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Updates to this Page

The following is a list of significant updates to this page:

Date	Update
September 30, 2010	Unified CVP Virtualization information posted to Unified Communications Virtualization Wiki.
January 12, 2011	Added information on using CVP with C-Series servers.

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- September 1, 2011 Added support for ESXi 4.1.
- February 6, 2012 Updated with the CVP support for TCP and UDP on UCS C-series servers.
- July 6, 2012 Virtualization support for Release 9.0(1).
- January 28, 2013 CVP Media Server co-residency as general support.
- August 30, 2013 Virtualization support for Release 10.0(1).
- September 10, 2013 Updated ESXi 5.1 Support Information

Information for Partners about Cisco Unified CVP on UCS Deployment Certification and Ordering

It is important that partners who are planning to sell UCS products on Unified Cisco Customer Voice Portal, read the [Unified CCE DocWiki](#) page. This page contains essential information for partners about the following:

- ◇ Partner Certification Requirements
- ◇ UCS Server Ordering Information
- ◇ Important Notes on Cisco UCS Service and Support

Virtual Hardware Support

[Click here for a Legend](#)

Component & Capacity Point	VM Configuration Requirements				Supported Hardware (Latest)		Supported Hardware (Older)	
	vCPU	vRAM	vDisk	vNIC	UCS Tested Reference Configurations	UCS or 3rd-party Specs-based	UCS Tested Reference Configurations	UCS or 3rd-party Specs-based

• Co-residency support = Full

VXML Server	4 (2 cores, 2 sockets)	4 GB	146 GB	1	Yes	Yes	Yes	Yes
OAMP	2 (1 cores, 2 sockets)	2 GB	40 GB	1	Yes	Yes	Yes	Yes
Reporting Server	4 (2 cores, 2 sockets)	4 GB	72 GB 438 GB	1	Yes	Yes	Yes	Yes

VMware and Application Software Requirements

CVP Version Support	ESXi Configuration Requirements				OVA File Download	Software requirements for Unified CVP applications in the ESXi/UCS platform
	ESXi Version	VMV Version	Reservation	vNIC Adapter		

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10.0(1)	5.1	8	Y	VMXNet 3	<u>10.0(1) OVA</u>	<u>Hardware and System Software Specification for Cisco Unified Customer Voice Portal, Release 10.0(1)</u>
	5.0	8	Y	E1000		
9.0(1)	5.1	8	Y	E1000	<u>9.0(1) OVA</u>	<u>Hardware and System Software Specification for Cisco Unified Customer Voice Portal, Release 9.0(1)</u>
	5.0	7	N	E1000		
	4.1	7	N	E1000		
8.0(1)	5.1	8	Y	E1000	<u>8.5(1) OVA</u>	<u>Hardware and System Software Specification for Cisco Unified Customer Voice Portal, Release</u>
	4.1	7	N	E1000		
	4.0	7	N	E1000	<u>8.0(1) OVA</u>	<u>8.0(1)</u>

Note: It is possible to upgrade the hardware version of virtual machines already in production to the versions listed as supported in the 'VMware and Application Software Requirements' table above.

To upgrade a virtual machine to the latest hardware version [click here](#).

Unified CVP Support for Virtualization on the ESXi/UCS Platform

Starting with Release 10.0(1), all Unified CVP components can be deployed using the single OVA on any CVP supported virtualization hardware. Starting with Release 8.0(1), virtualization of the following deployments and Unified CVP components on Cisco Unified Communications Systems (UCS) B-Series hardware is supported:

- ◇ Unified CVP Call Server
- ◇ Unified CVP VXML Server
- ◇ Unified CVP Reporting Server
- ◇ Unified CVP Ops Console

The following deployments and Unified CVP components have not been qualified and are not supported in virtualization:

- ◇ H323 Call flow Deployment
- ◇ Distributed VXML Server and Call Server deployment where each server runs on a separate VM
- ◇ All in one lab deployment with small reporting server

For VMware supported features with Unified CVP [click here](#)

Note: Unified CVP components are supported on the UCS platform only in a virtualized environment with ESXi server.

Unified CVP Component Capacities and VM Configuration Requirements

For details associated with VM requirements [click here](#).

The [Table containing Unified CVP component capacities and VM configuration requirements](#) provides the information on CVP component capacities and the VM configuration requirements. You must use the OVA virtual machine templates to create the Unified CVP component VMs.

UCS Hardware Requirements

Requirements for Cisco Unified Customer Voice Portal using UCS B200 M1 hardware are located [here](#).

