



Information About Deploying Cisco CSR 1000v on Microsoft Azure

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Overview of Cisco CSR 1000v on Microsoft Azure

The Cisco Cloud Services Router (CSR) 1000v is a full-featured Cisco IOS XE router, enabling IT departments to deploy enterprise-class networking services in the Microsoft Azure cloud. Most Cisco IOS XE features are also available on the virtual Cisco CSR 1000v.

You can choose to deploy Cisco CSR 1000v software on new or existing infrastructure, such as a virtual network.

The following VPN features are supported on the Cisco CSR 1000v: IPsec, DMVPN, FlexVPN, Easy VPN and SSLVPN. You can use dynamic routing protocols such as EIGRP, OSPF, and BGP to construct multi-tier architectures within Azure, and interconnect with corporate locations or other clouds.

You can secure, inspect, and audit hybrid cloud network traffic with application-aware Zone Based Firewall. You can also use IP SLA and Application Visibility and Control (AVC) to find out about performance issues, fingerprint application flows and export detailed flow data for real-time analysis and network forensics.

Prerequisites for Deploying Cisco CSR 1000v on Microsoft Azure

These are the main three prerequisites for deploying a Cisco CSR 1000v:

- You must have a user account/subscription with Microsoft Azure. For more information about creating an account with Microsoft Azure, see [Get started with Azure](#).
- A number of resources must be deployed before, or during, the deployment of the Cisco CSR 1000v. For a description of the required resources, see [Microsoft Azure Resources, on page 2](#).

- A software license must be obtained for the Cisco CSR 1000v.

Microsoft Azure Resources

To deploy a Cisco CSR 1000V instance on Microsoft Azure, the following resources are required. You must create the required resources during the deployment if they do not already exist in the Azure network.

- Resource group: The container for resources. Resources include virtual machines, interfaces, virtual networks, routing tables, public IP addresses, security groups and storage accounts.



Note You must deploy a Cisco CSR 1000V with a Single Interface within an existing resource group only. The resource group can already contain other resources.

If you create an object in a resource group that depends upon an object in a second resource group, the second resource group cannot be deleted until you delete your object in the first resource group. Create a new resource group for a new deployment. For more information about resource groups, see: [Azure Resource Manager overview](#).

- Virtual network: A Cisco CSR 1000V with a 2-, 4-, or 8- Network Interface Cards (NICs). Requires a virtual network with a set of defined subnets. A Cisco CSR 1000V instance with a single interface requires a new or an existing virtual network with 1 subnet. For more information about virtual networks, see [Azure Virtual Network](#).
- Route table: The user defined routes (UDRs) for subnetworks.
- Security group: The security rules for the virtual network.
- Public IP address: The IP address of the Cisco CSR 1000V instance.
- Storage account: The storage account for the Cisco CSR 1000V image, VM disk files, and boot diagnostics. The storage account type "Standard_LRS" is the only currently supported type. For more details about creating a storage account, see: [About Azure storage accounts](#).
- Boot Diagnostics: The diagnostics used for debugging issues found during the operation of the Cisco CSR 1000V instance.
- Availability Set: A logical group of VMs. The VMs are separate and can run across multiple servers, racks, and switches in a data center. For more information on availability sets, see [Information about Availability Sets, on page 5](#), in this document. Also search for "Availability Set" in the [Microsoft Azure Documentation](#).
- Managed Disks: Provision to manage the storage accounts of VM disks. When you create a managed disk, specify the disk type (Premium or Standard) and the size of disk that you require. Azure Storage Service Encryption (SSE) is used by default for all the managed disks. For more information on managed disks, see [Azure Managed Disks Overview](#).
- Interfaces: The network interfaces for a Cisco CSR 1000V VM with 2, 4, or 8 network interfaces. You can assign a public IP address to any interface. (Commonly, the public IP address is assigned to the first interface). All the Cisco CSR 1000V VM interfaces are in a private subnet. You can assign the IP address of each private interface using the **ip address dhcp** command in the interface configuration or assign a

static IP address using the **ip address** command. For example, `ip address 1.1.1.1 255.255.255.0`. If you use a static IP address, ensure that the IP address is the same as the IP address assigned by Microsoft Azure. View the IP address of an interface by looking at the VM network settings in the Azure marketplace.

Cisco CSR 1000v Deployments in the Microsoft Azure Marketplace

Cisco has published a deployment solution templates in the Microsoft Azure marketplace to help create and manage resources. The following types of solution templates are supported:

- Full solution template - using this template, you can deploy a Cisco CSR 1000V with 2-, 4-, or 8- NICs, with other required resources.
- CSR 1000V-only template - using this template, you can deploy a Cisco CSR 1000V with a single interface, with pre-existing resources.

