Release Notes for StarOS™ Software Version 21.28.6

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Introduction

This Release Note identifies changes and issues related to this software release. This emergency release is based on release 21.28.5. These release notes are applicable to CUPS products.

Release Package Version Information

Table 1 - Release Package Version Information

Software Packages	Version
StarOS packages	21.28.6 build 90482

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.

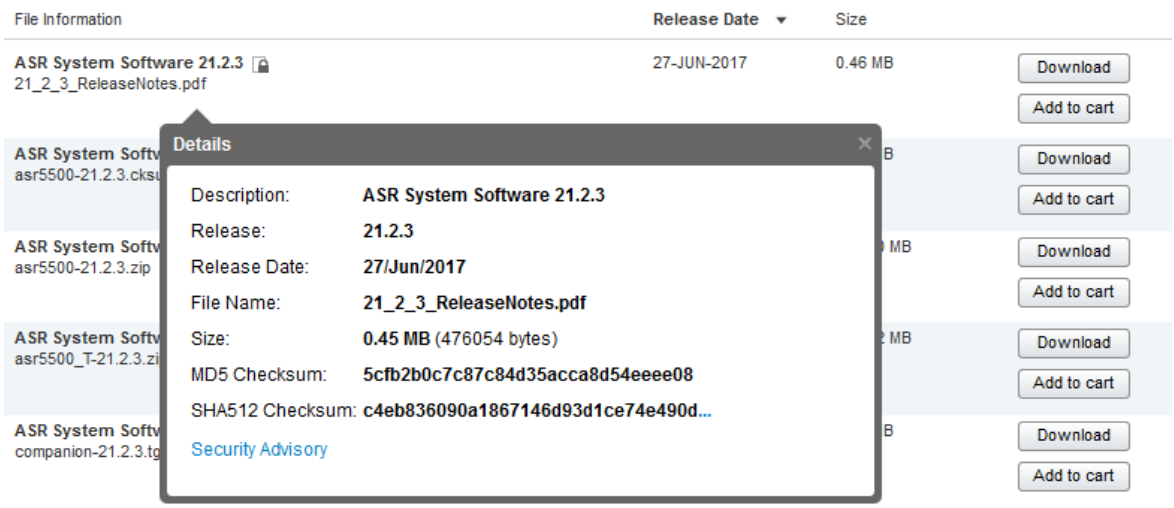
Firmware Updates

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 > certutil.exe -hashfile *<filename>.<extension>* SHA512
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>*

NOTES: *<filename>* is the name of the file. *<extension>* 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*
CSCwf01589	[CUPS-UP]UP send SX_mod_resp with PFCP_CAUSE_MANDATORY_IE_INCORRECT while doing handover	cups-cp
CSCwf49223	Number of active subs in show saegw-service statistics all is greater than actual	cups-cp
CSCwf59752	'show snmp trap statistics verbose wide' command leads to cli crash	cups-cp
CSCwe08636	[BP-CUPS] Dynamic rule is not getting installed with no policy-control update-default-bearer	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
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
CSCwb83398	[BP-CUPS] Lots of error logs GTPU Recover Session Failed for GTP-u Peer on standby UP	cups-up
CSCwf77251	[BP-CUPS]uplane_insert_tcp_ooo_in_list()uplane_handle_recvd_tcp_OOO_packet()uplane_analyze_tcp()	cups-up
CSCvu76574	[BP-CUPS] recovery-invalid-crr-clp-uplane-gtpu-session checkpoint error	cups-up
CSCwc29508	[BP-CUPS][sessmgr 12341 error][essmgr_uplane.c:36574][SXAB] UE IP Address is different in Traffic	cups-up
CSCwf01800	[CUPS-UP]Stats mismatch rulebase change during HO with only predef rule	cups-up
CSCwc73243	[BP-CUPS] Assertion failure at sess/sctrl/sessctrl_uplane_cfg_sync.c:23721	cups-up
CSCwd60551	"[BP-CUPS]: After task kill, sessmgr restart at function uplane_populate_nbr_field_edr_charging_id()"	cups-up
CSCwf03289	[CUPS-UP]UP not sending correct Uplink Volume in SX_SESSION_REPORT_REQUEST	cups-up

Bug ID	Headline	Product Found*
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
CSCwf55939	[BP-CUPS]: observed " sessmgr_uplane_send_sx_sess_modify_rsp_org()" crash on up	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 < 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
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
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
CSCwf86184	S8HR-LI Multiple DPC card restart observed during longevity.	sae-gw
CSCwf58771	[S8HR-Legacy] Observed junk values when switch-over to new active chassis and perform SM Recovery	sgw
CSCwf84990	[S8HR-Legacy] - Sessmgr memory not recovered back once after Buffered packets flushed out	sgw
CSCwe74835	[SMF-MONSUB]CLI instance id should be same in START/STOP of Trace.	smf
CSCwc67766	[UPF_SVI] N4 Session Report request is getting assigned wrong peer IP addr ::ffff:192.10.25.23	smf
CSCwf01246	[UPF-ST] : Sessmgr error logs "[N4] UE IP Address is different in PDR with PDR ID "	smf

