



## SD-AVC Overview

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## SD-AVC Overview

Cisco Software-Defined AVC (SD-AVC) is a component of [Cisco Application Visibility and Control \(AVC\)](#). It functions as a centralized network service, operating with specific participating devices in a network.

As an SDN solution operating network-wide, Cisco SD-AVC complements solutions such as:

- Cisco Intelligent WAN ([IWAN](#))
- Cisco EasyQoS
- Application Assurance

### Features and Benefits

| Feature/Benefit   | Description   |
|---|---|
| Network-level application recognition consistent across the network | The SD-AVC network service aggregates application data from multiple devices and sources, and provides that composite application information in return. Because SD-AVC operates at the network level, any application rule created by SD-AVC based on aggregated application data is shared and applied consistently across all participating network devices. |

| Feature/Benefit   | Description   |
|---|---|
| Improved application recognition in symmetric and asymmetric routing environments | <p>Cisco SD-AVC further refines application recognition accuracy by helping numerous devices in a network</p> <p>SD-AVC aggregates application data shared by participating devices in the network, and analyzes the shared application data. It then provides this composite application information (in the form of an application rules pack) to the participating routers, improving application recognition. Because SD-AVC shares application rules across numerous network devices, devices that see only one direction of a flow can benefit from the information collected on the other direction of the same flow.</p> <p>See <a href="#">SD-AVC and Application Recognition</a>.</p> |
| Improved first packet recognition   | <p>SD-AVC application rules are based on flow tuple (address and port) information. After a learning phase and sharing tuples among participating devices, the devices are able to identify new flows on the first packet, based on the tuple information</p>   |
| Protocol Pack update at the network level   | <p>SD-AVC can assist in deploying Protocol Packs to numerous routers in the network. Download the Protocol Packs directly from Cisco into a repository on the centralized SD-AVC network service, then use the SD-AVC Dashboard to select which devices in the network will receive the Protocol Packs.</p> <p>See <a href="#">Protocol Packs Page</a>.</p>   |
| SD-AVC Dashboard  | <p>Secure browser-based SD-AVC Dashboard over HTTPS for monitoring SD-AVC functionality and statistics, and for configuring Protocol Pack updates network-wide.</p> <p>See <a href="#">Using SD-AVC</a>.</p>  |
| Cloud Connector   | <p>SD-AVC connects to a cloud service provided by Cisco that improves traffic classification. Cloud Connector uses the latest information available about the server addresses used by public internet sites and services to improve SD-AVC classification of traffic.</p> <p>See <a href="#">Cloud Connector</a>.</p>  |
| Improved Microsoft Office 365 traffic classification                              | <p>The MS-Office365 Web Service component improves classification for Microsoft Office 365 traffic. The SD-AVC Dashboard displays the status of the component.</p>  |
| REST API  | <p>REST API for user-defined applications.</p> <p>See <a href="#">SD-AVC REST API</a>.</p>  |
| Analysis of unclassified traffic  | <p>To improve traffic visibility, SD-AVC analyzes unclassified/unidentified traffic and provides server or socket information about unclassified traffic flows that use significant bandwidth.</p> <p>See <a href="#">Unclassified Traffic Analysis and Discovery</a>.</p>  |

## No Change to Topology

Deploying SD-AVC within an existing network does not require any changes to the network topology.

## New Features and Changes, by Release

*Table 1: New and Changed Features, SD-AVC Release 3.2.0*

| Feature  | Description   |
|--|---|
| SD-AVC REST API: Enhancement of the L3L4 API     | Enhancement of the L3L4 API, extending the supported range of IP addresses.<br>See <a href="#">SD-AVC REST API</a> .  |
| Improved Cloud Connector reliability             | Improved Cloud Connector reliability, by improved cloud server connectivity.<br>See <a href="#">Cloud Connector</a> . |
| Proxy server configuration from SD-AVC Dashboard | Ability to configure a proxy server from the SD-AVC Dashboard.<br>See <a href="#">Configuring a Proxy Server</a> .    |