Requirements for C210 hardware are located in the [Unified Computing System Hardware](#). For UCS C210, CVP supports only the model ([UCS-C210M2-VCD2](#)). Other supported UCS models are at [Unified Communications Supported Applications](#)

Note: Unified CVP does not support UCS C200 and UCS-C210-M1.

For Unified CVP to work on UCS server, UCS firmware has to be 1.4(3c) or later.

Support for Unified Communications Manager Clustering Over the WAN with Unified CVP on UCS Hardware

You can deploy the Unified Communications Manager (Unified CM) Clustering Over the WAN deployment model with Unified CVP on UCS hardware.

When you implement this deployment model, be sure to follow the best practices outlined in the section "Multiple Cisco Unified CM Clusters" in the [Cisco Unified CVP Solution Reference Network Design](#)

In addition, note the following expectation for UCS hardware points of failure:

- Multiple points of failure on the Unified CVP UCS HA deployment can cause catastrophic failure, such as ICM software failovers and interruption of service. If multiple points of failure occur, replace the failed redundant components and links immediately.

B-Series Considerations

When deploying Clustering Over the WAN with B-Series hardware, use of the Cisco UCS M81KR Virtual Interface Card is recommended.

New B-Series deployments using Clustering Over the WAN should use a Nexus 7000 Series / Nexus 5000 Series vPC infrastructure, or a Cisco Catalyst 6500 Series Virtual Switching Supervisor Engine 720-10G.

Notes for Deploying Unified CVP Applications on UCS B-Series Hardware with SAN

In Storage Area Network (SAN) architecture, storage consists of a series of arrays of Redundant Array of Independent Disks (RAIDs). A Logical Unit Number (LUN) that represents a device identifier can be created on a RAID array. A LUN can occupy all or part of a single RAID array, or span multiple RAID arrays.

In a virtualized environment, datastores are created on LUNs. Virtual Machines (VMs) are installed on the SAN datastore.

Keep the following considerations in mind when deploying Unified CVP applications on UCS B-series hardware with SAN:

Compliance Considerations

- A dedicated SAN LUN and datastore must be used for Unified CVP database components. This means the CVP SAN LUNs cannot be shared by other applications. The SAN disk/storage array must be configured to meet the CVP IOPS requirements. The FC SAN solution is deployed in a shared environment where multiple applications are contending for storage access. The customers need to monitor the FC SAN performance and take appropriate actions to ensure the CVP IOPS and other UC IOPS requirements that share the same FC SAN systems are met. Should in the process of troubleshooting the SAN itself be identified as the problem, the customer must contact the system integrator or the SAN vendor for resolution.

Design Considerations

- The SAN must be designed in accordance with the UCS High Availability guidelines documented [here](#).
- The SAN design and configuration must meet the Unified CVP IOPS and Performance numbers described in the [Performance Requirements](#).
- The SAN design and configuration must meet the following VMware ESXi disk performance guidelines:
 - ◆ Disk Command Latency ? It should be 15 mSec or less. 15mSec latencies or greater indicates a possible over-utilized, mis-behaving, or mis-configured disk array.

Configuration Considerations

- For UCS B-series, Virtual Machines must be stored on and booted from the SAN.
 - ◆ Kernel Disk Command Latency ? It should be very small in comparison to the Physical Device Command Latency, and it should be close to zero. A high Kernel Command Latency indicates there is a lot of queuing in the ESXi kernel.
- The SAN design and configuration must meet the following Windows performance counters on Unified CVP VMs:
 - ◆ AverageDiskQueueLength must remain less than $(1.5 * (\text{the total number of disks in the array}))$.
 - ◆ %Disktime must remain less than 60%.
- Any given SAN array must be designed to have an IOPS capacity exceeding the sum of the IOPS required for all resident UC applications. Unified CVP applications should be designed for the 95th percentile IOPS values published in this wiki. Refer to the Performance Requirements section below for additional information. For other UC applications, please follow their respective IOPS requirements and guidelines.

Storage/Size Considerations

- Unified CVP requires application storage to be on VMFS. Raw Device Mapping (RDM) is not supported.
- The total size of all Virtual Machines on a disk (total size = VM disk + RAM copy) must not exceed 90% of the capacity of a datastore.

Input/Output Operations per Second (IOPS) Considerations

- IOPS utilization should be monitored for each application to ensure that the aggregate IOPS is not exceeding the capacity of the array. Prolonged buffering of IOPS against an array may result in degraded system performance and delayed reporting data availability. Refer to the Performance Requirements section below for additional information.

