



# Release Notes for StarOS™ Software Version 21.15.12

**First Published:** November 27, 2019

**Last Updated:** November 27, 2019

## Introduction

This Release Note identifies changes and issues related to this software release. This emergency release is based on release 21.15.10. These release notes are applicable to the ASR5500, VPC-SI and VPC-DI platforms.

## Release Package Version Information

**Table 1 - Release Package Version Information**

Software Packages	Version
StarOS packages	21.15.12, build 73702

Descriptions for the various packages provided with this release are located in [Release Package Descriptions](#).

## Feature and Behavior Changes

The following features and/or behavior changes have been introduced in this emergency release.

Refer to the [Release Change Reference](#) for a complete list of feature and behavior changes associated with this software release.

## Related Documentation

For a complete list of documentation available for this release, go to <http://www.cisco.com/c/en/us/support/wireless/asr-5000-series/products-installation-and-configuration-guides-list.html>.

## Installation and Upgrade Notes

This Release Note does not contain installation and upgrade instructions. Refer to the existing installation documentation for specific installation and upgrade considerations.

## Firmware Updates

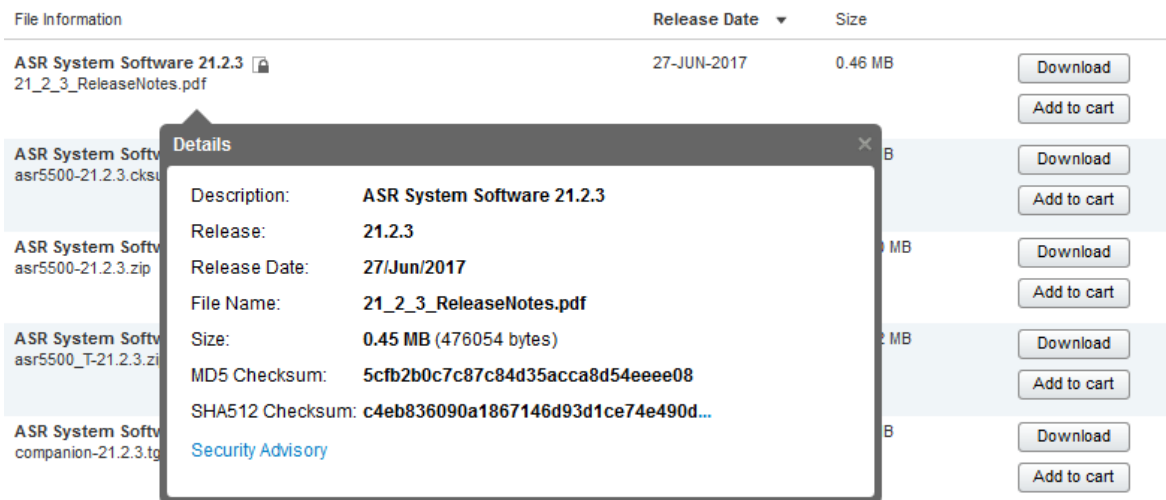
There are no firmware upgrades required for this release.

## Software Integrity Verification

To verify the integrity of the software image you have from Cisco, you can validate the SHA512 checksum information against the checksum identified by Cisco for the software.

Image checksum information is available through the following mechanisms:

- **Cisco.com Software Download Details:** To find the checksum, hover the mouse pointer over the software image you have downloaded.



At the bottom you find the SHA512 checksum, if you do not see the whole checksum you can expand it by pressing the "..." at the end.

- **.cksums file:** A file containing software image checksum information is distributed with the image files. The naming convention for this file is:

`<product>-<version>.cksums`

Example: `asr5500-21.4.0.cksums`

To validate the information, calculate a SHA512 checksum using the information in [Table 2](#) and verify that it matches either the one provided on the software download page.

To calculate a SHA512 checksum on your local desktop please see the table below.

