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Virtualization Software Requirements - Required vs. Supported Vendors, Products, Versions and Feature Editions

Note: This section only describes mandatory, optional, allowed or recommended virtualization software. For all other support policy elements (including supported hardware and supported application co-residency), see links on http://www.cisco.com/go/uc-virtualized.

Mandatory Virtualization Software

VMware vSphere ESXi is **mandatory** for all virtualized deployments of Cisco Collaboration.

- VMware vSphere **ESX is not supported, only ESXi**.
  - ◊ Recall ESX and ESXi are architecture options for VMware vSphere releases prior to 5.0 (click here for a comparison). VMware vSphere 5.0+ only offers the ESXi architecture option. Click here for VMware?s direction to transition from ESX to ESXi. An ESX cluster can contain ESXi hosts running Cisco Collaboration
  - ◊ Regardless of vSphere version, Cisco only supports ESXi with virtualized Collaboration products. Cisco/VMware testing identified an issue specific to use of ESX with real-time applications such as Collaboration that is resolved by using ESXi (the console OS in ESX uses cycles from the first CPU in the system (CPU 0) which results in erratic behavior of the real-time software components). ESXi contains several optimizations for real-time applications and is therefore what Cisco will support.
- No other VMware server virtualization products are supported.

VMware vCenter is

- **optional** when deploying on UC on UCS Tested Reference Configuration hardware
- **mandatory** when deploying on UC on UCS Specs-based and Third-party Server Specs-based hardware.
  - ◊ vCenter Statistics Level 4 logging is mandatory so that Cisco TAC is able to provide effective support.
  - ◊ Click here for how to configure VMware vCenter to capture these logs. If not configured by default, Cisco TAC may request enabling these settings in order to provide effective support.
  - ◊ Also note that enablement of specific VMware vSphere management features may require vCenter and/or a higher feature Edition of vSphere ESXi.
- Cisco Collaboration does not require its own dedicated vCenter.

- Note that when VMware vCenter is not required and is not used, then VMware vSphere ESXi's default management interface is its free/included VMware vSphere Client (formerly branded VI Client).

Nonvirtualized, physical, or bare-metal installations of Cisco Collaboration **are not supported on Cisco UCS**. Cisco Collaboration may only run on Cisco UCS when virtualized.

Other virtualization vendors/products are **not supported** at this time (e.g. Microsoft Hyper-V, Citrix Xen, Red Hat KVM, etc.).

Purchasing / Sourcing Options for Required Virtualization Software

Virtualized Deployment	Mandatory Virtualization Software
	Pick one of the following:
Cisco Business Edition 6000 (BE 6000)	• **Cisco UC Virtualization Hypervisor*** from Cisco (included with BE 6000 bundle) • **Cisco UC Virtualization Foundation*** from Cisco (via separate Collaboration pricelist SKUs)
	Pick one of the following:
Cisco Business Edition 7000 (BE 7000)	• **Cisco UC Virtualization Hypervisor*** from Cisco (included with BE 7000 bundle) or one of the following: • **Cisco UC Virtualization Foundation*** from Cisco (via separate Collaboration pricelist SKUs) • **VMware vSphere ESXi** Standard, Enterprise or Enterprise Plus Edition from Cisco (via separate Data Center pricelist SKUs) • **Customer-provided VMware vSphere ESXi** (direct from vmware.com, including enterprise license)
	Pick one of the following:
UC on UCS Tested Reference Configuration	• **Cisco UC Virtualization Foundation*** from Cisco (via separate Collaboration pricelist SKUs) • **VMware vSphere ESXi** Standard, Enterprise or Enterprise Plus Edition from Cisco (via separate Data Center pricelist SKUs) • **Customer-provided VMware vSphere ESXi** (direct from vmware.com, including enterprise license)
UC on UCS Specs-based	Pick one of the following:
	• **VMware vCenter** from Cisco (via separate Data Center pricelist SKUs) • **Customer-provided VMware vCenter**(direct from vmware.com)

	And also must pick one of the following: • **Cisco UC Virtualization Foundation*** from Cisco (via separate Collaboration pricelist SKUs) • **VMware vSphere ESXi** Standard, Enterprise or Enterprise Plus Edition from Cisco (via separate Data Center pricelist SKUs) • **Customer-provided VMware vSphere ESXi** (direct from vmware.com, including enterprise license)
3rd-party Server Specs-based	Both of the following: • **Customer-provided VMware vCenter** (direct from vmware.com) • **Customer-provided VMware vSphere ESXi** (direct from vmware.com, including enterprise license)

* Note these license options have limited capacity, feature and 3rd-party application support (see below) so may not be suitable for all deployments. If the capacity, features or 3rd-party support are mandatory, then:

- BE 7000, Tested Reference Configuration or Specs-based deployments require substitution with a different virtualization license option
- BE 6000 bundles require substitution with either a Tested Reference Configuration or Specs-based deployment with a different virtualization license option.

Logistics for Media access, License activation and technical support depend on purchase option.

- Click here for information on Cisco OEMs for virtualization software.
- See TAC TechNote Document ID#115955 for technical support clarifications.

Licensed/enabled features for virtualization software depend on the purchase option, as there are different licenses for the various feature Editions and Cisco OEMs.

◊ If purchasing direct from vmware.com or from Cisco's Data Center pricelist:
- Click here and here for comparisons of VMware vSphere ESXi feature Editions on vmware.com.
- Click here for VMware's Purchase Advisor for vSphere on vmware.com.
- Click here for an overview of VMware vSphere ESXi pricing policy on vmware.com.
- Click here for a clarification of VMware's vRAM pricing and licensing policies on vmware.com.
- Click here for a clarification of ?free ESXi 4.1? vs. ?vSphere ESXi 4.1 Hypervisor Edition? (formerly branded as "VMware ESXi Single Server Edition" or ?free ESXi?). Note this option is only available from vmware.com and not via Cisco Data Center pricelist.

