

Simulate Multicast

Cisco Crosswork Planning supports Source-Specific Multicast (SSM), which is a method of delivering multicast packets to receivers only from a specified source address that is requested by the receiver. By limiting the source, SSM reduces resource requirements and improves security.

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Representation of SSM parameters

SSM is specified by an (S,G) parameter per multicast flow. The (S,G) pair is labeled using a dot-decimal notation similar to IP addresses (for example, 1.1.1.1, 2.2.2.2). Each (S,G) pair is the name of a multicast flow, and each flow is listed in the **Multicast flows** table.

Discovered versus simulated multicast flows

How you work with multicast flows within Cisco Crosswork Planning differs depending on whether the multicast flow was discovered by Cisco Crosswork Planning or whether you are simulating it (Table 1: Discovered versus simulated multicast flows , on page 1).

Table 1: Discovered versus simulated multicast flows

	Discovered multicast flow	**Simulated multicast flow**
Creation	Cisco Crosswork Planning discovers multicast flows—(S,G) pairs)—and multicast traffic is derived from the Multicast Flow Traffic table.	First, manually create the multicast flow, defining both the source (S) and the destinations (G). Next, create a demand that links the source to these multicast destinations, allowing the routing to be simulated through the network.

	Discovered multicast flow	Simulated multicast flow
Hops	Each discovered multicast flow includes multicast flow hops, which are node-interface combinations through which the multicast path flows.	When you create a demand, it determines the path to take.
External hops	Cisco Crosswork Planning discovers multicast flow hops on interfaces that are external to the plan file. These are interfaces from a plan node to an external node, or from an external node to a plan node.	When you create a demand, it determines the path to take, but multicast external flow hops are not identified.
Destinations	Cisco Crosswork Planning does not identify a list of multicast destinations for each flow.	Specify destinations (nodes, interfaces, external ASes, or external endpoints) when you create multicast flows. When creating multicast demands, specify these as multicast destinations.
Applicable tables	• Multicast Flows • Multicast Flow Hops • Multicast Flow External Hops	• Multicast Flows • Multicast Flow Destinations • Demands

Set global multicast simulation parameters

Flow hops

If a plan file contains multicast information, it includes the current hops taken by multicast flows. You can specify that Cisco Crosswork Planning multicast simulations should follow these flow hops if possible. This is useful, for example, when calculating incremental routing changes on the current network state, such as those caused by a failure. For planning purposes, when the current state is not relevant, you can change this behavior to disregard the multicast flow hops.

Cisco Crosswork Planning uses the network state in its multicast simulation. You can set simulations to take into account multicast flow hops, as follows.

Procedure

Step 1 Open the plan file (see Open plan files). It opens in the **Network Design** page.

Step 2 In the toolbar, click **Network options** or choose **Actions > Edit > Network options**.

Step 3 Click the **Simulation** tab.

Step 4 To use or disregard multicast flow hops in simulation, check or uncheck **Use multicast flow hops**, and click **Save**.

Cisco next hop

For manually inserted demands, all SSM demand traffic for the (S,G) pair (multicast flow) goes through any interface that is traversed by that demand.

However, you can set Cisco Crosswork Planning to use Cisco next hops, which are calculated using a hash on S and G for a multicast flow (S,G). The hash calculation is different in IOS and IOS XR. The default behavior is that of IOS. The IOS XR hash is used on all nodes whose OS field starts with IOS XR.

Follow these steps to set Cisco Crosswork Planning to use Cisco next hops.

Procedure

Step 1 Open the plan file (see Open plan files). It opens in the **Network Design** page.

Step 2 In the toolbar, click **Network options** or choose **Actions > Edit > Network options**.

The Network options page opens.

Step 3 Click the **Protocols** tab.

Step 4 Under the **Multicast** section, from the **Multipath selection** drop-down list, choose **CiscoNextHop**.

Step 5 Click **Save**.

Multicast demands

For discovered multicast flows, you can insert demands manually. For details, see Create demands for multicast flows, on page 5.

For simulated multicast flows, create demands manually. For information on demands in general, see Simulate Traffic Flow from Source to Destination Using Demands.

