

Multi-Region Fabric Using Multicloud and SDCI

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Multi-Region Fabric Using Multicloud and SDCI

Table 1: Feature History

Feature Name	Release Information	Description
Multi-Region Fabric Using Multicloud and SDCI	Cisco IOS XE Catalyst SD-WAN Release 17.10.1a Cisco vManage Release 20.10.1	This feature enables you to configure a cloud backbone or a Software-Defined Cloud Interconnect (SDCI) provider backbone as core region (region 0), and cloud gateways or interconnect gateways as border routers. You can thus easily establish site-to-site connectivity in multiple cloud regions and cloud networks.

Information About Multi-Region Fabric Using Multicloud and SDCI

Minimum supported releases: Cisco IOS XE Catalyst SD-WAN Release 17.10.1a, Cisco vManage Release 20.10.1

Cisco Catalyst SD-WAN includes a technology called Cisco Catalyst SD-WAN Cloud OnRamp for Multicloud, for integrating public cloud infrastructure into the Cisco Catalyst SD-WAN fabric. For a network using Multi-Region Fabric, you can establish site-to-site connectivity in multiple cloud regions and cloud networks by using a cloud backbone or a Software-Defined Cloud Interconnect (SDCI) provider backbone as core region (region 0). In this configuration, one or more cloud regions are configured as separate Multi-Region Fabric regions. Cloud gateways or interconnect gateways are configured as border routers, and full-mesh

connectivity between gateways in different Multi-Region Fabric regions is set up to carry site-to-site traffic over the cloud backbone or the SDCI provider backbone.

The following cloud services support a cloud-based core region:

- Microsoft Azure
- Amazon Web Services (AWS)
- Google Cloud Platform (GCP)

The following SDCI provider supports an interconnect gateway-based core region:

- Megaport



Note

- In case of AWS, when site-to-site connectivity is enabled at the global setting level, each cloud gateway must be configured as a border router.
- In case of GCP, when site-to-site connectivity is enabled at the global setting level, only border routers that have site-to-site connectivity participate in core routing.
- The Megaport fabric supports private site-to-site connectivity. Therefore, it is not always necessary to have a full mesh of site-to-site connectivity when SDCI routers are configured as border routers. Routers that have direct connectivity with each other can create a full-mesh network among the connected sites. However, if the SDCI routers are in partial-mesh connectivity, it is still possible to establish full-mesh connectivity using the BFD tunnels. The routing protocol helps in advertising the connected links between the sites that do not have direct connectivity, and thus a full logical mesh of BFD tunnels over private links between the connected sites is created.

  For example, Site A is connected to Site B through a Virtual Cross Connect (VXC). Similarly, Site C is connected to Site B through another VXC. However, there is no direct connection between Site A and Site C. In this scenario, Site A can connect to Site C by using the VXC between Site B and Site C. The connectivity between Site A and Site C is discovered through the standard routing protocol in underlay, and thus BFD tunnels are formed between Site A and Site C.

Benefits of Multi-Region Fabric Using Multicloud and SDCI

- Multi-Region Fabric provides fully automated path compute for site-to-site traffic across a provider (cloud or SDCI) backbone. There are no manual hop-by-hop route policies needed, thereby providing you significant operational simplification.
- The network automatically routes around traffic routing failures, providing resiliency.
- In a deployment scenario with thousands of branches, using a cloud service or SDCI for the core region can be an easier option than configuring a complex control policy.

Supported Devices for Multi-Region Fabric Using Multicloud and SDCI

This feature is supported only on Cisco IOS XE Catalyst SD-WAN devices. Minimum supported release for the devices is Cisco IOS XE Catalyst SD-WAN Release 17.10.1a.

Prerequisites for Multi-Region Fabric Using Multicloud and SDCI

- You must have a cloud or SDCI account.
- Cloud gateways or interconnect gateways for regions that need to exchange traffic must be reachable to each other in the underlay routing.
- When using AWS, enable full-mesh connectivity between transit virtual path connections (TVPCs) of cloud gateways in different regions to carry site-to-site traffic.

Restrictions for Multi-Region Fabric Using Multicloud and SDCI

- After you enable the **Multi-Region Fabric** option in Cisco SD-WAN Manager, you cannot set it to disabled again.
- If you choose to assign a device to a different Multi-Region Fabric region, then assign all devices belonging to a cloud gateway or an interconnect gateway to the same Multi-Region Fabric region because there is no check to prevent a region mismatch.
- The Equinix SDCI is supported from Cisco Catalyst SD-WAN Control Components Release 20.12.1.