Bug ID	Headline	Product Found*
CSCwd51484	Apache Tomcat 9.0.0-M1 Req Smuggling and Azul Zulu java (2022-10-18) Mulitple Vulnerabilities	smi
CSCwe79529	opscenter 2 container are crashing (confd & 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
CSCwf84872	[UPF-ST] : Seen Error logs with sessmgr task kill	upf
CSCwf85212	[UPF-ST][Monsub]: Max 2-pcaps are generating instead of 4 in UPF for slowpath	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
CSCwf00180	[UPF-SVI] : Seen Error logs “[CDR 1966 - URR ID -2147435417]” with ICSR SW	upf
CSCwf84199	[UPF-ST] npumgr restart at ares_npumgr_vpp_blocking_request	upf
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
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 “SMGR ID mismatch during recovery”	upf
CSCwf71518	[UPF-ST]: Continuous error log seen on UPF “[N4] Uplane record not found for PDR with PDR ID 0x0”	upf
CSCwd99519	[UPF-ST] Error logs seen on UPF PDR not found with PDR ID 0x149 and Remove PDR PDR with ID 0x2ce	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
CSCwf77544	[UPF-ST] cli restart at cli_token_match_token_list() for cli p2p-detection protocol all	upf

Bug ID	Headline	Product Found*
* 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*
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
CSCwd40162	[BP-CUPS] sesmgr crash: Assertion failure at sess/smgr/sessmgr_fsm_func.c:10998	cups-cp
CSCwe32996	[BP-CUPS]: sessmgr crashes at Function: acsmgr_deactivate_predef_rules()	cups-cp
CSCwe80883	Incorrect Max Sessions under UP reselection situation	cups-cp
CSCwe74646	sessmgr restart on CUPS CP at function acsmgr_create_nsh_info	cups-cp
CSCwe75230	CP Tries Updating PDR ID 0x0000 - resulting in Reject and VoLTE Call Drop	cups-cp
CSCwd66766	cli display shows contradictory information for UP-Group name and UP-NODE-ID	cups-cp
CSCwe70452	[CUPS-CP] SessMgr restart while handling response for deletion	cups-cp
CSCwe50682	MCPTT flow not working after CUPS Upgrade to 21.28.m0	cups-cp
CSCwe64039	"[BP-CUPS]After sx-demux recovery,fresh ip-pool chunks not pushed to UP's,existing pools depleted"	cups-cp
CSCwe79487	sessmgr restart at sessmgr_saegw_handle_cleanup_smgr_data	cups-cp
CSCwe93220	Modification required in syslog error on CUPS CP	cups-cp
CSCwe81754	VPP restart due to SIGBUS error	cups-up
CSCwe62837	difference between CUPS and ASR5500 in case of redirected flow getting reclassified	cups-up

Bug ID	Headline	Product Found*
CSCwf23942	ePDG sends invalid S-NSSAI values in IKE_AUTH_RESPONSE even when 5G-IWK feature is not enabled	epdg
CSCwd10414	OFR Requirement to enable DH Group 5 in 21.27	epdg
CSCwe42649	MME using IPv6 address wrongly during TAU triggered inter-SGW change.	mme
CSCwe82813	Incorrect Cell-ID value observed in PWS Restart Indication message in mon pro	mme
CSCwe81395	MME is sending wrong Macro eNodeB ID under GLOBAL ENB-IDIE in PWS Restart and Failure Indication	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
CSCwc95123	[MME] Mmemgr restart are seen during regression carried on VPC-DI with PWS messages	mme
CSCwe30923	Observing sessmgr crash with function :: egtpc_resume_suspended_proc()	mme
CSCwb59168	Encoding error @Stop-Warning-Indication message for multiple eNB-ID in “Broadcast-Empty-Area-List”	mme
CSCwe95764	PGW-MPN: Session Manager restart happen during host-pool change	pdn-gw
CSCwe21138	BP-ICUPS: sessmgr restart : sfw_nat_allocate_port_chunk_from_recovery_list()	pdn-gw
CSCwf01825	One way traffic reported after UE goes into assume positive state when CCR-U triggered by VT	pdn-gw
CSCwe39289	"Update stats for planned switchover PreSwoTimeout, FlushChkptTimeout and NonCritFlushChkpt"	rcm
CSCwd94821	chkpointmgr pod restart does not initiate sock conn towards stby sessmgr	rcm
CSCwe40744	Boot Registration and Complete trap for UPF is missing UPF State	rcm
CSCwe74149	SRIOV MAC Reset during unbind for Trusted VF	staros

