

# Release Notes for Cisco CSR 1000v Series, Cisco IOS XE Gibraltar 16.10.x

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## Cisco CSR 1000v Series Cloud Services Routers Overview



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### Virtual Router

The Cisco Cloud Services Router 1000V (CSR 1000V) is a cloud-based virtual router that is intended for deployment in cloud and virtual data centers. This router is optimized to serve as a single-tenant or a multitenant WAN gateway.

When you deploy a CSR 1000V instance 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

CSR 1000V provides secure connectivity from an enterprise network such as a branch office or a data center, to a public or a private cloud.

## System Requirements

### Hardware Requirements

For hardware requirements and installation instructions, see the [Cisco CSR 1000v Series Cloud Services Router Software Configuration Guide](#).

### Software Images and Licenses

The following sections describe the licensing and software images for CSR 1000V.

## Cisco Smart Licensing

The Cisco CSR 1000V router supports Cisco Smart Licensing. To use Cisco Smart Licensing, you must first configure the Call Home feature and obtain the Cisco Smart Call Home Services. For more information, see [Installing CSR 1000V Licenses](#) and [Smart Licensing Guide for Access and Edge Routers](#).

For a more detailed overview on Cisco Licensing, go to <https://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:

- IPBASE technology package license with 10 Gbps maximum throughput
- SEC technology package license with 5 Gbps maximum throughput
- APPX technology package license with 5 Gbps maximum throughput
- AX technology package license with 2.5 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. The supported feature licenses depend on the release.

### Current License Types

The following are the license types that are supported (Cisco IOS XE Everest 16.4.1 or later):

- IPBase: Basic Networking Routing (Routing, HSRP, NAT, ACL, VRF, GRE, QoS)
- Security: IPBase package + Security features (IP Security VPN, Firewall, MPLS, Multicast)
- 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)

### Legacy License Types

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

### 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 Series 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

The 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

A memory upgrade license is available to add memory to the Cisco CSR 1000v router (Cisco IOS XE 3.11S or later). 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.

For example, these are filename examples for the Cisco IOS XE Everest 16.4.1 release:

- csr1000v-universalk9.16.04.01.ova
- csr1000v-universalk9.16.04.01.iso
- csr1000v-universalk9.16.04.01.qcow2

The filename attributes are listed below, along with the release properties.

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.

## Features and Notes: Cisco IOS XE Gibraltar 16.10.x

### Features - Cisco IOS XE Fuji 16.10.1a

The following new software features are supported on the Cisco CSR 1000v for Cisco IOS XE Fuji 16.10.1a.

- RIB/CEF Routing: Improvements to Show Tech Routing command. For detailed information, see the following Cisco document: [https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/isg/command/isg-cr-book/isg\\_m1.html#wp3145726977](https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/isg/command/isg-cr-book/isg_m1.html#wp3145726977).
- SpaceX: MPLS over DMVPN. For detailed information, see the following Cisco document: [https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/sec\\_conn\\_dmvpn/configuration/xs-16-10/sec-conn-dmvpn-xe-16-10-book/sec-conn-dmvpn-xe-16-10-book\\_chapter\\_010000.html](https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/sec_conn_dmvpn/configuration/xs-16-10/sec-conn-dmvpn-xe-16-10-book/sec-conn-dmvpn-xe-16-10-book_chapter_010000.html)
- L3 routed dual-stake IPoE sessions support. For detailed information, see the following Cisco document: <https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/isg/configuration/xs-16-10/isg-xe-16-10-book/isg-access-ip-sess.html>
- Smart Licensing. For further information, see the following Cisco document: [https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/smart-licensing/qsg/b\\_Smart\\_Licensing\\_QuickStart.html](https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/smart-licensing/qsg/b_Smart_Licensing_QuickStart.html).  
For a more detailed overview on Cisco Licensing, go to <https://cisco.com/go/licensingguide>.
- OSPF: Statistics per OSPF Neighbor. For detailed information, see the following Cisco document: <https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/ipv6/command/ipv6-cr-book/ipv6-s5.html>.
- NAT CLI simplification: simplify on-the-box data collection without having the user knowing architecture. For detailed information, see the following Cisco document: <https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/ipaddr/command/ipaddr-cr-book.html>.
- Optimized APM for Assurance monitoring. For further information, see: [https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/media\\_monitoring/configuration/xs-16-10/mm-xe-16-10-book.html](https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/media_monitoring/configuration/xs-16-10/mm-xe-16-10-book.html).
- Boot: Boot statement check before reload.

