Preparing for Installing Cisco Cloud Network Controller

Requirements for Extending the Cisco ACI Fabric to the Public Cloud

Before you can extend the Cisco Application Centric Infrastructure (ACI) to the public cloud, you must meet requirements for the Cisco ACI on-premises datacenter and the Microsoft Azure deployment.

Requirements for the On-Premises Data Center

This section lists the on-premises data center requirements for extending the Cisco Application Centric Infrastructure (ACI) fabric to the public cloud.

- Ensure that the Cisco ACI fabric is installed with the following components:
  - At least two Cisco Nexus EX or FX spine switches, or Nexus 9332C and 9364C spine switches, running Cisco Nexus 9000 Series ACI Mode switch software release 14.1 or later.
  - At least two Cisco Nexus pre-EX, EX, or FX leaf switches running the Cisco Nexus 9000 Series ACI Mode switch software release 14.1 or later.

Note Even though Cisco Nexus pre-EX leaf switches are supported, we recommend using later-generation leaf switches, such as EX or FX leaf switches, due to the End-of-Life announcement for these older pre-EX leaf switches as described in End-of-Sale and End-of-Life Announcement for the Cisco Nexus 9372PX and 9372TX Switches.

  - At least one on-premises Cisco Application Policy Infrastructure Controller (APIC) running release 4.1 or later and Cisco Nexus Dashboard Orchestrator (NDO) Release 2.2(x) or later.

- Cisco Nexus Dashboard Orchestrator 2.2(x) deployed with basic configuration.
- A network device capable of terminating Internet Protocol Security (IPsec).
- Verify that you have enough bandwidth for tenant traffic between on-premises and cloud sites.
- Verify that all leaf switches on the on-premises sites have the appropriate Cisco ACI license:
  - If the Cisco ACI on-premises site is a single site, then use the Essentials license tier (or higher) for the on-premises leaf switches
  - If the Cisco ACI on-premises site is a multi-site, then use the Advantage license tier (or higher) for the on-premises leaf switches

Note These licensing requirements for the on-premises data center are independent of the number of Cisco Cloud Network Controllers deployed on public clouds. For Cisco Cloud Network Controller licensing requirements, see Cisco Cloud Network Controller and On-Premises ACI Licensing Summary.

- Workloads that are connected to the Cisco ACI fabric.
- An intersite network (ISN) that is configured between the Cisco ACI fabric (spine) and the IP Security (IPsec) termination device.

  For information about creating an ISN, see the "Multipod" chapter of the *Cisco APIC Layer 3 Networking Configuration Guide*.
- Certain firewall ports must be permitted if you are deploying firewalls between your on-premises and Azure deployments. These include HTTPS access for the Cisco Cloud Network Controller, IPsec ports for each Azure CCR, and SSH connectivity for Azure CCR remote management.

  These firewall ports are described in more detail in Cisco Cloud Network Controller Communication Ports, on page 5 in this guide.

Requirements for the Azure Public Cloud

This section lists the Microsoft Azure requirements for extending the Cisco Application Centric Infrastructure (ACI) fabric to the public cloud.

Azure Accounts

You must have at least one Azure account. You will then create a subscription in your Azure account, where you can choose to deploy multiple tenants within the same subscription or you can create multiple subscriptions for the tenants.

Note Beginning with 26.0(2), support is now available for having multiple cloud subscriptions under a single tenant. For more information, see Tenants.

