Release Notes for StarOS™ Software Version 21.28.3 -

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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 21.28.2. These release notes are applicable to the ASR5500, VPC-SI ,VPC-DI platforms and RCM platform.

Release Package Version Information

Table 1 - Release Package Version Information

Software Packages	Version
StarOS packages	21.28.3 build 88901

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.

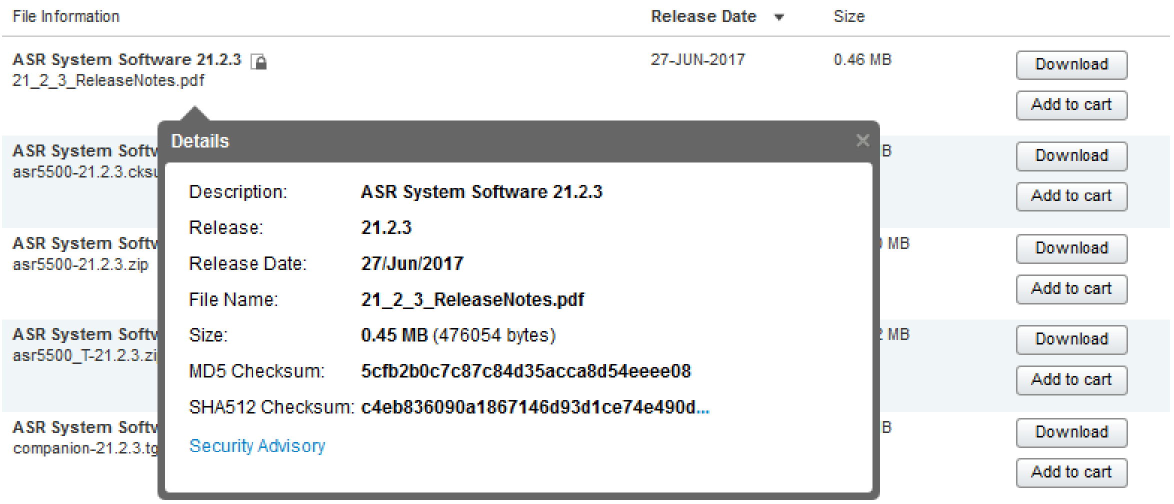
Firmware Updates

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.



File Information	Release Date	Size	
ASR System Software 21.2.3 21_2_3_ReleaseNotes.pdf	27-JUN-2017	0.46 MB	Download Add to cart
ASR System Softw asr5500-21.2.3.cksu		B	Download Add to cart
ASR System Softw asr5500-21.2.3.zip		MB	Download Add to cart
ASR System Softw asr5500_T-21.2.3.zi		MB	Download Add to cart
ASR System Softw companion-21.2.3.tg		B	Download Add to cart

Details

Description: ASR System Software 21.2.3
Release: 21.2.3
Release Date: 27/Jun/2017
File Name: 21_2_3_ReleaseNotes.pdf
Size: 0.45 MB (476054 bytes)
MD5 Checksum: 5cfb2b0c7c87c84d35acca8d54eeee08
SHA512 Checksum: c4eb836090a1867146d93d1ce74e490d...
Security Advisory