◊ If purchasing from Cisco's Collaboration pricelist:
- The **Cisco UC Virtualization Hypervisor** OEM option is only sold and supported for use with Business Edition 6000 or Cisco Business Edition 7000 and has the

following restrictions:

- ◊ It is not available or transferable for use with any other hardware or software.
- ◊ Physical server Hardware restricted to server configurations purchased with and used by Cisco Business Edition 6000 or Cisco Business Edition 7000.
- ◊ Max vCPU per VM is 8 (impacts ability to host Collaboration applications with larger footprints such as Cisco TelePresence Server Virtual Machine (vTS))
- ◊ New shipments of 5.x no longer limit max vRAM for the ESXi host. If on a prior deployment of 5.x (especially before April 2013) and uncertain if the license is restricting max vRAM or not, use Product Upgrade Tool to get latest 5.x license serial number. This serial number is usable on all 5.x versions (5.0, 5.1, 5.5).
- ◊ Does not support VMware vCenter management or any other advanced features. Same feature enablement as the "free ESXi download" from vmware.com. (e.g. impacts ability to use Cisco Prime Collaboration Deployment for migrations as requried VMware APIs not in this license).
- ◊ The only applications that may be hosted on this OEM are those that meet the requirements of the following Co-residency Policy Documents
  - BE6000 Co-residency Policy.
  - BE7000 Co-residency Policy
  - I.e. Cisco Collaboration apps and 3rd-party apps in Collaboration category of Solutions Plus or Cisco Developer Network, with a maximum count of 3rd-party VMs.

- The **Cisco UC Virtualization Foundation** OEM option is only sold and supported as an add-on SKU for use with Business Edition 6000, Business Edition 7000 and UC on UCS.
  - ◊ It is not available or transferable for use with non-UCS hardware or non-UC software.
  - ◊ Physical server Hardware restricted to 2-socket Cisco UCS models. Licenses cannot be split for 1-socket servers or combined for 4-socket servers.
  - ◊ Max vCPU per VM is 8 (impacts ability to host Collaboration applications with larger footprints such as Cisco TelePresence Server Virtual Machine (vTS)).
  - ◊ New shipments of 5.x no longer limit max vRAM for the ESXi host. If on a prior deployment of 5.x (especially before April 2013) and uncertain if the license is restricting max vRAM or not, use Product Upgrade Tool to get latest 5.x license serial number. This serial number is usable on all 5.x versions (5.0, 5.1, 5.5).
  - ◊ Supports connection to VMware vCenter management (vCenter software must be purchased separately). Does not enable any other advanced features (such as VMware High Availability, Data Recovery, vMotion, Distributed Switch, etc.). Does work with Cisco Prime Collaboration Deployment.
  - ◊ Same restrictions as Cisco UC Virtualization Hypervisor with respect to what applications may be hosted on this OEM (must meet the requirements of the Cisco Business Edition 6000 and Cisco Business Edition 7000 Co-residency Policy Documents listed above for Cisco UC Virtualization Hypervisor).

Cisco VN-Link, Cisco Nexus® 1000V, Cisco Nexus 1010, VM-FEX and VMware vNetwork Distributed Switch

- **Recommended but not mandatory** for deployments using local networking and DAS storage, such as UC on UCS TRC where the TRC is UCS C-Series with DAS and 1GbE NICs.
- **Strongly recommended** for deployments leveraging NAS/SAN storage and FCoE, such as UC on UCS B-Series / UCS C-Series connected to Cisco 6x00 Fabric Interconnect Switches.

    ◊ Cisco UCS 6x00 does not currently support Layer 3 to Layer 2 COS markings. Additionally, the UC applications and operating systems cannot set the Layer 2 COS markings. Use of Cisco Nexus® 1000V is therefore strongly recommended as this is currently the only way to deterministically manage traffic congestion through the UCS 6x00.

Note: Cisco Unified Contact Center Enterprise only supports Nexus 1000V for up to 1000 agents and requires design review (partners can check https://communities.cisco.com/docs/DOC-24466). See also UCS Network Configuration for Unified CCE. Otherwise, these options are supported by Cisco Collaboration apps that support the VMware vNetwork Distributed Switch feature (see Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client). Note that these features require the Enteprise Plus Edition of VMware vSphere ESXi.

For more information on Cisco VN-Link, Cisco Nexus 1000V and VM-FEX, see the following:

◊ http://www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns892/ns894/white_paper_c11-5253
◊ http://www.cisco.com/en/US/products/ps9902/index.html
◊ http://www.cisco.com/en/US/netsol/ns1124/index.html

Supported Versions, Patches and Updates of VMware vSphere ESXi

ESXi Major/Minor Versions, Maintenance Versions and Patches/Updates

- Cisco Collaboration apps will explicitly indicate which Major/Minor versions they support (e.g. ESXi 4.0, 4.1, 5.0, 5.1, 5.5). There is no "or later" ... unlisted versions are not tested/supported.
- With a particular supported major/minor version (such as ESXi 5.1)...

    ◊ A Cisco Collaboration app will only specifiy a minimum maintenance release (e.g. 5.1 U1) if required by its guest OS or for hardware compatibility.
    ◊ A Cisco Collaboration app will only specify a MAXIMUM maintenance release if there are known incompatibilitites. To date this has never been the case, so if the hardware vendor supports it, it is allowed even if unlisted. Cisco recommendation is to use the latest Maintenance release supported by the hardware vendor.
    ◊ Cisco Collaboration apps do not prescribe or proscribe individual ESXi patches and updates. Cisco recommendation is to apply the latest patches and updates recommended by VMware and your hardware vendor. The following links can be used to determine if an individual Maintenance Release or patch "can" or "should" be deployed:
        - VMware Compatibilty Guide (http://www.vmware.com/go/hcl) for the the vSphere ESXi Major/Minor version supported by Cisco Collaboration.
        - Server Vendor's hardware compatiblity information for the vSphere ESXi Major/Minor version required by Cisco Collaboration. E.g. for Cisco UCS, see the Server Compatiblity documents at

http://www.cisco.com/en/US/partner/products/ps10477/prod_technical_reference_list.html.

