



# Release Notes for StarOS™ Software Version 21.28.h2

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## Introduction

This Release Note identifies changes and issues related to this software release. This release is the next major feature release since 21.28.h1. This release note is specific to CUPS User Plane only.

## Release Package Version Information

Table 1 - Release Package Version Information

Software Packages	Version
StarOS packages	21.28.h2, build 90483

## 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 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 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>&gt; certutil.exe -hashfile &lt;filename&gt;.&lt;extension&gt; SHA512</pre>
Apple MAC	Open a terminal window and type the following command  <pre>\$ shasum -a 512 &lt;filename&gt;.&lt;extension&gt;</pre>
Linux	Open a terminal window and type the following command  <pre>\$ sha512sum &lt;filename&gt;.&lt;extension&gt;</pre> <p>Or</p> <pre>\$ shasum -a 512 &lt;filename&gt;.&lt;extension&gt;</pre>
<b>NOTES:</b>	
<i>&lt;filename&gt;</i> is the name of the file.	
<i>&lt;extension&gt;</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.

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*
CSCwf59752	'show snmp trap statistics verbose wide' command leads to cli crash	cups-cp
CSCwf49223	Number of active subs in show saegw-service statistics all is greater than actual	cups-cp
CSCwe08636	[BP-CUPS] Dynamic rule is not getting installed with no policy-control update-default-bearer	cups-cp
CSCwf01589	[CUPS-UP]UP send SX_mod_resp with PFCP_CAUSE_MANDATORY_IE_INCORRECT while doing handover	cups-cp
CSCwf26675	[BP-CUPS] Abnormal Release record closure for 3g call with custom38 dictionary	cups-cp
CSCwf71126	An extra Sx Session Report is generated when moving network	cups-cp
CSCwe86265	Behavior of command documentation in CUPS-CP User Guide	cups-cp
CSCwf76901	"[cups-cp][21.28.m10.90398] CP is not decoding IE, errorReported: Received unexpected or repeated IE"	cups-cp
CSCwf26822	push config-to-up all takes longer than 5mins to finish	cups-cp
CSCwf42495	[CUPS-CP] [LI] Third target interception for the same subscriber NOT working as expected	cups-cp
CSCvu48856	[BP-CUPS]: [gtpc 47514 error] GTPC Misc error: Deactivation already in progress.	cups-cp
CSCvu76574	[BP-CUPS] recovery-invalid-crr-clp-uplane-gtpu-session checkpoint error	cups-up
CSCwf01800	[CUPS-UP]Stats mismatch rulebase change during HO with only predef rule	cups-up
CSCwf12887	Fatal Signal 11: smgr_uplane_rule_compare_icmp_type()	cups-up
CSCwb83398	[BP-CUPS] Lots of error logs GTPU Recover Session Failed for GTP-u Peer on standby UP	cups-up
CSCwc29508	[BP-CUPS][sessmgr 12341 error][essmgr_uplane.c:36574][SXAB] UE IP Address is different in Traffic	cups-up
CSCwf77251	[BP-CUPS]uplane_insert_tcp_ooo_in_list()uplane_handle_rcvd_tcp_OOO_packet()uplane_analyze_tcp()	cups-up
CSCwf55939	[BP-CUPS]: observed 'sessmgr_uplane_send_sx_sess_modify_rsp_org()' crash on up	cups-up