If you are deploying a Cisco CSR 1000V instance in a new network with no existing resources, it is recommended that you use a full solution template.

When you deploy a Cisco CSR 1000V instance with 2-, 4-, or 8- NICs solution template, many resources are automatically created. To know how to deploy the instance in this scenario, see [Deploy a CSR 1000v with Multiple Interfaces on Microsoft Azure](#).

To deploy a Cisco CSR 1000V instance and use the resources that already exist in Microsoft Azure, deploy the instance using a single interface template. For more information, see [Deploy a CSR 1000v with a Single Interface on Microsoft Azure](#). After you deploy a Cisco CSR 1000V instance with a single interface, you can manually add further interfaces using Powershell or by using Azure CLI commands.

Cisco CSR 1000v Public Cloud Deployments

The following 2, 4 and 8 NIC solution templates are currently offered in the Microsoft Azure marketplace in the public cloud:

Cisco IOS XE Release	Supported Instance Types/Max NICs supported
16.12.x, 17.1x, and 17.2.x releases	DS2_v2/D2_v2 (2 NICs) DS3_v2/D3_v2 (4 NICs) DS4_v2/D4_v2 (8 NICs)
17.3.x release	DS2_v2/D2_v2 (2 NICs) DS3_v2/D3_v2 (4 NICs) DS4_v2/D4_v2 (8 NICs) F16s_v2 (4 NICs) F32s_v2 (8NICs)

Cisco CSR1000V Government Cloud Deployments

The following 2, 4, and 8 NIC solution templates are currently offered in the Microsoft Azure marketplace in the government cloud:

Cisco CSR 1000V - XE 16.x with 2, 4 or 8 NICs

Cisco IOS XE releases 16.4, 16.5, 16.6, and 16.7 are supported.

Cisco CSR1000V Licensing

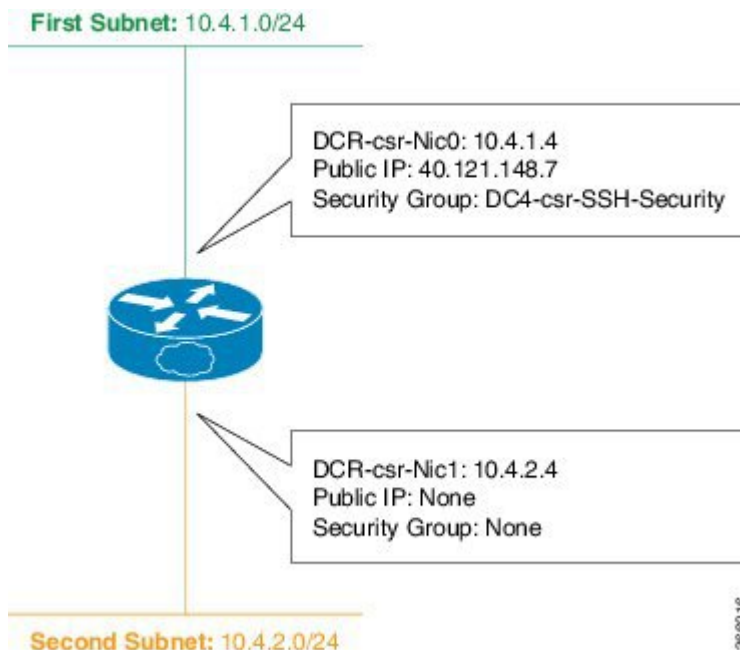
For a Cisco CSR1000V using the BYOL licensing model on Microsoft Azure, you must either have a conventional license or a smart license. The license determines the combinations of throughput level and technology packages that you can use.

For more information about obtaining a license, see [Licensing for a Cisco CSR 1000v on Microsoft Azure, on page 6](#)

Cisco CSR 1000v with 2 Network Interfaces—Example

This example shows the configuration that results after deploying a 2 network interface solution template from the Azure Marketplace.

A Cisco CSR 1000v virtual machine (2 vCPU, 7G RAM) is set up with 2 interfaces. There is a public IP address attached to the interface on the first subnet (NIC0). The first subnet (NIC0) has a security group with inbound rules for the interface. A default routing table is set up on the Microsoft Azure hypervisor router for the Cisco CSR 1000v. Note that a Cisco CSR 1000v can be deployed on a new or existing virtual network.