**Table 2 - Checksum Calculations per Operating System**

Operating System	SHA512 checksum calculation command examples
Microsoft Windows	Open a command line window and type the following command  > certutil.exe -hashfile <filename>.<extension> SHA512

Open Bugs in this Release

Operating System	SHA512 checksum calculation command examples
Apple MAC	Open a terminal window and type the following command  \$ shasum -a 512 <filename>.<extension>
Linux	Open a terminal window and type the following command  \$ sha512sum <filename>.<extension>  Or  \$ shasum -a 512 <filename>.<extension>
<p><b>NOTES:</b></p> <p>&lt;filename&gt; is the name of the file.</p> <p>&lt;extension&gt; is the file extension (e.g. .zip or .tgz).</p>	

If the SHA512 checksum matches, you can be sure that no one has tampered with the software image or the image has not been corrupted during download.

If the SHA512 checksum does not match, we advise you to not attempt upgrading any systems with the corrupted software image. Download the software again and verify the SHA512 checksum again. If there is a constant mismatch, please open a case with the Cisco Technical Assistance Center.

## Certificate Validation

In 21.12.0 and later releases, software images for StarOS, VPC-DI, and VPC-SI, and the companion software packages for StarOS and VPC are signed via x509 certificates. In pre-21.12.0 releases, image signing is not supported for VPC-DI and VPC-SI images, and for StarOS and VPC companion software packages.

USP ISO images are signed with a GPG key.

For more information and instructions on how to validate the certificates, refer to the README file available with the respective software packages.

## Open Bugs in this Release

The following table lists the known bugs that were found in, and/or that remain open in this software release.

**NOTE:** This software release may contain open bugs first identified in other releases. Additional information for all open bugs for this release are available in the [Cisco Bug Search Tool](#).

**Table 3 - Open Bugs in this Release**

Bug ID	Headline	Product Found*
CSCvo45414	sx-invalid-response seen when dynamic rule installed after predefined rule and sesMgr kill	cups-cp

## Open Bugs in this Release

Bug ID	Headline	Product Found*
CSCvr04110	[GGSN]- sessmgr_pgw_find_sx_trans_info_node()	cups-cp
CSCvr21882	BP CUPS:PC: sgx_update_install_rule_def_list()	cups-cp
CSCvq35024	sessmgr error: Misc Error:Callline invalid or in invalid state for sending checkpoints	cups-up
CSCvq64442	Subscriber pkt drop stats not updated to sessmgr from VPP on call clear.	cups-up
CSCvq71873	sessmgr_uplane_cleanup_pdr()	cups-up
CSCvr21683	BP CUPS:free_acct()	cups-up
CSCvo47244	[BP-CUPS] Discrepancy in dropped packet count statistics after Gy quota exhausted	cups-up
CSCvr08929	sessmgr restart seen on mme_app_fill_delete_sess_req	mme
CSCvr16715	MME selects PGW ip defined in "apn default-apn-profile" is configured ingoring specific APN config	mme
CSCvr39322	MME: SMGR Restart(Multi-fault) - mme_app_util_send_create_bearer_rsp().	mme
CSCvq93693	MME config update not happening on reload chasis applying enb-goup config	mme
CSCvr40741	PLT-ICUPS : vppctl show errors incrementing "lookup drops" and "PAWS check failed"	pdn-gw
CSCvr67110	[PLT-ICUPS]: [vpn 5103 error] UDP Med received packet with non-udp protocol on DPC2 card migration	pdn-gw
CSCvs09996	[BP-ICUPS]: mon sub on high speed UE causing sessmgr cpu hit 90%	pdn-gw
CSCvr89643	SESSMGR restart in 73255 build - Function sessmgr_rf_fill_service()	pdn-gw
CSCvr87913	[BP-ICUPS] sessmgr restart in sn_aaa_handle_acct_response_call	pdn-gw
CSCvq63005	Gbmgr restart seen on gbmgr_rx_gns_pdu	sgsn
CSCvr43658	[VPC-DI] SF iftask continually crashes when core 1 is configured in MCDMA mode	staros
CSCvr93031	[PLT-ICUPS]: High call drop with reason graceful-cleanup-on-audit-fail on ICSR swtich-over	pdn-gw
CSCvr48161	[BP-ICUPS]: NPUMGR task restart when mon sub was exercised	staros
CSCvs13238	BP-ICUPS : Unexpected session manager restart seen on 21.15.73587	pdn-gw
CSCvs18887	[BP-ICUPS]: huge session disconnect with reason gtpu-err-ind and gtpc-path-failure	pdn-gw

Resolved Bugs in this Release

Bug ID	Headline	Product Found*
CSCvs12021	[PLT-ICUPS] Inconsistency with respect to expected no. of LI connections after demux card migration	staros
CSCvr40362	UAME - K8S Cluster Node Recovery Actions (Post VM recovery by ESC) - Cluster SYNC fails	usp-uas
* Information in the "Product Found" column identifies the product in which the bug was initially identified.		

