Monitor Cisco ASR 9000 Network Virtualization (nV) Satellites and Cluster Services

## Monitor Cisco ASR 9000 nV Satellites

The Cisco ASR 9000 nV satellite feature set allows one or more smaller satellite switches to be interconnected with an Cisco ASR9000 device to form a single, combined access, aggregation and edge system.

Cisco Evolved Programmable Network Manager supports Cisco ASR 9000v, Cisco ASR 901, Cisco ASR 901S, Cisco ASR 903, and Cisco NCS 5001/2 devices as satellites. The Cisco ASR 9000v is a dedicated satellite switch that can only be used in nV satellite mode along with an Cisco ASR 9000 device. The Cisco ASR 901 and Cisco ASR 903 switches are "dual mode" switches. This means that they can operate both as standalone switches or as satellite switches within an nV system with an Cisco ASR 9000 device (in which case they are completely managed and controlled by the primary Cisco ASR 9000).

The satellite feature allows for both redundant and non redundant interconnections between the satellite switches and the primary Cisco ASR 9000s. The access side Ethernet ports of the satellite switches appear within the control and management planes of the host primary Cisco ASR 9000 just like locally connected Ethernet ports. All features that can be configured on the host Cisco ASR 9000 can also be configured and executed identically on satellite located ports. Effectively the satellite switches are *virtual line cards* of the host Cisco ASR 9000. Chassis management functions of the satellites such as software upgrades, inventory and environmental monitoring of hardware sensors (voltage, temperature etc) on the satellites are also seamlessly integrated into the same functions of the host Cisco ASR 9000, just like any other line card of the host Cisco ASR 9000 chassis.

Cisco Evolved Programmable Network Manager supports the following types of nV Satellite configurations:

• Dual home hub and spoke (inventory support only)
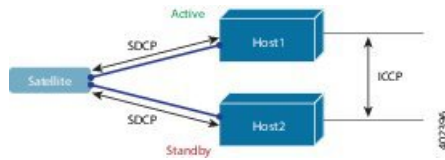
- The same satellite is dual homed to two separate Cisco ASR 9000 hosts – active and standby.

- Each host has an independent control channel with the satellite.

- The satellite is notified which host is active and which is standby.

- If the satellite loses its active host or link, failover occurs to its standby host.

- L2 fabric hub and spoke
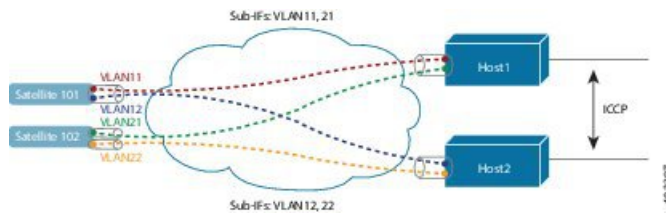
- L2 Fabric supports satellite connectivity across Ethernet Layer 2 domains.

- Satellite Fabric Link Redundancy—single physical link with two VLANs/EVCs or two physical links with one VLAN/EVC each.

- Each host L2 subinterface is mapped to one satellite fabric port.

- Simple Ring
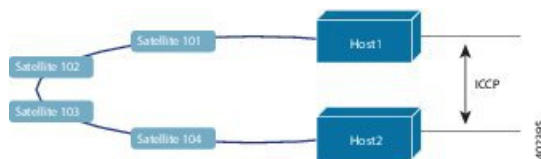
- Each satellite in the ring runs SDCP with two hosts independently.

- Each satellite maintains a logical hub-and-spoke topology over the physical ring topology.

- No local switching directly between satellites - all packets traverse the host.

Satellite Considerations in Cisco Evolved Programmable Network Manager

Satellites are not displayed in the Network Discovery page (**Inventory** > **Device Management** > **Network Devices**) because Cisco Evolved Programmable Network Manager does not support satellite device management operations from that page.

