



# Data Center

---

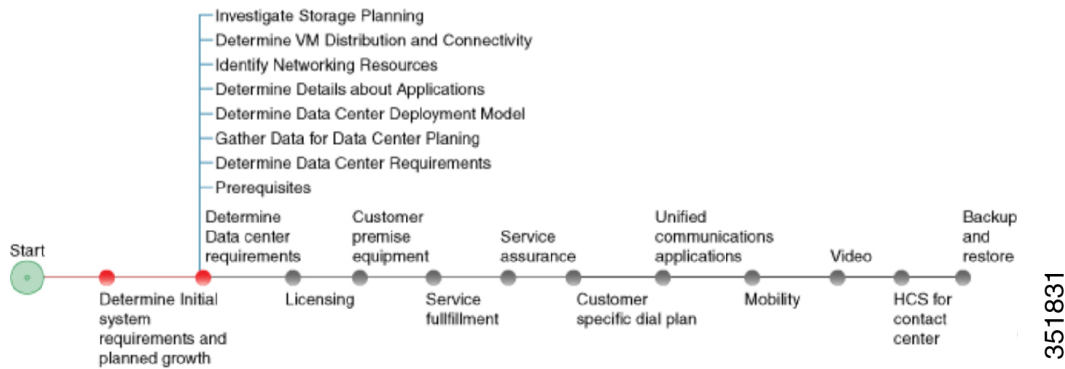
- [Prerequisites](#), on page 1
- [Data Center Workflow](#) , on page 2
- [Determine Data Center Requirements](#) , on page 2
- [Gather Data for Initial Data Center Planning](#) , on page 2
- [Determine the Data Center Deployment Model](#) , on page 3
- [Determine Details About Applications](#) , on page 4
- [Identify the Various Networking Resources](#) , on page 4
- [Determine Virtual Machine Distribution and Connectivity](#) , on page 6
- [Determine DMZ Requirements](#), on page 6
- [Investigate Storage Planning](#) , on page 7

## Prerequisites

Before you plan the data center for your Cisco HCS installation, make sure that you:

- Review and have access to the *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide*.
- Complete the actions outlined in previous sections of this guide including:
  - Initial system requirements and planned growth

# Data Center Workflow



## Determine Data Center Requirements

The following procedures lists the high-level steps required to determine your data center requirements.

### Procedure

- 
- Step 1**     [Gather Data for Initial Data Center Planning](#) , on page 2.
  - Step 2**     [Determine the Data Center Deployment Model](#) , on page 3.
  - Step 3**     [Determine Details About Applications](#) , on page 4.
  - Step 4**     [Identify the Various Networking Resources](#) , on page 4.
  - Step 5**     [Determine Virtual Machine Distribution and Connectivity](#) , on page 6.
  - Step 6**     [Determine DMZ Requirements](#), on page 6.
  - Step 7**     [Investigate Storage Planning](#) , on page 7.
- 

## Gather Data for Initial Data Center Planning

### Procedure

- 
- Step 1**     Collect and estimate the type of tenants using detailed information about your system. You should have already done this as part of [Complete Tenant Matrix](#).
- Gather information about customers, customer average sizes, future growth, security requirements, local versus central break out, regulatory requirements, and access models.

- Step 2** Determine if there are any other services that are offered from the same data center as Cisco HCS.
- Step 3** Determine the locations and the number of data centers that you plan to deploy for Cisco HCS.
- Locations and number of data centers are determined based on target market proximity requirements, redundancy requirements, size, and access models. All of these factors can affect your costs. For UC applications, for example, you should determine whether all of your customers will have the same redundancy or whether the redundancy is determined on a per-customer basis.
- Step 4** Determine whether you have a single or multiple data center setup.
- Step 5** Choose your site deployment type.
- Based on decisions made in [Determine Your HCS Data Center Deployment Model](#), decide the type of site for your data center:
- Hosted
  - Extender
  - Remote managed
  - Hosted Private Cloud/Large Enterprise
- 

## Determine the Data Center Deployment Model

Using the information collected about the locations, the number of data centers and the capital expenditure determines your deployment model. Deployment models are: Large PoD, Small PoD, or Micro Node. You may have already done this in [Determine Your HCS Data Center Deployment Model](#).

