



Cisco CSR 1000V Series Cloud Services Router Deployment Guide for Amazon Web Services

Cisco IOS XE Release 3.11S

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Preface

This preface describes the objectives and organization of this document and explains how to find additional information on related products and services. This preface contains the following sections:

- [Objectives, page i](#)
- [Revision History, page i](#)
- [Organization, page ii](#)
- [Related Documentation, page ii](#)
- [Document Conventions, page ii](#)
- [Obtaining Documentation and Submitting a Service Request, page iii](#)

Objectives

This document provides an overview of the Cisco CSR 1000V Series Cloud Services Router deployment on Amazon Web Services. It is not intended as a comprehensive guide to all of the software features that can be run using the Cisco CSR 1000V Series router. For more information, see the [Cisco CSR 1000V Series Cloud Services Router Software Configuration Guide](#).

For information on general software features that are also available on the Cisco CSR 1000V Series router, see the [Cisco IOS XE technology guide](#) for that specific software feature.

Revision History

The Revision History records technical changes to this document. The table shows the Cisco IOS XE software release number, the date of the change, and a brief summary of the change

Release	Date	Change Summary
Cisco IOS XE Release 3.11S	November 21, 2013	First release.

Organization

Chapter	Title	Description
Chapter 1	Overview of Cisco CSR 1000V Deployment on Amazon Web Services	Provides an overview of the Cisco CSR 1000V Series Cloud Services Router implementation on Amazon Web Services.
Chapter 2	Deploying the Cisco CSR 1000V on Amazon Web Services	Provides procedures for deploying the Cisco CSR 1000V Amazon Machine Image (AMI).

Related Documentation

This section refers you to other documentation that might also be useful as you configure your Cisco CSR 1000V router. The documentation listed below is available online.

- [Cisco CSR 1000V Series Cloud Services Router Release Notes](#)
- [Cisco CSR 1000V Series Cloud Services Router Software Configuration Guide](#)
- [Cisco CSR 1000V Series Cloud Services Router REST API Management Reference Guide](#)

The Cisco IOS XE release documentation homepage contains technology guides and feature documentation:

http://www.cisco.com/en/US/products/ps11174/tsd_products_support_series_home.html

For information on commands, see one of the following resources:

- [Cisco IOS XE Software Command References](#)
- [Command Lookup Tool](#) (cisco.com login required)

Document Conventions

This documentation uses the following conventions:

Convention	Description
^ or Ctrl	The ^ and Ctrl symbols represent the Control key. For example, the key combination ^D or Ctrl-D means hold down the Control key while you press the D key. Keys are indicated in capital letters but are not case sensitive.
<i>string</i>	A string is a nonquoted set of characters shown in italics. For example, when setting an SNMP <i>community</i> string to <i>public</i> , do not use quotation marks around the string or the string will include the quotation marks.

Command syntax descriptions use the following conventions:

Convention	Description
bold	Bold text indicates commands and keywords that you enter exactly as shown.
<i>italics</i>	Italic text indicates arguments for which you supply values.
[x]	Square brackets enclose an optional element (keyword or argument).
	A vertical line indicates a choice within an optional or required set of keywords or arguments.
[x y]	Square brackets enclosing keywords or arguments separated by a vertical line indicate an optional choice.
{x y}	Braces enclosing keywords or arguments separated by a vertical line indicate a required choice.
[x {y z}]	Braces and a vertical line within square brackets indicate a required choice within an optional element.

Examples use the following conventions:

Convention	Description
screen	Examples of information displayed on the screen are set in Courier font.
bold screen	Examples of text that you must enter are set in Courier bold font.
< >	Angle brackets enclose text that is not printed to the screen, such as passwords.
!	An exclamation point at the beginning of a line indicates a comment line. (Exclamation points are also displayed by the Cisco IOS XE software for certain processes.)
[]	Square brackets enclose default responses to system prompts.

The following conventions are used to attract the attention of the reader:



Note

Means *reader take note*. Notes contain helpful suggestions or references to materials that may not be contained in this manual.



Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/c/en/US/docs/general/whatsnew/whatsnew.html>

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Overview of Cisco CSR 1000V Deployment on Amazon Web Services

- [Introduction](#)
- [Cisco CSR 1000V AMI Options for Amazon Web Services](#)
- [Cisco IOS XE Technologies Not Supported](#)

Introduction

The Cisco CSR 1000V can be deployed on Amazon Web Services (AWS) for public and private cloud solutions. The implementation and installation on AWS is different than for the other supported hypervisors. The Cisco CSR 1000V is supported on the following AWS platforms:

- AWS Elastic Compute Cloud (EC2)
For more information, see the AWS EC2 documentation at:
<http://aws.amazon.com/documentation/ec2/>
- AWS Virtual Private Cloud (VPC)
For more information, see the AWS EC2 documentation at:
<http://aws.amazon.com/documentation/vpc/>

Note that EC2 supports only one network interface, whereas you can configure multiple network interfaces with VPC.

