



Release Notes for StarOS™ Software Version 21.28.m14

First Published: September 28, 2023

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Introduction

This Release Note identifies changes and issues related to this software release. This planned maintenance release is based on release 21.28.m12. These release notes are applicable to StarOS and RCM products.

Release Package Version Information

Table 1 - Release Package Version Information

Software Packages	Version
StarOS packages	21.28.m14, build 91474

Feature and Behavior Changes

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

Related Documentation

For the complete list of CUPS documentation available for this release, go to <https://www.cisco.com/c/en/us/support/wireless/virtual-packet-core/products-installation-and-configuration-guides-list.html>.

For the complete list of the corresponding StarOS documentation, go to <https://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 general installation and upgrade instructions. Refer to the existing installation documentation for specific installation and upgrade considerations.

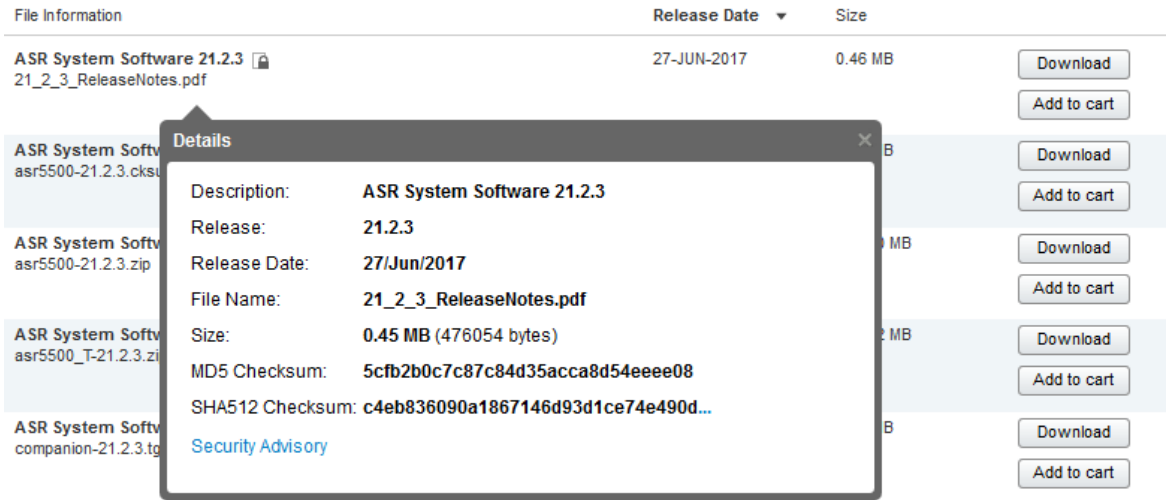
Firmware Updates

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 **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.

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 see [Table 2](#).

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 <pre>> certutil.exe -hashfile <filename>.<extension> SHA512</pre>
Apple MAC	Open a terminal window and type the following command <pre>\$ shasum -a 512 <filename>.<extension></pre>
Linux	Open a terminal window and type the following command <pre>\$ sha512sum <filename>.<extension></pre> <p>Or</p> <pre>\$ shasum -a 512 <filename>.<extension></pre>
NOTES:	
<i><filename></i> is the name of the file.	
<i><extension></i> is the file extension (e.g. .zip or .tgz).	

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.

