | | | |
|---------------------------|------------------|----------------------------------|-------------------------|----------------------|--------------|----------|
| Page 1 of 11, 268 entries | | Deployment | | Node points | | |
| Advanced | | Execution details | | Live | | |
| ACTIONS | DEPLOYED VERSION | OPERATING SYSTEM | IP | VENDOR | PRODUCT NAME | TYPE |
| <input type="checkbox"/> | | Windows XP | 10.41.132.162 | Apple, Inc. | | computer |
| <input type="checkbox"/> | | Windows 11 | 169.254.147.215 | Quanta Computer Inc. | | computer |
| <input type="checkbox"/> | | macOS | - | Apple, Inc. | | computer |
| <input type="checkbox"/> | | Windows 10 / 11 / Server / Se... | 10.41.48.205 | | | computer |
| <input type="checkbox"/> | v0.0.110 | Ubuntu Linux 22.04 | 10.41.48.102 | VMware, Inc. | | computer |
| <input type="checkbox"/> | | Windows 7 | 172.18.104.28 | | | computer |
| <input type="checkbox"/> | | Windows 11 | 169.254.245.42 | Intel Corporate | | computer |
| <input type="checkbox"/> | | macOS 12.6.2 | fe80:947c:9ff:fed0:a02c | Apple, Inc. | | computer |

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

2. Select the machine(s) to deploy Arc on, and choose from the available Arc deployment options.

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.

Make connections

Connect a deployed CMC, Guardian, Guardian Air or Arc sensor, and work with their data right here in Vantage.

My sensor is: **N2OS** **Arc** Guardian Air

Download the correct Arc bundle for your Operating System and Architecture.

Configure Arc bundle

Windows [386] (msi) Linux [amd64] (zip) macOS [amd64] (zip)
Windows [386] (zip) Linux [arm] (zip) macOS [arm64] (zip)
Windows [amd64] (msi) Linux [arm64] (zip)
Windows [amd64] (zip)

Sensor ID

Next

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 (zip) |
| macOS - arm64 (zip) |
| Linux - amd64 (zip) |
| Linux - arm (zip) |
| Linux - arm64 (zip) |
| Windows - 386 (msi) |
| Windows - 386 (zip) |
| Windows - amd64 (msi) |
| Windows - amd64 (zip) |

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.

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 `--%`, example: `msiexec --% /i "arc.windows.amd64.msi" /L*v "installer.log"`

You can pass custom arguments to the setup installer by settings **ARGS** prop:

```
msiexec /i "arc.windows.amd64.msi" /L*v "installer.log" ARGS="--mode=silent"
```

Supported arguments list:

- `--mode=[silent|gui]` (Select if start setup in GUI mode or in silent mode.)
- `--acceptLicense=true` (If set skips license (EULA) acceptance, mandatory for silent mode.)
- `--endpoint=<ip address of guardian or vantage>`
- `--token=<token to connect to guardian>`
- `--installDeps=[all|sysmon|usbpcap|npcap|psscriptblocklogging]` (It supports multiple values separated by "," Example: `sysmon,usbpcap,npcap`)
- `--uninstallDeps=[all|sysmon|usbpcap|npcap|psscriptblocklogging]` (Same as above.)
- `--sysmonPath=<path of sysmon.zip>` (To be used to provide the path of sysmon installed, otherwise it will be downloaded from guardian/vantage or from Microsoft. It is required to install an old version of sysmon (Windows 7).)
- `--rebootIfRequired=false` (It will not reboot the machine if required.)
- `--createShortcutIcon=false` (This will not create a desktop shortcut.)
- `--startArcService=false` (It will not install/start arc service.)

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.

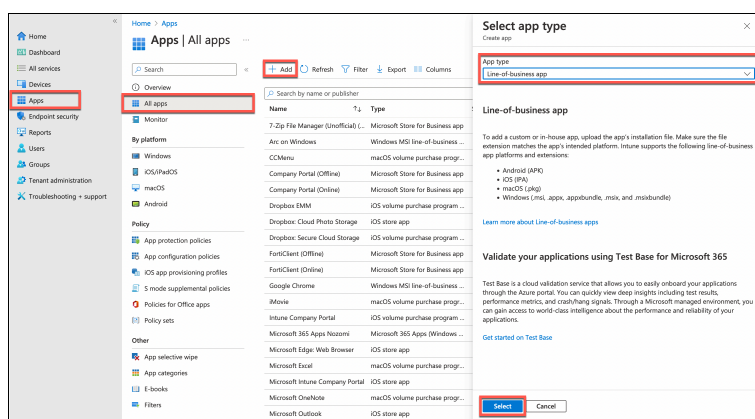
Before you begin

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

- Downloaded the correct Arc package for your [OS](#)
- Compiled the [MSI](#) file