Cisco CSR 1000V AMI Options for Amazon Web Services

The Cisco CSR 1000V for AWS is purchased and launched as an Amazon Machine Image (AMI) on AWS Marketplace. The following Cisco CSR 1000V AMI is available:

- [Bring Your Own License](#)

Bring Your Own License

Using this option, you purchase the Cisco CSR 1000V software license(s) directly from Cisco and launch the Bring Your Own license (BYOL) AMI from AWS Marketplace. After you deploy the Cisco CSR 1000V AMI from AWS Marketplace and launch the instance, you install the Cisco licenses using the standard Cisco Software Activation process.

The Cisco CSR 1000V BYOL AMI operates as follows:

- You purchase the Cisco CSR 1000V software licenses directly from Cisco, and you pay only the hourly usage fees for the AWS EC2 or VPC.
- Each software license can be used for only on AWS instance.
- You can install more than one license on an AWS instance, but the multiple licenses can apply only to that instance.
- You can rehost the license if required using the Cisco Software Licensing tool. The process for rehosting a license used on a BYOL AMI is the same as for other Cisco CSR 1000V licenses.

For more information about the Cisco CSR 1000V software licenses and the process for rehosting a license, see the [Cisco CSR 1000V Series Cloud Services Router Software Configuration Guide](#). For a list of license SKUs, see the [Cisco CSR 1000V Series Cloud Services Router Release Notes](#).

Cisco IOS XE Technologies Not Supported

When deployed on an AWS instance, the Cisco CSR 1000V supports fewer Cisco IOS XE technologies than are supported for other hypervisors. Some technologies may not be available because they are not supported in an Amazon cloud.



Note

The CLI commands for the non-supported features may be visible on the Cisco CSR 1000V, but testing by Cisco has determined that these features will not function in AWS deployments. To verify CLI commands that are not supported, see the Cisco IOS XE documentation for non-supported features.

[Table 1-1](#) lists the Cisco IOS XE technologies that are not supported when deploying the Cisco CSR 1000V on an AWS instance.



Note

Routing protocols are supported over a tunnel only.

Table 1-1 Cisco IOS XE Technologies Not Supported on AWS Deployments

Technology	Non-Supported Features
IP	<ul style="list-style-type: none"> • IPv6 Forwarding • IPv6 Routing
Basic Routing	<ul style="list-style-type: none"> • OSPF
IP Multicast	<ul style="list-style-type: none"> • IGMP • PIM

Table 1-1 Cisco IOS XE Technologies Not Supported on AWS Deployments (continued)

Technology	Non-Supported Features
Data Center Interconnect	<ul style="list-style-type: none"> • OTV • VxLAN • WCCPv2
MPLS	<ul style="list-style-type: none"> • MPLS • EoMPLS • VRF • VPLS
Redundancy	<ul style="list-style-type: none"> • HSRP
WAAS	<ul style="list-style-type: none"> • Integrated AppNav-XE

The following caveats apply to the Cisco IOS XE technology support on AWS deployments:

- Only one interface can be configured with the **ip address dhcp** command.
- You cannot apply NAT PAT on the same interface that is configured with a crypto map. The workaround is to use a different IP Security feature such as SVTI or DMVPN, or you can configure a two-router solution with one router for NAT and another router for the IP Security crypto map.
- You cannot configure HSRP between the Cisco CSR 1000V nodes in an Amazon cloud. Amazon does not allow running HSRP on the hosts in the VPC. Amazon AWS blocks all broadcast and multicast traffic in a VPC.
- Cisco recommends that you disable the Source/Destination check on the Cisco CSR 1000V interfaces.
- EtherChannel is not supported.



Deploying the Cisco CSR 1000V on Amazon Web Services

- [Prerequisites](#)
- [Launching the Cisco CSR 1000V AMI](#)
- [Accessing the Cisco CSR 1000V AMI](#)

Prerequisites

Before attempting to launch the Cisco CSR 1000V on AWS, the following prerequisites apply:

- You must have an Amazon Web Services account.
- FireFox is more stable with AWS than other browsers and is recommended.
- An SSH client (for example, Putty on Windows or Terminal on Macintosh) is required to access the Cisco CSR 1000V console.
- Determine whether the Cisco CSR 1000V will be deployed on an Amazon EC2 instance or on an Amazon VPC instance.
- Determine the instance type that you want to deploy for the Cisco CSR 1000V. See the next section for more information.

Supported Instance Types

The Amazon Machine Image supports different instance types, which determine the size of the instance and the required amount of memory.

[Table 2-1](#) lists the AMI instance types supported for the Cisco CSR 1000V, and the specifications as set by AWS.

Table 2-1 AMI Instance Type Specifications

Instance Type	EC2 Compute Units	Virtual Cores	Memory Required	Platform	I/O	Maximum Number of Network Interfaces Supported per Instance (EC2-VPC only)
Standard Medium (m1.medium)	2	1	3.75 GB	32-bit 64-bit	Moderate	2
Standard Large (m1.large)	8	2 (with 2 ECUs each)	7.5 GB	64-bit	Moderate	4
Standard XL (m1.xlarge)	8	4 (with 2 ECUs each)	15 GB	64-bit	High	4
M3 Extra Large (m3.xlarge)	13	4 (with 3.25 ECUs each)	15 GB	64 bit	Moderate	4

Launching the Cisco CSR 1000V AMI

You launch the Cisco CSR 1000V AMI directly from AWS Marketplace.