Open Bugs in this Release

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 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*
CSCwf26675	[BP-CUPS] Abnormal Release record closure for 3g call with custom38 dictionary	cups-cp
CSCwf42495	[CUPS-CP] [LI] Third target interception for the same subscriber NOT working as expected	cups-cp
CSCwh43087	[CUPS 21.28.m10] URR not created during re-installation of previously removed ruledef	cups-cp
CSCwh51263	CP does not create the Redirect-FAR for FUJ-redirect on the second time	cups-cp
CSCwe73462	[BP-CUPS][sessmgr 10396 error]smgr_recovery.c:13989]Sessmgr-10Recover call from CRR failed post SR	cups-up
CSCwh01131	Mon sub feature cases are not working for Pures, Purep and Collapsed call model	cups-up
CSCwh03670	[CUPS-UP] Downlink total fp packets not shown correctly in case of http out of order packet	cups-up
CSCwh20389	EGTUPPathFail not generated in CP node	cups-up
CSCwh37600	Charging ID inside correlation number is showing 00 00 when using SGW-Service	cups-up
CSCwh51099	[CUPS] Some DNS requests are not re-addressed when p2p is enabled	cups-up
CSCwh54640	[21.28.Fm12.91254] [cups-up] vpnmgr error messages on UP	cups-up
CSCwh58126	[cups-up][21.28.Fm12.91299] Fatal Signal 11: 11 PC: [0495e396/X] uplane_find_app_data_flow()	cups-up
CSCwf13605	ipsecdemux crash on asr5500 during crypto call model longevity	epdg
CSCwc65963	sessmgr restart is seen when configuring and unconfiguring Lawful intercept CLIs multiple times	mme
CSCwh63134	sessmgr crash Assertion failure Function: egtpc_send_req_msg()	mme

Resolved Bugs in this Release

Bug ID	Headline	Product Found*
CSCwh69453	SGSN sending abnormal RAB assignment request.	mme
CSCwh69453	SGSN sending abnormal RAB assignment request.	mme
CSCwh69446	[CP-MME] observing "imsimgr: DATACORRUPTION-AVERTED" warning in debug logs	mme
CSCwf87596	On qvpc, MPLS/VPN - Staros is reversing the bottom/top labels	pdn-gw
CSCwh50864	Sessionmgr Restart -sgwdrv_pdn_fsm_st_newcall_pending_evt_clear_pdn	pdn-gw
CSCwe51959	v21.28.mx as the upstream branch :: RHEL-8 Build Issues fix in downstream Dev Branch v21.28.ZVx	staros
CSCwd99519	[UPF-ST] Error logs seen on UPF PDR not found with PDR ID 0x149 and Remove PDR PDR with ID 0x2ce	upf
* 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*
CSCwh16710	CUPS - GX monitoring: overcharging when 4g->3g HO occurs	cups-cp
CSCwf12125	CUPS: Discrepancy between the time SGW CDR and the time CGF log	cups-cp
CSCwf59752	'show snmp trap statistics verbose wide' command leads to cli crash	cups-cp
CSCwh43745	Assertion failure at sess/egtp/egtpc/egtpc_interface.c:280	cups-cp
CSCwe06468	CUPS CP: sessmgr restart seen in Function: sgwdrv_pdn_fsm_st_connected_evt_modify_bearer_ind()	cups-cp
CSCwh25370	[BP-CUPS]: While performing LTE to WIFI HO observed "S2B/A HO" Error logs continuously on longevity	cups-cp
CSCwh22569	[CUPS]:observed sessmgr crash when configured with P4 customer config	cups-cp
CSCwf99858	SessMgr snap due to race condition	cups-cp
CSCwf01589	[CUPS-UP]UP send SX_mod_resp with PFCP_CAUSE_MANDATORY_IE_INCORRECT while doing handover	cups-cp
CSCwe81062	CDRs are not sent after unplanned SF card migration	cups-cp
CSCwh12011	[BP-CUPS]: Multiple sessmgr restarts sgwdrv_epsb_fsm_st_connected_evt_s5_disconnected()	cups-cp
CSCwf49223	Number of active subs in show saegw-service statistics all is greater than actual	cups-cp
CSCwf86398	After WLAN->LTE handover, CP is updating non-existing FAR, leading to handover failure.	cups-cp