Satellites can only belong to Location groups because, as network nodes, they are normally managed according to location. In addition, if you add a host device to a group, its satellites are not automatically added to the group unless the group meets the following guidelines.

- If you use Add Devices Manually—From the create (or edit) group page, click Add, then choose All Locations from the Filter by drop-down list. The satellites will be listed if they match your criteria.

- If you use Add Devices Dynamically—Make sure you are creating a location group; and from the create (or edit) group page, choose All Locations from the Parent Group at the top of the page.

Minimum Device and OS Requirements for Cisco ASR 9000 nV Satellites

The following are the minimum device and device operating system requirements for the nV satellite feature set.

- Hardware — Cisco ASR 9000 Series Aggregation Services Routers with Cisco ASR 9000 Enhanced Ethernet line cards as the location of Inter Chassis Links and Cisco ASR9000v, Cisco ASR 901, Cisco ASR 903, Cisco NCS 5001, or Cisco NCS 5002 routers as satellite devices.

  Note If the satellite is not an ASR 9000 device, its details will not be available in the host device's chassis view.

- Software — Cisco IOS XR 5.2.0.

Additional support may be available. For more information see the Cisco Evolved Programmable Network Manager.

Get Quick Information About a Specific Satellite: Satellite 360 View

The Satellite 360 view is a popup window that provides quick information about a satellite device, its inventory, and its status. This includes device alarms, modules, interfaces, and hosts.

To launch a Satellite 360 view:

- Click the "i" icon next to the device name in almost any device table

- From the network topology, click a device in an expanded group, then click **View**

The Satellite 360 view provides general satellite device information at the top of the view, and more detailed interface information in tabs in the lower part of the view.

Information Provided in Satellite 360 View	Description
General information	The satellite device type and name, status, last configuration change, and last inventory collection,
Modules	Modules that are configured on the satellite device, including their name, type, state, ports, and location.

Interfaces	Name, operational and admin status for each associated satellite device . Also provides a launch point for the Interface 360 view.
	Note Subinterfaces for satellite devices are not listed under the Satellite 360 view.
Hosts	Name, IP address, and role (Active or Standby) of host devices that are connected to the satellite.

View Cisco ASR 9000 Host-Satellite Topologies in the Topology Map

You can visualize the Cisco ASR 9000 host-satellite topologies and see, at a glance, whether there are active alarms on the host or satellites. From the topology map you can drill down to get further information about the host and satellite devices.

You can easily identify a satellite in the map by its label which includes the satellite ID and the IP address of the Cisco ASR 9000 host.

Note   To see the links between the devices in the satellite topology, you must enable the Inter-Chassis Control and ICCP links in the Link Types filter (top right corner above the map). ICCP protocol is used for host to host links.

To view Cisco ASR 9000 host-satellite topologies in the map:

Step 1   Choose **Maps >Topology Maps >Network Topology** in the left navigation pane.

Step 2   From the Groups pane on the left, select the group that contains the Cisco ASR 9000 host and satellites. The topology map displays all the devices in the selected group.

Step 3   Locate the host or one of the satellites in the map.

Step 4   To display the links between host and satellites:

- Click the filter icon in the topology toolbar and choose **Link Types**.

• Check the Control Plane, Inter_Chassis_Control, and ICCP check boxes, then click **OK**.

Step 5   Click a satellite to launch a popup showing the satellite ID as well as the ID of the active and standby hosts.

Step 6   Click View 360 in the popup to see more details about the satellite and its hosts in the Satellite 360 view, as described in

Identify the Satellites Connected to a Cisco ASR 9000 Host

The Device 360 view for a selected Cisco ASR 9000 host contains information about the device itself as well as about the satellites connected to the host.

To identify the satellites connected to a Cisco ASR 9000 host:

Step 1   Choose **Inventory >Device Management > Network Devices** in the left navigation pane.

Step 2   From the Device Group pane on the left, select the group that contains the Cisco ASR 9000 host.

Step 3   Locate the host in the device list on the right.

