



# Release Notes for StarOS™ Software Version 21.27.h0

**First Published:** April 19, 2022

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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 21.26.h0. This is a deployment quality release for the CUPS-UP product that is based on new Cisco UCS M6 hardware.

## Release Package Version Information

**Table 1 - Release Package Version Information**

Software Packages	Version
StarOS packages	21.27.h0, build 84972

## Verified Compatibility

Product	Version
CUPS-CP	21.27.1.84985

## 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.

The screenshot shows a table of software files with columns for 'File Information', 'Release Date', and 'Size'. A 'Details' popup window is open over the first row, displaying the following information:

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...
	<a href="#">Security Advisory</a>

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).	

## Open Bugs in this Release

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*
CSCwa98422	[BP-CUPS]observed smgr restart acsmgr_check_n_delete_pdrs_for_deleting_bearer in Longevity run	cups-cp
CSCvz64416	"[BP-CUPS] Assertion failure at messenger/memacct.c:435 Function: free_acct,Observed in Longevity run"	cups-cp
CSCvz92617	[BP-CUPS]:Huge number of error logs observed acsmgr_populate_chrg_info_from_urr failure	cups-cp
CSCwa83375	[BP-CUPS] Observed sessmgr restart : snx_sgw_driver_handle_modify_rsp on CP in Longevity setup	cups-cp
CSCwb41247	[BP-CUPS] Observed smgr restart smgr_fsm_newstate on CP on Longevity execution	cups-cp
CSCwb28987	Observed push error in show sx peers wide- UAANEEN Content Type: (null) in PFD Mgt Req	cups-cp
CSCwb47036	Unexpected SX_SESSION_REPORT_REQUEST while running tc related to TEACAT_CSCvy16459	cups-up
CSCwb60545	[BP-CUPS] Assersion Failure at PC: [0433e7bf/X] smc_sxb_fill_sess_info()	cups-cp
CSCwb26988	[SVI] continuous crashes on CM run SegFault sx_tun_fsm_handle_sess_mod_rsp_evt() &lt;unknown&gt;();	cups-up
CSCvz03179	[BP-CUPS] Assertion failure @ func sessmgr_uplane_check_calls_on_rulebases	cups-up
CSCwa68097	[BP-CUPS] crash seen on smgr_uplane_opt_hash_table_deinit()	cups-up

## Open Bugs in this Release

Bug ID	Headline	Product Found*
CSCwb41336	[BP-CUPS]Observed smgr restart sn_memblock_memcache_alloc&shm_tcp_mtree_lookup mem in profile op	cups-up
CSCwb38623	[BP-CUPS] Observed smgr restart "sessmgr_uplane_process_sx_sess_modify_remove_gx_alias_pdr_list"	cups-up
CSCwb37060	5G statistics attempt/success/failure increments when License is not enabled	epdg
CSCvu18163	Recovery mechanism is not working as expected for CIOT calls after session manager restart	mme
CSCvu37233	Multiple Sessmgr restarts seen while doing service card migration from active to standby	mme
CSCwa79744	BP-ICUPS : CUSP Feature not working in 21.27.x builds	pdn-gw
CSCwb30942	BP-ICUPS: PGW Buffering Enhancement feature is not working	pdn-gw
CSCwa85022	SRP loopbck with VRF and vpnv4 dropping all packet after switchover	pdn-gw
CSCwa41573	BP-ICUPS: VPP restart seem during the callmodel run with redundancy events	pdn-gw
CSCwa15922	BP-ICUPS: sessmgr restart at sfw_nat_allocate_port_chunk_from_recovery_list()	pdn-gw
CSCwb39363	BP-ICUPS: Snx SM memory leak found for few sessmgr instances after call-model run in VzW SVI ASR5500	pdn-gw
CSCwb03181	[SGIR-Ph3]Observed multiple sessmgr restarts after ICSR reverse switchover	sae-gw
CSCwb57136	[SGIR-Ph3]Observing failure message under statistics cli for http endpoint configured profile in SBY	sae-gw
CSCwb35998	[UPF-SVI] :sessmgr restarted at sessmgr_uplane_set_teid_pdr_binding_info()	smf
CSCwb42789	[SVI-UPF]: sessmgr restart due to sessmgr_uplane_apply_action_ip_readdress.cold	upf
CSCwa75121	[UPF-VoN7] UPF doesn't trigger Sx Session Report for Volume Threshold breach intermittently	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*
CSCwa16910	[BP-CUPS] Assertion failure @ sess/sx/sxc/sx_interface.c:235 func sx_handle_user_sap_event	cups-cp
CSCwb08991	[BP-CUPS] Observed smgr restart sn_msg_arriving_handle in Longevity run leads to 100% call loss	cups-up
CSCwa81017	[BP-CUPS] Observed sessmgr restart which impacted 30% call drops on UP also caused some sideeffects	cups-up

