



# Installation Overview

SD-AVC operates in a service/agent configuration. For details, see [SD-AVC Architecture](#).

- **Network Service:** The SD-AVC network service is installed as a virtualized component on a Cisco device service container, and operates on the device as a service. See: [System Requirements: SD-AVC Network Service Host, on page 2](#)
- **Agent:** Other devices in the network are enabled as agents, and communicate with the SD-AVC network service. See: [Configuring Network Devices to Use SD-AVC](#)
- **High Availability:** SD-AVC supports a high availability (HA) configuration, using more than one SD-AVC network service. See: [SD-AVC High Availability](#)
- **Connectivity:** Operating SD-AVC requires connectivity between the SD-AVC network service and the SD-AVC agents that operate on devices in the network. See: [Configuring Connectivity, on page 3](#)

## Summary of Setup

The following table briefly describes the steps to set up SD-AVC:

*Table 1: Setup*

	Setup Task	Section
1	Download the open virtual appliance (OVA) file for the SD-AVC network service and install it on a host device accessible by other devices in the network.	See: <a href="#">Installing the SD-AVC Network Service, on page 4</a>
2	Enable the SD-AVC agent on Cisco devices in the network, pointing them to the SD-AVC network service set up in the previous step. (In a high availability setup, include more than one SD-AVC network service instance.)	See: <a href="#">Configuring Network Devices</a>
3	Configure connectivity, or optionally, secure connectivity.	See: <a href="#">Configuring Connectivity, on page 3</a> , <a href="#">Configuring Secure Connectivity</a>

- [System Requirements: SD-AVC Network Service Host, on page 2](#)
- [Configuring Connectivity, on page 3](#)

- [Using SD-AVC with Cisco IWAN, on page 4](#)
- [Installing the SD-AVC Network Service, on page 4](#)
- [Upgrading the SD-AVC Network Service, on page 9](#)

## System Requirements: SD-AVC Network Service Host

The following table describes platform requirements for hosting the SD-AVC network service.

**Table 2: SD-AVC Network Service Host Requirements**

Host	Memory	Storage	Recommended OS	CPU
Cisco ASR1001-X Aggregation Services Routers	M-ASR1001X-16GB	NIM-SSD and SSD-SATA-400G	Cisco IOS XE 17.7.1 or later	—
Cisco ASR1002-X Aggregation Services Router	M-ASR1002X-16GB	MASR1002X-HD-320G	Cisco IOS XE 17.7.1 or later	—
Cisco ASR1002-HX Aggregation Services Router	M-ASR1002HX-16GB	NIM-SSD and SSD-SATA-400G	Cisco IOS XE 17.7.1 or later	—
Cisco ISR4431 Integrated Services Router	RAM: MEM-4400-4GU16G Flash: MEM-FLASH-16G	NIM-SSD and SSD-MSATA-400G	Cisco IOS XE 17.7.1 or later	—
Cisco ISR4451 Integrated Services Router	RAM: MEM-4400-4GU16G Flash: MEM-FLASH-16G	NIM-SSD and SSD-MSATA-400G	Cisco IOS XE 17.7.1 or later	—
Cisco Catalyst 8000V Edge Software	Minimum: 8 GB Recommended: 8 GB	20 GB	Cisco IOS XE 17.7.1 or later	Large-scale scenario (100 or more devices): 4 cores  Small-scale scenario (<100 devices): 1 core
Cisco DNA Center Traffic Telemetry Appliance (TTA)	—	—	Cisco IOS XE 17.7.1 or later	—

# Configuring Connectivity

Operating SD-AVC requires connectivity between various components.

- SD-AVC network service and host
- SD-AVC network service and agents
- Connectivity to the SD-AVC Dashboard

This section describes the connectivity requirements. If secure connectivity is required, see: [Configuring Secure Connectivity](#)

## Connectivity between SD-AVC Network Service and Host

Connectivity is required between the SD-AVC network service, which operates as a virtualized service, and the device hosting it. The host platform requires connectivity with the service through a virtual interface called VirtualPortGroup. The virtual service communicates with the host over this virtual interface, using SSH on TCP port 22.

## Connectivity between SD-AVC Network Service and Agents

Network devices operating with SD-AVC use an SD-AVC agent, which operates in the background on the device, to communicate with the central SD-AVC network service. Connectivity is required between each of these network devices and the SD-AVC network service (more than one network service in SD-AVC high availability configurations).