*Table 2: New and Changed Features, SD-AVC Release 3.1.0*

| Feature                   | Description  |
|---------------------------|--|
| Cloud Connector REST APIs | REST APIs added for the Cloud Connector: connect, disable, clear credentials, display configuration, display cloud data<br>See <a href="#">SD-AVC REST API</a> . |

*Table 3: New and Changed Features, SD-AVC Release 3.0.0*

| Feature              | Description   |
|----------------------|---|
| Cloud Connector      | SD-AVC connects to a cloud service provided by Cisco that improves traffic classification. Cloud Connector uses the latest information available about the server addresses used by public internet sites and services to improve SD-AVC classification of traffic.<br>See <a href="#">Cloud Connector</a> .  |
| Protocol Pack import | When Cisco releases a new Protocol Pack, SD-AVC indicates that the new Protocol Pack is available. SD-AVC now provides an option to import the Protocol Pack directly from Cisco to the local SD-AVC repository, without requiring the Software Download tool. The Protocol Pack can then be deployed to devices in the network.<br>See <a href="#">Protocol Packs Page</a> . |

| Feature                | Description  |
|------------------------|--|
| System log server      | SD-AVC keeps a system log as a local file. Beginning with this release, SD-AVC can also send system messages to an external system log server in real time.<br><br>See <a href="#">Serviceability Page</a> .   |
| Signed SSL certificate | By default, the browser-based SD-AVC Dashboard provides a self-signed SSL certificate that appears in a browser as untrusted. Optionally, you can register your specific domain and acquire a signed SSL certificate specifically for use with SD-AVC, and import the certificate into SD-AVC. Connecting to the SD-AVC Dashboard is then secure and trusted.<br><br>See <a href="#">Serviceability Page</a> . |
| Changed TCP port range | SD-AVC uses TCP ports for communication between the central SD-AVC network service and the devices in the network running the SD-AVC agent. Port 8080 was added, changing the range from:<br><br>21 and 59990-60000<br><br>to<br><br>21, 8080, and 59990-60000   |

**Table 4: New and Changed Features, SD-AVC Release 2.2.1**

| Feature                            | Description   |
|------------------------------------|---|
| REST API improvements              | Several improvements to the SD-AVC REST API.  |
| Optimization of device update time | SD-AVC optimizes the time interval for updating devices in the network, according to the number of devices in the network. For networks containing a relatively small number of devices, updates can occur up to 10 times faster. Updates include the latest aggregated application data, custom applications, and Protocol Pack updates. |
| Changed TCP port range             | SD-AVC uses TCP ports for communication between the central SD-AVC network service and the devices in the network running the SD-AVC agent. The range was simplified from:<br><br>21 and 59900-60000<br><br>to<br><br>21 and 59990-60000  |
| Improved handling of proxy servers | When a network includes a proxy server, SD-AVC recognizes the proxy server IP and synchronizes the IP as a proxy, thereby preventing the SD-AVC agent from caching the IP. This prevents errors in flow classification.   |

**Table 5: New and Changed Features, SD-AVC Release 2.2.0**

| Feature                        | Description  |
|--------------------------------|--|
| Improved scale                 | SD-AVC supports 1 segment with 6000 devices, or up to 12 segments with 1000 devices in each.   |
| MS-Office365 Connector updates | The MS-Office 365 Connector (external source for SD-AVC) has been updated to incorporate the new Microsoft Office 365 web API. Recent changes that Microsoft has made to the Microsoft Office 365 web API have blocked the SD-AVC Microsoft Office 365 Connector, breaking its functionality in previous releases of SD-AVC. |