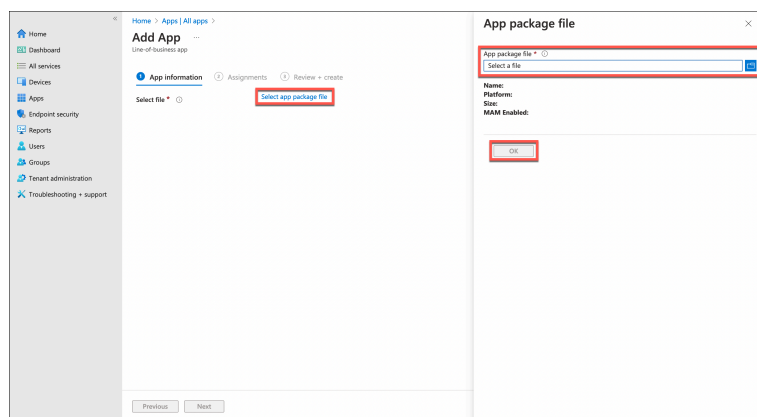
Procedure

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**.

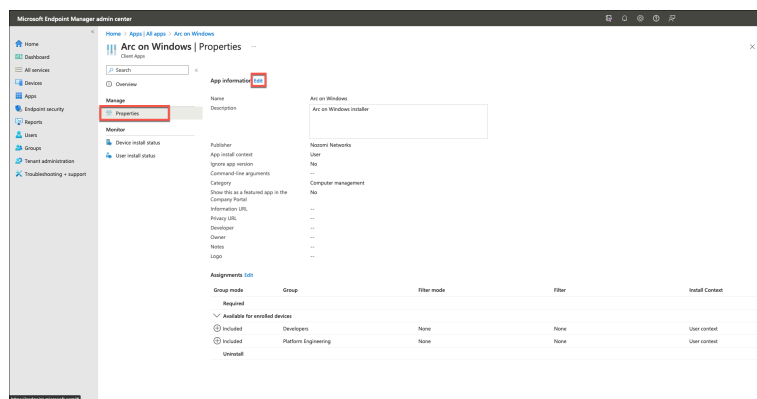
10. Select the name of the correct file.

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 \(on page 69\)](#).

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.