When upgrading their IOS software image, customers might sometimes delete their old image without updating the boot statement. This could result in entering the ROMMON (ROM Monitor) mode. To recover from the ROMMON mode, the following enhancements are supported for different use cases:

1. Reload the router with config-reg configuration -- Before reloading, the router checks if the first boot statement points to an image that exists and verifies it. If the image is missing or invalid, the users are prompted for confirmation to proceed with reload of the router.

2. Reload the router with `config-register 0x2102 - auto boot` – The router checks if the boot variable is set properly, and accordingly prompts the users to proceed with caution.
  3. Reload the router with `config-register 0x2102 - auto boot` and the boot variable (bootvar) is set, but there is no image in bootvar set path – The router checks if the bootvar is properly set and if there is any image set in the bootvar path. If there is no image in the bootvar path (hard disk/bootflash/flash, and so on), then the reload is cancelled with a warning message, and the users are prompted to correct the boot statement or copy the image to hard disk.
  4. Auto boot and boot variable is set – If the image is present in the bootvar path, then the router reload is allowed.
- BGP: Display the time at which route was installed in bgp table—For detailed information, see the following Cisco document:[https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute\\_bgp/command/irg-cr-book/bgp-s1.html](https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute_bgp/command/irg-cr-book/bgp-s1.html).
  - BGP: add a peak watermark output along with a timestamp of when the peak occurred on a per neighbor basis to the `show ip bgp neighbor` command—For detailed information, see the following Cisco document:[https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute\\_bgp/command/irg-cr-book/bgp-s1.html](https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute_bgp/command/irg-cr-book/bgp-s1.html).
  - BGP: Improve the Show tech BGP command. For detailed information, see the following Cisco document:[https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute\\_bgp/command/irg-cr-book/bgp-s1.html](https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute_bgp/command/irg-cr-book/bgp-s1.html).
  - VXLAN GPE P2MP Tunnels Support. For detailed information, see the following Cisco document:<https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/cether/configuration/xe-16-10/ce-xe-16-10-book/vxlan-gpe-p2mp-tunnel.html>.
  - DHCP-Radius-Proxy support with ISG. For detailed information, see the following Cisco document:<https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/isg/configuration/xe-16-10/isg-xe-16-10-book/isg-dhcp-radius-proxy.html>.
  - LISP: Enhance debug LISP filter. For detailed information, see the following Cisco document:[https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute\\_lisp/command/ip-lisp-cr-book/lisp-debug-cmds.html](https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute_lisp/command/ip-lisp-cr-book/lisp-debug-cmds.html)
  - BGP: Show ip bgp neighbors command additions. For detailed information, see the following Cisco document: [https://www.cisco.com/c/en/us/td/docs/ios/iproute\\_bgp/command/reference/irg\\_book/irg\\_bgp5.html](https://www.cisco.com/c/en/us/td/docs/ios/iproute_bgp/command/reference/irg_book/irg_bgp5.html)
  - CSR1000V: Azure performance improvements. For detailed information, see the following Cisco document: [https://www.cisco.com/c/en/us/td/docs/routers/csr1000/software/aws/b\\_csraws/overview\\_of\\_cisco\\_csr\\_1000v\\_deployment\\_on\\_amazon\\_web\\_services.html](https://www.cisco.com/c/en/us/td/docs/routers/csr1000/software/aws/b_csraws/overview_of_cisco_csr_1000v_deployment_on_amazon_web_services.html)
  - CSR on AWS: Add support for C5 and M5 instance types (KVM based). For detailed information, see the following Cisco document: [https://www.cisco.com/c/en/us/td/docs/routers/csr1000/software/aws/b\\_csraws/overview\\_of\\_cisco\\_csr\\_1000v\\_deployment\\_on\\_amazon\\_web\\_services.html](https://www.cisco.com/c/en/us/td/docs/routers/csr1000/software/aws/b_csraws/overview_of_cisco_csr_1000v_deployment_on_amazon_web_services.html)
  - vCME support on CSR1000v (Phase 1). For detailed information, see the following Cisco document:[https://www.cisco.com/c/en/us/td/docs/voice\\_ip\\_comm/cucme/admin/configuration/manual/cmeadm/cmevir.html](https://www.cisco.com/c/en/us/td/docs/voice_ip_comm/cucme/admin/configuration/manual/cmeadm/cmevir.html)
  - MiFID2 Recording Proxy. For detailed information, see the following Cisco document:<https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/voice/cube/configuration/cube-book/voi-cube-media-proxy.html>