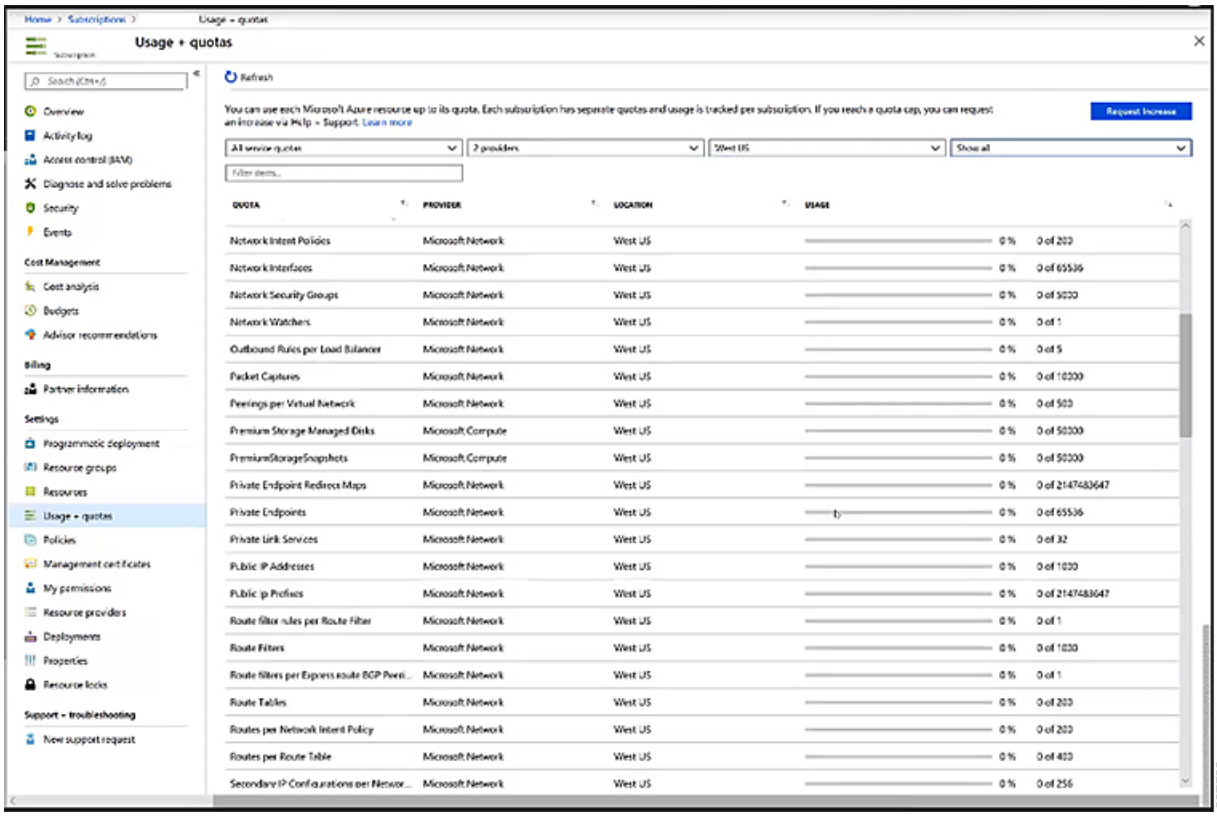
Note You can run only one Cloud Network Controller in the infra account. Running multiple Cloud Network Controllers in the same infra account is not supported.

Azure Quota Limits

Verify that you have the appropriate Azure quota limits:

1. Navigate to **Subscriptions** > **Settings: Usage + quotas**.
2. In the **Select a provider** field, select:
   - Microsoft.Compute
   - Microsoft.Network
3. In the **Select a location** field, select your region (for example, **West US**).
4. In the last field, change **Show only items with usage** to **Show all**.

Output similar to the following appears. Use this output to verify that you have the appropriate Azure quota limits.



Azure Resources

You need the following resources as part of the Azure deployment:

- Access to the Azure Marketplace offer. Locate the Cisco Cloud Network Controller offer on the Azure Marketplace and follow the steps in that page.
- The following cloud resource requirements (assumes one tenant, one VRF):

Resource Name	Resource Type	Minimum Requirement
Virtual Networks	Network	2
Static Public IP Addresses	Network	9
Network Security Groups	Network	5
Application Security Groups	Network	5
Application Gateways	Network	1
Virtual Machines	Compute	3
Standard DSv2 Family vCPUs	Compute	16
Standard DSv3 Family vCPUs	Compute	8
Premium Storage Managed Disks	Compute	4

Azure Resource Providers

For every subscription that you use with the Cisco Cloud Network Controller, including for tenants that have subscriptions that you might add later, you must register the following resource providers:

- `microsoft.insights`
- `Microsoft.EventHub`
- `Microsoft.Logic`
- `Microsoft.ServiceBus`

For more information, see Registering the Necessary Resource Providers.

CCR

There are two types of licensing models available:

- BYOL (Bring Your Own License)
- PAYG (Pay as You Go)

BYOL

Deploy the CCRs in the appropriate size, depending on the bandwidth requirement defined during the Cisco Cloud Network Controller setup.

The value for the throughput of the routers determines the size of the CCR instance that you deploy; a higher value for the throughput results in the deployment of a larger VM. CCR licensing is based on the throughput configuration that you set as part of the Cisco Cloud Network Controller setup process. You need the equivalent or higher license in your Smart account and the AX feature set for compliance.

The Cisco Catalyst 8000V supports tier-based (T0/T1/T2/T3) throughput options. The following table lists what Azure VM sizes are needed for different router throughput settings for the Cisco Catalyst 8000V:

CCR Throughput	Azure VM Size
T0 (up to 15M throughput)	DS3_v2
T1 (up to 100M throughput)	DS3_v2
T2 (up to 1G throughput)	DS3_v2
T3 (up to 10G throughput)	F16s_v2

Tier2 (T2) is the default throughput supported by Cisco Cloud Network Controller.