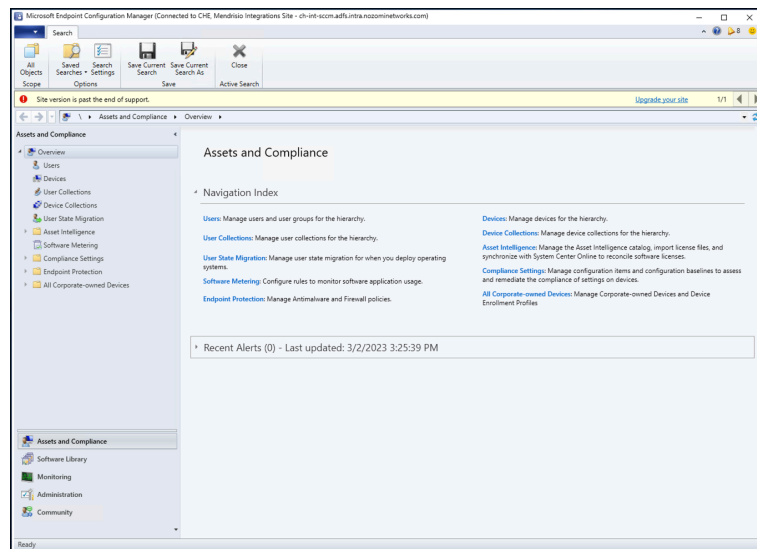
Before you begin

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

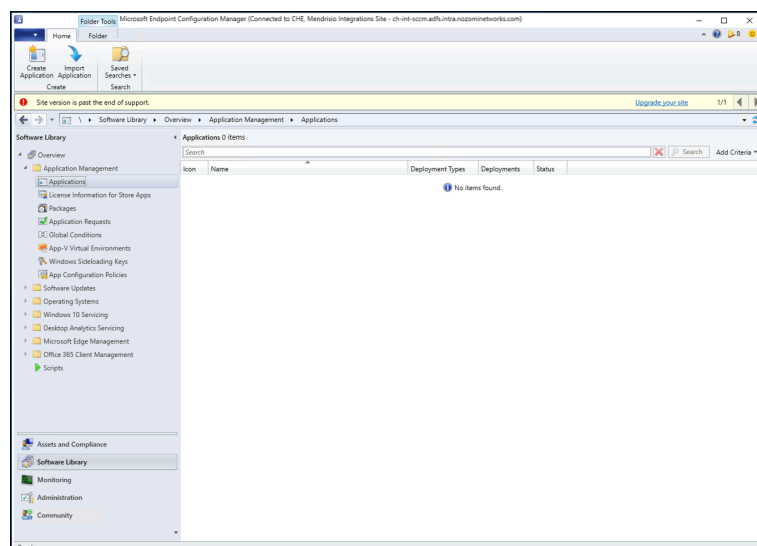
- Downloaded the correct Arc package for your [OS](#)
- Compiled the [MSI](#) file

Procedure

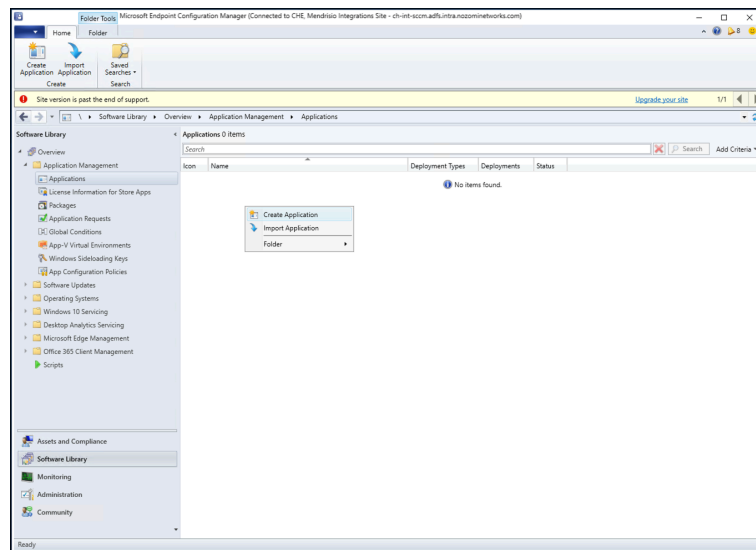
1. Open **Microsoft Endpoint Configuration Manager**.



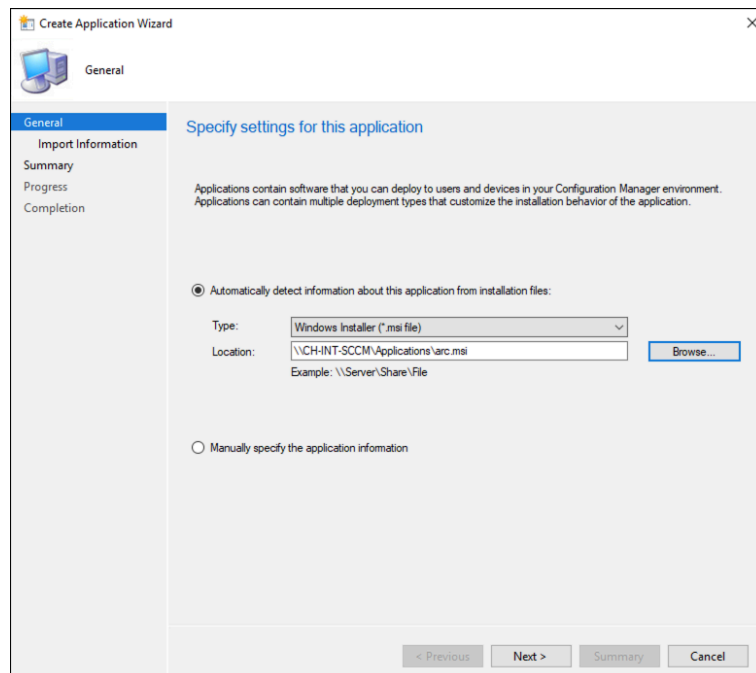
2. Go to **Software Library > Overview > Application Management > Applications**.