For further information, see the *Cisco Hosted Collaboration Solution Release 12.5 Capacity Planning Guide*

### Procedure

---

- Step 1** Examine key attributes to determine the data center deployment model:
- Number of tenants
  - Average tenant size
  - Total dedicated UC instances
  - Total shared UC instances
  - Total UC instances and clusters
  - Supported applications
- Step 2** Use the data and capacity requirements to determine the data center deployment model across one or more data centers.
-

# Determine Details About Applications

## Procedure

---

- Step 1** Determine whether the management applications will be NATted into a Customer Domain.
- Step 2** Review the *Cisco Hosted Collaboration Solution Compatibility Matrix* to determine the required application versions for the current release.

For the most recent compatibility information, see the compatibility matrix from the Cisco HCS documentation page [http://www.cisco.com/en/US/partner/products/ps11363/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/partner/products/ps11363/tsd_products_support_series_home.html)

---

# Identify the Various Networking Resources

Build your network infrastructure with consideration of the following networking resources:

- Virtual machine templates: Details about these templates and other sizing considerations can be found in the [Unified Communications Virtualization Sizing Guidelines](#).
- Service profiles on Cisco Unified Computing System (UCS) Manager: Decide how many service profiles you want for your system. From a hardware perspective, the best service profile choice is two profiles when you compare upgrade reduction versus hardware required. If hardware is not an issue, four service profiles is the best choice.
- Addressing scheme for the UC applications: For more details, refer to [IP Addressing for HCS Applications, on page 5](#).
- Management domain addressing.
- NATted address pools in management domain for UC applications: For more details, refer to [NAT Planning Considerations , on page 5](#).
- VLANs: Use the recommended numbering scheme. For more details, refer to [Grouping VLANs and VLAN Numbering, on page 5](#).
- PSTN connectivity: For more details, refer to [Identify Trunking Services](#).
- Remote site access: Consider the following options for remote site access:
  1. Site-to-Site VPN
  2. Line Side access or Over-the-Top (OTT) VPN
  3. SBC as a session border controller for SIP trunking
  4. MPLS VPN
  5. AnyConnect
  6. FlexVPN
  7. Plan for Expressway Deployment to allow roaming users to connect remotely.

## IP Addressing for HCS Applications

One VLAN for each customer must be dedicated for each Cisco HCS Enterprise customer. Overlapping addresses for customer UC infrastructure applications of each customer is supported.

The option to select the address pool from which addresses will be assigned for the customer's UC infrastructure applications (Cisco HCS Instance) is also supported. This option is necessary to avoid any conflicts with customer-premises addressing schemes.

**Note**

When deploying Cisco HCS in the hosted environment, you must *not* have NAT between any end device (phone) and the Cisco Unified Communications Manager (UC application) on the line side, because some of the mid-call features may not function properly. However, when Over The Top access is supported (using Expressway, etc.), there can be NAT in front of the endpoint. It is also recommended that the HCS Management applications *not* be deployed within a NAT. Using NAT between the vCenter Server system and ESXi/ESX hosts is an unsupported configuration. For more details, see <http://kb.vmware.com/kb/1010652>

## NAT Planning Considerations

### HCS-LE Deployment

For an HCS-LE deployment (single customer only), implementing Network Address Translation (NAT) between your management applications and Unified Communications applications is not required. If you implement NAT in this scenario, the synthetic call feature of Cisco Unified Operations Manager is not available.

## Grouping VLANs and VLAN Numbering

Cisco recommends that when you design Layer 2 for a Cisco HCS deployment, you group the VLANs based on their usage. The current Service Provider Cisco HCS data center design assumes that each end customer consumes only two VLANs; however, it is possible to configure four VLANs for each end customer.