Use Cases for Multi-Region Fabric Using Multicloud and SDCI

Use Case 1: Multi-Region Fabric Deployment with Cloud Service Provider as Backbone

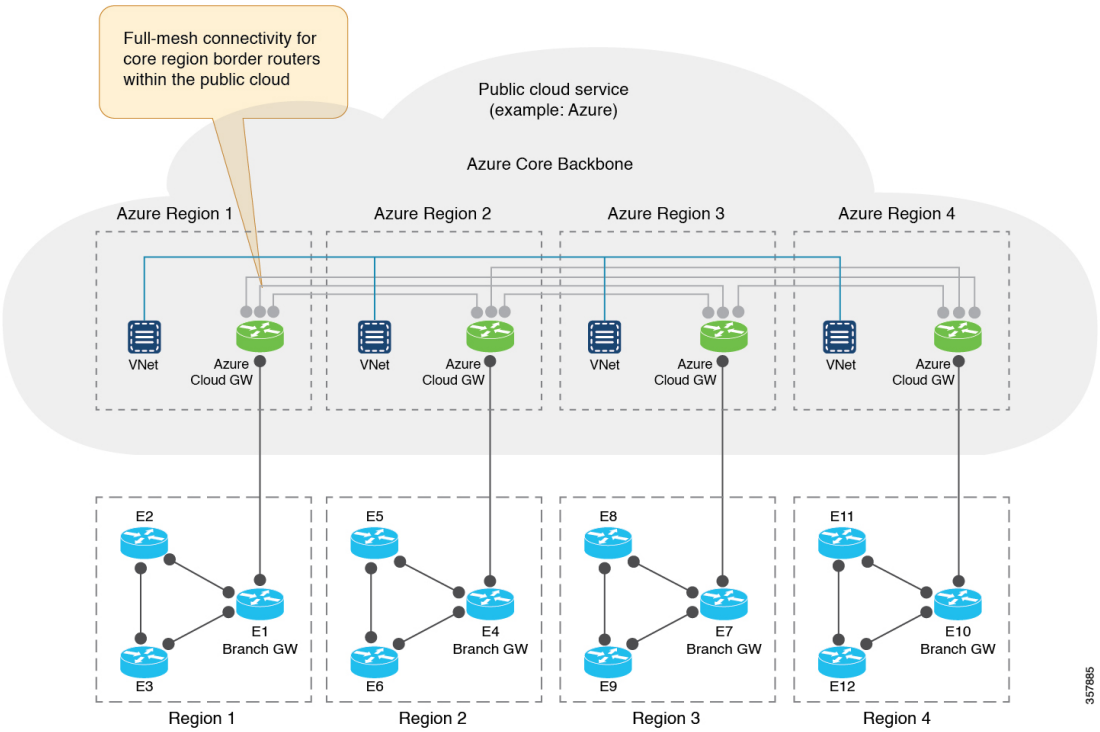
An organization has a large number of branch offices, and is using Multi-Region Fabric. They choose to use a public cloud service—Microsoft Azure—for the core region to simplify configuration and to enable rapid deployment of additional border routers when needed.

The organization configures four Azure cloud regions as Multi-Region Fabric regions: Azure Region 1, Azure Region 2, Azure Region 3, and Azure Region 4. In each region, a cloud gateway is brought up and configured as a border router. The border routers form the core region and have full-mesh connectivity.

Within each access region, edge routers connect to a cloud gateway that serves as the border router for the region.

An edge router in region 2 can connect to an edge router in region 3 by traversing the core overlay network. For example, E5 can connect to E9 by traversing the core overlay network.

Figure 1: Multi-Region Fabric Deployment with Cloud Service Provider as Backbone



Use Case 2: Multi-Region Fabric Deployment with SDCI as Backbone: Edge-Cloud Topology