## Resolved Bugs in this Release

The following table lists the known bugs that are resolved in this specific software release.

**NOTE:** This software release may contain bug fixes first introduced in other releases. Additional information for all resolved bugs for this release are available in the [Cisco Bug Search Tool](#).

**Table 4 - Resolved Bugs in this Release**

Bug ID	Headline	Product Found*
CSCvr38053	[BP-CUPS] Seg. fault at acsmgr_icsr_frwk_retry_gr_common_send()	cups-cp
CSCvr76635	[BP CUPS] pgw_drv_fsm_handle_modify_bearer_rsp()	cups-cp
CSCvs21549	[BP-CUPS]Discrepancy in EDR(sn-ruledf-name) in case flows are terminated by FIN/RST.	cups-up
CSCvn29201	[KT-DVT] only 16 ruledf is displayed "show subscriber user-plane-only-full"	cups-up
CSCvs12083	"[BP-ICUPS] vpp, npumgr,hatsyste,bfdls reload observed in certain conditions when mon-sub is enabled"	pdn-gw
CSCvs16025	[ICUPS-PLT]: VPP flows not getting closed after idle-timeout occurs	pdn-gw
CSCvr65974	[BP-ICUPS] MonSub Control packets missing in slowpath generated pcap	pdn-gw
CSCvs07535	[BP-ICUPS] : Monsub activation issue observed for collapsed campon calls intermittently	pdn-gw
CSCvs15975	Cisco SAEGW CUPS restart seen for sessmgr at user-plane	staros
CSCvs08833	Cannot save core files larger than 2GB	staros
CSCvr39996	Enable DDF Reload Support w VPP based ICUPS	staros
* Information in the "Product Found" column identifies the product in which the bug was initially identified.		

# Operator Notes

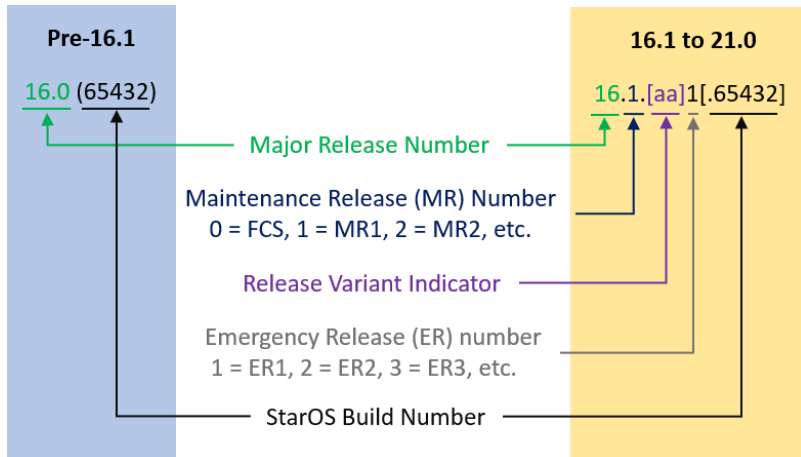
## StarOS Version Numbering System

The output of the **show version** command displays detailed information about the version of StarOS currently running on the ASR 5x00 or Cisco Virtualized Packet Core platform.