Step 4   Click the "i" icon next to the device IP address/DNS to open the Device 360 view for the host.

> **Note**   You can also access the Device 360 view from the map by clicking on the device and then clicking **View 360** in the displayed popup.

The Satellites tab lists the satellites that are associated with the host and provides basic information about each satellite, such as type, description, IP address, and MAC address. It also indicates whether the satellite is currently connected to or disconnected from the host. The Satellites tab is only present in the Device 360 view for Cisco ASR 9000 host and satellite devices.

Step 5   Click the "i" icon next to the IP address in the Satellites tab to open the Device 360 view for the satellite. The Hosts tab lists the active and standby hosts associated with that satellite.

Device 360° Last Updated: 11-Jan-2023 02:48:17 PM IST

Auto-Refresh Off ▼ | ↻

View ▼   Actions ▼

ASR901-CSG-1-DOMAIN1.cisco.com ✓ 🔳 ↔

10.56.23.16 | Cisco ASR901-6CZ-FT-A Router

B04 nm-ts-mnm40:2026
up for 121 days 21 hrs 52 mins 53 secs

OS Type IOS
OS Version 15.6(2)SP6
Active Proxy IP Address No data available
Creation Time 10-Jan-2023 01:38:32 AM IST
Last Inventory Change 11-Jan-2023 01:31:03 AM IST

CPU Utilization (%)   Memory Utilization (%)

6h ▼   6h ▼

| ‹ | Alarms | Modules | Interfaces | Neighbors | Circuit/ | » | › |

Severity	Condition	Timestamp ▼	Affected Objects	Alarm ID
⚠	BGP-5... ⓘ	10-Jan-202...	BGP Neighbor :...	4430431
⚠	BGP-5... ⓘ	10-Jan-202...	BGP Neighbor :...	4430436
⚠	BGP-5... ⓘ	10-Jan-202...	BGP Neighbor :...	4430429

Identify the Hosts Connected to a Satellite

Usually the links in the map will clearly show the satellite topology including the host and the connected satellites. If for some reason the satellites are shown without links, it is easy to identify the hosts with which a satellite is associated.

To identify the hosts connected to a satellite:

Step 1 Choose **Maps > Topology Maps Network Topology** in the left navigation pane.

Step 2 From the Device Groups pane on the left, select the group that contains the Cisco ASR 9000 host and satellites. The map displays all the devices in the selected group.

Step 3 Click a satellite device, identified by its label which begins with **Satellite ID**.

Step 4 In the displayed popup, click **View 360** to launch the Satellite 360 view.

The Hosts tab in the Satellite 360 view lists the host devices to which the satellite is connected and their role, either active or standby.

# Monitor Cisco ASR 9000 nV Satellites for Faults

When a fault occurs on a satellite, Cisco Evolved Programmable Network Manager associates (localizes) the fault to either the host device or satellite device depending on the fault type.

- If a fault occurs on a physical entity, such as a port, fan, or module, Cisco Evolved Programmable Network Manager identifies the satellite device as the fault location.

- If the fault occurs on a logical entity such as a subinterface, Cisco Evolved Programmable Network Manager identifies the host device as the fault location because the subinterface is configured on the host.

If an alarm occurs on dual-homed satellite, the alarm is duplicated, with one alarm on the active host and another on the standby host.