**Table 6: New and Changed Features, SD-AVC Release 2.1.1**

| Feature  | Description  |
|--|--|
| Memory and CPU allocation                              | Smart allocation of memory and CPU resources used for tracking sockets and L3 incoming entries.  |
| Application rules pack distribution by network segment | For improved control, you can assign application rules pack distribution by network segment.   |
| User-defined applications by network segment           | For improved control, user-defined applications can be defined by network segment.   |
| Debugging by device or network segment                 | SD-AVC <b>Dashboard &gt; Serviceability</b> page > <b>Vertical Debug</b> : Can track traffic for a specific device or network segment. |
| Unclassified Traffic Visibility                        | Ability to enable or disable the Unclassified Traffic Visibility feature. See <a href="#">Serviceability Page</a> .                    |
| User Interface improvements                            | Numerous improvements to usability.  |

**Table 7: New and Changed Features, SD-AVC Release 2.1.0**

| Feature                        | Description  |
|--------------------------------|--|
| REST API                       | The REST API enables configuring user-defined applications, providing classification of applications not covered by the standard Protocol Pack. See <a href="#">SD-AVC REST API</a> .  |
| Unclassified traffic discovery | To improve traffic visibility, SD-AVC analyzes unclassified/unidentified traffic and provides server or socket information about unclassified traffic flows that use significant bandwidth. See <a href="#">Unclassified Traffic Analysis and Discovery</a> .  |
| Source interface configuration | On network devices operating with SD-AVC, you can specify the interface that will appear as the source address for all SD-AVC traffic between the network device and the SD-AVC network service. See <a href="#">Source Interface Configuration Overview</a> . |

| Feature   | Description  |
|---|--|
| Ability to configure proxy DNS servers for the MS-Office365 Connector | By default, SD-AVC has two Cisco OpenDNS DNS servers configured. Improved ability to add additional DNS servers. |

**Table 8: New and Changed Features, SD-AVC Release 2.0.1**

| Feature   | Description   |
|---|---|
| SD-AVC system time and displayed times  | Improved display of times in the SD-AVC Dashboard. Internally, the SD-AVC network service uses standard UTC. The Dashboard displays times according to the internal SD-AVC system time, adjusted by the local time zone offset of the PC that is accessing the Dashboard.<br><br>See <a href="#">SD-AVC System Time and Displayed Times</a> . |
| Improved ability to configure and view DNS servers for the MS-Office365 Connector | By default, SD-AVC has two Cisco OpenDNS DNS servers configured. Improved ability to add additional DNS servers.  |

**Table 9: New and Changed Features, SD-AVC Release 2.0.0**

| Feature  | Description   |
|--|---|
| Updated user interface                               | <ul style="list-style-type: none"> <li>• Improved interactive display of traffic data</li> <li>• Improved presentation of warnings and errors affecting devices</li> </ul>  |
| Improved control of Protocol Pack deployment         | <ul style="list-style-type: none"> <li>• Can update Protocol Packs for individual devices, for segments, or for all devices in the network</li> <li>• Ability to revert to the Protocol Pack built into the Cisco IOS release</li> </ul> <p>See <a href="#">Protocol Packs Page</a>.</p>  |
| Improved Microsoft Office 365 traffic classification | <p>MS-Office365 Connector is a component introduced in this release that improves classification for Microsoft Office 365 traffic. The SD-AVC Dashboard displays the status of the component.</p> <p>This feature requires connectivity to a DNS server. By default, SD-AVC uses Cisco OpenDNS servers: 208.67.222.222 and 208.67.220.220</p> |
| Support for more devices                             | Support for 4000 network devices operating with SD-AVC  |

# Using SD-AVC in an Asymmetric Routing Scenario

## The Challenge of Asymmetric Routing

One of the challenges that SD-AVC addresses well is application recognition in asymmetric routing scenarios. While it is not the only situation in which SD-AVC offers improved results, asymmetric routing demonstrates one of the advantages of aggregating application data from many sources.

Certain network configurations may produce "asymmetric routing" as an unintended effect. In asymmetric routing, the packets of a single two-way connection travel by different paths between network nodes. For example the downstream traffic from a server to a client might be routed through one path, while the upstream traffic from the client to the server might be through a different path. When this occurs, AVC operating on a hub router may see only a single direction of the traffic for that connection, posing a challenge to application recognition.

