Release Notes for Cisco CSR 1000v Series, Cisco IOS XE 16

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This release notes document provides information about Cisco CSR 1000v Series Cloud Services Routers operating with Cisco IOS XE 16.

For earlier releases, see Cisco CSR 1000v Series Release Notes, Cisco IOS XE 3S.

- Cisco CSR 1000v Series Cloud Services Routers Overview
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Cisco CSR 1000v Series Cloud Services Routers Overview

Virtual Router

The Cisco CSR 1000v Cloud Services Router is a cloud-based virtual router deployed on a virtual machine (VM) instance on x86 server hardware. It supports a subset of Cisco IOS XE software features and technologies, providing Cisco IOS XE security and switching features on a virtualization platform.

When the Cisco CSR 1000v is deployed on a VM, the Cisco IOS XE software functions as if it were deployed on a traditional Cisco hardware platform. You can configure different features depending on the Cisco IOS XE software image.

Secure Connectivity

The Cisco CSR 1000v provides secure connectivity from an enterprise network (such as in a branch office or data center) to the public or private cloud.

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Migrating to Cisco IOS XE 16

The *Cisco IOS XE Denali 16.2 Migration Guide for Access and Edge Routers* contains important information for migrating successfully from Cisco IOS XE 3S to Cisco IOS XE 16.2.

For a list of caveats in this release, see the Open Caveats—Cisco IOS XE 16.2.1 section.

Technologies Supported by a Platform

A platform's product landing page lists technology configuration guides for Cisco IOS XE technologies that the platform supports.

In each technology configuration guide, a Feature Information table indicates when a feature was introduced to the technology. For some features, the table also indicates when additional platforms have added support for the feature.

To determine whether a particular platform supports a technology, view the list of technology configuration guides posted on the platform's product landing page.

System Requirements

The following sections describe the system requirements for the Cisco CSR 1000v Series Cloud Services Routers.

- Hardware Requirements
- Software Images and Licenses

Hardware Requirements

For hardware requirements and installation instructions, see the *Cisco CSR 1000v Series Cloud Services Router Software Configuration Guide*.

Software Images and Licenses

- Cisco Smart Licensing
- Cisco CSR 1000v Evaluation Licenses
- Cisco CSR 1000v Software Licenses
- Software Image Nomenclature for OVA, ISO, and QCOW2 Installation Files

Cisco Smart Licensing

The Cisco CSR 1000v supports activation using Cisco Smart Licensing. To use Cisco Smart Licensing, you must first configure the Call Home feature and obtain Cisco Smart Call Home Services. For more information, see the *Cisco CSR 1000v Cloud Services Router Software Configuration Guide*.

For a more detailed overview on Cisco Licensing, go to *cisco.com/go/licensingguide.*

Cisco CSR 1000v Evaluation Licenses

Evaluation license availability depends on the software version:

- Evaluation licenses valid for 60 days are available at the Cisco Software Licensing (CSL) portal: http:/www.cisco.com/go/license

   The following evaluation licenses are available:

   – AX technology package license with 50 Mbps maximum throughput

   – APPX technology package license with 10 Gbps maximum throughput

   If you need an evaluation license for the Security technology package, or for an AX technology package with higher throughput, contact your Cisco service representative.

   For instructions on obtaining and installing evaluation licenses, see the "Installing CSL Evaluation Licenses for Cisco IOS XE 3.13S and Later" section of the *Cisco CSR 1000v Software Configuration Guide*.

Cisco CSR 1000v Software Licenses

Cisco CSR 1000v software licenses are divided into feature set licenses. Supported feature licenses depend on the release.

Legacy License Types

Three legacy technology packages—**Standard**, **Advanced**, and **Premium**—were replaced in Cisco IOS XE Release 3.13 with the **IPBase**, **Security**, and **AX** technology packages.

Current License Types

The following license types are supported in Cisco IOS XE 16:

- IPBase: Basic Networking Routing (Routing, HSRP, NAT, ACL, VRF, GRE)

- Security: IPBase package + Security features (IP Security VPN, Firewall, MPLS, Multicast, QoS)

- AX: IPBase package + Security features + Advanced Networking features (AppNav, AVC, OTV and LISP)

- APPX Package: IPBase package + Advanced Networking features - Security features (IP security features not supported)

Features Supported by License Packages

For more information about the Cisco IOS XE technologies supported in the feature set packages, see the overview chapter of the *Cisco CSR 1000v Cloud Services Router Software Configuration Guide.*

Throughput

The Cisco CSR 1000v router provides both perpetual licenses and term subscription licenses that support the feature set packages for the following maximum throughput levels:

- 10 Mbps

- 50 Mbps

- 100 Mbps

- 250 Mbps

- 500 Mbps

- 1 Gbps

- 2.5 Gbps
- 5 Gbps
- 10 Gbps

Throughput levels are supported for different feature set packages in each version. For more information about how the maximum throughput levels are regulated on the router, see the *Cisco CSR 1000v Cloud Services Router Software Configuration Guide.*

Memory Upgrade

Beginning with Cisco IOS XE 3.11S, a memory upgrade license is available to add memory to the Cisco CSR 1000v. This license is available only for selected technology packages.

Additional Information about Licenses and Activation

For more information about each software license, including part numbers, see the Cisco CSR 1000v Router Datasheet. For more information about the standard Cisco IOS XE software activation procedure, see the *Software Activation Configuration Guide, Cisco IOS XE Release 3S*.