- Exclusive Elliptical Curve Ciphers on CUBE. For detailed information, see the following Cisco document: <https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/voice/cube/configuration/cube-book/voi-cube-sip-tls.html>
- APPNAV-XE APP-ID classification filter. For detailed information, see the following Cisco document: [https://www.cisco.com/c/en/us/td/docs/routers/access/4400/appnav/isr/isr\\_appnav.html](https://www.cisco.com/c/en/us/td/docs/routers/access/4400/appnav/isr/isr_appnav.html)
- UTD (IPS and Url-filtering) migration to IOX Containers on ISR4k, CSR, ISRV. For detailed information, see the following Cisco document: : [https://www-author3.cisco.com/c/en/us/td/docs/ios-xml/ios/sec\\_data\\_utd/configuration/xe-16-10/sec-data-utd-xe-16-10-book/snort-ips.html](https://www-author3.cisco.com/c/en/us/td/docs/ios-xml/ios/sec_data_utd/configuration/xe-16-10/sec-data-utd-xe-16-10-book/snort-ips.html)
- Multicast: Extend debug command. For detailed information, see the following Cisco document: : <https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/debug/command/i1/db-i1-cr-book.html>
- Programmability—gRPC Dial-in and Dial-out. Expands existing Model Driven Telemetry capabilities with the addition of gRPC protocol support and Dial-Out (configured) telemetry subscriptions (Network Essentials and Network Advantage).  
For detailed information, see the following Cisco document: [https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/prog/configuration/1610/b\\_1610\\_programmability\\_cg/model\\_driven\\_telemetry.html](https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/prog/configuration/1610/b_1610_programmability_cg/model_driven_telemetry.html).
- Programmability—YANG Data Models—For the list of Cisco IOS XE YANG models available with this release, navigate to <https://github.com/YangModels/yang/tree/master/vendor/cisco/xe/16101>. Revision statements embedded in the YANG files indicate if there has been a model revision. The README.md file in the same GitHub location highlights changes that have been made in the release..

## Notes

The following section includes important notes about the Cisco CSR 1000v for Cisco IOS XE Fuji 16.10.x

### Deferrals

Cisco IOS software images are subject to deferral. We recommend that you view the deferral notices at the following location to determine whether your software release is affected:

<https://tools.cisco.com/security/center/publicationListing.x>

### Field Notices

- Field Notices—We recommend that you view the field notices to determine whether your software or hardware platforms are affected. You can find the field notices at the following location:

<http://www.cisco.com/c/en/us/support/web/tsd-products-field-notice-summary.html>

## Limitations and Restrictions

There are no new limitations and restrictions in this release.

# Resolved and Open Bugs for Cisco IOS XE 16.x

## Overview

Caveats, or bugs describe unexpected behavior. Severity 1 caveats are the most serious, severity 2 caveats are less serious, and 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\\_\(ITA\)](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 is not displayed, it is possible that the defect number does not exist or the defect does not have a description available.

You can use the [Bug Search Tool](#) to view new and updated caveats. To search for bugs, go to <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 that you enter in this field.

The tool provides autofill while you type in these fields to assist in entering valid values. For example, a search using release number **16.6** should find the caveats for Cisco IOS XE Everest 16.6.1.

## Caveats: Cisco IOS XE Fuji 16.10.x

### Resolved Caveats—Cisco IOS XE Gibraltar 16.10.2

Caveat ID Number	Description
<a href="#">CSCvn02171</a>	HOLE is not created when 'acl default passthrough configured.
<a href="#">CSCvn30138</a>	Crash with show service-insertion service-context command in AppNav cluster.
<a href="#">CSCvn38590</a>	CTS policies download fails with Missing/Incomplete ACEs error.
<a href="#">CSCvn72973</a>	Device is getting crashed on the "cts role-based enforcement".

Caveat ID Number	Description
<a href="#">CSCvo00968</a>	Radius attr 32 NAS-IDENTIFIER not sending the FQDN.
<a href="#">CSCvo03458</a>	PKI "revocation check crl none" does not fallback if CRL not reachable.
<a href="#">CSCvo24170</a>	Crash due to chunk corruption in ISIS code.
<a href="#">CSCvo25785</a>	Crash on an LNS router in process ACCT periodic process.
<a href="#">CSCvo27553</a>	PKI incorrect fingerprint calculation during CA authentication.
<a href="#">CSCvo38985</a>	Crash at the VRF configuration.
<a href="#">CSCvp29906</a>	Cisco Cloud Services Router 1000V Series router crash due to file descriptor leak.