Simulated multicast demands

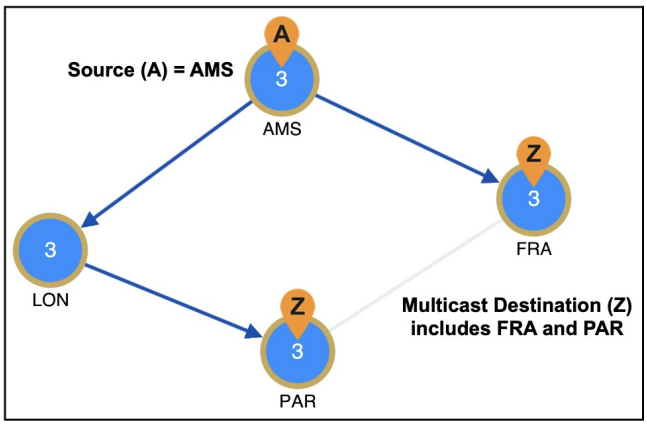
For manually inserted demands, all SSM demand traffic for the (S,G) pair (multicast flow) goes through any interface that is traversed by that demand. SSM demands are routed to take the shortest path from the destination to the source, rather than from the source to the destination, as unicast demands do. By default, multicast multipath is disabled. If two paths of equal cost exit from a node on the route back to the source, the path is chosen based on:

- The remote interface with the highest IP address is used.
- If IP addresses are not available, the router name with the lowest lexicographical name is used.

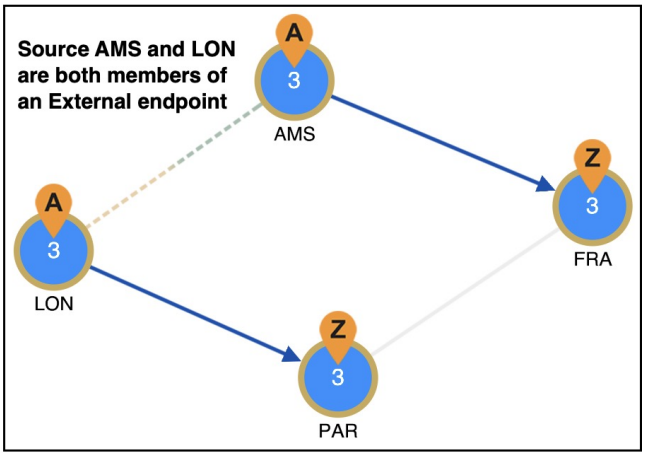
However, you can set Cisco Crosswork Planning to use the Cisco next-hop multicast, multipath selection method. For information, see Cisco next hop, on page 3.

The sources of these multicast demands can be nodes, interfaces, external ASes, or external endpoints. Using interfaces lets you specify the exact interface on which demand traffic is entering. Using external endpoints lets you model situations where the multicast source is outside of the nodes in the plan, and there is more than one possible entry point of the traffic flow into and through the interfaces in the plan.

In this example, the selected demand has a node source of AMS, and a multicast destination containing two nodes: FRA and PAR. The source node (S) is marked by A, and the destinations in the receiver group (G) are marked by Z.



You can model a source that is outside the plan using external endpoints. In this example, the demand's source is an external endpoint that contains AMS and LON as members. The multicast destination includes both FRA and PAR.



Multicast flows

View multicast flows

To view sources and destinations of multicast demands, select the demand from its table. The source is identified in the plot by A and the destinations are identified by Z.

Note You can only view the Multicast flow details in the UI if it's already present in your plan file. You cannot create, edit, or delete the multicast flows from the UI.

To view...	Show this table
Multicast flows, including both source and receiver names	Multicast flows
Discovered multicast flow hops, including (S,G) name, hop node, and hop interface	Multicast flow hops
Discovered multicast flow external hops (destinations that are inferred as external to the plan), including (S,G) name, direction of the outbound interface	Multicast flow external hops
User-created multicast flow destinations, including (S,G) name and destination node	Multicast flow destinations
Multicast demands	Demands

Create demands for multicast flows

Follow these steps to create demands for multicast flows.

Procedure

Step 1 Open the plan file (see Open plan files) with Multicast details. The plan file opens in the **Network Design** page.

Step 2 From the toolbar, choose **Actions** > **Insert** > **Demands** > **Demand**.

OR

In the Network Summary panel on the right side, click  > **Demands** in the **Demands** table.

Step 3 In the **Name** field, enter the name of the demand.

Step 4 In the **Source** area, define the source (S) of the multicast flow.

a) From the **Type** list, select the source as a node, interface, external AS, or external endpoint.

b) For node sources, select both the site and the node.

For interface sources, select the site, node, and the interface.

For external ASes, select both the external AS and the node within the plan file through which this external traffic flows.

For external endpoints, select its name.

Step 5 In the **Destination** area, define the receiver group (G) of the multicast flow.

a) From the **Type** list, choose **Multicast destination**.

b) From the **(G) Receiver** list, choose the receiver that identifies the simulated multicast flow (S,G).

Step 6 (Optional) Complete all other fields as needed, and then click **Add**.