



Configuring Cisco Cloud APIC Using the Setup Wizard

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Configuring and Deploying Inter-Site Connectivity

Before you can begin to configure and deploy your Cloud APIC, you must first configure and deploy your Cisco ACI Multi-Site and your on-premises Cisco ACI, if you are connecting an on-premises site to cloud sites. The actual configuration for each varies, depending on your requirements and setup. If you are connecting an on-premises site to cloud sites, you will also need to configure and deploy an on-premises IPsec termination device to connect to the Cisco Cloud Services Router 1000Vs deployed by Cloud APIC in Microsoft Azure. See [Components of Extending Cisco ACI Fabric to the Public Cloud](#) for more information.

Following are documents that will aid you in the process of configuring and deploying these components:

- Cisco ACI documentation: Available at [Cisco Application Policy Infrastructure Controller \(APIC\) documentation](#), such as [Operating Cisco Application Centric Infrastructure](#) and [Cisco APIC Basic Configuration Guide, Release 4.0\(1\)](#).
- Cisco ACI Multi-Site: Available at [Cisco ACI Multi-Site documentation](#), such as [Cisco ACI Multi-Site Orchestrator Installation and Upgrade Guide, Release 2.0\(1\)](#).
- Cisco Cloud Services Router 1000V: Available at [Cisco CSR 1000v documentation](#).

Gathering On-Premises Configuration Information



Note You do not have to gather any information in this section if you are only configuring cloud site-to-cloud site connectivity for your Cloud APIC.

Use the following list to gather and record the necessary on-premises configuration information that you will need throughout these procedures to set up your Cloud APIC:

Necessary On-Premises Information	Your Entry
On-premises IPsec device public IP address	
IPsec termination device to CSR OSPF area	
On-premises APIC IP address	
ACI Multi-Site Orchestrator IP address	

Understanding Limitations for Number of Sites, Regions and CSRs

Throughout this document, you will be asked to decide on various configurations for sites, regions and CSRs. Following is a list of limitations for each that you should keep in mind as you're making configuration decisions for each.

Sites

The total number of sites that you can have with Cloud APIC depends on the type of configuration that you are setting up:

- **On-premises ACI site-to-cloud site configuration (AWS or Azure):** ACI Multi-Site multi-cloud deployments support any combination of one or two cloud sites (AWS or Azure) and one or two on-premises sites for a maximum total of four sites. The connectivity options are:
 - Hybrid-Cloud: On-premises-to-single cloud site connectivity
 - Hybrid Multi-Cloud: On-premises-to-multiple cloud sites connectivity
- **Multi-Cloud: Cloud site-to-cloud site connectivity (AWS or Azure):** ACI Multi-Site multi-cloud deployments support a combination of any two cloud sites (AWS, Azure, or both) for a total of two sites.
- **Cloud First: Single-Cloud Configuration:** ACI Multi-Site multi-cloud deployments support a single cloud site (AWS or Azure)

Regions

Within each site, you can have a maximum of four regions per site. Cloud APIC can manage multiple regions as a single site.

CSRs

You can have a certain number of CSRs within some regions, with the following limitations:

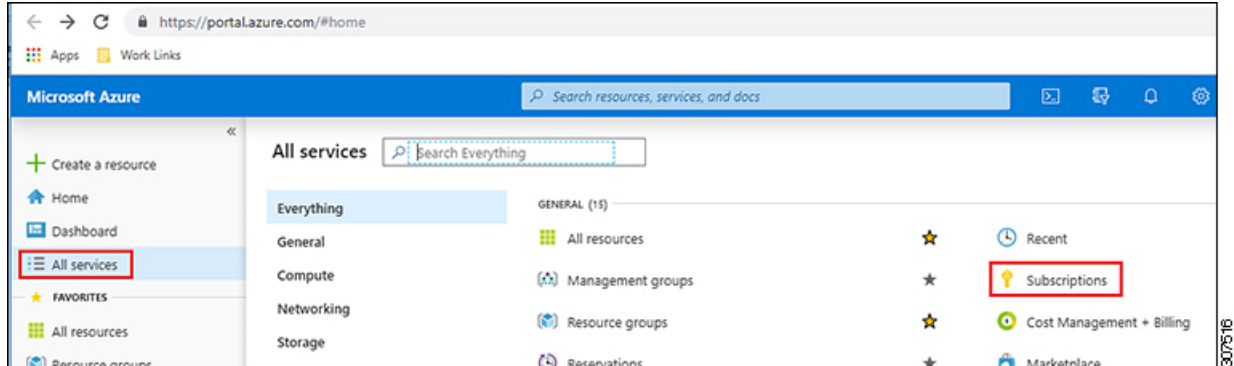
- You must have at least one region with CSRs deployed to have inter-VNET or inter-VRF communications.
- You do not have to have CSRs in every region.