***** Information in the “Product Found” column identifies the product in which the bug was initially identified.

Operator Notes

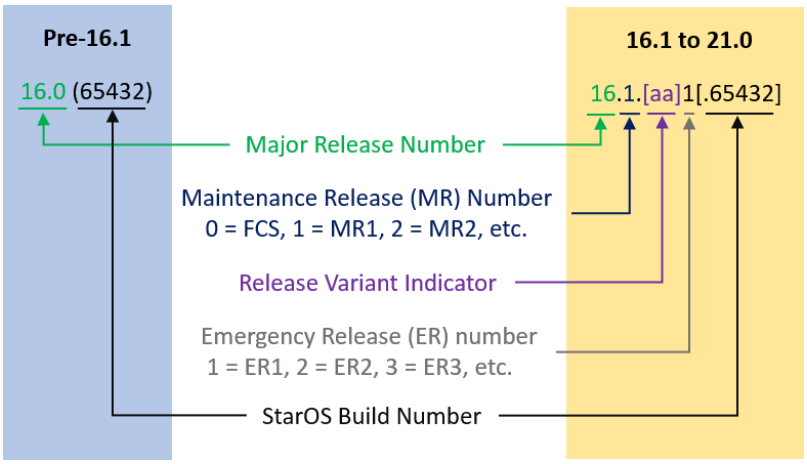
StarOS Version Numbering System

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.

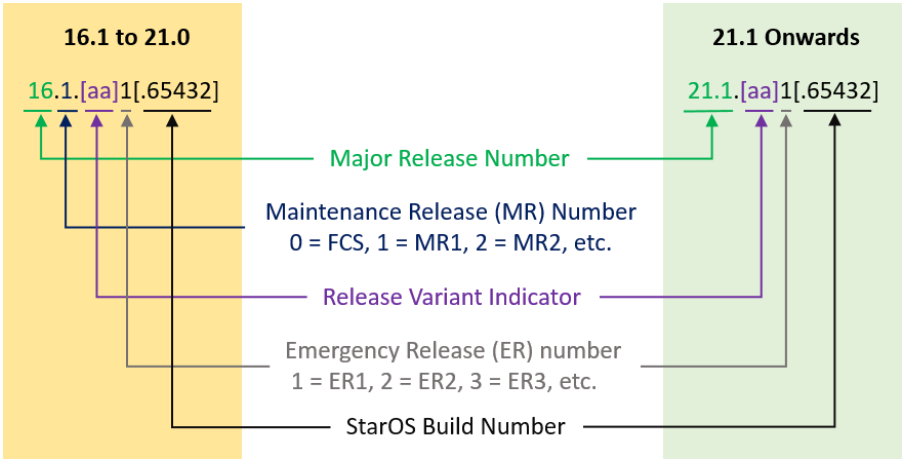
Prior to release 16.1, the *Image Version* field displayed a branch of software including the build number, for example “16.0 (55435)”. Subsequent releases of software for the major release differed only in build number. Lab Quality/EFT releases versus deployment releases also differed only in build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



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
qvpc-di-template-vmware-<release>.zip	qvpc-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.
qvpc-di-template-vmware_T-<release>.zip	qvpc-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.
qvpc-di-template-libvirt-kvm-<release>.zip	qvpc-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.
qvpc-di-template-libvirt-kvm_T-<release>.zip	qvpc-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.
qvpc-di-<release>.qcow2.zip	qvpc-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.
qvpc-di_T-<release>.qcow2.zip	qvpc-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		
qvpc-si-<release>.bin.zip	qvpc-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.

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	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.
qvpc-si-<release>.iso.zip	qvpc-si-<release>.iso	Contains the VPC-SI 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-si_T-<release>.iso.zip	qvpc-si_T-<release>.iso	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. 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-si-template-vmware-<release>.zip	qvpc-si-template-vmware-<release>.ova	Contains the VPC-SI 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.
qvpc-si-template-vmware_T-<release>.zip	qvpc-si-template-vmware_T-<release>.ova	Contains the trusted VPC-SI 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.
qvpc-si-template-libvirt-kvm-<release>.zip	qvpc-si-template-libvirt-kvm-<release>.tgz	Contains the same VPC-SI 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.
qvpc-si-template-libvirt-kvm_T-<release>.zip	qvpc-si-template-libvirt-kvm_T-<release>.tgz	Contains the same trusted VPC-SI 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.
qvpc-si-<release>.qcow2.zip	qvpc-si-<release>.qcow2.gz	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. 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
qvpc-si_T-<release>.qcow2.zip	qvpc-si_T-<release>.qcow2.gz	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. 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 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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