## Open Bugs in this Release

Bug ID	Headline	Product Found*
CSCwb08978	[BP-CUPS] Observed smgr restart smgr_get_shm_info in Longevity run	cups-up
CSCwa74942	[BP-CUPS] Assertion failure at smgr_uplane_config_grp_of_prefixed_urls during sessmgr task recovery	cups-up
CSCwa03743	[CUPS-LI-IPv6] IPv6 traffic interception is counted as ip4-li-proxy instead of ip6-li-proxy	cups-up
CSCwa92153	Corruption in vpnmgr when large amount of data gets dumped	mme
CSCwa75811	For 3G to 4g TAU for DECOR subscriber MME is introducing 10s delay for SGSN context request message	mme
CSCwa93249	MME sessmgr restart seen in Function: mme_app_egtpc_abort_low_priority_trans()	mme
CSCwb09095	MME shall include Monitoring-Event-Report even when count of UEs is 0.	mme
CSCwb32296	Assertion failure at messenger/mempool.c:399	mme
CSCwa82770	MME : PSM edrx is inconsistent under show mme-service session output.	mme
CSCwa92158	[BP-CUSP] TCP Accelerator relative sequence number calculation following 2^32 wrap round	pdn-gw
CSCwb25063	BP-ICUPS: outer fragmentation is not happening when access-link ip-fragmentation set as df-ignore	pdn-gw
CSCvy96788	[CUPS-CP] CLI stuck on `show active-charging sessions full imsi &lt;imsi&gt;`	pdn-gw
CSCwa52619	"During collection of ssd, vpnctrl facility goes to over state "	pdn-gw
CSCwb06949	sessmgr restart on sessmgr_clp_filter function	pdn-gw
CSCvz36326	qci arp-priority-level not updated in config	pdn-gw
CSCwa50873	Many session disconnect reasons are not documented	pdn-gw
CSCwa11844	BP-ICUPS: aaamgrs are going to over state due to high memory usage	pdn-gw
CSCwa49484	RCM workaround for unreliable alert-forwarder	rcm
CSCwb48335	RCM push corrupted config to UP after unplanned migration from UP	rcm
CSCwa54898	Sessmgr restart - Fatal Signal 6: PC: [09ed1233/X] acsmgr_adc_dispatch_event()	sae-gw
CSCwa58920	sessmgr process restarted at egtpc_handle_user_sap_event	sae-gw
CSCwa99907	sessmgr process restarted at acsmgr_dcca_send_ccr_terminate()	sae-gw
CSCwa40146	[LI-PGW] Observed un-expected content buffer stats output	sae-gw
CSCvz61597	[SGIR-Ph1] After first switchover some profiles are in unknown state initially in save & reload case	sae-gw
CSCvz47695	RTT file is not generated in SaMOG for RTT event transactions	samog
CSCvz46069	IPv6 Mgmt IP not reachable after CF switchover	staros
CSCvy27914	"Failed to get CAF semaphore, CAF card=X"	staros
CSCwa12029	MIOs Cards is crashing due to bad minicores	staros
CSCwa67424	No warning prompts seen while deleting the sub cli's of active-charging configuration	staros

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Bug ID	Headline	Product Found*
CSCwa80728	ip routing shared-subnet config is not getting updated in SCT	staros
* Information in the "Product Found" column identifies the product in which the bug was initially identified.		