### • Ports

Communication between agent and service uses the following protocols and ports:

- **UDP:** Port 50000
- **TCP:** Ports 21, 8080, 59990-60000

### • Firewalls and Access Lists

Ensure that communication is possible from the SD-AVC agent to the SD-AVC network service on these ports for the relevant traffic. For example:

- Firewall policy must enable communication from the SD-AVC agent to the SD-AVC network service.
- If a network device has an access control list (ACL) configured, the ACL must permit communication from the SD-AVC agent to the SD-AVC network service.

## Connectivity to the SD-AVC Dashboard

Connecting to the SD-AVC Dashboard (see [Using SD-AVC](#)) requires access to the device hosting the SD-AVC network service, and involves TCP traffic through port 8443. Ensure that network policy (firewall, ACL, and so on) permits this connectivity for devices requiring access to the SD-AVC Dashboard.

## Using SD-AVC with Cisco IWAN

When operating SD-AVC in a Cisco IWAN environment, the SD-AVC network service may be hosted on the hub master controller (MC) or on a router dedicated for the purpose of hosting the service.

In either case, verify that the host device meets the system requirements for hosting the SD-AVC network service.

See: [System Requirements: SD-AVC Network Service Host, on page 2](#), [Installing the SD-AVC Network Service, on page 4](#)

## Installing the SD-AVC Network Service

The SD-AVC network service operates as a virtualized service on a Cisco router. It requires a few steps of configuration on the host router. After configuration is complete, you can check service status using the browser-based SD-AVC Dashboard.

**Table 3: Overview of Installation Steps**

Task	Steps
System requirements	Step 1
Installation	Steps 2 to 7
Configuration, Activation	Step 8 to 12
Verification	Steps 13 to 14
Connecting to SD-AVC Dashboard	Step 15

Examples follow the steps below.

### Installation Procedure

The following procedure installs the SD-AVC network service as a virtualized service on a Cisco router.

1. Verify that the intended host device meets the system requirements. See: [System Requirements: SD-AVC Network Service Host, on page 2](#)
2. Download the tar file for the SD-AVC network service from Cisco.com, using the [Download Software](#) tool. Specify a platform that supports hosting the SD-AVC virtual service, then navigate to software downloads for the platform. Select the **SD AVC Router Virtual Service** option to display available files for SD-AVC.

Example filename: `iosxe-sd-avc.4.3.tar`

3. Copy the downloaded file onto the device that will host the SD-AVC network service. Copy the file to one of the following locations, depending on the platform type:
  - For the Cisco Catalyst 8000V, use: `bootflash`
  - For ASR1000 Series or ISR4000 Series devices, use: `harddisk`

**harddisk** refers to the SSD or HD specified in the system requirements for the platform ([System Requirements: SD-AVC Network Service Host, on page 2](#)).

4. On the device, verify that the MD5 checksum of the downloaded tar file matches the checksum value provided.




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**Note** The correct MD5 checksum value appears on the [Download Software](#) page when downloading the package.

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**verify /md5 bootflash:filename.tar**

**Example:**

```
Device#verify /md5 bootflash:iosxe-sd-avc.4.3.tar
.....Done!
verify /md5 (bootflash:iosxe-sd-avc.4.3.tar) = d8b7af1b163ccc5ad28582a3fd86c44e
```

5. Ensure that the system time is set correctly on the host device.
  - (If using an NTP server) Verify that the platform is connected to the NTP server and that the system time is correct.
  - (If setting time manually) Set the system time correctly.




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**Input** If you change the system time after the SD-AVC service is already running, uninstall and re-install the SD-AVC service to ensure correct synchronization.

[Unconfiguring or Uninstalling the SD-AVC Network Service Installation Overview, on page 1](#)

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6. If specific DNS servers are required, configure the server(s) on the host device.




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**Input** Adding DNS servers after SD-AVC is active restarts the SD-AVC network service. During restart, the following are interrupted:

- Protocol Pack deployment to network devices
  - Vertical debug
- 

7. On the host device, execute the following command to extract the tar file and install the SD-AVC network service. By default, it is installed on the same storage device where the package was saved.

