Release Notes for StarOS™ Software Version 21.28.mh6

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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.mh3. 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.mh6, build 89849

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.

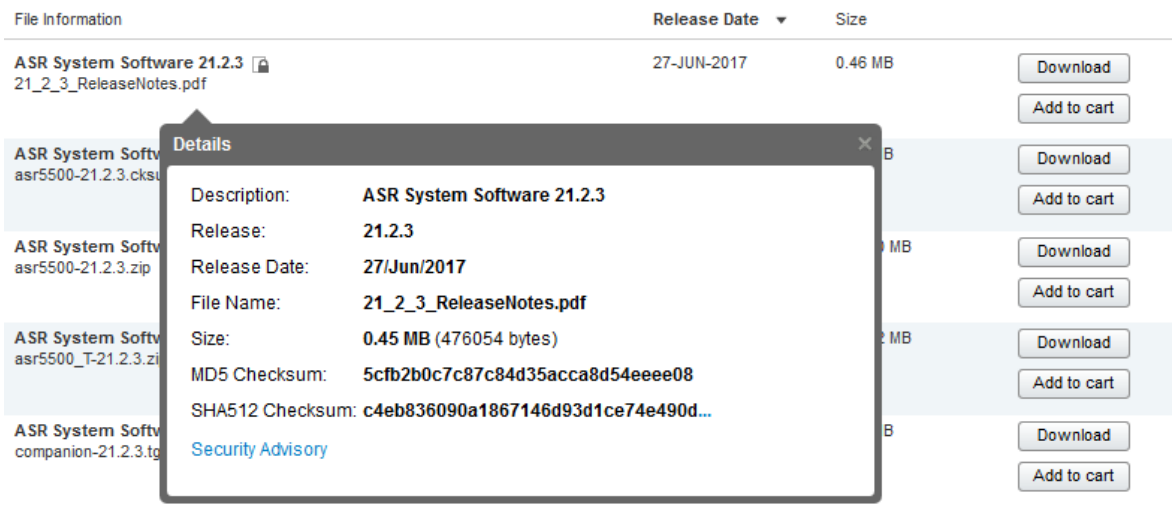
Firmware Updates

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*
CSCwe91396	Duplicate TEP removal by CP.	cups-cp
CSCwe94671	[CUPS-CP]CP not sending Used-Service-Unit in CCRT-GY message after clearing call	cups-cp
CSCwe08636	[BP-CUPS] Dynamic rule is not getting installed with no policy-control update-default-bearer	cups-cp
CSCwc29508	[BP-CUPS][sessmgr 12341 error][essmgr_uplane.c:36574][SXAB] UE IP Address is different in Traffic	cups-up
CSCwc34754	Active call got disconnected during handoff from 4G to wifi on ICSR setup with Gx-Alias enabled.	cups-cp
CSCwf01589	[CUPS-UP]UP send SX_mod_resp with PFCP_CAUSE_MANDATORY_IE_INCORRECT while doing handover	cups-cp
CSCwf14306	"F138422: Show Subscribers cli with UUT, CC and UPG values displays no subs in multi-pdn pure-s call"	cups-cp
CSCwd99519	[UPF-ST] Error logs seen on UPF PDR not found with PDR ID 0x149 and Remove PDR PDR with ID 0x2ce	cups-cp
CSCwe63553	[BP-CUPS]: [saegw 191006 error] Misc Error: Upper and Loer call handle mismatch during drop call	cups-cp
CSCwe86265	Behavior of command documentation in CUPS-CP User Guide	cups-cp
CSCwe97010	[CUPS-CP] mismateched in show ip pool summary stats	cups-cp
CSCwd19379	[BP-CUPS] call drops on sessmgr task kill - recover_sgx_from_crr failed	cups-cp
CSCwd27672	[BP-CUPS]:Assertion failure at Function: sn_memblock_memcache_alloc()	cups-cp
CSCwf15212	[BP-CUPS] egtp echo request not making it out of the CP	cups-cp
CSCwe93326	Fatal Signal 11: PC: egtpc_slist_comp_peer_addr()	cups-cp
CSCwf09429	VPP NSH Fastpath Tables Not Initialized	cups-up