- Always verify with server vendor if a hardware-vendor-specific ESXi image is required. E.g. you want to upgrade from 5.0 to 5.0 U3. If the server is Cisco UCS, you may need to use a UCS-specific image for U3 on vmware.com.
- Always verify with server vendor that the update is compatible with server model?s bios/firmware/driver state. E.g. 5.0 U3 on UCS C220 M3 SFF, check the UCS interop matrix to see if any updates required before U3 will work on that hardware.
- Before applying a VMware upgrade or update to a host, always verify compatibility with each Cisco Collaboration app (At a Glance table at www.cisco.com/go/uc-virtualized)

Note that use of VMware vSphere ESXi 4.1 requires **disabling the "LRO" setting (click here for details)**.

For details on "legacy" virtualization support (i.e. 7.x of UC apps with VMware vSphere on limited 3rd-party servers), see the following links:

- Cisco Unity Virtualization Design Guide
- Virtualization Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted 7.5(3)

Virtual Machine Version (vmv)

The vmv represents the version of virtual hardware. New ESXi versions may increase the latest vmv version, but new ESXi versions support older vmv versions (see vmware.com for information on compability of old vmv versions with new ESXi versions).

Cisco Collaboration apps do not require or even use most of the new features in new vmv versions (e.g. larger VMs, more virtual HW options, etc.). Cisco Collaboration apps only require vmv4 functionality, so a newer vmv is usually transparent. To date, Cisco has not discovered any issues with Collaboration apps due to a newer vmv version.

Cisco-provided/required OVA files will be for the specific vmv version used when testing the ESXi major/minor version (e.g. OVAs for ESXi 5.x include vmv7 and vmv8).

For customers using vSphere Client instead of vCenter, it is NOT recommended to upgrade to a newer vmv. E.g. at the time of this writing, vmv10 includes new features that require vCenter.

Otherwise, unless indicated NOT to by a Cisco Collaboration app, customers are free to manually upgrade the vmv to a newer vmv supported by the ESXi version (click here for details). Cisco does not produce OVA files for newer vmv versions, or test newer vmv versions since VMware indicates these are backwards compatible..

Virtual Machine File System (VMFS)

This is transparent to Cisco Collaboration apps, but recommend using the latest version offered for the major/minor version of VMware vSphere ESXi you are deploying on.

VMware vSphere ESXi Version Support for Call Processing and System Management Applications

Application	**VMware vSphere ESXi 4.0**	**VMware vSphere ESXi 4.1 Cisco UC Virt. Foundation 4.1***	**VMware vSphere ESXi 5.0 Cisco UC Virt. Foundation 5.0***	**VMware vSphere ESXi 5.1 Cisco UC Virt. Foundation 5.1***
Unified Communications Manager (Unified CM)	See Virtualization for Cisco Unified Communications Manager (CUCM)			
Cisco Paging Server for Unified CM	See Virtualization for Cisco Paging Server			
Unified CM IM & Presence Service	See Virtualization for Unified CM IM and Presence			
Cisco Business Edition 6000	See Cisco Business Edition 6000			
Cisco Emergency Responder (CER)	See Virtualization for Cisco Emergency Responder			
Session Manager Edition (SME)	See Virtualization for Cisco Unified CM - Session Management Edition			
Unified Attendant Consoles	See Virtualization for Cisco Unified Attendant Consoles			
Cisco Intercompany Media Engine (CIME)	See Virtualization for Cisco Intercompany Media Engine			
Cisco UC Management Suite				
• (Cisco UPM, UOM, USM, USSM)	8.0 and later	8.0 and later	8.6 and later	UPM: 8.6 and later UOM/USM/USSM:Not supported
Cisco Prime UC Management Suite				
• (Prime UPM, Prime UOM, Prime USM)				
Prime Collaboration Manager	Not supported	Not supported	1.2 and later	Not supported
Prime Collaboration Provisioning (PCP)	See Virtualization for Cisco Prime Collaboration Provisioning			
Prime Collaboration	See Virtualization for Cisco Prime Collaboration Assurance			

Assurance (PCA)

* For applications that are allowed "on-box" with Cisco Business Edition 6000, this also includes version compatibility with Cisco UC Virtualization Hypervisor which is only supported for use with Cisco Business Edition 6000.

VMware vSphere ESXi Version Support for Messaging and Presence Applications

Application	VMware vSphere ESXi 4.0	VMware vSphere ESXi 4.1 Cisco UC Virtualization Foundation 4.1*	VMware vSphere ESXi 5.0 Cisco UC Virtualization Foundation 5.0*	VMware vSphere ESXi 5.1 Cisco UC Virtualization Foundation 5.1*	VMware vSphere ESXi 5.5 Cisco UC Virtualization Foundation 5.5*
Cisco Unity Connection	See Virtualization for Cisco Unity Connection				
Cisco Unity	See Virtualization for Cisco Unity				
Cisco Unified Presence	See Virtualization for Cisco Unified Presence				

* For applications that are allowed "on-box" with Cisco Business Edition 6000, this also includes version compatibility with Cisco UC Virtualization Hypervisor which is only supported for use with Cisco Business Edition 6000.

VMware vSphere ESXi Version Support for Contact Center Applications

Note: For Virtual Machines that need **more than 4 vCPUs**, the VMware vSphere ESXi 4.1 **Enterprise Plus** licensing is required (8 way virtual SMP capability and applicable to ESXi 4.x only). The VMware vSphere 4.1 Enterprise Plus license can be procured from the Cisco build-to-order or directly from the VMware (see VMware Purchasing section above.)

