Manuals+ — User Manuals Simplified.

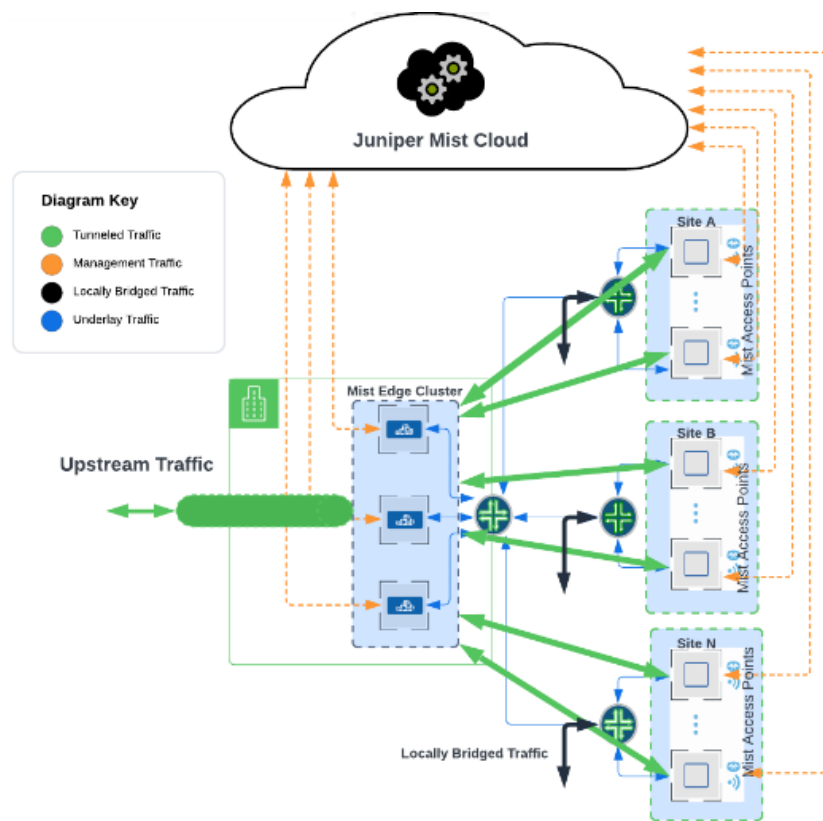# Juniper NETWORKS Mist Edge Design User Guide

Contents

Juniper NETWORKS Mist Edge Design

Product Information

Specifications

Juniper Mist Edge is a network appliance that provides advanced networking capabilities. It is available as a physical or virtual appliance.

Below are the specifications for the physical appliances:

Model	Maximum APs	Maximum Clients	Maximum Throughput	Data and Management Interfaces	Power Supply
ME-X1	500	5000	2 Gbps	Dual-Port 1GbE (Data) Dual-Port 1GbE (Mgmt)	Single, Cabled Power Supply, 250W
ME-X2	500	5000	4 Gbps	Dual Port 1GbE (Data) Dual Port 1GbE (Mgmt)	Single, cabled, 250W
ME-X3	5000	50,000	20 Gbps	Dual Port 10GbE SFP+ (Data) Dual Port 1GbE (Mgmt)	Dual, cabled, 250W

Product Usage Instructions

Chapter 1: When to Consider Juniper Mist Edge for your network

This chapter provides information on client considerations when deciding to use Juniper Mist Edge for your network.

Client Considerations

If you have traffic from different WLAN APs that needs to be directed to two or more Juniper Mist Edge clusters, you can use Juniper Mist Edge. These clusters can be kept in the same data center or geographically independent. It is important to note that due to geographic segmentation, these clusters do not share the same Layer 2 VLANs.

Chapter 2: How to Choose a Juniper Mist Edge Model
This chapter provides information on how to choose the appropriate Juniper Mist Edge model for your network.

Hardware Specifications
This section provides detailed hardware specifications for Juniper Mist Edge physical appliances.