Software Image Nomenclature for OVA, ISO, and QCOW2 Installation Files

The Cisco CSR 1000v installation file nomenclature indicates properties supported by the router in a given release.

The following are filename examples for the 16.2 release:
csr1000v-universalk9.16.02.01.ova
csr1000v-universalk9.16.02.01.iso
csr1000v-universalk9.16.02.01.qcow2

Table 1 lists the attributes and the release properties indicated.

Table 1   OVA Installation Filename Attributes

Filename Attribute	Properties
Example: universalk9	Installed image package.
03.09.00a.S.153-2.S0a	Indicates that the software image is for the Cisco IOS XE 3.9.0aS release image (mapped to the Cisco IOS 15.3(2) release).
std or ext	Standard release or extended maintenance support release. Every third release, beginning with 16.3, is planned to be an extended maintenance support release (16.3, 16.9, 16.12, ...).

Features and Notes by Release

- Release: Cisco IOS XE 16.2.1

Release: Cisco IOS XE 16.2.1

Notes

Support for ESXi and KVM Hypervisors in this Release

Due to an issue specific to Red Hat Enterprise Linux, when launching the Cisco CSR1000v in a Red Hat Enterprise Linux environment using **virt-install**, set the host mode as follows:

- In Red Hat Enterprise Linux 6, use:

```
--cpu host
```

- In Red Hat Enterprise Linux 7, use:

```
--cpu host-model
```

For additional information about deployment in a KVM environment, see Installing the Cisco CSR 1000v in KVM Environments in in *Cisco CSR 1000v Cloud Services Router Software Configuration Guide*.

Cisco Unified Border Element (CUBE) is supported on Cisco CSR 1000v platforms running Cisco IOS XE 16.2 release

For more information on CUBE support in Cisco IOS XE 16.2, see:
http://www.cisco.com/c/en/us/td/docs/ios-xml/ios/voice/cube/configuration/cube-book/read-me-first.html

Limitations and Restrictions in Cisco IOS XE 16.2.1

Hypervisor Limitations

- In this release, the Cisco CSR 1000v supports ESXi and KVM hypervisors. Future Cisco IOS XE 16.x releases may support additional hypervisors.

REST API Management Container Images Compatible with 16.2.1

- When using the Cisco IOS XE REST API with the router, note the following limitation: If the router is operating with Cisco IOS XE 16.2 or later, use the latest REST API management container image. Attempting to use a REST API container image released before Cisco IOS XE 16.2 may cause the router to crash repeatedly.

Caveats

See the following sections.

- Caveats—Cisco IOS XE 16.2.1

Overview

Caveats, or "bugs," describe unexpected behavior. Severity 1 caveats are the most serious. Severity 2 caveats are less serious. Severity 3 caveats are moderate caveats. This section includes severity 1, severity 2, and selected severity 3 caveats.

Terminology

The *Dictionary of Internetworking Terms and Acronyms* contains definitions of acronyms that are not defined in this document:

http://docwiki.cisco.com/wiki/Category:Internetworking_Terms_and_Acronyms_(ITA)

Bug Search Tool

If you have an account on Cisco.com, you can also use the Bug Search Tool (BST) to find select caveats of any severity. To reach the Bug Search Tool, log into Cisco.com and go to https://tools.cisco.com/bugsearch/search.

If a defect that you have requested cannot be displayed, it may be because the defect number does not exist or the defect does not have a description available.

You can use to the Bug Search Tool to view new and updated caveats: https://tools.cisco.com/bugsearch/search.

For Best Bug Search Tool Results

For best results when using the Bug Search Tool:

- In the **Product** field, enter Cloud Services Router.
- In the **Releases** field, enter one or more Cisco IOS XE releases of interest. The search results include caveats related to any of the releases entered in this field.

The tool provides autofill while you type in these fields to assist in entering valid values.

Releases beginning with **3.x** have an equivalent release number beginning with **15.x**, as shown in the following table. Include the **15.x** equivalent to ensure that all relevant caveat results are displayed.

Table 2   Release Number Equivalents for Recent Releases

For...	...search using the following equivalent release numbers
3.14	3.14 and 15.5(1)
3.15	3.15 and 15.5(2)
3.16	3.16 and 15.5(3)
3.17	3.17 and 15.6(1)

Field Notices

We recommend that you view the field notices for the current release to determine whether your software or hardware platforms are affected. You can access the field notices from the following location:

http://www.cisco.com/c/en/US/support/tsd_products_field_notice_summary.html

Caveats—Cisco IOS XE 16.2.1

Open Caveats—Cisco IOS XE 16.2.1

Table 3   Open Caveats—Cisco IOS XE 16.2.1

Caveat	Description
CSCux86511	Polaris, RestAPI/ACL: shared management interfaces are not working
CSCux44284	Cisco IOS XE Denali 16.2: CSR1000v - UP01 1vCPU CEF Performance Degradation - 10% to 30%
CSCuy96961	csr_mgmt container loses default route after CSR reboot
CSCux36581	Part of MMA punt records lost and not accounted on LSMPI intf

Related Documentation

For information about the Cisco CSR 1000v Series and associated services, see:
Documentation Roadmap for Cisco CSR 1000v Series, Cisco IOS XE 16.

This document is to be used in conjunction with the documents listed in the "Related Documentation" section.