Bug ID	Headline	Product Found*
CSCwe97231	[CUPS-UP]: Field missing in cli “show subscribers user-plane-only callid <call-id> flows full”	cups-up
CSCwf01800	[CUPS-UP]Stats mismatch rulebase change during HO with only predef rule	cups-up
CSCvu76574	[BP-CUPS] recovery-invalid-crr-clp-uplane-gtpu-session checkpoint error	cups-up
CSCwd72712	[CUPS UP] gtpumgr shows memory warn in standby UP	cups-up
CSCwe73462	[BP-CUPS][sessmgr 10396 error]smgr_recovery.c:13989]Sessmgr-10Recover call from CRR failed post SR	cups-up
CSCwb83398	[BP-CUPS] Lots of error logs GTPU Recover Session Failed for GTP-u Peer on standby UP	cups-up
CSCwf20606	[cups-up][21.28.m7.89804] Assertion failure at sess/smgr/sessmgr_audit_utils.c:15456	cups-up
CSCwe51492	Sessmgr crash with function :: uplane_create_app_data_flow on Data UPs	cups-up
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
CSCwf13612	asr500: ipsecdemux crash ipsecdemux_deallocate_session_entry() during chip hang longevity	epdg
CSCwf13605	ipsecdemux crash on asr5500 during crypto call model longevity	epdg
CSCwe86661	CN-MME couldn't process NAS msg from UE - 4g attach failed	mme
CSCwc65963	sessmgr restart is seen when configuring and unconfiguring Lawful intercept CLIs multiple times	mme
CSCwe54541	[MME] mmedemux recovery is not supported for ENDC SON feature	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
CSCwe45652	PGW is not triggering UBR after RAR from PCRF for IP Filter Replace	pdn-gw
CSCwe62325	Ubuntu 16.04 ESM/18.04LTS/20.04LTS/22.04LTS/22.10 : systemd vulnerability seen in RCM VM Nessus Scan	rcm
CSCwc53741	Checkpointed information lost after checkpointmgr pod restart	rcm
CSCwd91543	IKE notify packets are not responded after pod reload	rcm
CSCwf15441	egtpegmgr restart seen on SPGW after recent SW upgrade.	sae-gw
CSCwf04371	sessmgr restart at acsmgr_clp_send_checkpoint_dcca	sae-gw
CSCwf12837	[UPF-ST]: 5g-wlan HO failing due to remove pdr	smf
CSCwf01246	[UPF-ST] : Sessmgr error logs “[N4] UE IP Address is different in PDR with PDR ID “	smf
CSCwc67766	[UPF_SVI] N4 Session Report request is getting assigned wrong peer IP addr ::ffff:192.10.25.23	smf
CSCwf13514	[UPF-ST] SessoinModReq failure with FAR already present with FAR ID “ Mandatory IE incorrect”	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
CSCwd35335	SFR: UPF not able to send trafic on E810 100Gbps links	upf
CSCwe88330	[UPF-SVI] Continuous error logs on vpnmgr - RTNETLINK socket recv buffer under on hermes	upf
CSCwf00180	[UPF-SVI] : Seen Error logs "[CDR 1966 - URR ID -2147435417]" with ICSR SW	upf
CSCwf15247	[ST-UPF] hold queue cli getting configured but not persistent on UPF	upf
CSCwe33291	[UPF-SVI]: Continuous error logs on standby UPF "SMGR ID mismatch during recovery"	upf
CSCwe92004	No user-plane traffic after 4G (eNB in IPv4) to 5G (gNB in IPv6) mobility in idle mode	upf
CSCwf20631	[UPF-ST]: LI intercept for combo/Pure S call is not maintained post ICSR/N:M RCM SWO	upf
CSCwf08057	[UPF-SVI] : Seen Update FAR not found with FAR ID 0x11e with RCM planned/Unplanned SW	upf
CSCwd60981	[UPF] UPF does not initiate Sx_Session_Report_Req after receiving GTP_ERROR_IND_MSG	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 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*
CSCwd66766	cli display shows contradictory information for UP-Group name and UP-NODE-ID	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
CSCwe96707	[BP-CUPS]: Fatal Signal 11 at PC: [044f7f48/X] smc_enter_sxb_sxab_pdn_fsm()	cups-cp
CSCwe27712	Behavioural difference between CUPS and NON-CUPS in terms of handling Gy response code 4011	cups-cp
CSCwe66791	[BP-CUPS]: Observed sessmgr crash smgr_fsm_state_line_connected() on Efence build	cups-cp