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

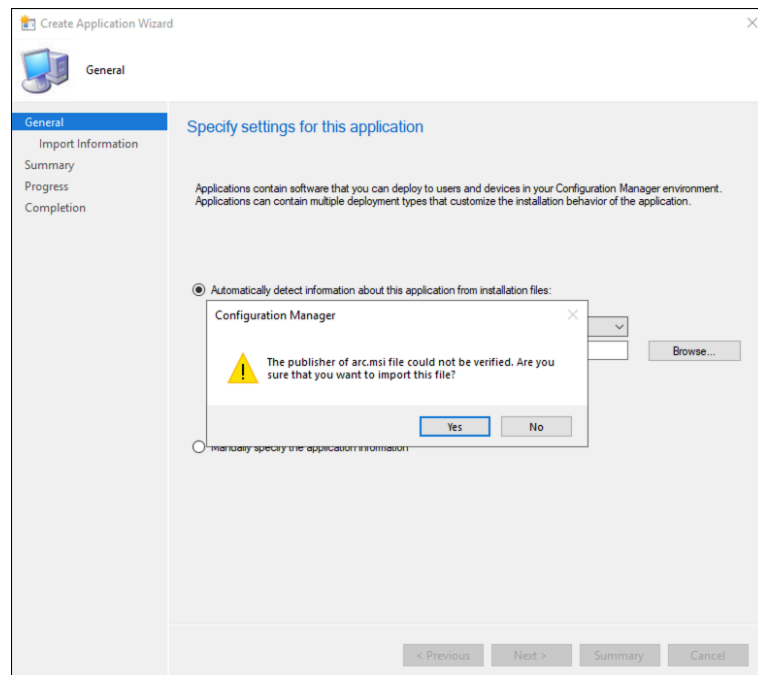


4. Browse and select the location of the *MSI* file, and then select **Next**.

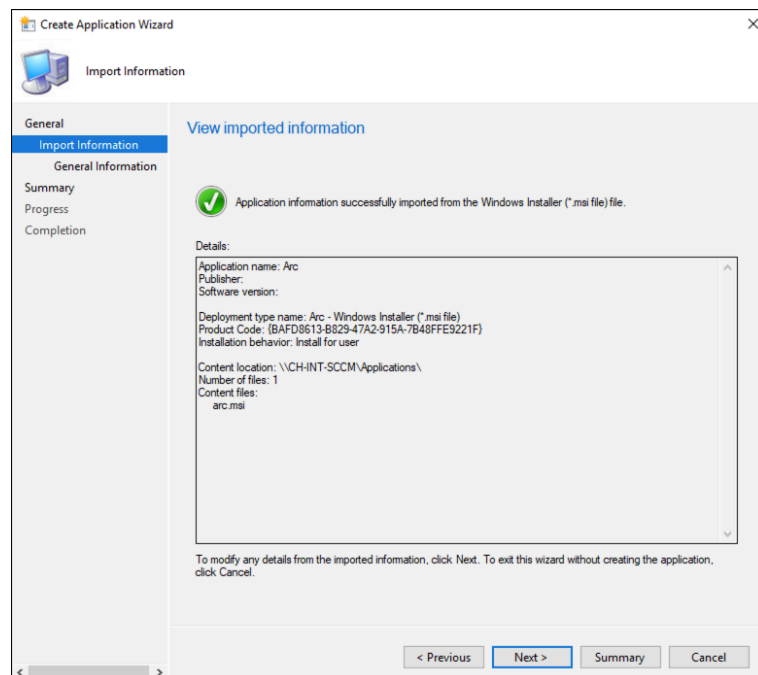


Result: A dialog shows.