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*
CSCwe32987	[BP_CUPS] NSH Traffic steering is broken on hermes - 21.26.hx	cups-cp
CSCwc34754	Active call got disconnected during handoff from 4G to wifi on ICSR setup with Gx-Alias enabled.	cups-cp
CSCwe37928	Observing sessmgr crash::sn_aaa_session_get_user_data	cups-cp
CSCwd59111	"[BP-CUPS] [Syslogs] msid <310260390152986>, CSReq with HO received without valid fteid or with Remot"	cups-cp
CSCwd19379	[BP-CUPS] call drops on sessmgr task kill - recover_sgx_from_crr failed	cups-cp
CSCwe24070	[BP-CUPS]: sessmgr crash at Function: acsmgr_collect_usage_for_all_monitoring_keys()	cups-cp
CSCwe08636	[BP-CUPS] Dynamic rule is not getting installed with no policy-control update-default-bearer	cups-cp
CSCwd99519	[UPF-SVI] Error logs seen on UPF PDR not found with PDR ID 0x149 and Remove PDR PDR with ID 0x2ce	cups-cp
CSCwd27672	[BP-CUPS]:Assertion failure at Function: sn_memblock_memcache_alloc()	cups-cp
CSCvu76574	[BP-CUPS] recovery-invalid-crr-clp-uplane-gtpu-session checkpoint error	cups-up
CSCwc73243	[BP-CUPS] Assertion failure at sess/sctrl/sessctrl_uplane_cfg_sync.c:23721	cups-up
CSCwd91525	[CUPS-LI] Collisions were seen after UP planned and unplanned switchover in RCM setup	cups-up
CSCwd94756	Bulkstat counters show lower IPv6 throughput compared to real throughput	cups-up
CSCwe14834	[BP-CUPS]:sessmgr crash on UP " sessmgr_uplane_process_sx_update_far_update_tep_teid.part.1368()"	cups-up
CSCwe40695	CUPS UP - ruledefs associated with host-pool are not working after UP Switchover	cups-up
CSCwe40765	[MME] GNodeB Lookup fails for the connected gnb received in config update message	mme
CSCwc65963	sessmgr restart is seen when configuring and unconfiguring Lawful intercept CLIs multiple times	mme

Bug ID	Headline	Product Found*
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
CSCwd75230	AVP Framed-IP-Address missing in radius accounting when HO from LTE to VoWIFI	pdn-gw
CSCwc83287	[Smoke2-ICUPS] Undefined_Function_PC and hatsystem_process_card_fail_msg crash seen in regression	pdn-gw
CSCwd95524	chkpointmgr pushing other active's info instead of failing active to the stby at SWO	rcm
CSCwd91543	IKE notify packets are not responded after pod reload	rcm
CSCwd94821	chkpointmgr pod restart does not initiate sock conn towards stby sessmgr	rcm
CSCwd51484	Apache Tomcat 9.0.0-M1 Req Smuggling and Azul Zulu java (2022-10-18) Mulitple Vulnerabilities	smi
CSCwd81548	[5GaaS] Edge proxy NFs rely on NF restarts to apply config changes	smi
CSCwe11650	[UPF-SVI]-bulkstats process in warn state after overnight longevity	upf
CSCwd60981	[UPF] UPF does not initiate Sx_Session_Report_Req after receiving GTP_ERROR_IND_MSG	upf
CSCwd35335	SFR: UPF not able to send trafic on E810 100Gbps links	upf
CSCwe29094	[UPF-SVI] : Seen Uplane received invalid far id in PDU on task kill	upf
CSCwd67556	[UPF-SVI]: PC: [044a7e26/X] sessmgr_stop_ddn_recovery_timer()	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*
CSCwe37797	CP sends GW/PCEF_MALFUNCTION when trying to modify ADC rule	cups-cp
CSCwd29916	IP Pool-ID changes after reload - causing call recovery failures in CP ICSR setup	cups-cp
CSCwc19599	Gy credit control failure handling not working when Gy link is down between CP and OCS	cups-cp
CSCwc94195	CUPS: PGW CDR containing wrong (future) timestamp in “record opening time”	cups-cp
CSCwd65151	[CUPS CP] sessmgr restart seen in function sessmgr_saegw_send_sx_modify_req_li()	cups-cp
CSCwd40162	[BP-CUPS] sesmgr crash: Assertion failure at sess/smgr/sessmgr_fsm_func.c:10998	cups-cp
CSCwd39033	Multiple Sessmgr Crash with function:ipms_flush_hidx	cups-cp
CSCwd40148	[CUPS-CP] SessMgr restarts on Sec rat trigger hitting threshold with 2 def bearers for pure-S calls	cups-cp
CSCwd51827	CUPS CP sessmgr crash in sessmgr_app_svr_event_control_dispatch - 21.23.26	cups-cp
CSCwd20301	[BP-CUPS] SessMgr restart due to corruption when processing secondary RAT records	cups-cp
CSCwe17344	[BP-CUPS] Fatal Signal 11: 11 PC: [0a2e24dc/X] check_n_update_gx_rules()	cups-cp
CSCwc53115	Fatal Signal 11 in sessmgr_send_modify_rsp_towards_saegw_sgw_drv 21.23.24 of CUPS CP	cups-cp
CSCwd08502	[CUPS CP] MBR reduced to 1Kbps during 4G to 3G handoff if 4G AMBR is 4294968	cups-cp
CSCwd76879	Sessmgr process restarted at function sessmgr_compress_call_info()	cups-cp
CSCwd71878	[BP-CUPS] Sessionnot terminated after Gy Bypass time exhaustion (SU_URR time quota)	cups-cp
CSCwd87905	[BP-CUPS] Observed sessmgr restart “free_acct()” during sessmgr kill in longevity setup.	cups-cp
CSCwc88588	"CUPS-CP - After quota holding timer expiry, CP doesn't invoke Gy"	cups-cp
CSCwd14939	[CUPS-CP] Incorrect duration for time limit triggered CDRs after configuration change	cups-cp
CSCwd44023	SGW incorrectly handling collision between MBR & CBR during N26 handover	cups-cp
CSCwc59454	slow response for new calls to existing apn / ip pool at “push config” and “update ip-pool”	cups-cp
CSCwd19554	[BP-CUPS] memory bloating at acsmgr_cups_allocate_charging_snapshot	cups-cp
CSCwd19632	Assertion failure at sessmgr_app_svr_event_control_dispatch	cups-cp
CSCwd60353	CUPS - SAEGW - 21.25.10 - acsmgr_process_qgr_and_create_pdr_far	cups-cp
CSCwd19115	[BP-CUPS]:Assertion failure at ipms/ipms_api.c:1239 Function: ipms_event()	cups-cp
CSCwc18750	ARP Request have wrong Sender IP set to network address instead of interface address	cups-up