Notation Convention. The 8.0(1+) means 8.0(x) (x=1 and later 2,3,etc.) The 8.0(x) SU1+ means 8.0(x) and thereafter SU such as SU1, SU2, SU3, etc. in the 8.0(x). The 8.0(1)+ means 8.0(1) and thereafter releases like 8.0(1), 8.0(2) or 8.5(1), etc. The 8.x means any releases in that train: 8.0, 8.1, etc. The same is for other major releases (9, 10, etc.) using the + or x convention.

Application	VMware vSphere ESXi 4.0 and 4.0 Updates	VMware vSphere ESXi 4.1 and 4.1 Updates	VMware vSphere ESXi 5.0 and 5.0 Updates	VMware vSphere ESXi 5.1/5.5 and 5.1/5.5 Updates
Unified Contact Center Express / IP IVR	See Virtualization for Cisco Unified Contact Center Express			
Cisco Unified Work Force Optimization (WFO), Quality Management (QM), and Work Force Management (WFM)	See Virtualization for Cisco Unified Work Force Optimization Suite for Cisco Unified Contact Center Express			
Unified Contact Center Enterprise	See Virtualization for Unified CCE			

Cisco Packaged Contact Center Enterprise	See Virtualization for Cisco Packaged Contact Center Enterprise
Cisco Unified Intelligence Center	See Virtualization for Cisco Unified Intelligence Center
Unified Contact Center Management Portal	See Virtualization for Cisco Unified Contact Center Management Portal
Unified Customer Voice Portal (all components)	See Virtualization for Cisco Unified Customer Voice Portal
Cisco MediaSense	See Virtualization for Cisco MediaSense
Cisco SocialMiner	See Virtualization for Cisco SocialMiner
Cisco Unified Email Interaction Manager - Web Interaction Manager	See Virtualization for Cisco Unified Email Interaction Manager - Web Interaction Manager
Cisco Finesse	See Virtualization for Cisco Finesse

VMware vSphere ESXi Version Support for TelePresence Applications

Application	VMware vSphere ESXi 4.0	VMware vSphere ESXi 4.1	VMware vSphere ESXi 5.0	VMware vSphere ESXi 5.1
Cisco TelePresence Manager	1.8.x, 1.9.0	1.8.x, 1.9.0	1.8.x, 1.9.0	Not currently supported
Cisco TelePresence Multipoint Switch	1.8.x, 1.9.0	1.8.x, 1.9.0	1.8.x, 1.9.0	Not currently supported
Cisco TelePresence Video Communication Server	See Virtualization for Cisco TelePresence Video Communications Server			
Cisco TelePresence Conductor	See Virtualization for Cisco TelePresence Conductor			
Cisco TelePresence Management Suite	See Virtualization for Cisco TelePresence Management Suite			

Supported Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client

This section only clarifies technical support for VMware vSphere ESXi features.

- ◊ Not all features in a given Major/Minor release of VMware vSphere ESXi may be licensed/enabled. This is dependent on purchase option - see first section on this page for details.
- ◊ A Collaboration application may not support every feature in a given Major/Minor version of VMware vSphere ESXi. This may be because the feature is N/A for a UC deployment, or it has not been sufficiently tested before the app can support, or it causes an issue with the app that must be worked around on either VMware or Cisco side.

The table below lists VMware vSphere ESXi feature support by UC app/version. If the feature is supported, click on its name in the table to view UC caveats and best practices. This site will be updated as new support becomes available.

Note: feature support for Cisco Unified Contact Center Enterprise varies by component (e.g. Peripheral Gateway) and deployment model (e.g. "Rogger") - this section will give a summary support position, but for individual components see Support for Virtualization on the ESXi/UCS Platform.

Legend for Feature Support Tables

◊ Y(C) = Supported with **C**aveats - see Best Practices for details
◊ Y(P) = **P**artial (limited) support only - see Best Practices for details
◊ No = the feature is not supported at this time - see Best Practices for alternatives, if any.

VMware Feature Support for Unified Communications 8.0(2) through 10.0

For guide to abbreviations, see At a Glance table at http://www.cisco.com/go/uc-virtualized.

Feature	CUCM PCD PLM	Cisco Paging Server	CER	SME	CUxAC	PCP	PCA	UPM	UOM, USM, USSM	CIME	Unity Connection	CUP + IM&P
vSphere ESXi 4.0 Features												
VM Templates (OVAs)	Y(C)		Y(C)	Y(C)	Y(C)	Y	Y	Y	Y	Y(C)	Y(C)	Y(C)
Copy Virtual Machine	Y(C)		Y(C)	Y(C)	No	Y(C)	no	Y(C)	No	Y(C)	Y(C)	Y(C)
Restart Virtual Machine on Different ESXi Host	Y(C)		Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)
Resize Virtual Machine	Y(P)		Y(P)	Y(P)	Y(P)	Y(P)	Y(P)	Y(P)	Y(P)	Y(P)	Y(P)	Y(P)
VMware Hot Add	No		No	No	No	No	No	No	No	No	No	No
Multiple Physical NICs and vNICs	Y(P)		Y(P)	Y(P)	Y(P)	Yes	Y(P)	Yes	Y(P)	Y(P)	Y(P)	Y(P)
VMware High Availability (HA)	Y(C)		Y(C)	Y(C)	No	Y(C)	No	Y(C)	No	Y(C)	Y(C)	Y(C)
VMware Site Recovery Manager (SRM)	Y(C)		Y(C)	Y(C)	No	Y(C)	No	Y(C)	No	Y(C)	Y(C)	Y(C)
VMware vNetwork Distributed Switch	Y(C)		Y(C)	Y(C)	No	Y(C)	No	Y(C)	No	Y(C)	Y(C)	Y(C)
	Y(C)		Y(C)	Y(C)	Y(P)	Yes	No	Yes	No	No	Y(P)	Y(C)