Resolved Bugs in this Release

Bug ID	Headline	Product Found*
CSCwf96709	CLI "event-update send-usage-report reset-usage" sending huge CCR-U msg towards PCRF with 0 usage	cups-cp
CSCwc34754	Active call got disconnected during handoff from 4G to wifi on ICSR setup with Gx-Alias enabled.	cups-cp
CSCwh47513	CUPS - MBR-UBR collision	cups-cp
CSCwh36428	CP fails to push ECS config after Sx interface restarts	cups-up
CSCwc44211	CUPS UP - Upgrade from 21.23.n9 to 21.23.n10 observed higher RTT/delay between S1U/SGi	cups-up
CSCwh48115	CSCwh48115 : debug Call Trace messages generated without enabling debug	cups-up
CSCwd70361	Assertion failure at sess/sctrl/sessctrl_uplane_cfg_sync.c:23427	cups-up
CSCwf83239	[S8HR-CUPS] Keepalives information not displayed correctly on UP	cups-up
CSCwc99110	[BP-CUPS]: Assertion failure at sess/smgr/sessmgr_gtpu.c sessmgr_egtpu_signalling_routine()	cups-up
CSCwh12215	APN/PDN Info is not synced after Standby UP reload	cups-up
CSCwf03068	Rulebase ID change causing rulebase corruption	cups-up
CSCwf77251	[BP-CUPS]uplane_insert_tcp_ooo_in_list()uplane_handle_rcvd_tcp_OOO_packet()uplane_analyze_tcp()	cups-up
CSCwf34386	VPP restart	cups-up
CSCwh37204	sessmgr crash with libc.so.6/__memcpy_sse2_unaligned()	cups-up
CSCwh52237	CUPS UP: CC drops after Server-Unreachable (with interim-volume and interim-time) kicks in	cups-up
CSCwe00049	sessmgr memory usage is increasing while number of subscribers remains mostly the same	cups-up
CSCwf15283	[BP-CUPS] sessmgr crash: [SXB] GTPU Recover Session Failed in standby UP	cups-up
CSCwf94414	ipsecmgr memory leak when certificate chain used for authentication	epdg
CSCwh37722	Wrong timestamp in SecondaryRATUsageReport	mme
CSCwh38832	Memory is not freed for the SGS EPS Detach Ack message in certain scenarios.	mme
CSCwh23438	Call failure with Update Bearer Response with No Resource Available	mme
CSCwh06795	Bulkstats restart seen at ld-linux.so.2/_dl_sysinfo_int80()	mme
CSCwh22287	MME set ULR Homogeneous-Support-of-IMS-Voice-Over-PS-Sessions AVP Mandatory flag incorrectly	mme
CSCwh08635	Sessmgr unexpected task restart Assertion failure at sess/egtp/egtpc/egtpc_utils.c:804	mme
CSCwf58752	Truncated dest-host from node on Gx CCR-T's	pdn-gw
CSCwh14081	session mgr restart during monitor key installation	pdn-gw
CSCwe35187	SessMgr restart seen during the collision scenario for 3g handover	pdn-gw
CSCwf57524	egtpinmg task restart egtpmgr_find_smgr_for_5G_sub_round_robin.cold	pdn-gw
CSCwf81446	'Noconfirm' option doesn't work to remove the configuration	pdn-gw

Bug ID	Headline	Product Found*
CSCwh36497	ESP flows are out of order packets between NPU and SM.	pdn-gw
CSCwf92306	Support for rulebase change fo NAT on demand pools	pdn-gw
CSCwf90908	[SAEGW] PGW send EGTP_CAUSE_CONTEXT_NOT_FOUND the 3G -> 4G when handover delay is 2.5 sec or less	pdn-gw
CSCwf81615	MISSING_FLOW_INFORMATION when PCEF receives > 1 Charging-Rule-Base-Name rule installs	pdn-gw
CSCwh37227	session mgr restart during vowifi to LTE handover	pdn-gw
CSCwf82030	PGW does not forward intercept data to LI server when voice APN is provisioned	pdn-gw
CSCwh05036	Reverting the changes of CDET CSCwf34985	pdn-gw
CSCwf50059	Password expiration notification resets the expiration date to 1969:12:31:23:59:59 after MCBU-I-1498	pdn-gw
CSCwf92466	PGW does NOT send CSResp if it get CCA-I with Result-Code DIAMETER_AUTHORIZATION_REJECTED (5003)	pdn-gw
CSCwd17939	In sGWRRecord, changeTime appearing as before time from recordOpeningTime and duration showing zero	sae-gw
CSCwf34985	Increased number of Del-bear-requests and Del-Session-Requests seen on S5 and S11 on SAEGW	sae-gw
CSCwf74560	sessmgr task restart Assertion failure at sess/snx/drivers/sgw/sgw_ue_fsm.c	sgw
CSCwf93799	session manager Assertion failure at sess/snx/drivers/sgw/sgw_epsb_fsm.c	sgw
CSCwf84990	[S8HR-Legacy] - Sessmgr memory not recovered back once after Buffered packets flushed out	sgw
CSCwf58771	[S8HR-Legacy] Observed junk values when switch-over to new active chassis and perform SM Recovery	sgw