PAYG

The Cisco Cloud Network Controller supports a range of VM types. The table below shows the various instances of the VM types available along with their capacity.

VmName on Azure	Memory	vCPUs	NetworkBw
DS3V2	14GiB	4	Up to 3 Gigabit
DS4V2	28GiB	8	Up to 6 Gigabit
F16SV2	32GiB	16	Up to 12.5 Gigabit
F32SV2	64GiB	32	Up to 16 Gigabit

Changing the value in the **VM Type** field in the First Time Setup changes the other factors of the CCR as listed in the table above. Choosing a higher value for the VM size results in higher throughput.

Cisco Cloud Network Controller

Cisco Cloud Network Controller is deployed using Standard_D8s_v3.

Cisco Cloud Network Controller Communication Ports

When configuring your Cisco Cloud Network Controller environment, keep in mind that the following ports are required for network communications:

- For communication between the Cisco Nexus Dashboard Orchestrator and the Cisco Cloud Network Controller: HTTPS (TCP Port 443 inbound/outbound)

  For the Cisco Cloud Network Controller, use the same Cisco Cloud Network Controller management IP address that you will use to log into the Cisco Cloud Network Controller at the beginning of Configuring Cisco Cloud Network Controller Using the Setup Wizard.

- For communication between the on-premises IPsec device and the CCRs deployed by Cisco Cloud Network Controller in Azure: Standard IPsec ports (UDP ports 500 and 4500 should be open)

  For the two Azure CCRs, the public IPsec peering IP as provided if you download the ISN device configuration files using the instructions in Configuring the Intersite Infrastructure.

- If you want to connect and manage the CCRs deployed by Cisco Cloud Network Controller in Azure, allow port TCP 22 inbound/outbound to the public IP address of each CCR.
- For license registration (towards `tools.cisco.com`): Port 443 (outbound) is required
- For DNS: UDP Port 53 outbound
- For NTP: UDP Port 123 outbound
- If remote authentication is used (LDAP, Radius, TACACS+, SAML), open the proper ports
- If a certificate authority is used, open the proper ports

Cisco Cloud Network Controller Installation Workflow

This section provides a high-level description of the tasks that are required to install and deploy Cisco Cloud Network Controller. You perform installation tasks through Azure management portal, the Azure Resource Manager (ARM) template, the Cisco Cloud Network Controller Setup Wizard, and Cisco Application Centric Infrastructure (ACI) Nexus Dashboard Orchestrator.

1. Fulfill all prerequisites, which include tasks in the on-premises data center and the public cloud.

   See the section "Requirements for Extending the Cisco ACI Fabric to the Public Cloud, on page 1."

2. Deploy Cisco Cloud Network Controller in Azure.

   This task includes subscribing to the CCR, registering the necessary resource providers, and creating an application in Azure.

   You also must create an Azure SSH keypair, deploy the Cisco Cloud Network Controller in Azure, and add a role assignment for a VM.

   See the section "Deploying the Cisco Cloud Network Controller in Azure."

3. Configure Cisco Cloud Network Controller using the Setup Wizard.

   This task includes logging into Cisco Cloud Network Controller and configuring the fabric managed by the Cisco Cloud Network Controller for connecting to the public cloud. You also add the Azure region selection. You provide the Border Gateway Protocol (BGP) autonomous system number (ASN) and OSPF area ID for intersite network (ISN) peering and add an external subnet. You then add the IPsec peer address.

   See the section "Configuring Cisco Cloud Network Controller Using the Setup Wizard."

4. Configure Cisco Cloud Network Controller using Nexus Dashboard Orchestrator.

   - For on-premises-to-cloud connectivity, this task includes logging into the Cisco Nexus Dashboard Orchestrator GUI, adding the on-premises and cloud site, configuring the fabric connectivity infra, and configuring the properties for the on-premises site. You then configure the Cisco ACI spines, BGP peering, and enable the connectivity between the on-premises site and the Azure cloud sites.
   - For cloud-to-cloud connectivity, this task includes logging into the Cisco Nexus Dashboard Orchestrator GUI, adding the cloud sites, enabling the Nexus Dashboard option and selecting the **Deploy Only** option when you are deploying the configuration.

   See the section "Managing Cisco Cloud Network Controller Through Multi-Site."

5. Use Cisco Cloud Network Controller to extend Cisco ACI policy into the Azure public cloud.

   See the sections "Creating a Tenant Using the Cisco Cloud Network Controller GUI" and "Configuring Cisco Cloud Network Controller Components."