## Open Bugs in this Release

Bug ID	Headline	Product Found*
CSCwc73243	[BP-CUPS] Assertion failure at sess/sctrl/sessctrl_uplane_cfg_sync.c:23721	cups-up
CSCwf03289	[CUPS-UP]UP not sending correct Uplink Volume in SX_SESSION_REPORT_REQUEST	cups-up
CSCwf58498	[CUPS-UP]DL Data packet getting drop while CBresponse is pending and DL data came	cups-up
CSCwf81465	[CUPS-UP]Sessmgr crash at uplane_remove_portmap_mtree_entries while doing mid session rulebase chang	cups-up
CSCwe51492	Sessmgr crash with function :: uplane_create_app_data_flow on Data UPs	cups-up
CSCwd91525	[CUPS-LI] Collisions were seen after UP planned and unplanned switchover	cups-up
CSCwc99110	[BP-CUPS]: Assertion failure at sess/smgr/sessmgr_gtpu.c sessmgr_egtpu_signalling_routine()	cups-up
CSCwe73462	[BP-CUPS][sessmgr 10396 error]smgr_recovery.c:13989]Sessmgr-10Recover call from CRR failed post SR	cups-up
CSCwf58640	[CUPS-UP]Need support for show user-plane-service gtpu statistics In SSD	cups-up
CSCwf86050	[cups-up]: Sessmgr crash at egtpu_process_update_req_evt() seen on standby UP	cups-up
CSCwf18184	Multiple Ipsecmgr's are in warn state in 21.28.m3 build	epdg
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
CSCwd29108	[NSO-MOB-FP] error with nfv-vim package with NSO 5.7.6.2 or 5.8.4 or 5.6.8 and MFP 3.4	nso-mob-fp
CSCwf81446	'Noconfirm' option doesn't work to remove the configuration	pdn-gw
CSCwf57524	egtpinmg task restart egtpmgr_find_smgr_for_5G_sub_round_robin.cold	pdn-gw
CSCwf81615	MISSING_FLOW_INFORMATION when PCEF receives &gt; 1 Charging-Rule-Base-Name rule installs	pdn-gw
CSCwe62325	Ubuntu 16.04 ESM/18.04LTS/20.04LTS/22.04LTS/22.10 : systemd vulnerability seen in RCM VM Nessus Scan	rcm
CSCwd91543	IKE notify packets are not responded after pod reload	rcm
CSCwe43183	Some UPF specific rcm-controller traps do not show UPF IP address	rcm
CSCwc10141	keepalived to controller notification fails but no retry	rcm
CSCwb74230	Switchover statistics info is missing in Switchover verbose statistics.	rcm
CSCwc53741	Checkpointed information lost after checkpointmgr pod restart	rcm
CSCwf86184	S8HR-LI Multiple DPC card restart observed during longevity.	sae-gw
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
CSCwe74835	[SMF-MONSUB]CLI instance id should be same in START/STOP of Trace.	smf
CSCwf01246	[UPF-ST] : Sessmgr error logs &quot;[N4] UE IP Address is different in PDR with PDR ID &quot;;	smf

## Open Bugs in this Release

Bug ID	Headline	Product Found*
CSCwf71518	[UPF-ST]: Continuous error log seen on UPF &quot;[N4] Uplane record not found for PDR with PDR ID 0x0&quot;;	smf
CSCwc67766	[UPF_SVI] N4 Session Report request is getting assigned wrong peer IP addr ::ffff:192.10.25.23	smf
CSCwd51484	Apache Tomcat 9.0.0-M1 Req Smuggling and Azul Zulu java (2022-10-18) Multiple Vulnerabilities	smi
CSCwe79529	opscnter 2 container are crashing (confd & amp; confd-notifications)	smi
CSCwd81548	[5GaaS] Edge proxy NFs rely on NF restarts to apply config changes	smi
CSCwe51959	v21.28.mx as the upstream branch :: RHEL-8 Build Issues fix in downstream Dev Branch v21.28.ZVx	staros
CSCwe95648	[UPF-MONSUB]No fastpath(vpp) pcaps are generated for 4G SGWU only call.	upf
CSCwf04131	[UPF-MONSUB]Extra Sx report for MONSUB report.	upf
CSCwf08000	[SVI-UPF] Error logs Remove PDR PDR with ID observed	upf
CSCwf77945	[cnUPF-ST] : P5G - The CPU 1/0 is running low on memory. (0M free)	upf
CSCwf84260	[UPF-ST] bgp stuck after doing port shut/no shut	upf
CSCwf00180	[UPF-SVI] : Seen Error logs &quot;[CDR 1966 - URR ID -2147435417]&quot; with ICSR SW	upf
CSCwd08526	[SVI-UPF] sessmgr restarts at sessmgr_uplane_cleanup_clp_data()	upf
CSCwf08057	[UPF-SVI] : Seen Update FAR not found with FAR ID 0x11e with RCM planned/Unplanned SW	upf
CSCwf11828	[UPF-ST]: Error logs Invalid FAR with id 5 received in PDU. IMSI: 311480071230621 Interface: N4	upf
CSCwd99519	[UPF-ST] Error logs seen on UPF PDR not found with PDR ID 0x149 and Remove PDR PDR with ID 0x2ce	upf
CSCwd60981	[UPF] UPF does not initiate Sx_Session_Report_Req after receiving GTP_ERROR_IND_MSG	upf
CSCwf73165	slow cli and logs with resmgr warning The CPU 1/0 is running with a high 5-minute average cpu usage	upf
CSCwf78063	[cnUPF-ST] : P5G - vpp restart Recent errno: 75 Value too large for defined data type	upf
CSCwe80667	[UPF-MONSUB]Router advertisement/solicit packet is not captured on GTPU while egressing from sessmgr	upf
CSCwe80795	[UPF-MONSUB]GTPU end marker is not captured in slowpath pcap.	upf
CSCwf84551	[cnUPF-ST] : P5G - rip_api_init rip_zebos_init	upf
CSCwf37593	[UPF-SVI] : cnUPF vpp_main in warn state with longevity	upf
CSCwf62665	[UPF-MONSUB]:uplink data pkts going via slowpath are not captured in FP trace	upf
CSCwe33291	[UPF-ST]: Continuous error logs on standby UPF &quot;SMGR ID mismatch during recovery&quot;;	upf
CSCwe77481	[UPF-MONSUB]Incoming gtpu/GTPU error indication is not captured in slowpath pcap.	upf
CSCwf14455	[UPF-ST] : sessmgr restarted at smgr_is_proto_enabled_for_callid_cups()	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 were found in, and remain open in this 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 - Open Bugs in this Release**