- For regions with CSRs deployed to enable connectivity, the number of CSRs that you can deploy in each region varies:
 - For cloud site-to-cloud site configurations (Multi-Cloud):
 - CSRs can be deployed on a maximum of two managed regions.
 - A maximum of two CSRs per managed region is supported, for a total of four CSRs per cloud site.
 - For on-premises-to-cloud site (Hybrid-Cloud or Hybrid Multi-Cloud) or for single-cloud (Cloud First) configurations :
 - CSRs can be deployed on all four managed regions.
 - A maximum of four CSRs per managed region is supported, for a total of 16 CSRs per cloud site.

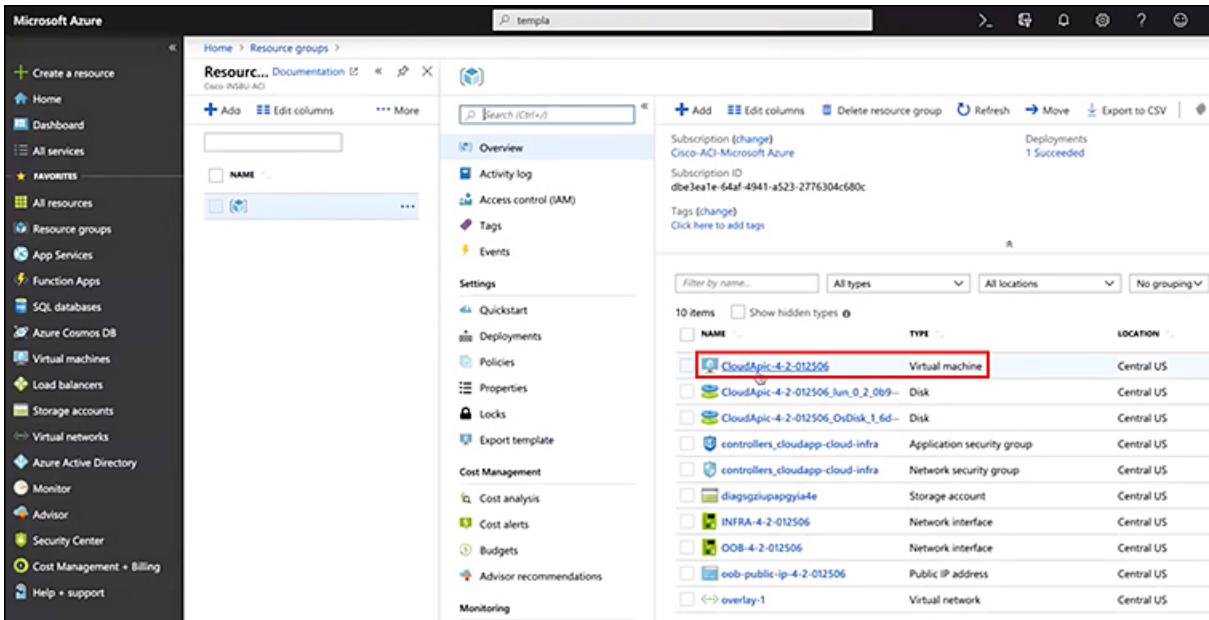
Locating the Cloud APIC IP Address

These procedures describe how to locate the IP address for the Cloud APIC through the Azure site.

- Step 1** From the main Azure management portal page, click the **All services** link in the left nav bar, then click the **Subscriptions** link.