**Resolved Caveats—Cisco IOS XE Gibraltar 16.10.1b**

Caveat ID Number	Description
<a href="#">CSCvm52259</a>	CSR1Kv: Throughput and bandwidth level is not set correctly when upgrade to 16.10.1 .bin image with AWS/Azure PAYG

**Open Caveats—Cisco IOS XE Fuji 16.10.1a**

Caveat ID Number	Description
<a href="#">CSCvm25851</a>	qfp-bqs-internal ucode still crashes with fix in CSCvc35307
<a href="#">CSCvm39485</a>	Small clock changes or time drifts can cause GETVPN TBAR drops (GDOI/IPSEC-PI)
<a href="#">CSCvm51112</a>	"clear crypto sa vrf MyVrf" triggers crash after updating pre-shared-keys
<a href="#">CSCvm55018</a>	A control plane 'delete' command to flush the queue is not being drained out of the command queue
<a href="#">CSCvm57021</a>	Crash in CENT-MC-0 process after Doubly-linked list corruption
<a href="#">CSCvm73802</a>	Azure CSR1000v 16.9 - show bootflash: is empty
<a href="#">CSCvm75066</a>	MPLSoVPN: Change behavior of default route in NHRP. Must insert 0.0.0.0/0 instead of /32
<a href="#">CSCvm76452</a>	IPSec background crash while sending SNMP trap
<a href="#">CSCvm80502</a>	Traceroute not working when sourced from NAT Inside interface
<a href="#">CSCvm91323</a>	Router crash with reload reason: LocalSoftADR and core file generated "cpp-mcplo-ucode"
<a href="#">CSCvm93589</a>	Performance Monitor not working when "collect transport round-trip-time" is configured
<a href="#">CSCvm93794</a>	FlexVPN MPLS - label in CEF not added when shortcut to hub is created (by glitch)
<a href="#">CSCvm99778</a>	IOS-PKI: grant auto trustpoint <tp_name> does not work with IOS Sub CA



Caveat ID Number	Description
<a href="#">CSCvn00997</a>	CSR1000V CUBE-Standard INVALID TAG
<a href="#">CSCvn07614</a>	Out of Band DTMF Events Not Passing to CUCM via SCCP When Using IOS MTP
<a href="#">CSCvn09472</a>	cpp_cp_svr memory leak in module: IPHC Svr Info_st
<a href="#">CSCvn10032</a>	Input errors when reloading CSR
<a href="#">CSCvn12253</a>	Software crash due to watchdog after entered switchport command.
<a href="#">CSCvn18757</a>	Crash after removing a service-policy while the BQS is stuck
<a href="#">CSCvn19382</a>	Crash after comparing tunnel FIB entries
<a href="#">CSCvn52259</a>	CSR1Kv: Throughput/BW level not set correctly when upgrade to 16.10.1 .bin image with AWS/Azure PAYG.
<a href="#">CSCvm75697</a>	Create_node should not allow user to create / update same node and throw exception that it exists

### Resolved Caveats—Cisco IOS XE Fuji 16.10.1a

Caveat ID Number	Description
<a href="#">CSCve76719</a>	Cisco IOS XE Software for Cisco ISRV Router Static Credential Vulnerability
<a href="#">CSCvj79145</a>	CSRs fail to scale up to desired NAT64 stateful Dynamic translations
<a href="#">CSCvk41664</a>	CSR1000v: crash at mempool_add_region when adding memory
<a href="#">CSCvk72831</a>	CSCvj79145 fix exposed a latent DPDK issue leading to a crash with MPLS IPv6 per vrf prefix
<a href="#">CSCvm46634</a>	Azure CSR1000v HAv1 VXE_CLOUD_HA-4-NOTCFGD, flags=0x7F0000 error

### Related Documentation

- [Release Notes for previous versions of Cisco Cloud Services Router 1000V Series](#)
- [Configuration Guides for Cisco Cloud Services Router 1000V Series](#)
- [Product Landing page for Cisco Cloud Services Router 1000V Series](#)
- [Datasheet for Cisco Cloud Services Router 1000V Series](#)
- [Field Notices](#)
- [Deferral Notices](#)
- [Cisco Bulletins](#)