Specifications for Physical Appliances
The table below lists the physical appliances along with their corresponding models and specifications:

Model	Maximum APs	Maximum Clients	Maximum Throughput	Data and Management Interfaces	Power Supply
ME-X1	500	5000	2 Gbps	Dual-Port 1GbE (Data) Dual-Port 1GbE (Mgmt)	Single, Cabled Power Supply, 250W
ME-X2	500	5000	4 Gbps	Dual Port 1GbE (Data) Dual Port 1GbE (Mgmt)	Single, cabled, 250W
ME-X3	5000	50,000	20 Gbps	Dual Port 10GbE SFP+ (Data) Dual Port 1GbE (Mgmt)	Dual, cabled, 250W

Chapter 3: How to Design the Deployment of Juniper Mist Edge
This chapter provides information on the design considerations for deploying Juniper Mist Edge.

Layer 2 Redundancy Design Consideration
When designing the deployment of Juniper Mist Edge, it is important to consider Layer 2 redundancy. This ensures high availability and fault tolerance in the network.

Layer 3 (Data Center) Considerations
In addition to Layer 2 redundancy, it is also important to consider Layer 3 (Data Center) considerations when deploying Juniper Mist Edge. These considerations help optimize network performance and ensure efficient data center operations.

Failover Tunnel Timers
Failover tunnel timers are an important aspect of the Juniper Mist Edge deployment. These timers determine the duration before failover occurs in case of a primary link failure.

Port and IP Address Configuration Requirements
Proper port and IP address configuration is essential for the successful deployment of Juniper Mist Edge. This section provides detailed requirements and guidelines for configuring ports and IP addresses.

FAQ

1. **Q: What is Juniper Mist Edge?**

   A: Juniper Mist Edge is a network appliance that provides advanced networking capabilities.

2. **Q: What are the available models of Juniper Mist Edge?**

   A: Juniper Mist Edge is available in three physical appliance models: ME-X1, ME-X2, and ME-X3.

3. **Q: What are the maximum APs and clients supported by each model?**

   A: The maximum APs and clients supported by each model are as follows:

   - ME-X1: 500 APs, 5000 clients
   - ME-X2: 500 APs, 5000 clients

- ME-X3: 5000 APs, 50,000 clients

4. **Q: What are the data and management interfaces available on the physical appliances?**

   A: The physical appliances have dual-port 1GbE interfaces for data and management.

Juniper Mist Edge Design Guide

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About the Guide
Juniper Mist™ Edge Design Guide is for administrators who want to design the network using Juniper Mist™ Edge and to understand the configuration choices that are available through the Juniper Mist™ cloud portal.

CHAPTER 1 When to Consider Juniper Mist Edge for your network

Client Considerations
You can effectively manage broadcast and multicast traffic, prevent excessive flooding, and avoid MAC table overflow by deploying Juniper Mist edge devices in your wireless network.

- For deployments with an expected number of wireless clients exceeding 4000 in a segment (across all VLANs), you can consider Juniper Mist Edge for deployment.

- For deployments exceeding 100,000 wireless clients, you can configure multiple tunnels to carry traffic from different WLAN APs to two or more Juniper Mist Edge clusters. Because of geographic segmentation, these clusters do not share the same Layer 2 VLANs. You can keep the Juniper Mist Edge devices in the same data center or geographically independent.

CHAPTER 2 How to Choose a Juniper Mist Edge Model

Hardware Specifications

Juniper Mist Edge is available as a physical or virtual appliance.

Specifications for Physical Appliances
The following table lists the physical appliances with models and specifications:
Juniper Mist Edge Models with Specifications

| Model	Maximum APs	Maximum Clients	Maximum Throughput	Data and Management Interfaces	Power Supply
ME-X1	500	5000	2 Gbps	Dual-Port 1GbE (Data) Dual-Port 1GbE (Mgmt)	Single, Cabled Power Supply, 250W
ME –X1-M	500	5000	4 Gbps	Dual Port 1GbE (Data) and Dual Port 1Gbe (Mgmt)	Single, cabled, 250W
ME–X5	5000	50,000	20 Gbps	Dual Port 10GbE SFP+ (Data) and Dual Port 1GbE (Mgmt)	Dual, Hot plug, Redundant (1+1), 750W