Bug ID	Headline	Product Found*
CSCwf63318	(CUPS) SGW incorrectly handling collision between MBR & CBR during N26 handover	cups-cp
CSCwf11062	Sessmgr restart after GTP-C path failure	cups-cp
CSCwd33517	show apn statistics shows wrong value for GERAN and UTRAN users	cups-cp
CSCwe86228	cli display shows contradictory information for UP-Group name and UP-NODE-ID	cups-cp
CSCwe91366	"URR node not found at CP for URR-id" of URR-id ended with 1 or 2	cups-cp
CSCwe91396	Duplicate TEP removal by CP.	cups-cp
CSCwf36402	Sessmgr restart on CUPS CP at function - sessmgr_ggsn_sx_deallocate_trans_info_node	cups-cp
CSCwf24872	"[BP-CUPS]After sxdemux card migration,fresh ip pool chunks not pushed & existing pools got depleted"	cups-cp
CSCwe91366	quot;URR node not found at CP for URR-id quot; of URR-id ended with 1 or 2	cups-cp
CSCwf11062	Sessmgr restart after GTP-C path failure	cups-cp
CSCwf24872	"[BP-CUPS]After sxdemux card migration,fresh ip pool chunks not pushed amp; existing pools got depleted"	cups-cp
CSCwd33517	show apn statistics shows wrong value for GERAN and UTRAN users	cups-cp
CSCwe50682	MCPTT flow not working after CUPS Upgrade to 21.28.m0	cups-cp
CSCwe91396	Duplicate TEP removal by CP.	cups-cp
CSCwf36402	Sessmgr restart on CUPS CP at function - sessmgr_ggsn_sx_deallocate_trans_info_node	cups-cp
CSCwf63318	(CUPS) SGW incorrectly handling collision between MBR amp; CBR during N26 handover	cups-cp
CSCwe27814	[BP-CUPS]: [sessmgr 12325 error] Invalid FAR with id 8 received in PDU.	cups-cp
CSCwf40956	[BP-CUPS]MCPTT-[gtpc 47514 error] GTPC Misc error: Deactivation already in progress.Unexpected event	cups-cp
CSCwf63483	CSCwb53858 ACSMGR 91432 Error - gt; Node prints unnecessary debug logs	cups-cp
CSCwe86228	cli display shows contradictory information for UP-Group name and UP-NODE-ID	cups-cp
CSCwf66330	Sessmgr restart observed with function :: sessmgr_sgw_send_abort_pdn_req_to_drv in CP	cups-cp
CSCwe94031	BP-CUPS] Assertion failure at sess/sx/sxc/sx_evt_handler_comm.c:625	cups-cp
CSCwd93230	"[CUPS UP] When dynamic rule precedence is zero, UP is not accounting packet in URR "	cups-up
CSCwe83354	GTPU Test Echoes Received but not Reported to CLI	cups-up