View Satellite Faults in a Topology Map

In the topology map, you will see an alarm badge overlaid on the alarm source: the satellite device, the host device, or the link between the satellite and host device.
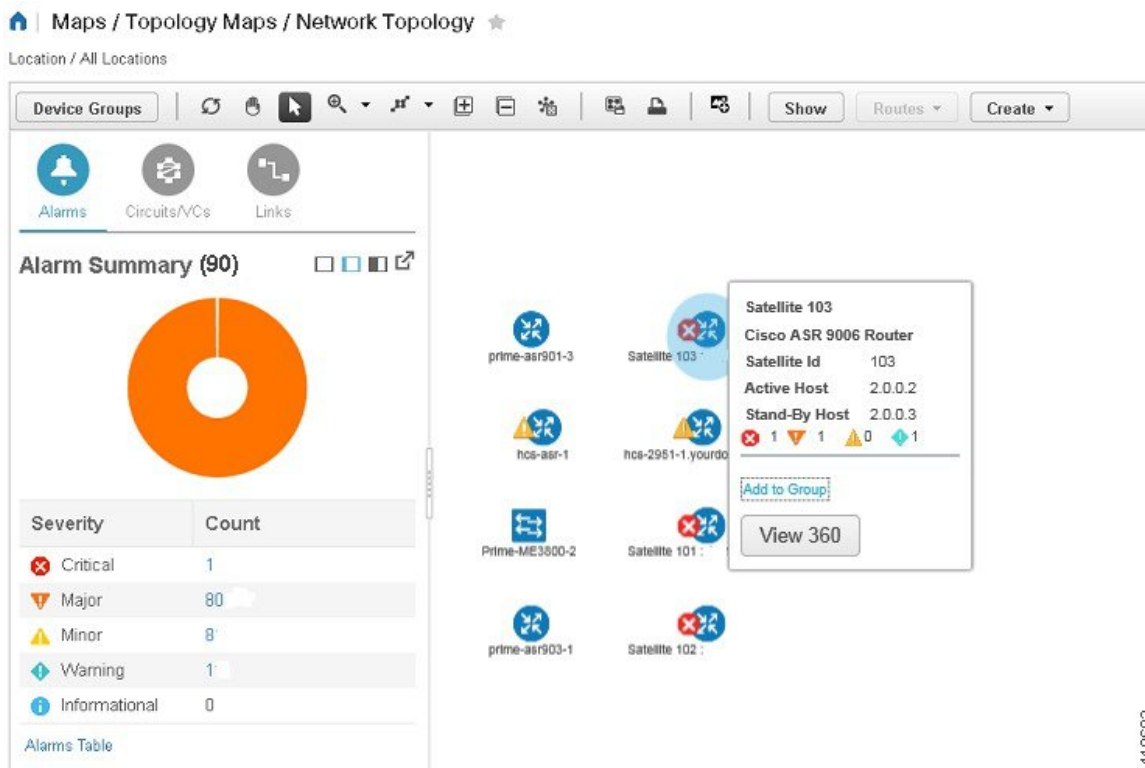
If there are several alarms on the same entity, the alarm badge severity represents that of the most severe alarm.

Right-click the alarmed entity to display a popup that shows the count of all active alarms related to the entity. Link-related alarms, such as Link Down, generate an alarm badge on the relevant link in the topology map.

View Satellite Faults Using a Device 360 View

To find out which objects are affected by the device alarms, click View 360 from the popup menu and check the Affected Objects column. If you want to view details about a specific alarm, click the alarmID hyperlink.

View Satellite Faults in the Alarms and Events Table

To get satellite alarm information from the Alarm table, choose **Monitor** > **Monitoring Tools** > **Alarms and Events**, then click the **Alarms** tab.

Cisco Evolved Programmable Network Manager lists the host device as the Failure Source. The Satellite ID and Location fields identify the satellite source.

Monitor a Cisco ASR 9000 nV Edge Cluster

nV Edge is a feature where two or more Cisco ASR 9000 Series Router chassis are combined to form a single logical switching or routing entity. This allows you to operate two Cisco ASR 9000 Series Router platforms as a single virtual Cisco ASR 9000 Series system. Effectively, they can logically link two physical chassis with a shared control plane, as if the chassis were two route switch processors (RSPs) within a single chassis.

There are two types of links in the nV edge topology:

• Control links, used for control traffic.

• Inter-Rack links, used for data generation and forwarding of data between chassis.