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



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



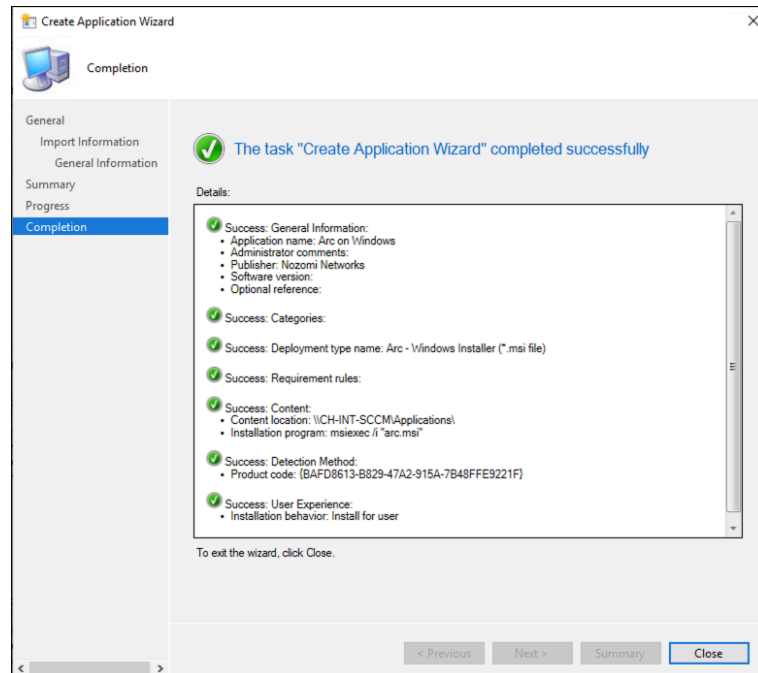
7. On the **General Information** page, enter details in the fields as necessary. Select **Next**.

The screenshot shows the 'Create Application Wizard' window, specifically the 'General Information' tab. The left sidebar lists 'General', 'Import Information', 'General Information' (selected), 'Summary', 'Progress', and 'Completion'. The main area is titled 'Specify information about this application'. It contains several input fields: 'Name' (filled with 'Arc on Windows'), 'Administrator comments' (empty), 'Publisher' (filled with 'Nozomi Networks'), 'Software version' (empty), 'Optional reference' (empty), and 'Administrative categories' (empty with a 'Select...' button). Below these, a section titled 'Specify the installation program for this application and the required installation rights.' contains an 'Installation program' field (filled with 'msiexec /i "arc.msi"' and a 'Browse...' button), a checkbox for 'Run installation program as 32-bit process on 64-bit clients.' (unchecked), and an 'Install behavior' dropdown (set to 'Install for user'). At the bottom are navigation buttons: '< Previous', 'Next >' (highlighted), 'Summary', and 'Cancel'.

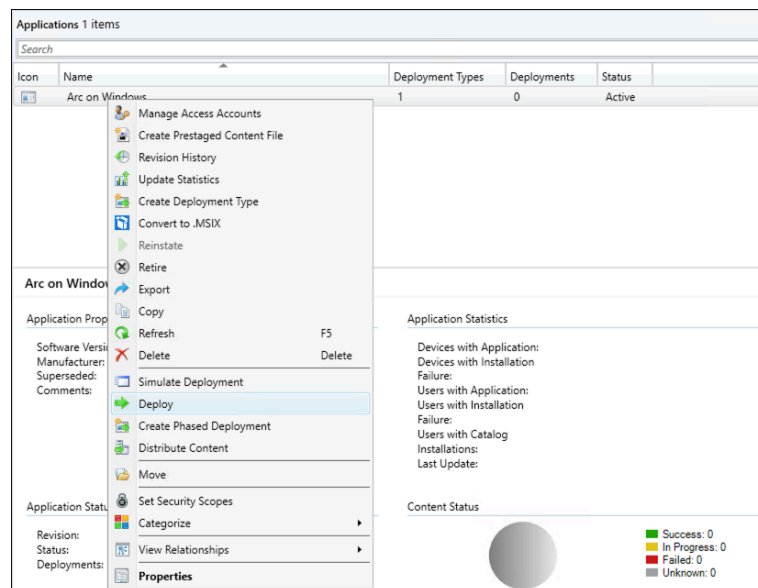
8. Review the settings, and then select **Next**.

The screenshot shows the 'Create Application Wizard' window, specifically the 'Summary' tab. The left sidebar lists 'General', 'Import Information', 'General Information', 'Summary' (selected), 'Progress', and 'Completion'. The main area is titled 'Confirm the settings for this application'. It contains a 'Details' section with a list of settings: 'General Information' (Application name: Arc on Windows, Administrator comments, Publisher: Nozomi Networks, Software version, Optional reference), 'Categories' (Deployment type name: Arc - Windows Installer (*.msi file)), 'Requirement rules', 'Content' (Content location: \\CH-INT-SCCM\Applications\, Installation program: msiexec /i "arc.msi"), 'Detection Method' (Product code: {BAFD8613-B829-47A2-915A-7B48FFES221F}), and 'User Experience' (Installation behavior: Install for user). Below the details is a note: 'To change these settings, click Previous. To apply the settings, click Next.' At the bottom are navigation buttons: '< Previous', 'Next >' (highlighted), 'Summary', and 'Cancel'.