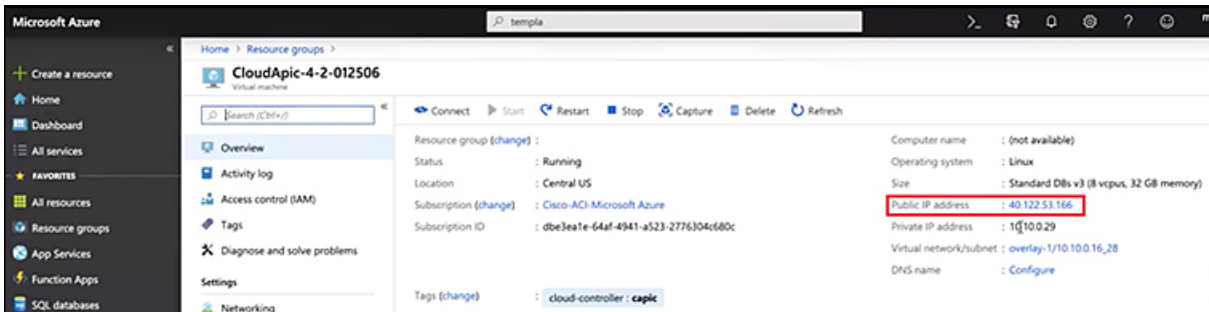


- Step 2** In the **Subscriptions** page in the Azure management portal, click the subscription account that you just created. The overview information for that subscription is displayed.
- Step 3** From the overview page for that subscription, locate the **Resource groups** link in the left nav bar and click that link. The resource groups for that subscription is displayed.
- Step 4** Choose the resource group that you chose or created in [Deploying the Cloud APIC in Azure](#). The overview information for that resource group is displayed.
- Step 5** In the overview page for the resource group, locate your Cloud APIC VM instance (shown as **Virtual machine** under the TYPE column), and click the link for that VM instance.



The overview information for the Cloud APIC VM instance is displayed.

Step 6 Locate the entry in the **Public IP address** field in this page and copy that IP address entry.



This is the Cloud APIC IP address that you will use to log into the Cloud APIC.

Configuring Cisco Cloud APIC Using the Setup Wizard

Follow the procedures in this topic to set up the cloud infrastructure configuration for your Cloud APIC. Cloud APIC will automatically deploy the required Azure constructs and the necessary CSRs.

Before you begin

Following are the prerequisites for this task:

- You have met the requirements that are outlined in [Requirements for Extending the Cisco ACI Fabric to the Public Cloud](#) before proceeding with the tasks in this section.

- You have successfully completed the procedures that are provided in [Deploying the Cloud APIC in Azure](#).

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- Step 1** Locate the IP address for your Cloud APIC.
See [Locating the Cloud APIC IP Address, on page 3](#) for those instructions.
- Step 2** Open a browser window and, using the secure version of HTTP (`https://`), paste the IP address into the URL field, then press Return to access this Cloud APIC.
For example, `https://192.168.0.0`.
If you see a message asking you to **Ignore Risk and Accept Certificate**, accept the certificate to continue.
- Step 3** Enter the following information in the login page for the Cloud APIC:
- **Username:** Enter **admin** for this field.
 - **Password:** Enter the password that you provided to log into the Cloud APIC.
 - **Domain:** If you see the **Domain** field, leave the default Domain entry as-is.
- Step 4** Click **Login** at the bottom of the page.
- Note** If you see an error message when you try to log in, such as `REST Endpoint user authentication datastore is not initialized - Check Fabric Membership Status of this fabric node`, wait for several minutes, then try again after a few minutes. You might also have to refresh the page in order to log in.
- The Welcome to Cloud APIC setup wizard page appears.
- Step 5** Click **Begin Set Up**.
The **Let's Configure the Basics** page appears, with these areas to be configured:
- **DNS and NTP Servers**
 - **Region Management**
 - **Smart Licensing**
- Step 6** In the **DNS and NTP Servers** row, click **Edit Configuration**.
The **DNS and NTP** page appears.
- Step 7** In the **DNS and NTP** page, add the DNS, if necessary, and NTP servers.
- A DNS server is already configured by default. Add a DNS server if you want to use a specific DNS server.
 - An NTP server is not configured by default, however, so we recommend that you configure an NTP server. Skip to [7.d, on page 5](#) if you want to configure an NTP server and you do not want to configure a DNS server.
- a) If you want to use a specific DNS server, under the **DNS Servers** area, click **+Add DNS Provider**.
 - b) Enter the IP address for the DNS servers and, if necessary, check the box next to Preferred DNS Provider.
 - c) Click the check mark next to the DNS server, and repeat for any additional DNS servers that you want to add.
 - d) Under the **NTP Servers** area, click **+Add Providers**.