## Deep Packet Inspection and Asymmetry

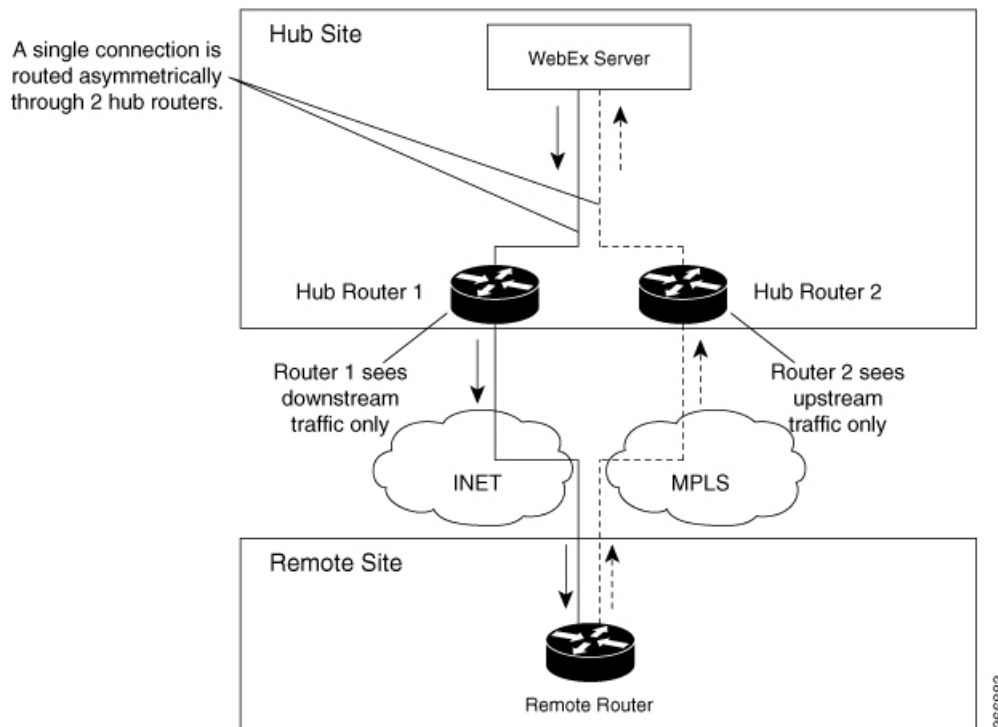
AVC deep packet inspection (DPI) operates best when it sees both directions of traffic. In symmetric routing, AVC operating on a single device that handles both directions of a flow can fully analyze metadata and other traffic attributes to help identify the application creating the flow. By contrast, an asymmetric scenario can limit the ability to recognize some types of traffic. This is especially true when AVC sees only to the downstream traffic for a particular flow.

Asymmetric routing may occur for various reasons, including from intelligent path selection by Cisco IWAN. The issue particularly affects hub routers within an enterprise network with a hub/branch topology.

## Effects of Limited Application Recognition

Limiting AVC application recognition can affect classification of traffic for QoS policy, visibility, and other functionality. Consequently, a solution that overcomes the limitations caused by asymmetric routing is especially helpful for maximum network efficiency.

Figure 1: Asymmetric Routing Example



### Centralized Server Aggregating Application Data

SD-AVC compiles and analyzes application data from multiple devices within the network, including devices that separately handle the downstream and upstream traffic for a single flow. Using data from multiple sources, SD-AVC synchronizes application information network-wide, overcoming the challenges of asymmetric routing. This strategy provides a major improvement to application recognition within networks, improving the effectiveness of application-based solutions.

With the improved application recognition, AVC can apply application-based policies, such as QoS, path selection, and visibility more accurately. For example, with complete information about both streams of a flow, a path selection policy can direct the downstream path through the same route as the upstream.



Figure 2: Asymmetric Routing and SD-AVC