VMware vMotion												
VMware Dynamic Resource Scheduler (DRS)	No		No	No	No	No	No	No	No	No	No	No
VMware Dynamic Power Management	No		No	No	No	No	No	No	No	No	No	No
Long Distance vMotion	No		No	No	No	Y(C)	No	Y(C)	No	No	No	No
VMware Storage vMotion	Y(C)		Y(C)	No	No	Yes	No	Yes	No	No	No	No
VMware Update Manager (VUM)	Y(P)		Y(P)	Y(P)	Y(P)	Y(P)	Y(P)	Y(P)	Y(P)	Y(P)	Y(P)	Y(P)
VMware Consolidated Backup (VCB)	No		No	No	No	No	No	No	No	No	No	No
VMware Data Recovery (DR, VDR)	No		No	No	No	Yes	No	Yes	No	No	No	No
VMware Snapshots	No		No	No	No	Y(C)	No	Y(C)	No	No	No	No
VMware Fault Tolerance (FT)	No		No	No	No	Y(C)	No	Y(C)	No	No	No	No
VMware vCenter Converter	No		No	No	No	No	No	Y(C)	No	No	No	No
VMsafe	No		No	No	No	No	No	No	No	No	No	No
VMware vShield	No		No	No	No	No	No	No	No	No	No	
Virtual Appliance Packaging of UC apps	No		No	No	No	Y(C)	No	Y(C)	No	No	No	
3rd-Party VM-based Backup Tools (e.g. Veeam, Viziocore, esXpress)	No		No	No	No	No	No	No	No	No	No	
3rd-Party VM-based Deployment	No		No	No	No	No	No	No	No	No	No	

Tools (e.g. rPath, Platespin)												
3rd-Party Physical To Virtual (P2V) Migration Tools	No		No	No	No	No	No	No	No	No	No	
All others not listed	No		No	No	No	No	No	No	No	No	No	
New features in vSphere ESXi 4.1												
VMware Boot from SAN	Y(C)		Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)
All other new features in vSphere ESXi 4.1	No	No	No	No	No	No	No	No	No	No	No	No
Existing ESXi 4.0 features persisted in 4.1	See ESXi 4.0 section above											
New vSphere ESXi 5.x Features												
vSphere Storage Appliance	See Storage Requirements for Specs-based hardware support (click here)											
vSphere Data Protection (VDP)	No	No	No	No	No	No	No	No	No	No	No	No
All other new features in vSphere ESXi 5.x	No	No	No	No	No	No	No	No	No	No	No	No
Existing ESXi 4.0, 4.1, 5.0 features persisted in ESXi 5.0	See sections for ESXi 4.0, 4.1, 5.0 above.											
Cisco App Features dependent on ESXi Features												
Cisco New Identity CLI using ESXi VM Cloning	Y(C)	No	No	No	No	No	No	No	No	No	No	Y(C)

VMware Feature Support for Messaging 8.0(2) through 10.0

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Feature	Unity
vSphere ESXi 4.0 Features	
VM Templates (OVAs)	Y(C)
Copy Virtual Machine	Y(C)
Restart Virtual Machine on Different ESXi Host	Y(C)
Resize Virtual Machine	Y(P)
VMware Hot Add	No
Multiple Physical NICs and vNICs	Y(P)
VMware High Availability (HA)	Y(C)
VMware Site Recovery Manager (SRM)	No
VMware vNetwork Distributed Switch	Y(C)
VMware vMotion	No
VMware Dynamic Resource Scheduler (DRS)	No
VMware Dynamic Power Management	No
Long Distance vMotion	No
VMware Storage vMotion	No
VMware Update Manager (VUM)	Y(P)
VMware Consolidated Backup (VCB)	Y(C)
VMware Data Recovery (DR, VDR)	No
VMware Snapshots	Y(C)
VMware Fault Tolerance (FT)	No
VMware vCenter Converter	No
VMsafe	No
VMware vShield	No
Virtual Appliance Packaging of UC apps	No
3rd-Party VM-based Backup Tools (e.g. Veeam, Viziocore, esXpress)	No
3rd-Party VM-based Deployment Tools (e.g. rPath, Platespin)	No
3rd-Party Physical To Virtual (P2V) Migration Tools	No
All others not listed	No
vSphere ESXi 4.1 Features	
Identity	No
VMware Boot from SAN	Y(C)
All other vSphere ESXi 4.1 Features	No

VMware Feature Support for Contact Center 8.0(2) through 10.x

Notation: Y: regular Yes

Feature	Unified CCX	Cisco WFO,	Unified CCE,	Unified IC	Cisco MediaSense	SocialMiner	Unfied EIM-WIM	Cisco Finesse

		QM, and WFM	CVP					
vSphere ESXi 4.0 Features								
VM Templates (OVAs)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)
Copy Virtual Machine	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	No
Restart Virtual Machine on Different ESXi Host	Y(C)	Y(C)	Y(C)	Y(C)	No	Y(C)	No	No
Resize Virtual Machine	Y(P)	Y(P)	No	Y(P)	No	No	No	No
VMware Hot Add	No	No	No	No	No	No	No	No
Multiple Physical NICs and vNICs	Y(P)	Y(P)	Y(P)	Y(P)	No	No	No	No
VMware High Availability (HA)	No	No	No	No	No	No	Y(C)	No
VMware Site Recovery Manager (SRM)	No	No	No	No	No	No	No	No
VMware vNetwork Distributed Switch	Y(C)	Y(C)	No	Y(C)	Y(C)	No	No	No
VMware vMotion	Y(C)	Y(P)	No	No	No	No	No	No
VMware Dynamic Resource Scheduler (DRS)	No	No	No	No	No	No	No	No
VMware Dynamic Power Management	No	No	No	No	No	No	No	No
Long Distance vMotion	No	No	No	No	No	No	No	No
VMware Storage vMotion	Y(C)	Y(C)	No	No	No	No	No	No
VMware Update Manager (VUM)	No	No	No	No	No	No	No	No
VMware Consolidated Backup (VCB)	No	No	No	No	No	No	No	No
	No	No	No	No	No	No	No	No