- e) Enter the IP address for the NTP servers and, if necessary, check the box next to Preferred NTP Provider.
- f) Click the check mark next to the NTP server, and repeat for any additional NTP servers that you want to add.

Step 8 When you have finished adding the DNS and NTP servers, click **Save and Continue**.

The **Let's Configure the Basics** page appears again.

Step 9 In the **Region Management** row, click **Begin**.

The **Region Management** page appears.

Step 10 Verify that the Cloud APIC home region is selected.

The region that you selected when you were configuring your cloud site is the home region and should be selected already in this page. This is the region where the Cloud APIC is deployed (the region that will be managed by Cloud APIC), and will be indicated with the text `cAPIC_deployed` in the Region column.

Step 11 Select additional regions if you want the Cloud APIC to manage additional regions, and to possibly deploy CSRs to have inter-VNET communication and Hybrid-Cloud, Hybrid Multi-Cloud, or Multi-Cloud connectivity on those other regions.

The CSR can manage up to four regions, including the home region where Cloud APIC is deployed.

A Cloud APIC can manage multiple cloud regions as a single site. In a typical Cisco ACI configuration, a site represents anything that can be managed by an APIC cluster. If a Cloud APIC manages two regions, those two regions are considered a single site by Cisco ACI.

The following options are available on the row for any region that you select:

- **Cloud Routers:** Select this option if you want to deploy CSRs in this region. You must have at least one region with CSRs deployed to have inter-VNET or inter-VPC communications. However, if you choose multiple regions in this page, you do not have to have CSRs in every region that you choose. See [Understanding Limitations for Number of Sites, Regions and CSRs, on page 2](#) for more information.
- **Inter-Site Connectivity:** Select this option if you want this region to connect to other sites (for example, if you want this region to connect to an on-premises site, or to connect cloud site-to-cloud site, through Cisco ACI Multi-Site). Infra VNETs or VPCs are deployed on all regions selected for inter-site connectivity. Note that when you select inter-site connectivity for a region, the cloud routers option is also selected automatically for this region because you must have two cloud routers deployed for inter-site connectivity hubs.

Step 12 When you have selected all the appropriate regions, click **Next** at the bottom of the page.

The **General Connectivity** page appears.

Step 13 Enter the following information on the **General Connectivity** page.

- a) In the **Fabric Autonomous System Number** field, enter the BGP autonomous system number (ASN) that is unique to this site.

Note the following Microsoft Azure ASN restrictions:

- Do not use 32-bit ASNs. Azure VPN Gateways support 16-Bit ASNs at this time.
- The following ASNs are reserved by Azure for both internal and external peerings:
 - Public ASNs: 8074, 8075, 12076
 - Private ASNs: 65515, 65517, 65518, 65519, 65520

You cannot specify these ASNs for your on-premises VPN devices when connecting to Azure VPN gateways.

- The following ASNs are [reserved by IANA](#) and cannot be configured on your Azure VPN Gateway: 23456, 64496-64511, 65535-65551 and 429496729

- b) In the **Subnet for Cloud Router** field, enter the subnet for the cloud router.

The first subnet pool for the first two regions is automatically populated. If you selected more than two regions, you will need to add a subnet for the cloud router to the list for the additional two regions. Addresses from this subnet pool will be used for inter-region connectivity for any additional regions that are added that need to be managed by the Cloud APIC after the first two regions. This must be a valid IPv4 subnet with mask /24.

- c) Under the **Cloud Router Template** area, in the **Number of Routers Per Region** field, choose the number of Cisco Cloud Services Routers (CSRs) that will be used in each region.

See [Understanding Limitations for Number of Sites, Regions and CSRs, on page 2](#) for more information on any limitations on the number of CSRs per region.

- d) In the **Username**, enter the username for the Cisco Cloud Services Router.

Note Do not use `admin` as a username for the Cisco Cloud Services Router when connecting to an Azure cloud site.

- e) In the **Password** field, enter the password for the Cisco Cloud Services Router.

- f) In the **Throughput of the routers** field, choose the throughput of the Cisco Cloud Services Router.

Changing the value in this field changes the size of the CSR instance that is deployed. Choosing a higher value for the throughput results in a larger VM being deployed.

Note If you wish to change this value at some point in the future, you must delete the CSR, then repeat the processes in this chapter again and select the new value that you would like in the same **Throughput of the routers** field.