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**.

The screenshot shows the 'Deploy Software Wizard' window, specifically the 'General' tab. The left sidebar lists the steps: General, Content, Deployment Settings, Scheduling, User Experience, Alerts, Summary, Progress, and Completion. The main area is titled 'Specify general information for this deployment'. It contains two dropdown menus: 'Software' with 'Arc on Windows' selected and 'Collection' with 'All Users' selected. Both have 'Browse...' buttons to the right. Below these are two checkboxes: 'Use default distribution point groups associated to this collection' (unchecked) and 'Automatically distribute content for dependencies' (checked). At the bottom is a large text area for 'Comments (optional)'. Navigation buttons at the bottom right are '< Previous', 'Next >', 'Summary', and 'Cancel'.

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

The screenshot shows the 'Deploy Software Wizard' window, specifically the 'Content' tab. The left sidebar is the same as in the previous screenshot. The main area is titled 'Specify the content destination'. It features a table with columns 'Name' and 'Type' showing 'There are no items to show in this view.' Below this is a section for 'Additional distribution points, distribution point groups, and the distribution point groups that are currently associated with collections to distribute content to:'. It includes a search bar, a table with columns 'Name', 'Description', and 'Associations' (also empty), and an 'Add' button. A dropdown menu is open from the 'Add' button, showing 'Distribution Point' and 'Distribution Point Group'. Navigation buttons at the bottom right are '< Previous', 'Next >', 'Summary', and 'Cancel'.

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

The screenshot shows the 'Content' page of the 'Deploy Software Wizard'. The left sidebar has a tree view with 'Content' selected. The main area is titled 'Specify the content destination'. It contains a table with columns 'Name' and 'Type'. Below the table, there is a section for 'Additional distribution points, distribution point groups, and the distribution point groups that are currently associated with collections to distribute content to:'. This section includes a search filter, an 'Add' button, and a table with columns 'Name', 'Description', and 'Assoc'. The table contains one entry: 'CH-INT-SCCM.ADFS.INTRA.NOZOMINETWORKS.C...' with the description 'Distribution point'. At the bottom, there are buttons for '< Previous', 'Next >', 'Summary', and 'Cancel'.

| Name | Type |
|--|------|
| There are no items to show in this view. | |

| Name | Description | Assoc |
|--|--------------------|-------|
| CH-INT-SCCM.ADFS.INTRA.NOZOMINETWORKS.C... | Distribution point | |

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

The screenshot shows the 'Deployment Settings' page of the 'Deploy Software Wizard'. The left sidebar has a tree view with 'Deployment Settings' selected. The main area is titled 'Specify settings to control how this software is deployed'. It contains two dropdown menus: 'Action' (set to 'Install') and 'Purpose' (set to 'Required'). Below these are four checkboxes: 'Allow end users to attempt to repair this application', 'Pre-deploy software to the user's primary device', 'Send wake-up packets', and 'Allow clients on a metered Internet connection to download content after the installation deadline, which might incur additional costs'. At the bottom, there are buttons for '< Previous', 'Next >', 'Summary', and 'Cancel'.

Action:

Purpose:

☐ Allow end users to attempt to repair this application

☐ Pre-deploy software to the user's primary device

☐ Send wake-up packets

☐ Allow clients on a metered Internet connection to download content after the installation deadline, which might incur additional costs

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

The screenshot shows the 'Scheduling' page of the 'Deploy Software Wizard'. The left sidebar contains a list of steps: General, Content, Deployment Settings, Scheduling (highlighted), User Experience, Alerts, Summary, Progress, and Completion. The main area is titled 'Specify the schedule for this deployment'. It includes a text block explaining that the application will be available as soon as it is distributed to the content server(s) unless it is scheduled for a later time. Below this, there are settings for 'Time based on' (set to UTC), 'Schedule the application to be available at' (set to 3/2/2023 at 2:31 PM), and 'Installation deadline' (set to 'As soon as possible after the available time'). There is also a checkbox for 'Delay enforcement of this deployment according to user preferences, up to the grace period defined in client settings.' At the bottom right, there are four buttons: '< Previous', 'Next >' (highlighted), 'Summary', and 'Cancel'.