Maintenance Considerations

- To help keep your system running most efficiently, schedule automatic database purging and database backups to run when your system is least busy.

Performance Requirements

- ◇ CPU usage (average) should not exceed 60% for the ESXi Server and for each of the individual processors, and for each VM.
- ◇ Memory usage (average) should not exceed 80% for the ESXi Server and for each of the VMs.
- ◇ VM snapshots are not supported in production since they have significant impact on system performance.
- ◇ The SAN must be able to handle the following Unified CVP application disk I/O characteristics.
- ◇ Enable hyperthreading on all ESXi servers.

Performance Numbers on UCS Platform

HTTP Performance Metrics

- The following metrics are measured with full reporting

Call flow	Simultaneous Calls Supported	Calls Per Second
SIP Comprehensive	900	10
VXML Standalone	900	10
VXML Standalone with Req ICM Label (VXML Server on Tomcat)	900	10
VXML Standalone on WAS	900	10
VXML Standalone with Req ICM Label on WAS	900	10

HTTPS Performance Metrics

- The following metrics are measured with full reporting

Call flow	Simultaneous Calls Supported	Calls Per Second
SIP Comprehensive	275	3
VXML Standalone	275	3
VXML Standalone on WAS	275	3

VM IOPS Measurement

For storage system design guidelines refer, [UC Virtualization Storage System Design Requirements](#)

IOPS and Storage System Performance Requirements

Windows 2003 R2 Server:

IOPS Summary: (Unit in Number, Data are Blade-based)

CVP Server component	Average	MAX	95th Percentile
Call Server/VXML Servers	380	1536	797
Reporting Server	692	3403	2024
Operation Server	NA (Insignificant)	NA	NA

Windows 2008 R2 Server.

The following IOPS metrics are measured in peak load conditions with failover:

CVP Server	Average	MAX	95th Percentile
CS/VXML/Media Servers	50	1300	124
Reporting Server	329	1250	984
Operations Console	22	100	80

The following IOPS metrics are measured in peak load conditions with no failover:

CVP Server	Average	MAX	95th Percentile
CS/VXML/Media Servers	21	450	30
Reporting Server	40	930	56
Operations Console	22	100	80

- **Read/Write Ratio:**

The following table provides Read/Write Ratio:

CVP Server	Average	MAX	95th Percentile
CS/VXML/Media Servers	199/327	2249/1654	411/928
Reporting Server	3563/3000	14375/15390	10010/11506

Timekeeping Best Practices for Windows

You should follow the best practices outlined in the VMware Knowledge Base article [VMware KB:Timekeeping best practices for Windows](#)

- ESXi hosts and domain controllers should synchronize the time from the same NTP source.
- When Unified CVP virtual machines join the domain, they synchronize the time with the domain controller automatically using w32time.
- Be sure that **Time synchronization between the virtual machine and the host operating system** in the VMware Tools tool box GUI of the Windows Server 2003 guest operating system remains deselected; this checkbox is deselected by default.

System Performance Monitoring Using Windows Perfmon Counters

You must comply with the best practices described in the section titled System Performance Monitoring in the [Unified CVP Design Guide](#).

Unified CVP-Specific VM Installation Information

Migrating Unified CVP Installation from Physical to Virtual Server

Migration of Unified CVP from physical (MCS) server to any virtual server (UCS or non-UCS) server is not supported.

UCS Network Configuration

IMPORTANT: For instructions on performing the network configuration needed to deploy Cisco Unified Customer Voice Portal (Unified CVP) on a virtualized platform, please see below.

1) Network adapter setting modification on Reporting Server -The customers must modify the "Number of Receive Buffers" setting on the Reporting server to maximize full reporting and call load on the virtualized platform. If this setting is not modified after installing the OS, messages will get backed up on the CallServer and Message Queues will fill up resulting in a sharp drop in cps rate.

- Set the "Number of Receive buffers" on the Reporting Server TCP settings to 4096 (max).

Instructions:

1. On Reporting server, click on Control Panel->Network Connection.
2. Right click on Network Connection.
3. Click on advanced tab.

4. Under property tab, select "Number of Receive Buffers".
5. In the Value pulldown, enter 4096.
6. Restart the Reporting Server.

2) The following table provides the transport protocols supported by different CVP versions on virtual and non-virtual (bare metal or MCS servers) deployments. The same transport protocol must be used on all call legs of the SIP comprehensive call flow deployments.