VMware Data Recovery (DR, VDR)								
VMware Snapshots	No	No	No	No	No	No	No	No
VMware Fault Tolerance (FT)	No	No	No	No	No	No	No	No
VMware vCenter Converter	No	No	No	No	No	No	No	No
VMsafe	No	No	No	No	No	No	No	No
VMware vShield	No	No	No	No	No	No	No	No
Virtual Appliance Packaging of UC apps	No	No	No	No	No	No	No	No
3rd-Party VM-based Backup Tools (e.g. Veeam, Viziocore, esXpress)	No	No	No	No	No	No	No	No
3rd-Party VM-based Deployment Tools (e.g. rPath, Platespin)	No	No	No	No	No	No	No	No
3rd-Party Physical To Virtual (P2V) Migration Tools	No	No	No	No	No	No	No	No
All others not listed	No	No	No	No	No	No	No	No
vSphere ESXi 4.1 Features								
VMware Boot from SAN	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	Y(C)	No
All other vSphere ESXi 4.1 Features	No	No	No	No	No	No	No	No
vSphere ESXi 5.0 Features								
Same EXSi 4.1 features supported in ESXi 5.0	Y	Y	Y	Y	Y	Y	Y	Y
	No	No	No	No	No	No	No	No

All other vSphere ESXi 5.0 Features								
vSphere ESXi 5.1/5.5 Features								
Same EXSi 5.0 features supported in ESXi 5.1/5.5	Y	No	No	No	No	No	No	No
All other vSphere ESXi 5.1/5.5 Features	No	No	No	No	No	No	No	No

VMware Feature Support for TelePresence Applications

Feature	Cisco TelePresence Manager	Cisco TelePresence Multipoint Switch
vSphere ESXi 4.0 Features		
VM Templates (OVAs)	Y(C)	Y(C)
Copy Virtual Machine	Y(C)	Y(C)
Restart Virtual Machine on Different ESXi Host	Y(C)	Y(C)
Resize Virtual Machine	Y(P)	Y(P)
VMware Hot Add	No	No
Multiple Physical NICs and vNICs	Y(P)	Y(P)
VMware High Availability (HA)	Y(C)	Y(C)
VMware Site Recovery Manager (SRM)	Y(C)	Y(C)
VMware vNetwork Distributed Switch	Y(C)	Y(C)
VMware vMotion	No	No
VMware Dynamic Resource Scheduler (DRS)	No	No
VMware Dynamic Power Management	No	No
Long Distance vMotion	No	No
VMware Storage vMotion	No	No
VMware Update Manager (VUM)	No	No
VMware Consolidated Backup (VCB)	No	No
VMware Data Recovery (DR, VDR)	No	No
VMware Snapshots	No	No
VMware Fault Tolerance (FT)	No	No
VMware vCenter Converter	No	No
VMsafe	No	No
VMware vShield	No	No
Virtual Appliance Packaging of UC apps	No	No
	No	No

3rd-Party VM-based Backup Tools (e.g. Veeam, Viziocore, esXpress)		
3rd-Party VM-based Deployment Tools (e.g. rPath, Platespin)	No	No
3rd-Party Physical To Virtual (P2V) Migration Tools	No	No
All others not listed	No	No
vSphere ESXi 4.1 Features		
VMware Boot from SAN	No	No
All other vSphere ESXi 4.1 Features	No	No
vSphere ESXi 5.0 Features		
All vSphere ESXi 5.0 Features	No	No

Best Practices

Virtual Machine Templates (OVA files)

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client.

See www.dmtf.org for details on the Open Virtualization Format, which describes an OVF Package (a directory of files describing a virtual machine's configuration) and an OVA Package (single tar file containing an OVF Package).

?Template? in this context refers to an OVA file that defines the virtual server (but not the ?workload?, i.e. the UC OS and application). Each virtualized UC product provides a set of predefined virtual machine templates (as OVA files) for supported Virtual Machine (VM) configurations. Customers must download and use these OVA template files for initial install, as they cover items such as supported capacity levels and any required OS/VM/SAN ?alignment?. OVAs configured differently than the predefined templates are not supported at this time. To download the OVA files, refer to the Unified Communications Virtualization sizing guidelines.

Copy Virtual Machine

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client.

Copying a Virtual Machine (VM) copies both the virtual server configuration and the workload (UC OS and application) running on that virtual server to a file on networked shared storage. This allows VMs to be copied, then subsequently modified or shut down. This feature effectively provides a method to do full system backup/restore, take system images or revert changes to software versions, user data and configuration changes.

- ◊ Prior to copying, the VM must first be shutdown (which will shut down the virtual server, the UC OS and the UC application).
- ◊ If uploading a VM copy as a ?whole system restore?, clustered UC applications such as CUCM will probably require their replication to be manually ?fixed? via a CLI command.

Restart Virtual Machine on Different ESXi Host

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client.

A Virtual Machine (VM) file on network/shared storage can be booted on any physical server hosting ESXi that has access to that network shared storage. With multiple physical ESXi hosts connected to the same network shared storage, this can be used to perform:

- ◊ Fast manual server moves, e.g. moving VM from ESXi host A to ESXi host B in another chassis, closet, building, etc.
- ◊ Fast manual server recovery, e.g. moving VM from ESXi host A that has just had a server hardware or VMware failure to ESXi host B that is healthy. See also VMware High Availability and Site Recovery Manager.
- ◊ Setting up software at a staging location to be later moved or deployed elsewhere. For multi-site scenarios, this may instead require ?exporting? the VM.