Model	Maximum APs	Maximum Clients	Maximum Throughput	Data and Management Interfaces	Power Supply
ME– X5-M	5000	100,000	40 Gbps	Quad Port 10GbE SFP+ (Data) and Dual Port 10GbE SFP+ (Mgmt)	Dual, Hot plug, Redundant (1+1), 750W
ME– X10	10,000	100,000	40 Gbps	Quad Port 10GbE SFP+ (Data) and Dual Port 10GbE SFP+ (Mgmt)	Dual, Hot plug, Redundant (1+1), 750W

Contact your Juniper account team to identify which Juniper Mist Edge option is right for you. For specifications for a virtual appliance, seeNo Link Title

3 CHAPTER How to Design the Deployment of Juniper Mist Edge

Layer 2 Redundancy Design Consideration
APs located at multiple sites can terminate tunnels to Juniper Mist Edge devices that belong to the primary cluster (active/active). The Juniper Mist tunnel configuration determines the primary cluster where APs perform tunnel termination. To ensure Layer 2 redundancy, the cluster must consist of a minimum of two Juniper Mist Edge devices.. This arrangement provides robust network coverage and enhances overall system reliability. Additionally, regardless of the number of Juniper Mist edges in a cluster, all the edges are active and ensures load-balance of AP tunnels across the edges. The Juniper Mist cloud sends a list of Juniper Mist Edge devices to APs for tunnel termination. Each AP receives a list with a different order of Juniper Mist Edge devices. This order determines the preferred Juniper Mist Edge device for each AP. The following illustration depicts Layer 2 redundancy normal operations and failover operations in a Layer 2 redundancy deployment.

L2 Redundancy Normal Operations   L2 Redundancy Failover Operations
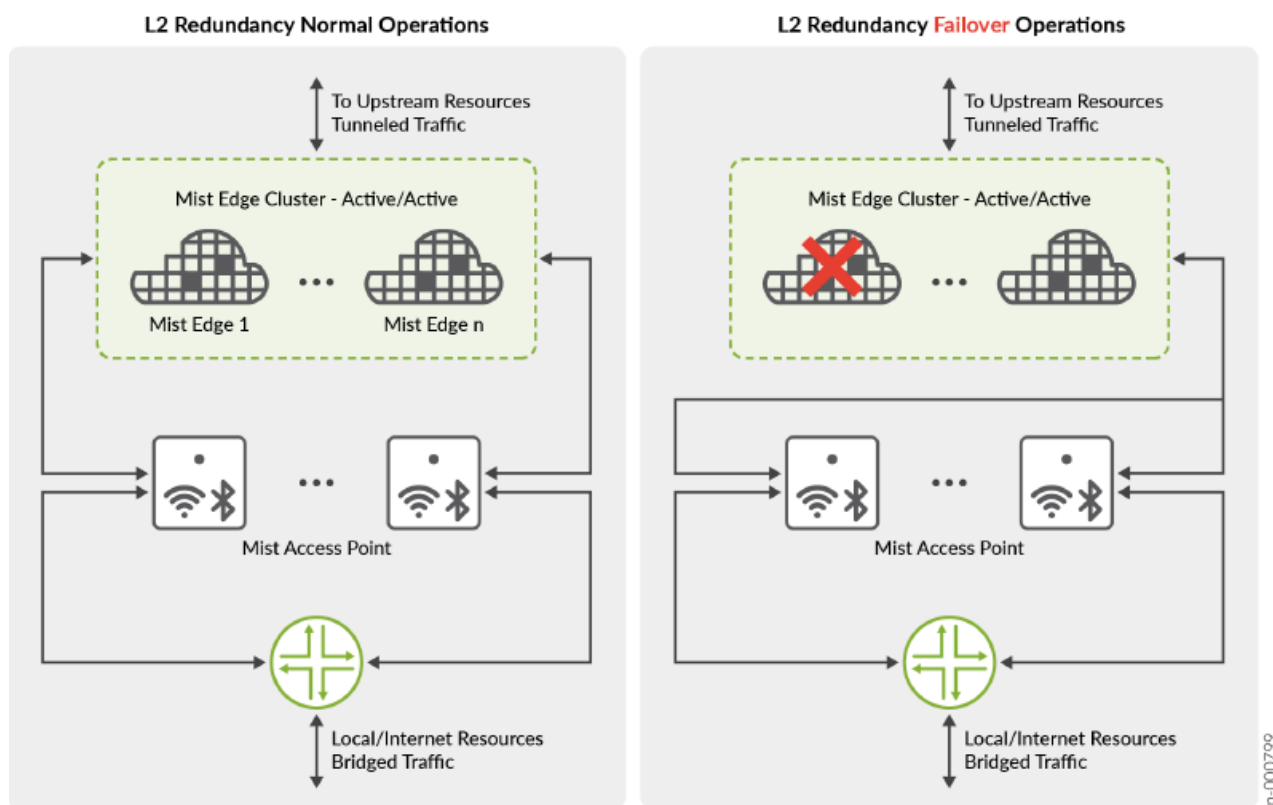
If multiple Juniper Mist Edge devices reside on the same Layer 2 segment in your network, we recommend you to:

- Add the Juniper Mist Edge devices to the same cluster in the active/active mode.
- Design for 80 percent capacity of the total number of tunnels on Juniper Mist Edge to keep additional capacity for failover.
- For example, plan for 4000 AP tunnels (which is 80 percent of the maximum number of tunnels), for an ME-X5-M SKU, which supports a maximum of 5000 AP tunnels.
- Temporarily oversubscribe the tunnel terminator service when multiple Juniper Mist Edge devices experience data loss.

When multiple sites tunnel traffic to a cluster with more than one Juniper Mist Edge device, APs from within a site may terminate tunnels on different edge devices. This behavior achieves optimal load balancing and is therefore the default and recommended behavior. However, you can tunnel traffic from a particular site to terminate on the same Mist edge by configuring Tunnel Host Selection under the Juniper Mist Clusters in the Juniper Mist portal.

You can select:

- Shuffle—Default option.
- Shuffle by Site—Configure APs on a single site to terminate on a same edge device within a cluster. If you select this option, remember to plan for the capacity of the edge device based on the largest AP site.

Figure 1 on page 8 illustrates the tunnel selection in a campus deployment when you select Shuffle option.
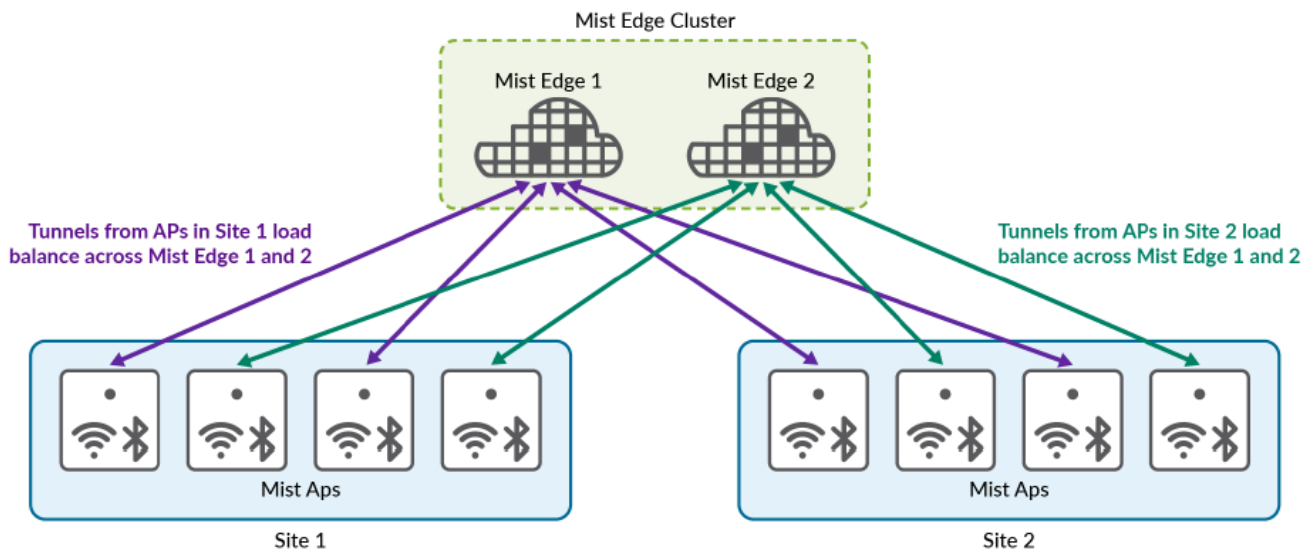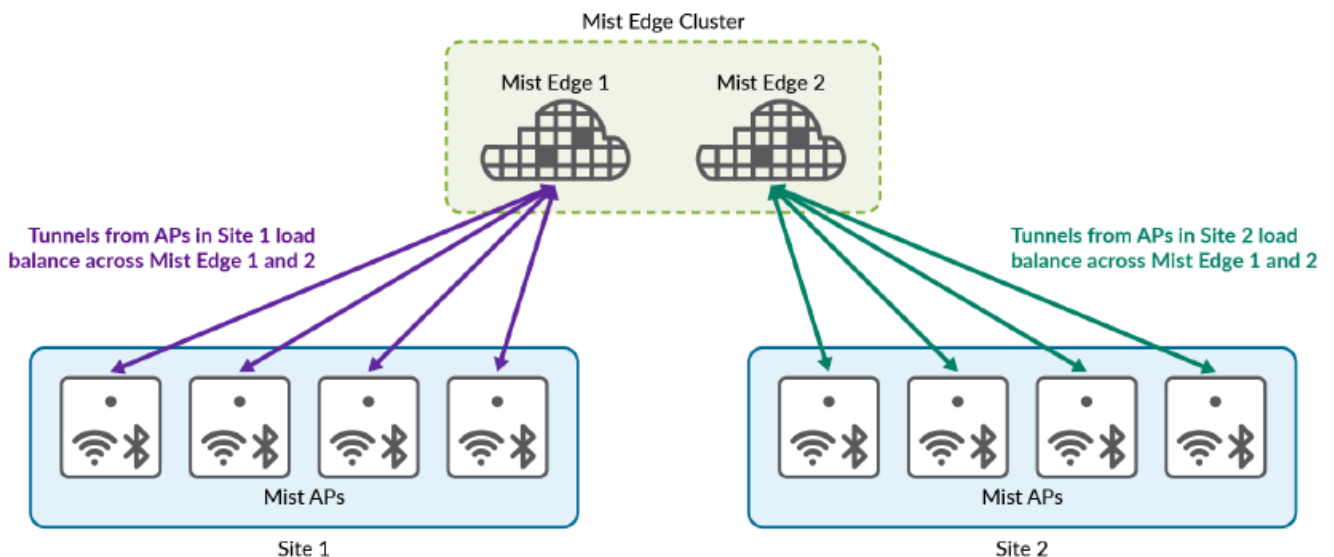
Tunnel Host Selection-Shuffle

Figure 2 on page 9 illustrates tunnel selection in a campus deployment when you select Shuffle by Site.