SIP transport protocols supported across various deployments:

Type of Hardware	Releases prior to CVP 8.5(1) ES6	CVP 8.5(1) ES6 or later releases
UCS C Series Virtualized*	TCP	TCP & UDP**
UCS B Series Virtualized*	TCP	TCP UDP***
Non Virtualized (bare metal)	TCP & UDP	TCP & UDP

The session transport protocol can be set to tcp or udp in the POTS dialpeer.

Any other combinations of the transport protocols other than the ones listed above can cause call setup failures or abnormally long call setup times under heavy load.

Footnote:

* Check the [Docwiki supported Application](#) page for the Cisco UCS B-series and C-series hardware models supported by the Unified CVP.

** To avoid CPU utilization spikes under load conditions, the time synchronization between virtual machine and the ESX server must be disabled. To disable it, install VMware Tools in the virtual machine, in the Windows task bar, double click on the VM icon, in VMware Tools Properties window, uncheck **Time synchronization between the virtual machine and the ESX Server** checkbox.

*** All the UCS servers listed on the [Unified Communications Virtualization Supported Applications](#) page support UDP on both VMWare ESXi 4.1 and ESXi 5.0.

3) **Cisco VLAN trunking to VMWare** For information on best practices for Cisco VLAN trunking to VMWare, refer to the [VMware website](#)

Notes for Deploying Unified CVP Applications on UCS C-Series Hardware

This section is applicable to storing Virtual Machines on C-210 local storage. The C-210 Server comes with a default local storage configured with two sets of RAID groups. Disk 1-2 is RAID 1, while the remaining

disks are either RAID 5 or RAID10.

- Install ESXi 4.0/4.1 on the first disk array group (RAID 1 with disk 1 and disk 2)
- The creation of the virtual machine for the Reporting Server requires a large virtual disk size. Max disk size for a single VM to be 438GB for the large reporting server.

You must follow the steps described below to configure the ESXi data store block size to 2MB.

Steps to configure the ESXi data store block size to 2MB:

1. Boot ESXi 4.0/4.1 and use VMware vSphere Client to connect to the ESXi host.
2. On the Configuration tab for the host, select Storage in the box labeled Hardware. Select the second disk array group with RAID-5 (or RAID-10) configuration, and you will see in the formatting of ?Datastore Details? that the block size is by default 1MB.
3. Right-click this data store and delete it. We will add the data store back in the following steps.
4. Click on the ?Add Storage?? and select the Disk/LUN.
5. The data store that was just deleted will now be available to add, select it.
6. In the configuration for this data store you will now be able to select the block size, select 2MB, and finish the adding of the storage to the ESXi host. This storage is now available for deployment of the virtual machines that requires large disk size, such as the Administration and Data Servers.

Steps for Installing Unified CVP Components on Virtual Machines

Follow the steps and references below to install or migrate the Unified CVP components on Virtual Machines.

1. Install, setup, and configure the UCS Hardware.
 2. Configure the UCS Network. See reference at [UCS Network Configuration for Unified CCE](#).
 3. Install and Boot VMWare ESXi. Refer to the [Cisco UCS B-Series Blade Servers VMware Installation Guide](#).
 4. Create the Unified CVP Virtual Machines from the OVA template available [here](#).
-
1. Install Windows OS and Websphere Application Server (if using VXML Server with WAS) on the created Virtual Machines. (Note: Microsoft Windows Server 2003 *Standard Edition* should be used for virtual machine guests. See related information in the links below.)
 2. Install Unified CVP Software components on the configured Virtual Machines. See install reference for installing Unified CVP Components in the [CVP Install and Upgrade guide](#)

Unified CVP Component Co-Residency and Sample Deployments

You can have one or more Unified CVP VMs co-resident on the same ESXi server. However, you must follow the rules described below:

- ◇ You can have any number of Unified CVP virtual machines and combination of co-residency of Unified CVP virtual machines with other UC applications on an ESXi server as long as the sum of all the virtual machine CPU and memory resource allocation is not over committed on the available ESXi server computing resources.
- ◇ You must not have CPU overcommitted on the ESXi server that is running Unified CVP application components . The total number of vCPUs among all the virtual machines

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- on an ESXi host must not be greater than the total number of CPUs available on the ESXi server. In the case of the Cisco UCS B-200 M1, the total number of CPUs available is 8.
- ◇ You must not have memory overcommitted on the ESXi host that is running UC realtime applications. You must allocate minimum 2GB of memory for the ESXi kernel. For example, if an ESXi server on B-200 M1 hardware has 36GB of memory, after you allocate 2GB for the ESXi kernel, you have 34GB available for the virtual machines. The total memory allocated for all the virtual machines on an ESXi server must not be greater than 34GB in this case.
 - ◇ VM co-residency with third party applications is not supported unless it is specifically described in this page.