In addition, the licensing of the CSR is based on this setting. You will need the equivalent or higher license in your Smart account for it to be compliant. See [Requirements for the Azure Public Cloud](#) for more information.

Note Cloud routers should be undeployed from all regions before changing the router throughput or login credentials.

- g) In the **License Token** field, enter the license token for the Cisco Cloud Services Router.

This is the Product Instance Registration token from your Cisco Smart Software Licensing account. To get this license token, go to <http://software.cisco.com>, then navigate to **Smart Software Licensing > Inventory > Virtual Account** to find the Product Instance Registration token.

Step 14 Click the appropriate button, depending on whether you are configuring on-premises connectivity or not.

- If you are not configuring inter-site connectivity (if you did not select **Inter-Site Connectivity** when you were selecting regions to manage in the **Region Management** page), click **Save and Continue**. The **Let's Configure the Basics** page appears again. Skip to [Step 17, on page 8](#).
- If you are configuring inter-site connectivity (if you selected **Inter-Site Connectivity** when you were selecting regions to manage in the **Region Management** page), click **Next** at the bottom of the page. The **Inter-Site Connectivity** page appears.

Step 15 Enter the following information in the **Inter-Site Connectivity** page:

- **IPSec Tunnels to Inter-Site Routers:** This field is necessary only for on-premises connectivity to cloud sites. There is no need to enter information in this field if you don't have an on-premises site.

In this area, click the + button next to the **Add Public IP of IPsec Tunnel Peer** field.

- Enter the peer IP address for the IPsec tunnel termination to the on-premises device.
- Click the check mark to add this peer IP address.
- **OSPF Area for Inter-Site Connectivity:** Enter the underlay OSPF area ID that will be used with on-premises ISN peering (for example, 0.0.0.1)
- Under the **External Subnets for Inter-Site Connectivity** heading, click the + button next to the **+Add External Subnet** field.
 - Enter the subnet tunnel endpoint pool (the cloud TEP) that will be used in Azure. It must be a valid IPv4 subnet with a mask between /16 and /22 (for example, 30.29.0.0/16). This subnet will be used to address the IPsec tunnel interfaces and loopbacks of the Cloud Routers used for on-premises connectivity, and cannot overlap with other on-premises TEP pools.
 - Click the check mark after you have entered in the appropriate subnet pools.

Step 16 When you have entered all the necessary information on this page, click **Save and Continue** at the bottom of the page. The **Let's Configure the Basics** page appears again.

Step 17 In the **Smart Licensing** row, click **Register**.

The **Smart Licensing** page appears.

Step 18 Enter the necessary information in the **Smart Licensing** page.

Cisco Smart Licensing is a unified license management system that manages software licenses across Cisco products. To register your Cloud APIC with Cisco Smart Software Licensing, do the following

- Ensure that this product has access to the internet or a Smart Software Manager satellite installed on your network.
- Log in to Smart Account:
 - Smart Software Manager: <https://software.cisco.com/>
 - Smart Software Manager Satellite: <https://www.cisco.com/c/en/us/buy/smart-accounts/software-manager-satellite.html>
- Navigate to the Virtual Account containing the licenses to be used by this Product Instance.
- Generate a Product Instance Registration Token (this identifies your Smart Account) and copy or save it.

To learn more about Smart Software Licensing, visit <https://www.cisco.com/go/smartlicensing>.

Step 19 Click **Register** at the bottom of the page if you entered the necessary licensing information on this page, or click **Continue in Evaluation Mode** if you want to continue in evaluation mode instead.

The **Summary** page appears.