## Operator Notes

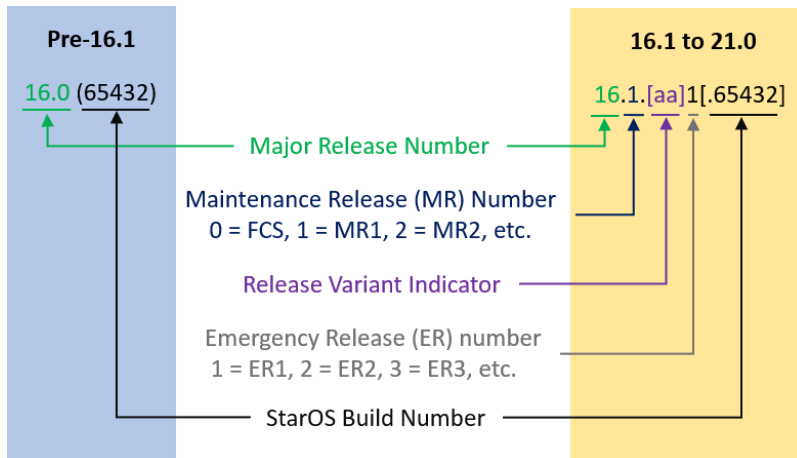
### StarOS Version Numbering System

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.

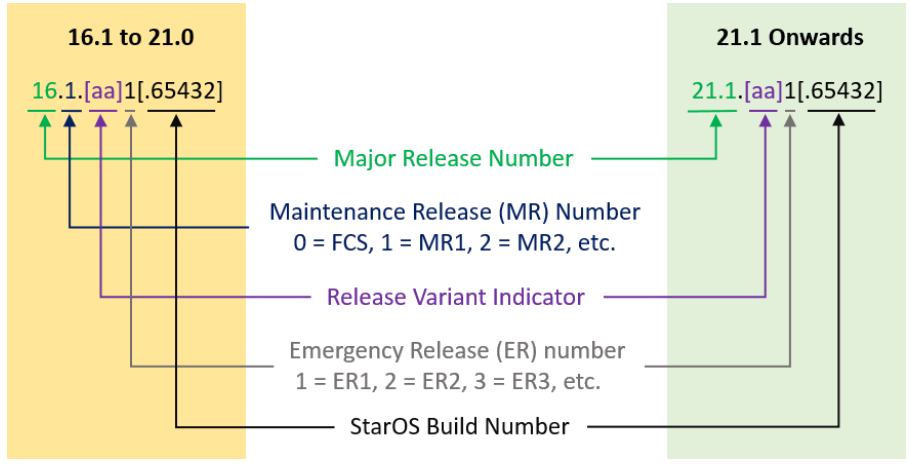
From release 16.1 onwards, the output of the **show version** command, as well as the terminology used to describe the Build Version Number fields, has changed. Additionally, **show version** will display slightly different information depending on whether or not a build is suitable for deployment.

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".

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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	<p>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.</p> <p>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.</p>
<b>Ultra Service Platform</b>		
usp-<version>.iso		<p>The USP software package containing component RPMs (bundles).</p> <p>Refer to <a href="#">Table 6</a> for descriptions of the specific bundles.</p>
usp_T-<version>.iso		<p>The USP software package containing component RPMs (bundles). This bundle contains trusted images.</p> <p>Refer to <a href="#">Table 6</a> for descriptions of the specific bundles.</p>
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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