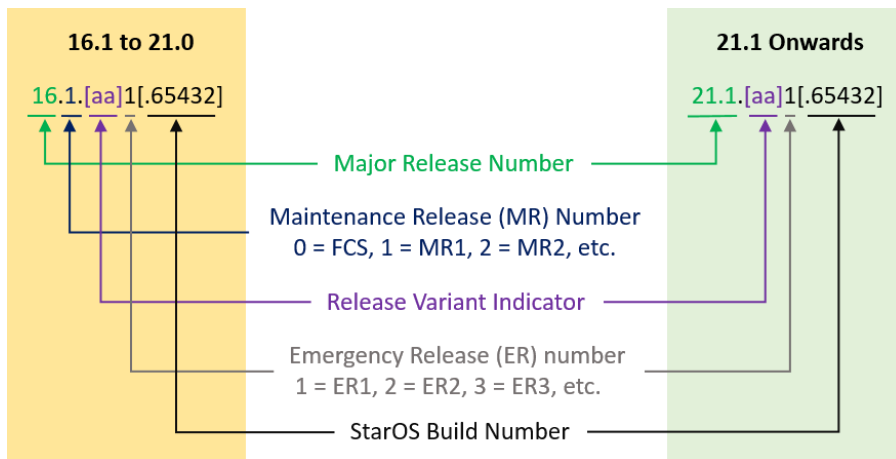
Prior to release 16.1, the *Image Version* field displayed a branch of software including the build number, for example “16.0 (55435)”. Subsequent releases of software for the major release differed only in build number. Lab Quality/EFT releases versus deployment releases also differed only in build number.

From release 16.1 onwards, the output of the **show version** command, as well as the terminology used to describe the Build Version Number fields, has changed. Additionally, **show version** will display slightly different information depending on whether or not a build is suitable for deployment.

The Version Build Number for releases between 16.1 and 21.0 include a major, maintenance, and emergency release number, for example “16.1.2”.



The Version Build Number for releases 21.1 and later include a major and emergency release number, for example, “21.1.1”.



Operator Notes

In either scenario, the appropriate version number field increments after a version has been released. The new version numbering format is a contiguous sequential number that represents incremental changes between releases. This format will facilitate identifying the changes between releases when using Bug Search Tool to research software releases.

## Release Package Descriptions

[Table 5](#) provides descriptions for the packages that are available with this release.

**Table 5 - Release Package Information**

In 21.12.0 and later Releases	In pre-21.12.0 Releases	Description
<b>ASR 5500</b>		
asr5500- <release>.zip	asr5500- <release>.bin	Contains the signed ASR 5500 software image, the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.
asr5500_T- <release>.zip	asr5500_T- <release>.bin	Contains the signed, trusted ASR 5500 software image, the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.
<b>StarOS Companion Package</b>		
companion- <release>.zip	companion- <release>.tgz	Contains numerous files pertaining to this version of the StarOS including SNMP MIBs, RADIUS dictionaries, ORBEM clients. These files pertain to both trusted and non-trusted build variants.  In 21.12.0 and later releases, the StarOS companion package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.
<b>VPC-DI</b>		
qvpc-di- <release>.bin.zip	qvpc-di- <release>.bin	Contains the VPC-DI binary software image that is used to replace a previously deployed image on the flash disk in existing installations.  In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.

## Operator Notes

In 21.12.0 and later Releases	In pre-21.12.0 Releases	Description
qvpc-di_T- <release>.bin.zip	qvpc-di_T- <release>.bin	<p>Contains the trusted VPC-DI binary software image that is used to replace a previously deployed image on the flash disk in existing installations.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvpc-di- <release>.iso.zip	qvpc-di- <release>.iso	<p>Contains the VPC-DI ISO used for new deployments, a new virtual machine is manually created and configured to boot from a CD image.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvpc-di_T- <release>.iso.zip	qvpc-di_T- <release>.iso	<p>Contains the trusted VPC-DI ISO used for new deployments, a new virtual machine is manually created and configured to boot from a CD image.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvpc-di-template- vmware- <release>.zip	qvpc-di-template- vmware- <release>.tgz	<p>Contains the VPC-DI binary software image that is used to on-board the software directly into VMware.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvpc-di-template- vmware_T- <release>.zip	qvpc-di-template- vmware_T- <release>.tgz	<p>Contains the trusted VPC-DI binary software image that is used to on-board the software directly into VMware.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>