The CVP Media Server VM can use a 2 vCPU VM profile like the CVP Operations Console VM profile. However, this is a third party VM and can be tailored to have a different VM profile to satisfy a particular CVP deployment need. CVP Media Server VM can be co-loaded on the CVP Call Server+VXML Server VM.

Creating Virtual Machines from OVA VM Templates

Open Virtualization Format (OVF) is an open standard for packaging and distributing virtual appliances. Files in this format have an extension of .ova. The naming convention for the template is PRODUCT_COMPONENT_USER COUNT_VERSION_VMVER.ova

Follow the instructions in the Downloading OVA Templates section below to download the OVA templates from cisco.com to a local datastore that vSphere Client can access.

Downloading OVA Templates

- ◇ Proceed to the [Cisco Download Page for CVP](#).
- ◇ To download a single OVA file, click the **Download File** button next to that file. To download multiple OVA files, click the **Add to Cart** button next to each file that you want to download, then click on the **Download Cart** link. A Download Cart page appears.
- ◇ Click the **Proceed with Download** button on this page. A Software License Agreement page appears.
- ◇ Read the Software License Agreement, then click the **Agree** button
- ◇ On the next page, click on either the **Download Manager** link (requires Java) or the **Non Java Download Option** link. A new browser window appears.
- ◇ If you selected Download Manager, a Select Location dialog box appears. Specify the location where you want to save the file, and click **Open** to save the file to your local machine.
- ◇ If you selected Non Java Download Option, click the **Download** link on the new browser window. Specify the location and save the file to your local machine.

Creating Virtual Machines by Deploying the OVA Templates

Unified CVP OVA Templates List

In the vSphere client, perform the following steps to deploy the Virtual machines.

1. Highlight the host or cluster to which you wish the VM to be deployed.
2. Select **File > Deploy OVF Template**.
3. Click the **Deploy from File** radio button and specify the name and location of the file you downloaded in the previous section **or** click the **Deploy from URL** radio button and specify the complete URL in the field, then click **Next**.
4. Verify the details of the template, and click **Next**.
5. Give the VM you are about to create a name, and choose an inventory location on your host, then click **Next**.
6. Choose the datastore on which you would like the VM to reside - be sure there is sufficient free space to accommodate the new VM, then click **Next**.
7. Choose a virtual network for the VM, then click **Next**.
8. Verify the deployment settings, then click **Finish**.

Notes

- ◇ VM CPU affinity is not supported. You do not need to set CPU affinity for the VMs that are running Unified CVP applications on the VMware ESXi on UCS platform.
- ◇ VM resource Reservation - VM resource reservation is not supported for the VMs that are running Unified CVP applications on the VMware ESXi on UCS platform. The VM computing resources should have a default reservation setting, which is no resource reservations.
- ◇ You cannot change the computing resource configuration of your VM at any time.
- ◇ You can never go below the minimum VM computing resource requirements as defined in the OVA templates.
- ◇ It is required that hyperthreading be enabled by default when running CVP on ESXi. ESXi Server hyperthread is enabled by default and this setting should not be modified. Please ensure all VM's with CVP servers has hyperthreading enabled.

Remote Control of the Virtual Machines

For administrative tasks, you can use either Windows Remote Desktop or the VMware Infrastructure Client for remote control.

Installing VMware Tools

The VMware Tools must be installed on each of the VMs and all of the VMware Tools default settings should be used. Please refer to the [VMware documentation](#) for instructions on installing or upgrading VMware Tools on the VM with Windows operating system.

Installing Unified CVP Components on Virtual Machines

You can install the Unified CVP components after the configuration of the VMs. Installation of these Unified CVP components on a VM is the same as the installation of these components on physical hardware.

Refer to the Unified CVP documentation for the steps to install Unified CVP components. You can install the supported Virus Scan software, or any other software in the same way as on physical hardware. Refer to the [CVP Hardware and System Software Specification](#) for more information.

VM network adapters for VMXNet 3

The install and upgrade procedure for VM network adapters for VMXNet 3, is documented in [Unified CVP Installation and Upgrade Guide](#)

Configuring the ESXi Data Store Block Size for Administration and Data Server

The creation of the virtual machine for the Unified CVP Reporting Server requires a large virtual disk size. You must follow the steps described below to configure the ESXi data store size to 438 GB for it to handle the Unified CVP Reporting Server data before you deploy the OVAs

Steps to configure the ESXi for CVP Reporting server to RAID10 found at [CVP Reporting Server Configuration](#)

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