**service sd-avc install package** *disk-with-tar:tar-filename* **media** *location-for-tar-expansion*

Table 4: Command Details

CLI keyword/argument	Description
<i>disk-with-tar</i>	Specify one of the following, according to the platform type. The location refers to where the tar file was saved in a previous step. <ul style="list-style-type: none"> <li>• Cisco Catalyst 8000V: <b>bootflash</b></li> <li>• ASR1000 Series or ISR4000 Series: <b>harddisk</b></li> </ul>
<i>tar-filename</i>	Downloaded tar file.
<i>location-for-tar-expansion</i>	Specify one of the following, according to the platform type: <ul style="list-style-type: none"> <li>• Cisco Catalyst 8000V: <b>bootflash</b></li> <li>• For ASR1000 Series or ISR4000 Series devices, use only: <b>harddisk</b></li> </ul> <p><b>Important</b> On ASR1000 and ISR4000 platforms, do not use <b>bootflash</b>. The CLI may allow you incorrectly to choose <b>bootflash</b>, but but this causes the step to fail. On these platforms, specify <b>only harddisk</b>.</p>

**Examples:**

- For the Cisco Catalyst 8000V:

```
service sd-avc install package bootflash:iosxe-sd-avc.4.3.tar media bootflash
```

- For ASR1000 Series or ISR4000 Series routers:

```
service sd-avc install package harddisk:iosxe-sd-avc.4.3.tar media harddisk
```

**8.** Configure the SD-AVC network service.

- Specify the router gateway interface that the virtualized service uses for external access.
- Specify a user-selected external-facing service IP address for the SD-AVC network service. This address must be within the same subnet as the gateway interface address.

This step accomplishes the following:

- Enables routers in the network to communicate with the SD-AVC network service.
- Enables access to the browser-based SD-AVC Dashboard.



**Note** Use this command only in scenarios in which the gateway interface is not attached to a VRF. If the gateway interface is attached to a VRF, use the steps described in [Operating the SD-AVC Network Service with Host Interface Attached to a VRF](#).

```
service sd-avc configure gateway interface interface service-ip service-ip-address [activate | preview]
```

Table 5: Command Details

CLI keyword/argument	Description
<b>activate</b>	Activates the service immediately. It is not typically recommended to use this option during this configuration step. Execute the <code>activate</code> option in a separate step, as shown below.
<b>preview</b>	<p>Preview the configuration without configuring or activating the service. When using this option, the configuration is not sent to the device.</p> <p><b>Note:</b> If the gateway interface is attached to a VRF, see <a href="#">Operating the SD-AVC Network Service with Host Interface Attached to a VRF</a>.</p> <p><b>Example output:</b></p> <pre>! Virtual port configuration interface VirtualPortGroup31   description automatically created for sd-avc service by   'service sd-avc configure' exec command   ip unnumbered gigabitEthernet1 end  ! Virtual service configuration virtual-service SDAVC   description automatically created for sd-avc service by   'service sd-avc configure' exec command   vnic gateway VirtualPortGroup31   guest ip address 10.56.196.101   exit end  ! Static route configuration ip route 10.56.196.101 255.255.255.255 VirtualPortGroup31</pre>
<i>interface</i>	<p>Gateway interface: The device interface that the virtualized service uses for external access.</p> <p><b>Note:</b> If the interface is attached to a VRF, see <a href="#">Operating the SD-AVC Network Service with Host Interface Attached to a VRF</a> for instructions for configuring the gateway.</p>
<i>service-ip-address</i>	<p>External-facing IP address, must be in the same subnet as the IP of the gateway interface.</p> <p><b>Example:</b></p> <pre>Gateway interface: 10.56.196.100 service-ip-address: 10.56.196.101</pre>

**Example:**

```
service sd-avc configure gateway interface gigabitEthernet1 service-ip 10.56.196.146
```

**9.** Activate the service.

**service sd-avc activate****Example:**

```
service sd-avc activate
```

10. Verify that the status of the SD-AVC network service is activated.

**service sd-avc status**

If installation and activation were successful, the displayed status is:

```
SDAVC service is installed, configured and activated
```

11. (ASR1000 Series or ISR4000 Series routers only) Execute the following:

```
(config)#platform punt-policer service-engine 100000 100000
```

12. Save the new configuration.

**copy running-config startup-config**

13. Ping the service IP configured in a previous step to verify that it is reachable.

14. Verify that SSH is enabled on the host device. Details vary according to different scenarios, but the following is a helpful reference:

<https://www.cisco.com/c/en/us/support/docs/security-vpn/secure-shell-ssh/4145-ssh.html>

**Example (uses SSH local authentication):**

```
aaa new-model
!
aaa authentication login default local
username cisco privilege 15 password cisco
ip domain name cisco.com
crypto key generate rsa
```

15. Wait several minutes for the service to become fully active, then use a Chrome browser to access the browser-based SD-AVC Dashboard, at the following URL, which uses the service-ip configured in an earlier step and port 8443. The SD-AVC Dashboard uses the same authentication as the platform hosting the SD-AVC network service.