Bug ID	Headline	Product Found*
CSCwe93220	Modification required in syslog error on CUPS CP	cups-cp
CSCwe64039	"[BP-CUPS]After sx-demux recovery,freshly defined ip-pool chunks not pushed to UP's"	cups-cp
CSCwe79487	sessmgr restart at sessmgr_saegw_handle_cleanup_smgr_data	cups-cp
CSCwe27814	[BP-CUPS]: [sessmgr 12325 error] Invalid FAR with id 8 received in PDU	cups-cp
CSCwe61003	[CUPS-CP] Unexpected “URR node not found at CP for URR-id” logs observed	cups-cp
CSCwe27287	[NSA/qvpc-di] CP prints 0 as a Sx-Cause value even CP receives it as 1	cups-cp
CSCwe51501	Call rejections ongoing even when license came back to underlimit after license was breached in CP	cups-cp
CSCwe70346	SessMgr restart observed LTE to WiFi handoff scenario	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
CSCwe70452	[CUPS-CP] SessMgr restart while handling response for deletion	cups-cp
CSCwd70361	Assertion failure at sess/sctrl/sessctrl_uplane_cfg_sync.c:23427	cups-up
CSCwe92586	[CUPS-UP]Sessmgr crashes at sessmgr_uplane_fill_pdr_info for case CUPS_HO_S2b_PureP_def_multipdn_01	cups-up
CSCwe53212	MLX5 Core Driver - missing local and vnfmeth interfaces	cups-up
CSCwc78174	EPDG crypto chip handling improvements to resolve crypto chip hang state on DPC1 only	epdg
CSCwe17332	IpsecDemux process restart due to invalid IpsecMgr id	epdg
CSCwc24046	EPDG cpaCyDhKeyGenPhase1() CPA_STATUS_RETRY improvements on top of CSCwb73691	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
CSCwe60630	CLI task restart during SSD collection	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
CSCwe28302	PLR with only IMEI option is not working	mme
CSCwb59168	Encoding error @Stop-Warning-Indication message for multiple eNB-ID in “Broadcast-Empty-Area-List”	mme
CSCwc93508	MME Sending incorrect TAC to SGW on Delete Session Request messages	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-ID” IE in PWS Restart and Failure Indication	mme
CSCwe44935	multiple config lines merged in to single line in qci-qos-mapping table in legacy and CUPS	pdn-gw
CSCwe21138	BP-ICUPS: sessmgr restart : sfw_nat_allocate_port_chunk_from_recovery_list()	pdn-gw