Minimum Device and OS Requirements for nV Edge

The following are the minimum device and device operating system requirements for nV edge:

• 2 Cisco ASR 9000 devices running Cisco IOS XR 5.2.0

• 4 10G SFP (for IRL)

• 4 1G SFP (for cluster/control links)

• 2 RSP nodes per chassis, with the exception of the Cisco ASR 9001 which is a single RSP system that supports cluster configuration

Additional support may be available. See the Cisco Evolved Programmable Network Manager.

View a nV Edge Cluster in the Topology Map

The nV edge cluster is represented in the topology map as a single object consisting of two linked chassis, one primary and one backup.

To view the Cisco ASR 9000 nV Edge topology in the map:

Step 1 Choose **Maps > Topology Maps> Network Topology** in the left navigation pane.

Step 2 From the Groups pane on the left, select the group that contains the Cisco ASR 9000 cluster. The topology map displays all the devices in the selected group.

Step 3 Click the primary or backup chassis. Note that both chassis are selected and a popup opens representing the two chassis together. You cannot access each chassis individually.

Step 4 To display links in the cluster topology:

> • Click the filter icon in the topology toolbar, then choose **Link Types**.

> • Check the Control Plane and Inter_Chassis_Control check boxes, then click **OK**.

Chassis 1 : 100.cisco.com

Primary node indicator

100.cisco.com
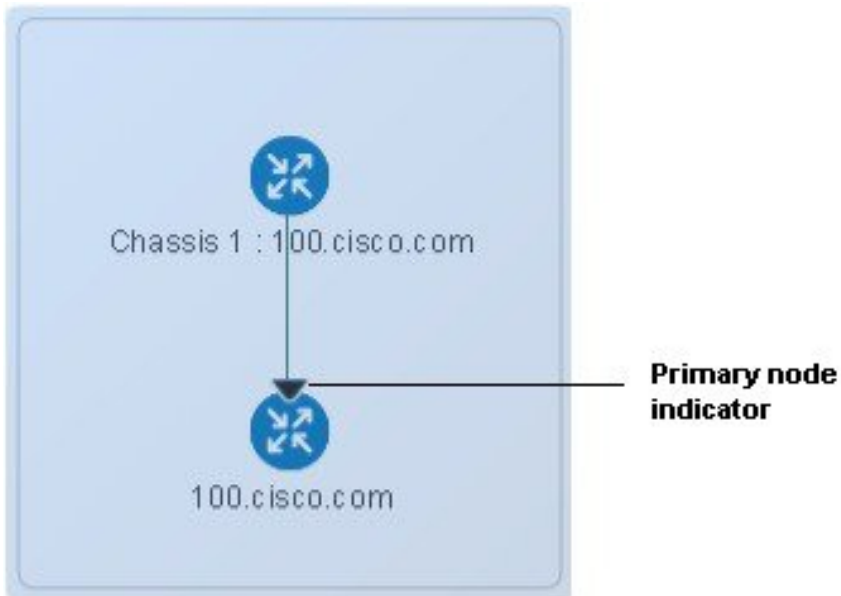
Identify the Primary and Backup Devices in a Cluster

The topology map clearly shows which chassis is primary and which is the backup chassis. Further details about the chassis are provided in the Device 360 view.

To identify the primary and backup devices and get more information:

Step 1 Choose **Maps > Network Topology** in the left navigation pane.

Step 2 From the Device Groups pane on the left, select the group that contains the Cisco ASR 9000 cluster setup. The map displays all the devices in the selected group.

Step 3 Click the cluster representation.

Step 4 In the displayed popup, click **View 360**.

Note that the Chassis tab in the Device 360 view lists and identifies the chassis in the cluster and provides information as to their status and their role (primary or backup).

Monitor and Troubleshoot a Cisco ASR 9000 nV Edge Cluster Service

Cisco Evolved Programmable Network Manager displays alarm indicators on the cluster and provides graphs showing CPU and memory utilization for the primary chassis in the Device 360 view.