**Tunnel Host Selection-Shuffle by Site**

Layer 3 (Data Center) Considerations

When you design data center redundancy or traffic separation between the Layer 3 data centers, separate the Juniper Mist Edge devices into primary and secondary clusters. Juniper Mist Edge devices in primary cluster are in an active mode and edge devices in secondary cluster are in standby mode. This arrangement is an active-standby deployment. Each cluster in the distributed data centers may have one or more edges. You can also achieve Layer 3 redundancy with one edge device each in the primary and secondary clusters. However, having more than one edge in each cluster provides maximum benefit by achieving both same cluster as well as across cluster redundancy. You can use the Juniper Mist portal to handle up to two cluster failovers. With this capability, you ensure optimal network management in your campus deployment. However, if you need additional levels of failover protection, Juniper Mist API provides you more flexibility to customize the configuration. To maximize the resource utilizations and balance the load across the datacenter, you can configure multiple Mist Tunnels from WLAN on APs, where one Mist Edge cluster is primary (active) for one set of tunnels and secondary (standby) for remaining set of tunnels. See the following illustration and configuration. The left part marked in green depicts a primary cluster and the right part marked in blue. depicts a secondary cluster. Note that the AP does not form concurrent tunnels to a secondary cluster member, dotted lines are for illustration only.

Data Center Redundancy or Separation in Layer 3
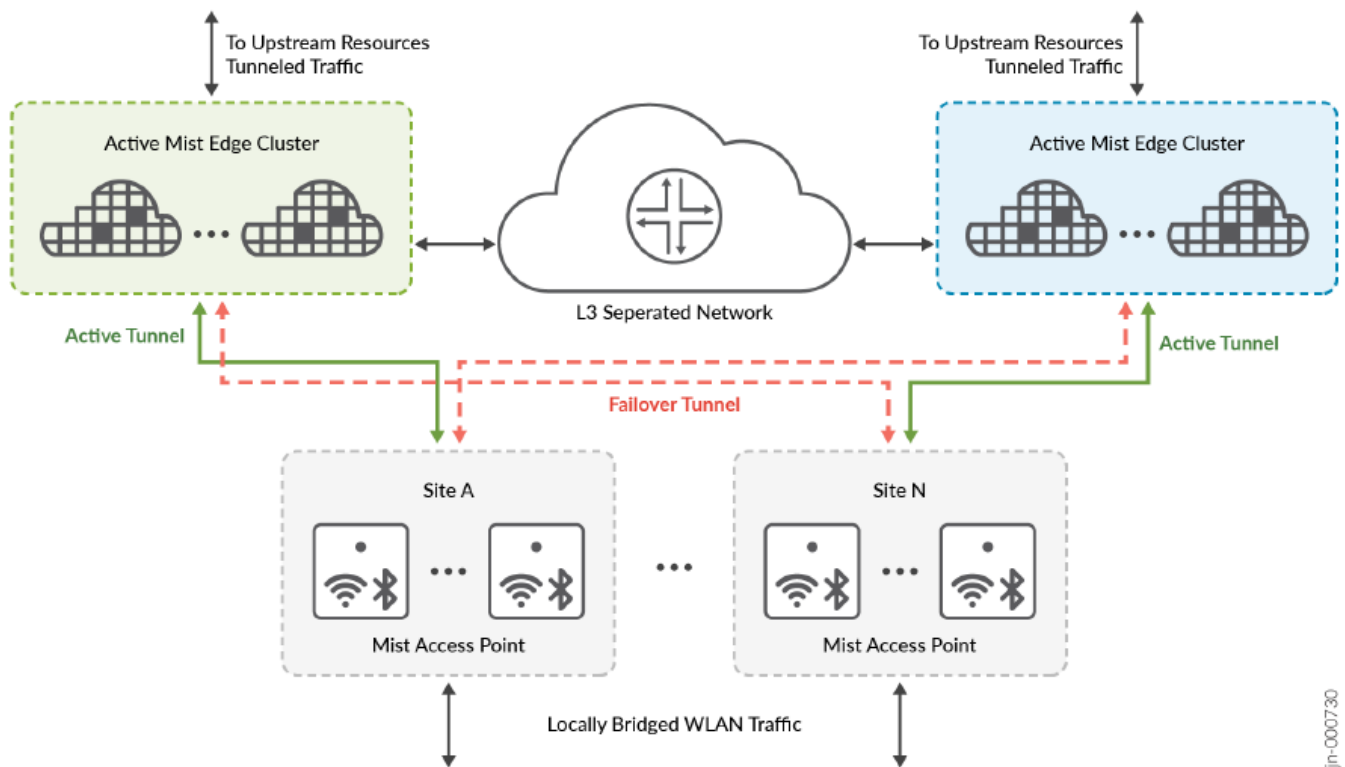
You can achieve a similar configuration as illustrated in Figure 3 on page 10 by using the options on the Juniper Mist Tunnel page, which is accessible from the Juniper Mist portal.