Subnetting Limits

The Cisco CSR 1000v on Microsoft Azure supports a subnet mask between /8 and /29 (CIDR definition).

The subnet /29 is the smallest available in Microsoft Azure, which supports 8 IP host addresses. 4 IP host addresses per subnet are reserved by Microsoft Azure. Therefore, for a /29 subnet, you have 4 IP host addresses available.

Information about Availability Sets

If you are deploying a Cisco CSR 1000v using a solution template for 2, 4 or 8 network interfaces from the Azure Marketplace, and choose to use the availability set feature, you must use a new availability set.

Availability sets are only available in solution templates for the public cloud (not for solution templates in the government cloud).

For more information, see [Azure Managed Disks Overview](#).

Availability Sets for a Cisco CSR 1000v with 2, 4 or 8 Network Interfaces

The logical grouping of VM resources in an availability set helps to keep groups of VMs isolated from one another. The VMs in an availability set can run across multiple physical servers, compute racks, storage units, and network switches. If you use availability sets, and then a hardware or Microsoft Azure software failure occurs, only a subset of your VMs are affected. You must use a new availability set, if you are deploying a Cisco CSR 1000v using a solution template for 2, 4 or 8 network interfaces. An availability set is only available for Cisco CSR 1000v public cloud deployments. (An availability set is not available for Cisco CSR 1000v government cloud deployments.)

When you choose to use an availability set and you are deploying a Cisco CSR 1000v with 2, 4 or 8 network interfaces using a solution template, you are asked to enter the following parameters:

- **Availability Set Name**—name of the new availability set. You cannot use the name of an existing availability set.
- **Platform Fault Domain Count**—count of the fault domains. VMs that are in the same fault domain share common storage as well as a common power source and network switch. Value: 1 or 2 (2 is the default).
- **Platform Update Domain Count**—count of the update domains, which are a group of VMs and underlying physical hardware that can be rebooted simultaneously. Value: 1 to 20 (20 is the default).

Availability Sets for a Cisco CSR 1000v with a Single Interface

To use an existing availability set, you must deploy a Cisco CSR 1000v with a Single Interface.

Frequently Asked Questions About Cisco CSR 1000v Deployments on Microsoft Azure

1. When I search for CSR in Azure Marketplace, I am presented with a list of CSR 1000v solution templates/deployments. Which one should I pick?

The best practices for deciding whether to pick a solution template (for 2-, 4- or 8- NICs) or to pick an individual CSR 1000v, are as follows:

If you are creating a new virtual network, use one of the solution templates (for 2-, 4- or 8- NICs). This saves you the time and effort of manually creating all the resources.

If any of the following conditions are true, use an individual Cisco CSR 1000v (for example, **Cisco CSR 1000V Bring Your Own License - XE 16.7**) :

- You have an existing resource group which does not contain a Cisco CSR 1000v and you want to deploy a Cisco CSR 1000v in the resource group.
- You have an existing resource group which already contains a Cisco CSR 1000v and you want to deploy another one in the same availability set.

2. I want to create multiple CSR 1000v's in my subscription and I want them all to be deployed in a single availability set. How can I do this?

Perform the following steps:

1. Deploy the first Cisco CSR 1000v using a 2, 4, 8 NIC solution template; for example, **Cisco CSR 1000v – XE 16.6 Deployment with 2 NICs**. Create a new availability set for this Cisco CSR 1000v.
2. Deploy an individual Cisco CSR 1000v; for example, **Cisco CSR 1000V Bring Your Own License - XE 16.7**. Select the same availability set that you created in step 1. Using this "Bring Your Own License" individual Cisco CSR 1000v allows you to reuse existing resources in existing non-empty resource groups.
3. Repeat step 2 for all of the remaining Cisco CSR 1000v's.

Licensing for a Cisco CSR 1000v on Microsoft Azure

The Cisco CSR 1000v supports the following license model:

Bring Your Own License Model

The Bring Your Own License (BYOL) licensing model, for the Cisco CSR 1000v on Microsoft Azure, supports the following two types of license:

- Cisco Software License (CSL)—uses a traditional Product Authorization Key (PAK) licensing model. For further information on using a PAK, see [Cisco Software Licensing \(CSL\)](#).
- Cisco Smart Licensing—assigns a license to Cisco CSR1000v instances dynamically. This allows you to manage licenses across different CSR1000v instances without having to lock each license to a specific CSR1000v UDI serial number. For more information on Cisco Smart Licensing, see [Smart Licensing](#).



Note In addition to paying for a Cisco CSR 1000v license, you will also need to pay for a Microsoft VM instance.