Note

You need to generate a key pair or use an existing one before you can launch the instance. For more information on generating a key pair, see the Amazon documentation.

To launch the Cisco CSR 1000V AMI, perform the following steps:

- Step 1** Log in to Amazon Web Services Marketplace at <https://aws.amazon.com/marketplace>.
- Step 2** Search AWS Marketplace for Cisco.
- Step 3** Select the Cisco CSR 1000V AMI that you plan to deploy. The following AMI is currently available:
 - Cisco Cloud Services Router (CSR) 1000V - Bring Your Own License

The AMI information page displays, showing the supported instance types and the hourly fees charged by AWS. Select the pricing details for your region.

Click **Continue**.
- Step 4** Enter your AWS email address and password, or create a new account.
The Launch on EC2 page displays.
- Step 5** Select the region from the Pricing Details drop-down list to verify the hourly usage charges.
- Step 6** Choose the Cisco CSR 1000V release version from the Select a Version drop-down list.
- Step 7** Click the **Launch with EC2 Console** button for your region.
The window to select the instance type displays.
Select the General purpose tab for the supported instance types. Select the instance type.

Click the **Next: Configure Instance Details** button.

Step 8 Configure the instance details.

- Using the Network drop-down list, select the network option. Choose one of the following:

- **Launch into EC2-Classic**

If you select EC2-Classic, you cannot configure additional network interfaces.

- Select a previously configured Virtual Private Cloud (VPC) or click the **Create new VPC** button.

If installing an instance on EC2-VPC, create a new interface and assign it an IP address and a subnet.



Note If you want to access the Cisco CSR 1000V using SSH, you must select the Auto-assign Public IP option.

You can create two interfaces on the Instance Details screen. To add more interfaces, click on the **Network Interfaces** option. The maximum number of interfaces supported depends on the instance type. For more information, see [Table 2-1 on page 2-2](#).

- Select the availability zone from the drop-down menu.
- Select additional options available from AWS.

Click the **Next: Add Storage** button.

Step 9 Add more storage as required.

Click the **Next: Tag Instance** button.

Step 10 Enter the tag information as needed.

Click the **Next: Configure Security Groups** button.

Step 11 Choose one of the following:

- Create a new Security Group
- Select an existing Security Group

The Cisco CSR 1000V requires SSH for console access. The Cisco CSR 1000V also requires that the Security Group, at a minimum, does not block TCP/22. These settings are used to manage the Cisco CSR 1000V.

Click the **Review and Launch** button.

Step 12 Review the Cisco CSR 1000V instance information.

Click **Launch**.

Step 13 When prompted, enter the key pair information. The key pair consists of a public key stored in AWS and your private key used to authenticate access to the instance. Do one of the following:

- a. Choose an existing key pair, or
- b. Create a new key by doing the following steps:
 - Upload your own public key
 - Create a new key pair on AWS:

Click on **Create Key Pair**. Enter the key pair name and click **Create**. After the key pair is created, click **Close**.

**Note**

AWS security policies require that the key pair permission level be set to 400. To set this value for the .pem file, open a UNIX shell terminal screen and enter the following command:

```
chmod 400 <pem file name>
```

Step 14 Click **Launch Instance**.

It takes approximately ten minutes to deploy the AMI instance. You can view the status by clicking on the Instances link on the menu.

Wait for the *State* to show **Running** and the *Status Checks* to show **passed**.

At this point, the Cisco CSR 1000V AWS instance is booted and ready for software configuration. Proceed to the next section.

Accessing the Cisco CSR 1000V AMI

The Cisco CSR 1000V instance on AWS requires SSH for console access. To access the Cisco CSR 1000V AMI, perform the following steps:

Step 1 Once the Cisco CSR 1000V status shows that it is running, select the instance.

Step 2 Enter the following UNIX shell command to connect to the Cisco CSR 1000V console using SSH:

```
ssh -i pem-file-name -l username IP-address/instance-hostname
```

**Note**

You must log in as **ec2-user** the first time you access the instance.

The private key stored in the .pem file is used to authenticate access to the Cisco CSR 1000V instance.

Step 3 Start configuring the Cisco CSR 1000V.

Note the following information about software licenses:

- If you deployed the BYOL AMI, the Cisco CSR 1000V first boots with limited feature support and a maximum throughput of 2.5 Mbps. You must install and activate the software license to obtain the licensed technology package features and the maximum throughput. See the “Installing Software Licenses and Setting Up Console Access” section of the [Cisco CSR 1000V Series Cloud Services Router Software Configuration Guide](#).
- A built-in 60-day evaluation license can be activated using the **license boot level premium** command, issuing the **write memory** command and then reloading the Cisco CSR 1000V.

See the [Cisco CSR 1000V Series Cloud Services Router Software Configuration Guide](#) for other initial configuration steps.