To achieve this configuration, you select and configure the Primary Cluster and Secondary Cluster options on the Juniper Mist Tunnel page. You can use the same tunnel object for mapping the tunneled WLAN in the WLAN configuration at multiple sites. The tunnel object must have Mist Cluster A as the preferred cluster and Mist Cluster B for Layer 3 redundancy. Juniper Access Points do not support simultaneous active and standby tunnels.

Tunnel Configuration in Sites A, B, and C

Tunnel Configuration in Sites D, E, and F

Failover Tunnel Timers

You can use the failover timer to determine the time span for which an access point (AP) waits before it fails over to another Juniper Mist Edge device. When APs tunnel traffic to multiple edge devices, you can adjust the failover timers in each tunnel for the respective VLANs. You can therefore fine-tune the performance of the VLANs that

carry application-sensitive data between the AP and the Juniper Mist Edge device.
NOTE: Do not configure a very aggressive failover timer if the network experiences latency and jitter.
You can refer to the following table to configure tunnel timers for a Juniper Mist tunnel.

Recommended Timers

Timers	Hello Interval	Retries	Total Time before Failover (Worst Case)
Aggressive	15	4	Approximately 22 seconds
Default	60	7	Approximately 60 seconds

Port and IP Address Configuration Requirements

IP Addresses and Data Port
Each Juniper Mist™ Edge device needs a minimum of two IP addresses. Juniper Mist Edge IP address and port configuration requirements are as follows:

- Out-of-Band Management (OOBM) port—The port is also known as the Mist port on the appliance. The OOBM port is a dedicated interface for the Juniper Mist Edge device to communicate with the Juniper Mist cloud. Through this port, the device receives configuration information and sends telemetry and status updates for services that run on the network edge. By default, the interface receives a Dynamic Host Configuration Protocol (DHCP)-assigned IP address and has network access to the Juniper Mist cloud. With this access, the interface can successfully complete zero-touch provisioning (ZTP).After you configure the Juniper Mist Edge device, on the Juniper Mist portal, you can change the OOBM IP address mode to a static IP address.
- We recommend using the DHCP-assigned IP address for the OOBM interface to complete the initial ZTP process. However, in cases where the DHCP server is unavailable, you can log in to Juniper Mist Edge using the credentials and manually assign the IP address.
- Tunnel port—An interface to which access points (APs) form a tunnel. You can configure the tunnel IP address in the Tunnel IP Configuration pane of the Juniper Mist portal.
  Juniper Mist Edge automatically detects the (tunnel) port channel. You can configure the data (tunnel) port as a single-arm or a dual-arm port. You can configure the data port as a single-arm or a dual-arm port.

NOTE: The OOBM port and the tunnel port have different IP addresses, and these addresses must be from different subnets.
Downstream traffic is the tunneled (encapsulated) traffic that originates from the AP. Upstream data is the client (after de-encapsulation) traffic that moves toward the upstream resources in your data center. You can monitor the LACP status on the Mist Edge Insights page on the Juniper Mist portal. You can see a sample LACP status report in the following illustration.

| LACP Status		
Name	**Member Port**	**Mode**
Po0	ge0, ge1	Active

Tunnel Port—Single-Arm and Dual-Arm Configuration

Juniper Mist Edge has multiple tunnel (data) ports. You can configure the tunnel port as a single-arm or a dual-arm port.

- A dual-arm tunnel port carries upstream and downstream traffic on two different ports. You can configure one more ports in each upstream and downstream direction. These ports automatically detect and form two LACP bundles. For dual-arm deployments, Juniper Mist Edge automatically configures each upstream data port as a trunk port. Juniper Mist Edge adds the VLANs that you configure for the Juniper Mist Tunnels as tagged VLANs. The downstream port is untagged and you must connect the port to the tunnel IP network.