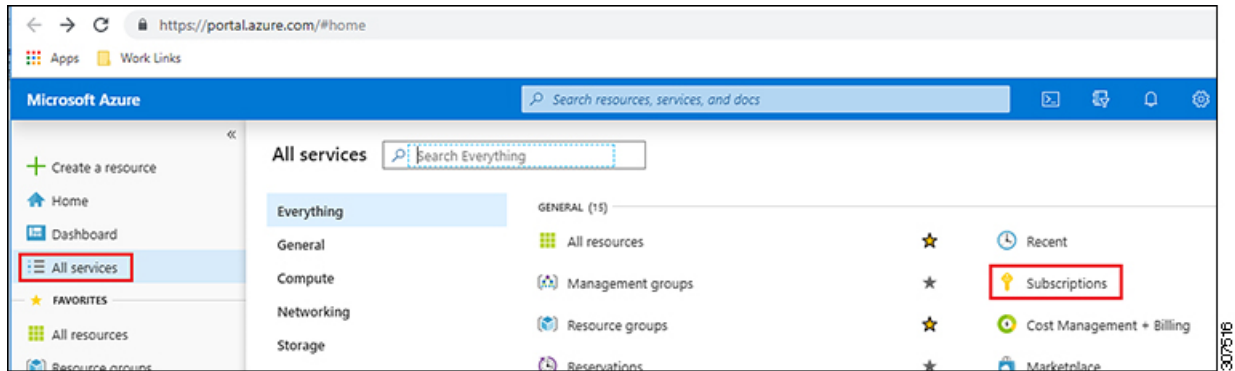
Step 20 Verify the information on the **Summary** page, then click **Finish**.

At this point, you are finished with the internal network connectivity configuration for your Cloud APIC.

If this is the first time that you are deploying your Cloud APIC, this process might take quite a bit of time, possibly 30 minutes or so before the process is successfully completed.

Step 21 Verify that the CSRs were successfully deployed.

- a) From the main Azure management portal page, click the **All services** link in the left nav bar, then click the **Subscriptions** link.



- b) In the **Subscriptions** page in the Azure management portal, click the subscription account that you created. The overview information for that subscription is displayed.
- c) From the overview page for that subscription, locate the **Resource groups** link in the left nav bar and click that link. The resource groups for that subscription is displayed.
- d) Choose the resource group that you chose or created in the **Custom deployment** page in [Deploying the Cloud APIC in Azure](#). The overview information for that resource group is displayed.
- e) In the overview page for the resource group, locate your CSR VM instance (shown as **Virtual machine** under the TYPE column), and click the link for that VM instance.

The CSR VM instance will have a name with a `ct_routerp_region_x_0` format, where:

- *region* is the managed region (for example, `westus`, `westus2`, `centralus`, or `eastus`)
- *x* is the CSR count, starting from zero

For example: `ct_routerp_centralus_0_0` or `ct_routerp_centralus_1_0`

The overview information for the CSR VM instance is displayed.

- f) Locate the **Status** field at the top left area in the page.
- If you see the text **Creating** in the **Status** field, then the CSRs are not fully deployed yet.
 - If you see the text **Running** in the **Status** field, then the CSRs are fully deployed.

What to do next

Determine if you are managing additional sites along with the Cisco Cloud APIC site or not:

- If you are managing additional sites (an on-premises site or cloud sites) along with the Cisco Cloud APIC site (if you selected the **Inter-Site Connectivity** option in the **Region Management** page), go to [Managing Cisco Cloud APIC Through Cisco ACI Multi-Site](#).
- If you are setting up a Cloud First configuration, where you are not managing any other sites along with the Cisco Cloud APIC site (if you selected only the **Cloud Routers** option in the **Region Management** page), you will not need to use the Cisco ACI Multi-Site for additional configurations. However, you will have additional configurations that you must perform in the Cisco Cloud APIC GUI in this case.

You also need to create a tenant using the Cisco Cloud APIC GUI using the instructions in [Creating a Tenant Using the Cisco Cloud APIC GUI](#).

Use the Global Create option in the Cisco Cloud APIC GUI to configure the following components:

- Tenant
- Application Profile
- EPG

See [Navigating the Cisco Cloud APIC GUI](#) and [Configuring Cisco Cloud APIC Components](#) for more information.

Verifying the Cisco Cloud APIC Setup Wizard Configurations

Use the procedures in this topic to verify that the configuration information that you entered in the Cloud APIC Setup Wizard are applied correctly.

In Cisco Cloud APIC, verify the following settings:

- Under **Cloud Resources**, click on **Regions** and verify that the regions that you selected are shown as **managed** in the Admin State column.
- Under **Infrastructure**, click on **Inter-Region Connectivity** and verify the information in this screen is correct.
- Under **Infrastructure**, click on **Inter-Site Connectivity** and verify the information in this screen is correct.
- Click on Dashboard and use the information in the On Premises Connectivity Status and the Inter-Region Connectivity Status boxes to verify that the setup wizard and tunnel configurations were done properly.

What to do next

Complete the multi-site configuration using the procedures provided in [Managing Cisco Cloud APIC Through Cisco ACI Multi-Site](#).