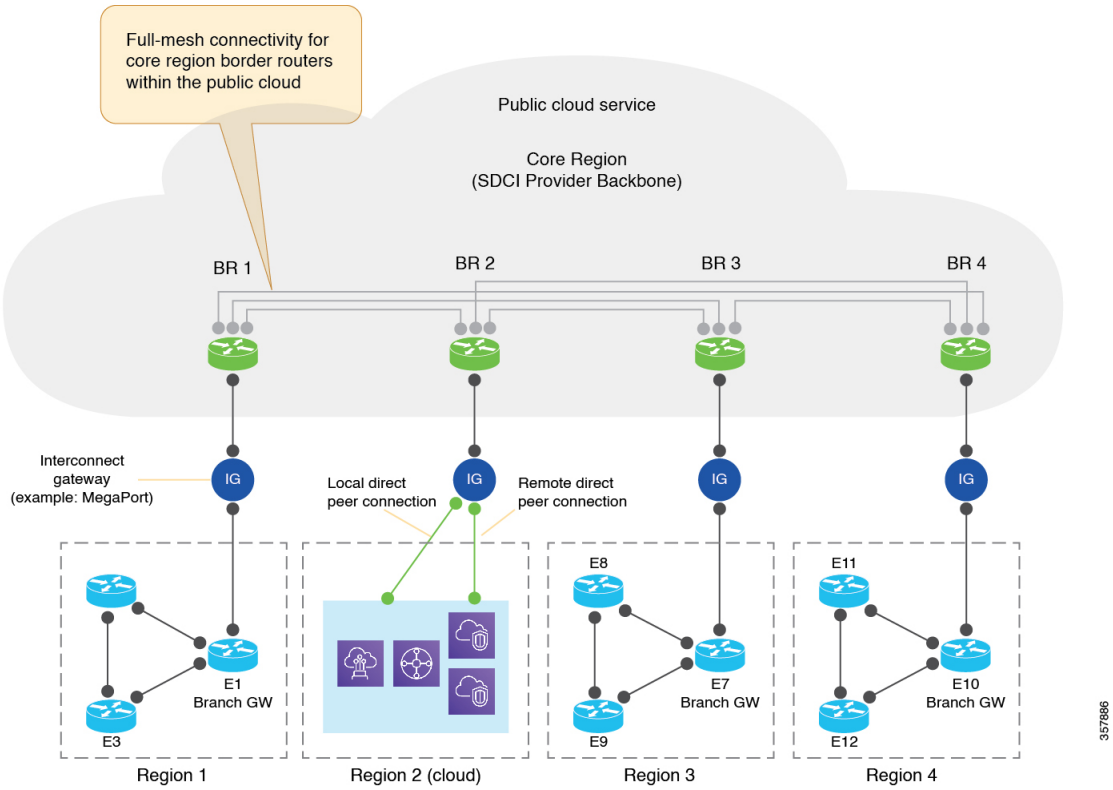
An organization has a large number of branch offices, and is using Multi-Region Fabric. They choose to use a cloud interconnect service—Megaport—for the core region to simplify configuration and to provide cost-effective, reliable connectivity between access regions and border routers.

The organization configures three cloud regions as Multi-Region Fabric regions: Region 1, Region 3, and Region 4. In addition, there is one cloud region that has not been configured as Multi-Region Fabric region: cloud region 2. In each region, an interconnect gateway is brought up and configured as a border router. The border routers form the core region and have full-mesh connectivity.

An edge router in region 1 can connect to an edge router in region 4 by traversing the core overlay network. For example, E3 can connect to E11 by traversing the core overlay network.

In addition, in this deployment, an edge router in region 1, region 3, or region 4 can directly connect to a cloud resource in cloud region 2 without the presence of a router in the cloud region itself.

Figure 2: Multi-Region Fabric Deployment with SDCI as Backbone: Edge-Cloud Topology



Use Case 3: Multi-Region Fabric Hybrid Deployment with SDCI as Backbone and Cloud Gateway as Edge Router