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

The screenshot shows the 'User Experience' page of the 'Deploy Software Wizard'. The left sidebar contains a list of steps: General, Content, Deployment Settings, Scheduling, User Experience (highlighted), Alerts, Summary, Progress, and Completion. The main area is titled 'Specify the user experience for the installation of this software on the selected devices'. It includes a text block 'Specify user experience setting for this deployment' and a dropdown menu for 'User notifications' (set to 'Display in Software Center and show all notifications'). Below this, there are checkboxes for 'When software changes are required, show a dialog window to the user instead of a toast notification', 'Software Installation', and 'System restart (if required to complete the installation)'. There is also a checkbox for 'Commit changes at deadline or during a maintenance window (requires restarts)'. At the bottom right, there are four buttons: '< Previous', 'Next >' (highlighted), 'Summary', and 'Cancel'.

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

Deploy Software Wizard

Alerts

General
Content
Deployment Settings
Scheduling
User Experience
Alerts
Summary
Progress
Completion

Specify Configuration Manager and Operations Manager alert options

Configuration Manager generates alerts when this application is deployed.

Threshold for successful deployment

☐ Create a deployment alert when the threshold is lower than the following:

Percent success:

After:

Threshold for failed deployment

☐ Create a deployment alert when the threshold is higher than the following:

Percent failure:

Enable System Center Operations Manager maintenance mode if you want Operations Manager to generate alerts when this application is deployed.

☐ Enable System Center Operations Manager maintenance mode

☐ Generate System Center Operations Manager alert when a software installation fails

< Previous **Next >** Summary Cancel

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

Deploy Software Wizard

Summary

General
Content
Deployment Settings
Scheduling
User Experience
Summary
Progress
Completion

Confirm the settings for this new deployment

Details:

- General**
 - Software: Arc on Windows
 - Collection: All Users (Member Count: 6)
 - Use default distribution point groups associated to this collection: Disabled
 - Automatically distribute content for dependencies: Enabled
- Deployment Settings**
 - Action: Install
 - Purpose: Required
 - Allow end users to attempt to repair this application: Disabled
 - Pre-deploy software to the user's primary device: Disabled
 - Send wake-up packets: Disabled
 - Allow clients to use a metered Internet connection to download content: Disabled
- Application Settings (retrieved from application in software library)**
 - Application Name: Arc on Windows
 - Application Version:
 - Application Deployment Types: Windows Installer (*.msi file)
- Scheduling**
 - Time based on: UTC
 - Available Time: As soon as possible
 - Deadline Time: Disabled
 - Delayed enforcement on deployment: Disabled
- User Experience**
 - User notifications: Display in Software Center and show all notifications
 - Ignore Maintenance Windows: Disabled
 - When software changes are required, show a dialog window to the user instead of a toast notification: Disabled

To change these settings, click Previous. To apply the settings, click Next.

< Previous **Next >** Summary Cancel

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.

Make connections

Connect a deployed CMC, Guardian, Guardian Air or Arc sensor, and work with their data right here in Vantage.

My sensor is: **N2OS** **Arc** Guardian Air

Download the correct Arc bundle for your Operating System and Architecture. [Configure Arc bundle](#)

Windows [386] (msi) Linux [amd64] (zip) macOS [amd64] (zip)

Windows [386] (zip) Linux [arm] (zip) macOS [arm64] (zip)

Windows [amd64] (msi) Linux [arm64] (zip)

Windows [amd64] (zip)

Sensor ID Your Sensor ID here

[Next](#)

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 (zip) |
| macOS - arm64 (zip) |
| Linux - amd64 (zip) |
| Linux - arm (zip) |
| Linux - arm64 (zip) |
| Windows - 386 (msi) |
| Windows - 386 (zip) |
| Windows - amd64 (msi) |
| Windows - amd64 (zip) |

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.

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.

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

Result: The **Arc setup wizard** shows.
5. Follow the steps in the wizard.

Results

Arc has been deployed.

Linux

Deploy Arc manually with a local UI

You can manually deploy Arc to run in Service mode.