Resize Virtual Machine

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client.

Similar to adding/removing physical hardware to/from a physical server, you can add/remove virtual hardware (vCPU, vRAM, vDisk, vNIC, etc.) to/from a Virtual Machine (VM) via a software change in VMware?s configuration interfaces. Where supported, this provides the VM equivalent of migration to a more powerful or less powerful server.

- ◊ Any changes to a VM must align with the best practices in Virtual Machine Templates (OVA files). VM changes that result in an unsupported OVA configuration are not allowed. Even if you align with supported OVA configurations, desired VM changes may be prevented by one of the other caveats below.
- ◊ Support for adding virtual hardware resources (similar to moving from a less powerful server to a more powerful server, such as MCS 7825 ? MCS 7845) depends on which resource, and which UC product:
  - Adding vCPU is supported for all apps except Unity and Unity Connection, but requires VM to be shutdown first.
  - Adding vRAM is supported but requires VM to be shutdown first.
  - Adding vDisk is not supported as it would require re-partitioning by the application.
- ◊ Adding vNIC is not supported unless the UC app supports multiple network connections with different IP addresses. See best practices for Multiple Physical NICs and vNICs.
- ◊ For all other changes, it is recommended to backup the application, reinstall application on a new OVA file, and restore the application.
- ◊ Removing virtual hardware resources (vCPU, vRAM, vDisk, etc.) is not supported (similar to moving from a more powerful server to a less powerful server, such as MCS 7845 ? MCS 7825). These migrations require backing up the application, reinstalling on a new OVA file, and and restoring the application.
- ◊ Live runtime resizing via the VMware Hot Add feature is not supported.

VMware Hot Add

Not supported. See Resize Virtual Machine instead.

Multiple Physical NICs and vNICs

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client.

Some virtualized UCS servers are configured with multiple physical NICs (see UCS page at http://www.cisco.com/go/swonly). Network traffic is switched from physical NICs to ?vNIC?s? of the Virtual Machines (VM) via either VMware vSwitch or Cisco Nexus 1000V. Customers can use these multiple NICs for VM network traffic, VMware console access, or management ?back-doors? for administrative access, backups, software updates or other traffic that is desired to be segregated from the VM network traffic. All these uses are supported for UC but note that UC apps like CUCM and UCCX only support a single vNIC with a single IP address.

VMware High Availability (HA)

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client.

This feature automatically restarts a Virtual Machine (VM) on the same physical server or a different physical server. It can be used to supplement software redundancy as a means of fast, automated Failed-server recovery when a VM (but not the application) is hung or if there is a fault with the physical host server or VMware software.

- ◊ Failovers to other servers must not result in an unsupported deployment model (e.g. destination server must align with supported co-residency after failover occurs).
- ◊ Does not protect vs. faults with the SAN or network hardware.

VMware Site Recovery Manager (SRM)

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client.

This feature provides an automated disaster recovery solution that works on a ?site to site? basis, where a ?site? comprises physical servers, VMware and SAN storage. Refer to the VMware documentation for requirements to use this feature. Cisco recommends to power off the VMs before the SAN replication occurs. Also always ensure a DRS backup of the Cisco Collaboration applications is available in case there are issues with the replicated VMs.

VMware Identity

The VMware identity feature allows you to copy an existing instance of a virtual Cisco Unified Presence, and change its identity. The identity of a system is made up of every setting that you usually configure during a fresh install (such as IP address, hostname, passwords).

You can then use this new identity for another instance of a Cisco Unified Presence on a virtual machine. This avoids you having to perform a complete installation each time you deploy a new Cisco Unified Presence.

VMware vNetwork Distributed Switch

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client.

Supporting apps in UC on UCS may either use this feature, or the Cisco VN-Link technology (such as Cisco Nexus 1000V).

VMware vMotion

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client.

This feature migrates a live, running Virtual Machine (VM) from one physical server to another.

The following applies to any use of vMotion with UC apps:

- ◊ VM must be installed on shared storage (SAN).
- ◊ Source and destination physical servers must be connected to same SAN.
- ◊ Destination physical server must not end up with over-subscribed hardware after the migration. Supported capacity and co-residency rules for UC must be followed before and after the migration.
- ◊ VMware ?Long Distance vMotion? (site to site) is not supported.
- ◊ The only supported scenario is a manual move to a different server, e.g. for planned maintenance on the server or VMware software, or during troubleshooting to move software off of a physical server having issues.
- ◊ Use of vMotion for real-time load-balancing of live UC VMs is not supported, whether alone or in conjunction with VMware Dynamic Resource Scheduler (DRS) or Dynamic Power Management (DPM).
- ◊ Moving a shut down VM during a maintenance window, i.e. a "cold migration" or "host to host migration", is not vMotion and is supported.

If the UC app is listed as "Supported with Caveats", then support is as described below:

- ◊ Migration of UC VMs that are live and processing live traffic is supported, but note that Cisco testing cannot cover every possible operational scenario. Testing has shown there is a slight risk of calls in progress being impacted for a few seconds as the migration occurs, with worst case result of the affected calls being dropped. If vMotion is suspected as the cause of dropped calls, customers should gather appropriate application logs as well as performance data from VMware vCenter and send to Cisco TAC for analysis.

If the UC app is listed as "Partial" support, then support is ?maintenance mode only? as described below:

- ◊ "Maintenance mode only" - VMware vMotion by definition operates on live VMs, but the VM running the UC app must be ?live but quiescent?. I.e. in a maintenance window, not in production, not processing live traffic. This is because during the vMotion cutover, the system is paused, which for real-time UC apps creates service interruption which degrade voice quality after the migration for calls in progress.
- ◊ Specifically for Cisco Unified Attendant Consoles, this means the CUxAC VM must not be doing any Hot Swap or taking any active calls, with no active Directory Synchronization in progress.