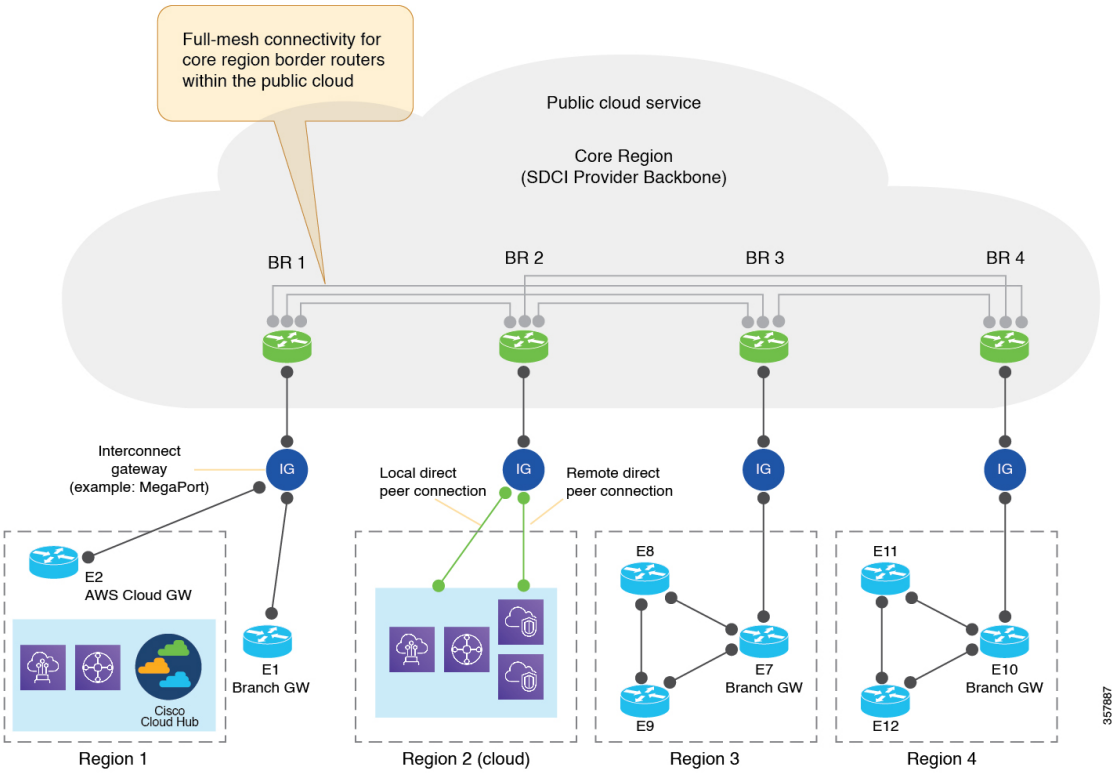
An organization has a large number of branch offices, and is using Multi-Region Fabric. They choose to use a cloud interconnect service—Megaport—for the core region to simplify configuration and to provide cost-effective, reliable connectivity between access regions and border routers.

The organization configures two cloud regions as Multi-Region Fabric regions: region 3 and region 4. In addition, there are two cloud regions that have not been configured as Multi-Region Fabric regions: cloud region 1 and cloud region 2. In each region, an interconnect gateway is brought up and configured as a border router. The border routers form the core region and have full-mesh connectivity.

An edge router in region 3 can connect to an edge router in region 4 by traversing the core overlay network. For example, E8 can connect to E11 by traversing the core overlay network.

In addition, in this deployment, cloud region 1 has a cloud gateway that acts as an edge router. It can connect to other edge routers within region 1 and also connect to the interconnect gateway or the border router that is assigned to the region.

Figure 3: Multi-Region Fabric Hybrid Deployment with SDCI as Backbone and Cloud Gateway as Edge Router



Workflow for Configuring Multi-Region Fabric with a Cloud Service Core Region

1. Enable Multi-Region Fabric.
2. Create a region in a network hierarchy.
3. Create a site in a network hierarchy.
4. Attach devices to a site.

   In this procedure, when specifying the site ID for a device, you can use any of the existing site IDs that are available in the network hierarchy or enter a new site ID. If you enter a new site ID without creating a node in the network hierarchy, the site is automatically created and listed on the **Configuration** > **Network Hierarchy** page.
5. Assign Regions to a Cisco Catalyst SD-WAN Controller Using Cisco SD-WAN Manager.
6. Create a cloud gateway border router.

   Using Cisco Catalyst SD-WAN Cloud OnRamp for Multicloud, create a cloud gateway in a public cloud service, and configure the **MRF Role** as **Border** router. For information about creating a cloud gateway in one of the supported public cloud services, such as AWS, Azure, or GCP, see the *Cisco Catalyst SD-WAN Cloud OnRamp Configuration Guide, Cisco IOS XE Release 17.x*.

7. If your topology includes Megaport, create an interconnect gateway at a Megaport location.

   Configure the **MRF Role** as **Border** router. For more information, see Create Interconnect Gateway at a Megaport Location.



Note After creating a cloud gateway or an interconnect gateway, if you move a site from one region to another, it creates a mismatch between the current region and the configured region. This notification is generated on the **Configuration** > **Cloud onRamp for Multicloud** > **Gateway Management** page. To ensure that the current region and the configured region are the same, click **…** adjacent to the gateway name and choose **Push Configuration**.