Before you begin

Make sure that you:

- Are signed in with admin rights
- 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`

**Note:**

This location is not mandatory, but it will grant Arc superuser permissions when it needs them.

3. [Open the local configuration UI \(on page 58\).](#)
4. In the **Configuration** page of the local configuration [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 connected.

Deploy Arc manually without a local UI

You can manually deploy Arc to run in Service mode.

Before you begin

Make sure that you:

- Are signed in with elevated privileges to execute all the commands in this procedure
- Have downloaded an Arc package

Procedure

1. Extract the [ZIP](#) package on the target machine.
2. Use [SSH](#) to log in to the target host.
3. If the folder `/usr/local/sbin` does not exist, create it.

**Note:**

This location is not mandatory, but it will grant Arc superuser permissions when it needs them.

4. Extract the contents of the [ZIP](#) archive into the folder `/usr/local/sbin/arc`
5. To register Arc as a service (daemon), execute the 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 connected.

macOS

Deploy Arc manually on macOS

You can manually deploy Arc to run in Service mode.

Before you begin

Make sure that you:

- Are signed in with admin rights
- 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 connected to the upstream endpoint.

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:

- Are signed in with admin rights
- 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 `arc`.



Note:

This location is not mandatory, but it will grant Arc superuser permissions when it needs them.

3. [Open the local configuration UI \(on page 58\)](#).
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.

Result: The **Execution status** changes from **Stopped** to **Running**. **One-shot mode only:** The **Connectivity status** changes from **Disconnected** to **Connected**.

Results

The Arc sensor is now connected to the upstream endpoint.

Linux

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:

- Are signed in with admin rights
- 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`

**Note:**

This location is not mandatory, but it will grant Arc superuser permissions when it needs them.

3. [Open the local configuration UI \(on page 58\)](#).
4. In the **Configuration** page of the local configuration [UI](#), set these parameters:
 - a. **Endpoint** (One-shot mode 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 mode only): 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. 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.

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.

Result: The **Execution status** changes from **Stopped** to **Running**. **One-shot mode only:** The **Connectivity status** changes from **Disconnected** to **Connected**.

Deploy Arc manually without a local UI

You can manually deploy Arc to run in Service mode.

Before you begin

Make sure that you:

- Are signed in with elevated privileges to execute all the commands in this procedure
- Have downloaded an Arc package

Procedure

1. Extract the [ZIP](#) package on the target machine.
2. Use [SSH](#) to log in to the target host.
3. If the folder `/usr/local/sbin` does not exist, create it.

**Note:**

This location is not mandatory, but it will grant Arc superuser permissions when it needs them.

4. Extract the contents of the [ZIP](#) archive into the folder `/usr/local/sbin/arc`
5. To register Arc as a service (daemon), execute the 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 connected.

macOS

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:

- Are signed in with admin rights
- 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 configuration UI \(on page 58\)](#).
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 Vantage 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 Vantage 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.

Result: The **Execution status** changes from **Stopped** to **Running**. **One-shot mode only:** The **Connectivity status** changes from **Disconnected** to **Connected**.

Results

The Arc sensor is now connected to the upstream endpoint.



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 configuration [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 7. 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 8. Elastic notification values - virtual sensors

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

Table 8. 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



Note:

When used as a command, the correct spelling is: `oneshot`

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 configuration UI \(on page 58\).](#)
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

[WinPcap](#) is not installed.



Note:

If [WinPcap](#) 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 [WinPcap](#).
2. Restart Arc to make sure that [WinPcap](#) 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 configuration UI \(on page 58\)](#).
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 configuration [UI](#).

Possible cause

You do not have **USB detections** enabled in the local configuration [UI](#).

Procedure

1. [Open the local configuration UI \(on page 58\)](#).
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 \(on page 41\)](#).
3. Alternatively, [Import Arc through a manual contents upload \(on page 42\)](#).

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 configuration [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 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.

Berkeley Packet Filter

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

Central Management Console

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

Central Processing Unit

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

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.

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.

Federal Information Processing Standards

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

File Allocation Table

FAT is a file system architecture used in computers for managing disk space. It maintains a table to track the allocation of files on a disk, supporting efficient data storage, access, and management

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.

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.

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.

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.

Packet Capture

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

Packet Capture Next Generation

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

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 Copy Protocol

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

Secure Shell

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

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.

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.

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.