Bug ID	Headline	Product Found*
CSCwd67633	[BP-CUPS]libvnet.so.19.08.1/vlan_ip4_qos_mark_node_fn_avx2() with vpp restart	cups-up
CSCwd09429	[CUPS] Active ftp is failing - SYN-ACK dropped due to “Invalid TCP pre-connection Request”	cups-up
CSCwd32296	UP credit-control group config after SO (diameter ignore-service-id option) is not proper	cups-up
CSCwd96944	sessmgr process restarted at function sessmgr_populate_pdr_in_teid_list()	cups-up
CSCwc44036	EDR printing wrong end time	cups-up
CSCwc87274	"CUPS,VPP restart in vlan_ip4_qos_mark_node_fn_avx2"	cups-up
CSCwc55681	CUPS CP Usage Report Failure. Received URR : 0x80000xxx not requested	cups-up
CSCwc63061	sessmgr restart during egtp signalling procedure	cups-up
CSCwc81666	[CUPS RCM] RCM trying to create the server list before the UP instance created	cups-up
CSCwd46457	SSD collection may cause BFD timeout with 16 vpp workers due to show memory main-heap	cups-up
CSCwd40057	"After all sessmgr restart, sx-peer-node info is lost on standby chassis"	cups-up
CSCwd10956	[BP-CUPS]: Sessmgr crash at uplane_populate_nbr_field_edr_charging_id() after task kill	cups-up
CSCwd95901	"CUPS UP - After sessmgr crash, sessmgr is not showing p2p as loaded in 'show module'"	cups-up
CSCwd16366	LI IPSec tunnel flaps intermittently due to SA Collision	epdg
CSCwc99355	Target MME sending Source SGW IPv6 address in Handover Request	mme
CSCwc93870	DCNR Devices and Attached DCNR calls shows different values	mme
CSCwd71339	Increase in DUCON_NSA errors / path switch failures	mme
CSCwd68562	ASR5500 - MME- 21.25.4 (83215) - MMES1PathFail increase	mme
CSCwc80299	"CBC , MME send Write Replace Warning Indication before Write Replace Warning Response"	mme
CSCwc95044	MME continues to use blockedlisted SGW	mme
CSCwd08401	MME requirement in the 3GPP Specifications with respect to EPS to 5GS Mobility registration	mme
CSCwd97399	Observing mmemgr crash:: cmPAsnDecChExt	mme
CSCwd52626	Assert at egtpc_resume_suspended_proc()	mme
CSCwe15218	Diamproxy Restart After FQDN Configuration on Gy Endpoint	pdn-gw
CSCwe21674	Authentication Failing during UDP Socket Creation when using IP VRF Forwarding	pdn-gw
CSCwd40511	sessmgr restart on acsmgr_process_tcp_packet	pdn-gw
CSCwd67200	Incomplete MSISDN in servedMSISDN CDR field	pdn-gw
CSCwd80515	PGW not binding Gx Dynamic rule for dedicated bearer in WiFi to LTE handoff scenario	pdn-gw
CSCwd43478	PGW rejecting create_Session_Req even if SGW is sending a Conditional/Optional IE	pdn-gw
CSCwe23018	CLI corruption in the output after running “update active-charging override-control rulebase-config	pdn-gw