## Resolved Bugs in this Release

Bug ID	Headline	Product Found*
CSCwf09429	VPP NSH Fastpath Tables Not Initialized	cups-up
CSCwf30799	[CUPS UP] UP is not accounting packet in URR after UP switchover for dynamic rule with precedence 0	cups-up
CSCwf44032	[BP-CUPS] Rule mis-match post the rule line modification which has ip server-domain-name	cups-up
CSCwf57017	UP is not advertising static IP using explicit-route-advertise feature under VRF towards PE	cups-up
CSCwf27682	Sessmgr's memory is contiously increasing	cups-up
CSCwf31856	sessmgr restart on standby UP node at smgr_uplane_config_rule_options	cups-up
CSCwf23942	ePDG sends invalid S-NSSAI values in IKE_AUTH_RESPONSE even when 5G-IWK feature is not enabled	epdg
CSCwe94309	MME rejecting the service request from NBIoT device in case when eea3 and eia3 is enabled	mme
CSCwf19626	Backward compatibility of MME (supporting LTE-M) with SGW that does not support LTE-M	mme
CSCwe94309	MME rejecting the service request from NBIoT device in case when eea3 and eia3 is enabled	mme
CSCwf19626	Backward compatibility of MME (supporting LTE-M) with SGW that does not support LTE-M	mme
CSCwe59929	Billing Impact caused by Gy CCR-T Request Number incorrectly increases after Assume Positive	pdn-gw
CSCwe83141	PGW Sends CCR-T when UE is in Assume Positive state and never established a Gy session	pdn-gw
CSCwf79740	[BP-CUPS]: While performing LTE to WIFI HO observed "CC Req No 1"; Error logs continuously generating	pdn-gw
CSCwe45652	PGW is not triggering UBR after RAR from PCRF for IP Filter Replace	pdn-gw
CSCwe64879	Bulkstats are reporting high utilization for DATARATE_IPPOOL schema	pdn-gw
CSCwf17642	The PGW sends a CCR-U with no USU when the Tariff-Time-Change value expires)	pdn-gw
CSCwe21138	BP-ICUPS: sessmgr restart : sfw_nat_allocate_port_chunk_from_recovery_list()	pdn-gw
CSCwe70747	[BP-PGW] Gy_CCR-Termination message AVP's validation is failed post the sessmgr/aaamgr recovery	pdn-gw
CSCwf34985	Increased number of Del-bear-requests and Del-Session-Requests seen on S5 and S11 on SAEGW	sae-gw
CSCwf15441	egtpegmgr restart seen on SPGW after recent SW upgrade.	sae-gw
CSCwf04371	sessmgr restart at acsmgr_clp_send_checkpoint_dcca	sae-gw
CSCwe91665	session manager restart at function tfDuplicateSharedBuffer on SAEGW	sae-gw
CSCwf21408	Apply patches for critical security updates on hermes kernel	staros

\* Information in the "Product Found" column identifies the product in which the bug was initially identified.

## Operator Notes

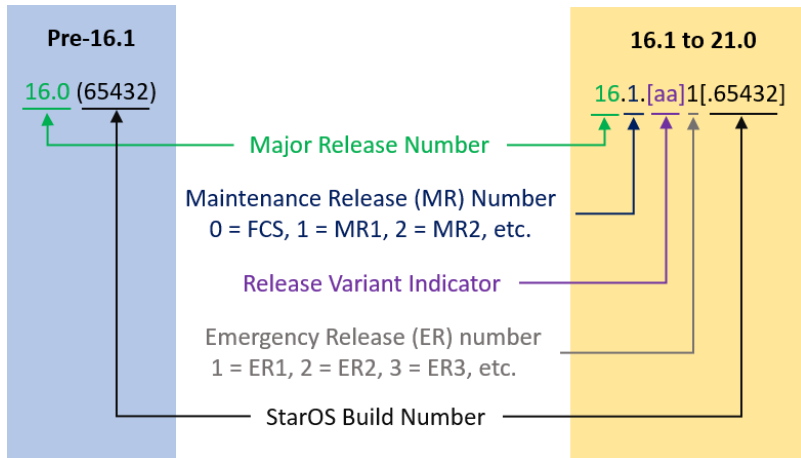
### StarOS Version Numbering System

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.

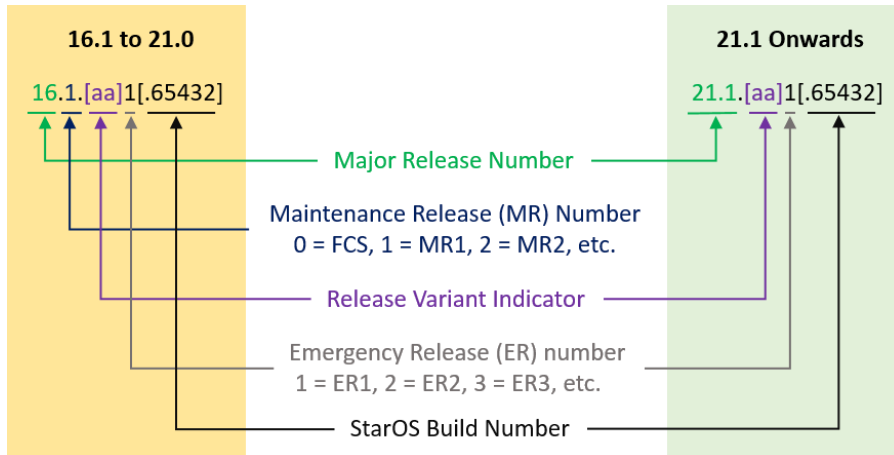
Prior to release 16.1, the *Image Version* field displayed a branch of software including the build number, for example “16.0 (55435)”. Subsequent releases of software for the major release differed only in build number. Lab Quality/EFT releases versus deployment releases also differed only in build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

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
<b>VPC Companion Package</b>		
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.
<b>Ultra Service Platform</b>		
usp-<version>.iso		The USP software package containing component RPMs (bundles).  Refer to <a href="#">Table 6</a> 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 <a href="#">Table 6</a> 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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