Operator Notes

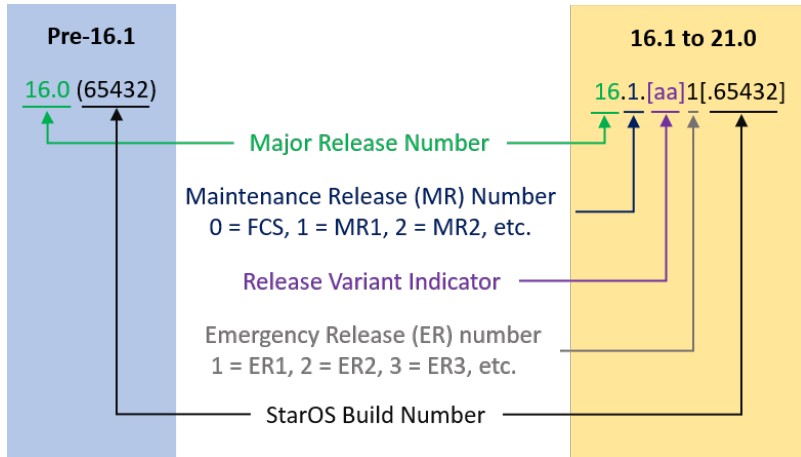
StarOS Version Numbering System

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.

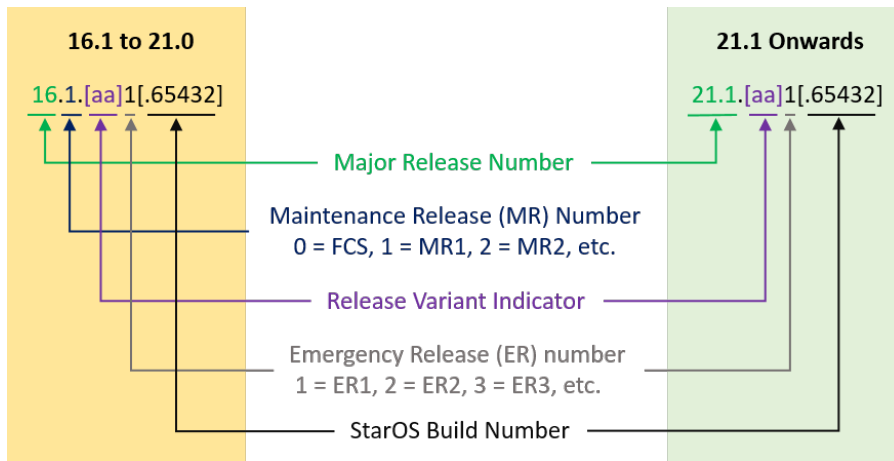
Prior to release 16.1, the *Image Version* field displayed a branch of software including the build number, for example “16.0 (55435)”. Subsequent releases of software for the major release differed only in build number. Lab Quality/EFT releases versus deployment releases also differed only in build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



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
ASR 5500		
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.
StarOS Companion Package		
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.
VPC-DI		
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.
qvpc-di_T-<release>.bin.zip	qvpc-di_T-<release>.bin	Contains the trusted 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.
qvpc-di-<release>.iso.zip	qvpc-di-<release>.iso	Contains the VPC-DI ISO used for new deployments, a new virtual machine is manually created and configured to boot from a CD image. 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.
qvpc-di_T-<release>.iso.zip	qvpc-di_T-<release>.iso	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. 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.