Bug ID	Headline	Product Found*
CSCwd46286	"Gy Server returns RC 5030 causing Assume Positive to kick in, CCR-T will contain USU with all zero"	pdn-gw
CSCwd55724	Duplicate Precedence assignment by PGW in TFT packet Filters	pdn-gw
CSCwc53423	Sessmgr task restart on sess/egtp/egtpc/egtpc_evt_handler_func	pdn-gw
CSCwd02729	Continuous EGTPCPathFailClear traps after receiving echo requests during no session	pdn-gw
CSCwe25352	Observed hatsystem_process restart at hatsystem_process_card_fail_msg() while unconfiguring CUTO	pdn-gw
CSCwd32146	?Update Bearer Request? is send PGW->SGW without EPS Bearer QoS, which is not aligned with 3GPP	pdn-gw
CSCwd39197	E911 calls fail with GTPv2 Cause Code 73 - No Resources Available after PGW fails to send DNS Query	pdn-gw
CSCwd65441	E911 calls fail with GTPv2 Cause Code 73 - No Resources Available after PGW fails to send DNS Query	pdn-gw
CSCwc09456	Sessmgr instance restart due to assertion failure at acs/acsmgr/acsmgr	pdn-gw
CSCwc97269	APN configuration getting removed	pdn-gw
CSCwd26943	AA Request sent by PGW with MCC 314 has the User-Name AVP MNC transposed to 024 in the Realm	pdn-gw
CSCwd44164	sessmgr task unexpected restarted occurred on PGW acs_http_accel_check	pdn-gw
CSCwc88534	Diagnostic code for unexpected dra peer switch	pdn-gw
CSCwd79989	checkpoint manager statistics are broken	rcm
CSCwd18840	Missing framed route after ICSR switchover	sae-gw
CSCwd64943	[SAEGW] - ASR5500- - 21.23. 12 ICSR Standby sessmgr in Memory over state	sae-gw
CSCwd99902	Assertion Failures triggered during ADMF provisioning/auditing LI configuration	sae-gw
CSCwe24837	New sessions accepted while APN set with newcall policy reject	sae-gw
CSCwe04086	Sessmgr Restart at sess/sgsn/stackmgr/sn_gprs_gtp.c	sgsn
CSCwd41111	[S8HR] SGW increments “Apn Lookup Failed” wrongly for packets sent over non-s8hr bearers	sgw
CSCwc69565	[S8HR] show lawful-intercept s8hr statistics all display the wrong ebi value	sgw
CSCwd41016	No session deletion after S5 path failure followed by bearer resource command	sgw
CSCwd07968	aaamgr going to warn/over state again and again	staros
CSCwd65439	Password change option for user in warning period before expiration.	staros
CSCwd49072	Improve detection of invalid qem entry access	staros
CSCwd12668	DL packets held within UPF after stream offload/onload	upf
CSCwe10556	[UPF] Flow Idle timing out even thought traffic is seen on fastpath	upf

Bug ID	Headline	Product Found*
CSCwd05061	EDNS readdress is not working	upf
* Information in the "Product Found" column identifies the product in which the bug was initially identified.		