<https://<service-ip>:8443>




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**Note** Accessing the SD-AVC Dashboard requires connectivity from the PC you are using to access the SD-AVC interface.

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**Installation Example for a Cisco Catalyst 8000V**

The following is an example of the CLI steps used to install the SD-AVC Network Service on a Cisco Catalyst 8000V. For this router, the first step includes bootflash as the location for extracting the tar file.

```
service sd-avc install package harddisk:iosxe-sd-avc.4.3.tar media bootflash
service sd-avc configure gateway interface gigabitEthernet1 service-ip 10.56.196.146
service sd-avc activate
service sd-avc status
copy running-config startup-config
```



### Installation Example for ASR1000 Series or ISR4000 Series Routers

The following is an example of the CLI steps used to install the SD-AVC network service on a Cisco ASR1000 Series or ISR4000 Series Router. The first command extracts the tar file to the harddisk location.

```
service sd-avc install package harddisk:iosxe-sd-avc.4.3.tar media harddisk
service sd-avc configure gateway interface gigabitEthernet1 service-ip 10.56.196.146
service sd-avc activate
service sd-avc status
platform punt-policer service-engine 100000 100000
copy running-config startup-config
```

## Upgrading the SD-AVC Network Service

Use the following procedure to upgrade the SD-AVC network service on the router hosting the service.



**Note** Upgrading clears the traffic data stored by the SD-AVC network service.

**Table 6: Overview of Upgrade Steps**

Task	Steps
Installation	Steps 1 to 7
Activation	Step 8
Verification	Step 9

1. Download the tar file for the SD-AVC network service from Cisco.com, using the [Software Download](#) tool. Specify a platform that supports hosting the SD-AVC virtual service, then navigate to software downloads for the platform. Select the **SD AVC Router Virtual Service** option to display available tar files for SD-AVC.

Example filename: **iosxe-sd-avc.4.3.tar**

2. Copy the downloaded tar file onto the device hosting the SD-AVC network service to be upgraded. Copy to one of the following locations, depending on the platform type:

- For the Cisco Catalyst 8000V, use: **bootflash**
- For ASR1000 Series or ISR4000 Series devices, use: **harddisk**

**harddisk** refers to the SSD or HD specified in the system requirements for the platform ([System Requirements: SD-AVC Network Service Host, on page 2](#)).

3. On the device, verify that the MD5 checksum of the downloaded tar file matches the checksum value provided.



**Note** The correct MD5 checksum value appears on the [Download Software](#) page when downloading the package.

```
verify /md5 bootflash:filename.tar
```

**Example:**

```
Device#verify /md5 bootflash:iosxe-sd-avc.4.3.tar
.....Done!
verify /md5 (bootflash:iosxe-sd-avc.4.3.tar) = d8b7af1b163ccc5ad28582a3fd86c44e
```

- Deactivate the service. This step stops the service but does not erase the database of compiled application data.

```
service sd-avc deactivate
```

- Verify that the service has been deactivated.

```
service sd-avc status
```

The following output confirms that the service has been deactivated:

```
Service SDAVC is installed, configured and deactivated
```

- On the host router, execute the following command to extract and install the package. By default, it is installed on the same storage device where the tar file is stored.

```
service sd-avc upgrade package disk-with-tar:tar-filename
```

**Table 7: Command Details**

CLI keyword/argument	Description
<i>disk-with-tar</i>	Specify one of the following, according to the platform type. The location refers to where the tar file was stored in a previous step. <ul style="list-style-type: none"> <li>Cisco Catalyst 8000V: <b>bootflash</b></li> <li>ASR1000 Series or ISR4000 Series: <b>harddisk</b></li> </ul>
<i>tar-filename</i>	Downloaded tar file.

**Examples:**

- For Cisco Catalyst 8000V:

```
service sd-avc upgrade package bootflash:iosxe-sd-avc.4.3.tar
```

- For Cisco ASR1000 Series or ISR4000 Series routers:

```
service sd-avc upgrade package harddisk:iosxe-sd-avc.4.3.tar
```

- (Optional) During the upgrade process, view the service status.

```
service sd-avc status
```

During the upgrade, the following output indicates that the service is being installed:

```
Service SDAVC is installing..., configured and deactivated
```

The following output indicates that the upgrade is complete:

```
Service SDAVC is installed, configured and deactivated
```

- Activate the service.

**service sd-avc activate****Example:**

```
service sd-avc activate
```

9. Verify that the status of the SD-AVC network service is activated.

**service sd-avc status**

If upgrade and activation were successful, the displayed status is:

```
SDAVC service is installed, configured and activated
```