VMware Dynamic Resource Scheduler

Not supported. See vMotion for what is supported.

VMware Dynamic Power Management

Not supported. See vMotion for what is supported.

Long Distance vMotion

Not supported. See vMotion for what is supported. Long Distance vMotion is a joint Cisco and VMware validated architecture for using the vMotion feature across data centers. For more information, see http://blogs.cisco.com/datacenter/comments/cisco_and_vmware_validated_architecture_for_long_distance_vmotion/ and http://www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns836/white_paper_c11-557822.pdf.

Storage vMotion

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client.

This ?customer convenience? feature provides easy migration of a live system from one SAN to another SAN. For UC apps, an easier suggested alternative is to just perform manual VM shutdown and migration to the new SAN. However, if Storage vMotion must be used, it is only under the following conditions:

- ◊ Requires SAN storage.
- ◊ May only be done during a maintenance window with UC VMs shut down.

VMware Update Manager (VUM)

NOTE: Support varies by application and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client. For more details on Cisco Unity support, see http://www.cisco.com/en/US/docs/voice_ip_comm/unity/virtualization_design/guide/cuvirtualdg010.html#wp82246.

This feature automates patching and updating of VMware vSphere hosts and Guest OS.

Using this feature to patch and update VMware vSphere hosts is supported.

However, using this feature to patch and update the guest OS is only supported by some applications and some versions, this is what is shown on this page when referring to VUM support. Note that Cisco Unified Communications applications upgrades, patches and updates can not be delivered through VMware Update Manager.

VMware Consolidated Backup (VCB)

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client. For more details on Cisco Unity support, see http://www.cisco.com/en/US/docs/voice_ip_comm/unity/virtualization_design/guide/cuvirtualdg010.html#wp82246.

This feature provides integration with 3rd-party backup utilities so that they can non-disruptively backup the OS and application in a Virtual Machine (VM). See also VMware Data Recovery and Copy Virtual Machine.

Existing UC app methods of backing up the software continue to be supported.

VMware Data Recovery

Not supported. See VMware Consolidated Backup for what is supported.

VMware Snapshots

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client. For more details on Cisco Unity support, see http://www.cisco.com/en/US/docs/voice_ip_comm/unity/virtualization_design/guide/cuvirtualdg010.html#wp82246.

Used to preserve the state of a VM without copying or creating additional VMs, effectively as a backup/restore or reversion technique. See also VMware Data Recovery and Copy Virtual Machine.

VMware Fault Tolerance

Not supported. See VMware High Availability for what is supported. Another alternative is manual Virtual Machine shutdown and migration.

VMware vCenter Converter

P2V tools are not supported. To migrate from bare-metal servers (e.g. Cisco 7800 Series Media Convergence Server) to UC on UCS, the supported procedure is:

- ◊ upgrade to 8.x software version on the bare-metal server
- ◊ take a software backup
- ◊ fresh install 8.x software on VMware / UC on UCS
- ◊ restore from backup

VMsafe

Not supported. See the documentation for the UC application software or UC appliance software to see what is supported.

VMware vShield

Not supported. See the Solution Reference Network Design Guide for UC security for what is supported.

Virtual Appliance Packaging of UC apps

Not supported. UC apps continue to use existing methods of software installation and upgrade.

3rd-Party VM-based Backup Tools

Not supported. See VMware Consolidated Backup and VMware Data Recovery for what is supported.

3rd-Party VM-based Deployment Tools

Not supported. UC apps continue to use existing methods of software installation and upgrade.

3rd-Party Physical To Virtual (P2V) Migration Tools

Not supported. See VMware vCenter Converter for what is supported.

VMware Boot from SAN

NOTE: support varies by app and version. Before reading the best practices below, verify support at Supported Editions and Features of VMware vSphere ESXi, VMware vCenter and VMware vSphere Client.

VMware ESXi 4.1 is required for this feature. Even it works with 4.0, VMware's official support is only for 4.1 and later. Requires use of a "diskless" server - see Supported Hardware for tested reference configurations. Both VMware ESXi and UC apps are installed on, and boot from, the fibre channel SAN. See UCS page at www.cisco.com/go/swonly for storage support policy.

vSphere Storage Appliance (VSA)

VSA is not really a "feature" but rather a storage product from VMware (see http://www.vmware.com/products/datacenter-virtualization/vsphere/vsphere-storage-appliance/overview.html).

If VSA is desired to be used as shared storage for a virtualized Cisco Collaboration deployment, it must meet the storage requirements for UC on UCS Specs-based or 3rd-party Server Specs-based (e.g. HCL, latencies, application VM capacity and performance needs).

vSphere Data Protection (VDP)

Not supported. VDP in vSphere ESXi 5.1 replaces "VDR" (vSphere Data Recovery / VMware Data Recovery) in prior ESXi releases: see http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2016565
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Services and Support Contracts for VMware are Required

Customers deploying virtualized UC must have a valid support contract for the VMware software in order to be supported.

For more information on virtualization software purchased from Cisco, see Purchasing / Sourcing Options for Required Virtualization Software above as well as this link: http://docwiki.cisco.com/wiki/License_Activation_for_Cisco_UC_on_UCS#PAK.2C_PAC_or_Serial_Number.3F_.C2.A0

Customers purchasing VMware software from a 3rd-party must purchase subscription services from that 3rd-party or directly from VMware.

Remember Cisco TAC only supports products purchased from Cisco with a valid, paid-up maintenance contract.

Cisco Field and Channel Partners may consult the Collaboration Ordering Guide for more information.

Cisco TAC Support Expectations

See How to Troubleshoot section of www.cisco.com/go/uc-virtualized, the Purchasing / Sourcing Options for Required Virtualization Software above, and this link:
http://docwiki.cisco.com/wiki/License_Activation_for_Cisco_UC_on_UCS#PAK.2C_PAC_or_Serial_Number.3F_.C2.A0

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