- A single-arm tunnel port carries both upstream and downstream traffic. You can configure one or more ports in a single arm and these ports can automatically detect and form a Link Aggregation Control Protocol (LACP) bundle. For single-arm deployments, Juniper Mist Edge automatically configures the data port as a trunk with tunnel IP as its untagged or native VLAN. Trunk adds the VLANs that you configure under the Juniper Mist Tunnels as tagged VLANs.
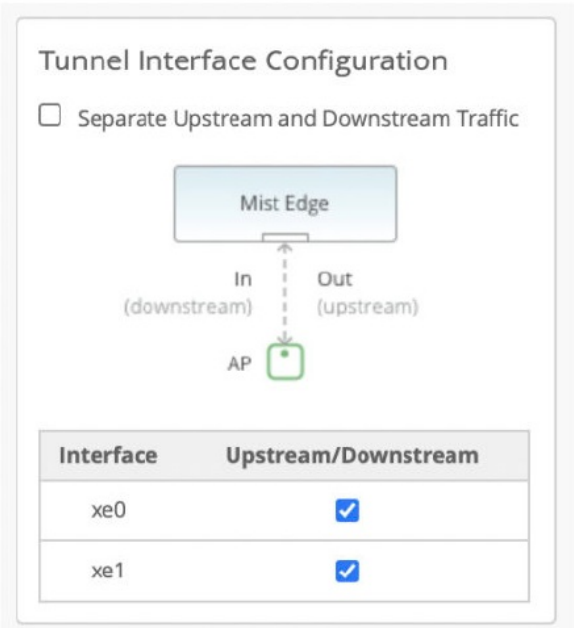
You can configure Juniper Mist Edge ports for single-arm or dual-arm deployments. The following illustration depicts the different configurations.

Examples for Single-Arm Deployment
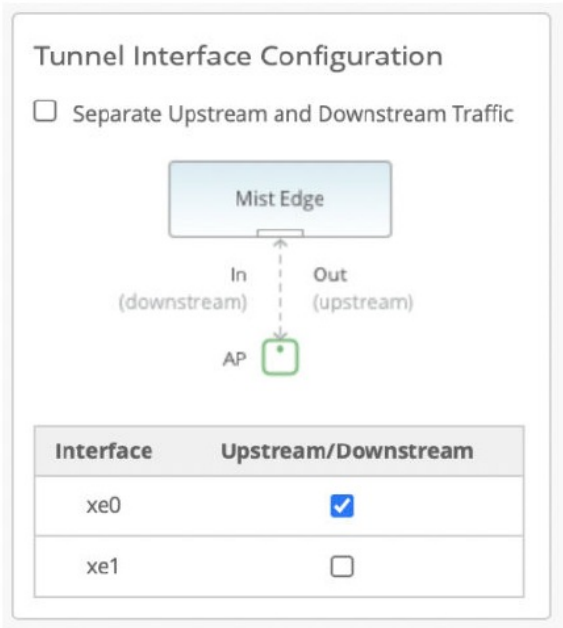
Examples for Dual-Arm Deployment

Tunnel Interface Configuration

☑ Separate Upstream and Downstream Traffic

Tunneled VLAN(s) | Out (upstream)

Mist Edge

In (downstream)

AP

Interface	Downstream	Upstream
xe0	☑	☐
xe1	☐	☑

Upstream Port VLAN ID

Tunnel Interface Configuration

☑ Separate Upstream and Downstream Traffic

Tunneled VLAN(s) | Out (upstream)

Mist Edge

In (downstream)

AP

Interface	Downstream	Upstream
xe0	☑	☐
xe1	☑	☐
xe2	☐	☑
xe3	☐	☑

Upstream Port VLAN ID

Documents / Resources

	Juniper NETWORKS Mist Edge Design [pdf] User Guide Mist Edge Design, Edge Design, Design

References

- ⑅ **Juniper Networks – Leader in AI Networking, Cloud, & Connected Security Solutions**
- ⑅ **End User License Agreement - Support - Juniper Networks**
- **User Manual**