Operator Notes

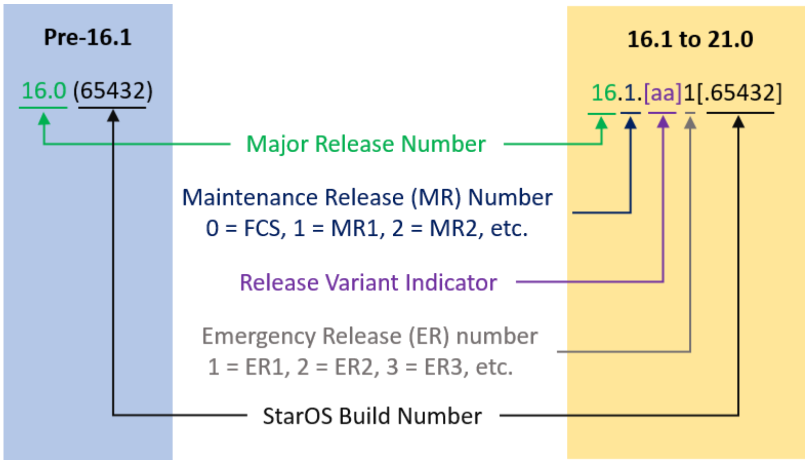
StarOS Version Numbering System

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.

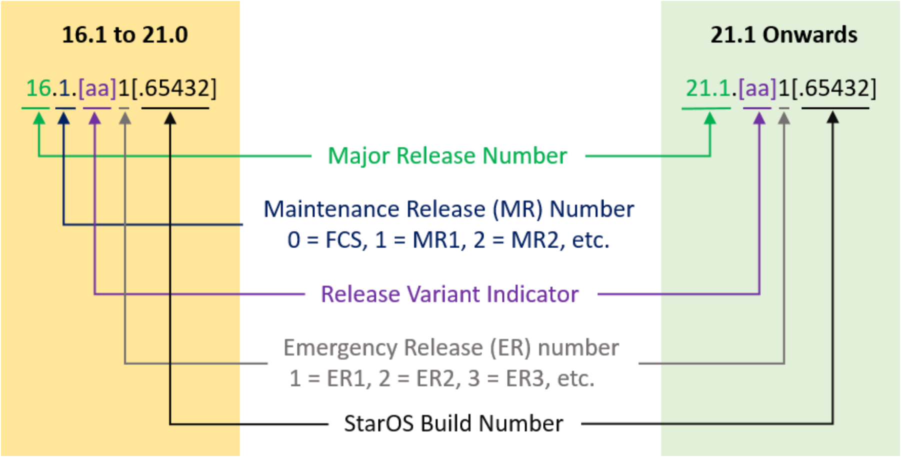
Prior to release 16.1, the *Image Version* field displayed a branch of software including the build number, for example "16.0 (55435)". Subsequent releases of software for the major release differed only in build number. Lab Quality/EFT releases versus deployment releases also differed only in build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


Pre-16.1
16.0 (65432)
16.1 to 21.0
16.1.[aa]1[.65432]
Major Release Number
Maintenance Release (MR) Number
0 = FCS, 1 = MR1, 2 = MR2, etc.
Release Variant Indicator
Emergency Release (ER) number
1 = ER1, 2 = ER2, 3 = ER3, etc.
StarOS Build Number

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


16.1 to 21.0
16.1.[aa]1[.65432]
21.1 Onwards
21.1.[aa]1[.65432]
Major Release Number
Maintenance Release (MR) Number
0 = FCS, 1 = MR1, 2 = MR2, etc.
Release Variant Indicator
Emergency Release (ER) number
1 = ER1, 2 = ER2, 3 = ER3, etc.
StarOS Build Number

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 identifyi ng 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.
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.

In 21.12.0 and later Releases	In pre-21.12.0 Releases	Description
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.
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.

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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