## Operator Notes

In 21.12.0 and later Releases	In pre-21.12.0 Releases	Description
qvmc-di-template-libvirt-kvm-<release>.zip	qvmc-di-template-libvirt-kvm-<release>.tgz	<p>Contains the same VPC-DI ISO identified above and additional installation files for using it on KVM.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvmc-di-template-libvirt-kvm_T-<release>.zip	qvmc-di-template-libvirt-kvm_T-<release>.tgz	<p>Contains the same trusted VPC-DI ISO identified above and additional installation files for using it on KVM.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvmc-di-<release>.qcow2.zip	qvmc-di-<release>.qcow2.tgz	<p>Contains the VPC-DI binary software image in a format that can be loaded directly with KVM using an XML definition file, or with OpenStack.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvmc-di_T-<release>.qcow2.zip	qvmc-di_T-<release>.qcow2.tgz	<p>Contains the trusted VPC-DI binary software image in a format that can be loaded directly with KVM using an XML definition file, or with OpenStack.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
<b>VPC-SI</b>		
qvmc-si-<release>.bin.zip	qvmc-si-<release>.bin	<p>Contains the VPC-SI binary software image that is used to replace a previously deployed image on the flash disk in existing installations.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>

Operator Notes

In 21.12.0 and later Releases	In pre-21.12.0 Releases	Description
qvpc-si_T- <release>.bin.zip	qvpc-si_T- <release>.bin	<p>Contains the trusted VPC-SI binary software image that is used to replace a previously deployed image on the flash disk in existing installations.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvpc-si- <release>.iso.zip	qvpc-si- <release>.iso	<p>Contains the VPC-SI ISO used for new deployments, a new virtual machine is manually created and configured to boot from a CD image.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvpc-si_T- <release>.iso.zip	qvpc-si_T- <release>.iso	<p>Contains the trusted VPC-SI ISO used for new deployments a new virtual machine is manually created and configured to boot from a CD image.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvpc-si-template- vmware- <release>.zip	qvpc-si-template- vmware- <release>.ova	<p>Contains the VPC-SI binary software image that is used to on-board the software directly into VMware.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvpc-si-template- vmware_T- <release>.zip	qvpc-si-template- vmware_T- <release>.ova	<p>Contains the trusted VPC-SI binary software image that is used to on-board the software directly into VMware.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>

Operator Notes

In 21.12.0 and later Releases	In pre-21.12.0 Releases	Description
qvpc-si-template-libvirt-kvm-<release>.zip	qvpc-si-template-libvirt-kvm-<release>.tgz	<p>Contains the same VPC-SI ISO identified above and additional installation files for using it on KVM.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvpc-si-template-libvirt-kvm_T-<release>.zip	qvpc-si-template-libvirt-kvm_T-<release>.tgz	<p>Contains the same trusted VPC-SI ISO identified above and additional installation files for using it on KVM.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvpc-si-<release>.qcow2.zip	qvpc-si-<release>.qcow2.gz	<p>Contains the VPC-SI binary software image in a format that can be loaded directly with KVM using an XML definition file, or with OpenStack.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
qvpc-si_T-<release>.qcow2.zip	qvpc-si_T-<release>.qcow2.gz	<p>Contains the trusted VPC-SI binary software image in a format that can be loaded directly with KVM using an XML definition file, or with OpenStack.</p> <p>In 21.12.0 and later releases, this package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>
<b>VPC Companion Package</b>		
companion-vpc-<release>.zip	companion-vpc-<release>.tgz	<p>Contains numerous files pertaining to this version of the VPC including SNMP MIBs, RADIUS dictionaries, ORBEM clients. These files pertain to both VPC-DI and VPC-SI, and for trusted and non-trusted build variants.</p> <p>In 21.12.0 and later releases, the VPC companion package also includes the signature file, a verification script, the x509 certificate, and a README file containing information on how to use the script to validate the certificate.</p>

## Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation*, at:

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

Subscribe to *What's New in Cisco Product Documentation*, which lists all new and revised Cisco technical documentation, as an RSS feed and deliver content directly to your desktop using a reader application. The RSS feeds are a free service.

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

All printed copies and duplicate soft copies of this document are considered uncontrolled. See the current online version for the latest version.

Cisco has more than 200 offices worldwide. Addresses and phone numbers are listed on the Cisco website at [www.cisco.com/go/offices](http://www.cisco.com/go/offices).

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: [www.cisco.com/go/trademarks](http://www.cisco.com/go/trademarks). Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1721R)

© 2019 Cisco Systems, Inc. All rights reserved.