Bug ID	Headline	Product Found*
CSCwe70747	[BP-PGW] Gy_CCR-Termination message AVP's validation is failed post the sessmgr/aaamgr recovery	pdn-gw
CSCwf01825	One way traffic reported after UE goes into assume positive state when CCR-U triggered by VT	pdn-gw
CSCwd75230	AVP Framed-IP-Address missing in radius accounting when HO from LTE to VoWIFI	pdn-gw
CSCwe17765	Sgi-reachability handling for permanent disappearance of sessmgr which handles sgi-reachability	pdn-gw
CSCwe59929	Billing Impact caused by Gy CCR-T Request Number incorrectly increases after Assume Positive	pdn-gw
CSCwe95764	PGW-MPN: Session Manager restart happen during host-pool change	pdn-gw
CSCwe22326	ARP value stuck after Inter RAT mobility	sgsn
CSCwe47631	Placeholder for Critical CVEs Fixes in Legacy Branch StarOS	staros
CSCwe74149	SRIOV MAC Reset during unbind for Trusted VF	staros
CSCwd08112	CPVM hanged in context initializing state after CF changeover by DI Internal fluctuation	staros
CSCwd82707	NEMO - Traffic loop observed on the Egress side for GRE traffic	staros
CSCwe48284	"TFTP failed by "ERR 2 Illegal TFTP operation","	staros
CSCwe11650	[UPF-SVI]-bulkstats process in warn state after overnight longevity	upf
***** Information in the "Product Found" column identifies the product in which the bug was initially identified.		

Operator Notes

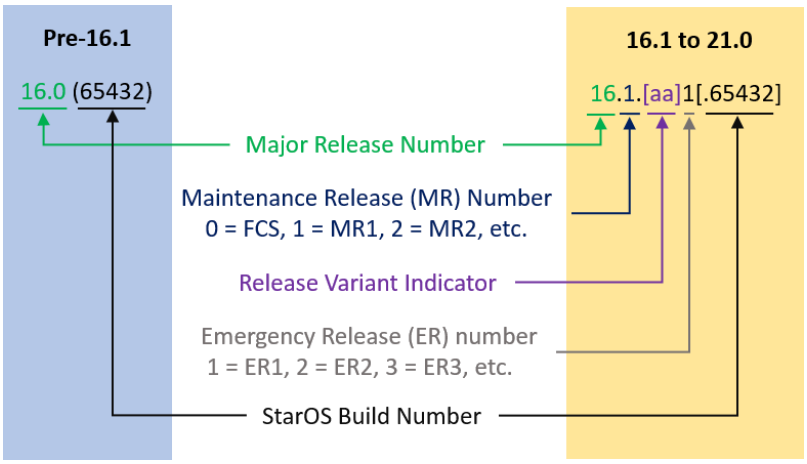
StarOS Version Numbering System

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.

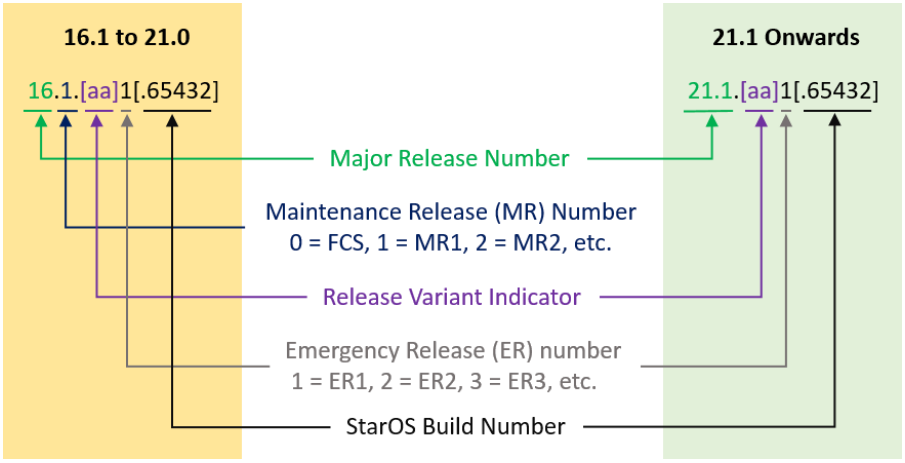
Prior to release 16.1, the *Image Version* field displayed a branch of software including the build number, for example "16.0 (55435)". Subsequent releases of software for the major release differed only in build number. Lab Quality/EFT releases versus deployment releases also differed only in build 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 4 provides descriptions for the packages that are available with this release.

Table 4 - 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 5 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 5 for descriptions of the specific bundles.
usp_rpm_verify_utils-<version>.tar		Contains information and utilities for verifying USP RPM integrity.

Table 5 - 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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