In 21.12.0 and later Releases	In pre-21.12.0 Releases	Description
qvmc-di-template-vmware-<release>.zip	qvmc-di-template-vmware-<release>.tgz	Contains the VPC-DI binary software image that is used to on-board the software directly into VMware. 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.
qvmc-di-template-vmware_T-<release>.zip	qvmc-di-template-vmware_T-<release>.tgz	Contains the trusted VPC-DI binary software image that is used to on-board the software directly into VMware. 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.
qvmc-di-template-libvirt-kvm-<release>.zip	qvmc-di-template-libvirt-kvm-<release>.tgz	Contains the same VPC-DI ISO identified above and additional installation files for using it on KVM. 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.
qvmc-di-template-libvirt-kvm_T-<release>.zip	qvmc-di-template-libvirt-kvm_T-<release>.tgz	Contains the same trusted VPC-DI ISO identified above and additional installation files for using it on KVM. 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.
qvmc-di-<release>.qcow2.zip	qvmc-di-<release>.qcow2.tgz	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. 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.
qvmc-di_T-<release>.qcow2.zip	qvmc-di_T-<release>.qcow2.tgz	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. 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.
VPC-SI		
qvmc-si-<release>.bin.zip	qvmc-si-<release>.bin	Contains the VPC-SI 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.
qvmc-si_T-<release>.bin.zip	qvmc-si_T-<release>.bin	Contains the trusted VPC-SI 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.

In 21.12.0 and later Releases	In pre-21.12.0 Releases	Description
qvmc-si-<release>.iso.zip	qvmc-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>
qvmc-si_T-<release>.iso.zip	qvmc-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>
qvmc-si-template-vmware-<release>.zip	qvmc-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>
qvmc-si-template-vmware_T-<release>.zip	qvmc-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>
qvmc-si-template-libvirt-kvm-<release>.zip	qvmc-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>
qvmc-si-template-libvirt-kvm_T-<release>.zip	qvmc-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>
qvmc-si-<release>.qcow2.zip	qvmc-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>
qvmc-si_T-<release>.qcow2.zip	qvmc-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>

In 21.12.0 and later Releases	In pre-21.12.0 Releases	Description
VPC Companion Package		
companion-vpc-<release>.zip	companion-vpc-<release>.tgz	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. 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.
Ultra Service Platform		
usp-<version>.iso		The USP software package containing component RPMs (bundles). Refer to Table 6 for descriptions of the specific bundles.
usp_T-<version>.iso		The USP software package containing component RPMs (bundles). This bundle contains trusted images. Refer to Table 6 for descriptions of the specific bundles.
usp_rpm_verify_utils-<version>.tar		Contains information and utilities for verifying USP RPM integrity.

Table 6 - USP ISO Bundles

USP Bundle Name	Description
usp-em-bundle-<version>-1.x86_64.rpm*	The Element Manager (EM) Bundle RPM containing images and metadata for the Ultra Element Manager (UEM) module.
usp-ugp-bundle-<version>-1.x86_64.rpm*	The Ultra Gateway Platform (UGP) Bundle RPM containing images for Ultra Packet core (VPC-DI). There are trusted and non-trusted image variants of this bundle.
usp-yang-bundle-<version>-1.x86_64.rpm	The Yang Bundle RPM containing YANG data models including the VNFD and VNFR.
usp-uas-bundle-<version>-1.x86_64.rpm	The Ultra Automation Services Bundle RPM containing AutoVNF, Ultra Web Services (UWS), and other automation packages.
usp-auto-it-bundle-<version>-1.x86_64.rpm	The bundle containing the AutoIT packages required to deploy the UAS.
usp-vnfm-bundle-<version>-1.x86_64.rpm	The VNFM Bundle RPM containing an image and a boot-up script for ESC (Elastic Service Controller).
ultram-manager-<version>-1.x86_64.rpm*	This package contains the script and relevant files needed to deploy the Ultra M Manager Service.
* These bundles are also distributed separately from the ISO.	

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>.

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