Use the following VLAN numbering scheme if four VLANs are configured for each end customer:

- 0100 to 0999: UC Apps (100 to 999 are the customer IDs)
- 1100 to 1999: outside VLANs (100 to 999 are the customer IDs)
- 2100 to 2999: hcs-mgmt ( 100 to 999 are the customer IDs)
- 3100 to 3999: Services ( 100 to 999 are the customer IDs)
- Use all the unused VLANs x000 to x099 (where x is 1, 2, or 3) and VLANS 4000 to 4095 for other purposes

Use the following number scheme if only two VLANs are configured for each end customer:

- 0100 to 1999: UC Apps (100 to 999 are the customer IDs for Group 1)
- 2100 to 3999: outside VLANs (100 to 999 are the customer IDs for Group 1)

Use the following numbering scheme for additional end customers:

- 2100 to 2999: UC Apps (100 to 999 are the customer IDs for Group 2)

- 3100 to 3999: outside (100 to 999 are the customer IDs for Group 2)
- Use the unused VLANs for other purposes

While this is the recommended grouping of VLANs to help you scale the number of customers that can be hosted on a Cisco HCS platform, you may reach the upper limit of customers due to limitations in other areas of the Cisco HCS solution.

## Determine Virtual Machine Distribution and Connectivity

### Procedure

---

- Step 1** Determine the virtual machine distribution. For more information on recommendations, refer to the *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide*.
- Oversubscribed clusters
  - Nonoversubscribed clusters
- Step 2** Analyze the available bandwidth.
- Based on the deployment model, estimate:
- The bandwidth needed between data centers.
  - The aggregate bandwidth needed between the data center and CPEs.
  - The aggregate bandwidth needed between the datacenter and PSTN network.
- Step 3** Determine the MPLS VPN peering arrangement between the Service Provider Cisco HCS Data Center and MPLS provider.
- Step 4** Determine whether to use Over-The-Top access or site-to-site VPN for remote access through the Internet.
- 

## Determine DMZ Requirements

For information on determining DMZ requirements for Expressway configuration see [Data Center Configuration Overview](#) , on page 6.

## Data Center Configuration Overview

This section provides guidance for configuring Collaboration Edge OTT in the Service Provider Cisco HCS data center. Use this information with, but not as a replacement for, the Cisco Expressway documentation.

Two more VLANs are required to accommodate ASA contexts, global DMZ inside and outside. The customer inside and outside VLANs are also required. Configuration is required in the Nexus 7000, vSphere Distributed Switch (VDS) (and in the Nexus 5000, if deployed), UCS Manager, and ASA. The global DMZ inside VLAN

(after Firewall) and the customer outside VLAN extend into the DC. These VLANs are used on the virtualized Cisco Expressway-E.

**Expressway in OTT Deployments** Expressway-E hosts the public IP address. The client accesses this address by way of the public Internet. Expressway-E typically sits in the DMZ of the enterprise network. In the HCS DC, Expressway-E runs on UCS behind the ASA. Expressway-C sits in the same IP address space as Cisco Unified Communications Manager. Communication between Expressway-C and Expressway-E is through the ASA, which provides the NAT and firewall functions.

**Shared Expressway for Business-to-Business Dialing:** Expressway-E hosts the public IP address. The non-HCS businesses access this address by way of the public Internet. Expressway-E typically sits in the DMZ of the shared network, between the common outside and shared inside firewall contexts on ASA, to create a DMZ. The Expressway-E is connected to the Expressway-C through the shared internal firewall context. Communication between Expressway-C and Expressway-E is through the ASA, which provides the NAT and firewall functions. The Expressway-C is peered with the session border controller (as a neighbor). For more information, see the *Cisco Hosted Collaboration Solution Solution Reference Network Design Guide*.

## Investigate Storage Planning

Consider the following for storage planning.

### Procedure

- 
- Step 1** Determine capacity needs.
- See *Cisco Hosted Collaboration Solution Release 12.5 Capacity Planning Guide* for more information about capacity.
- Step 2** Determine storage connectivity options such as such as FCOE (Fiber Channel over Ethernet), FC (Fiber Channel) or NAS. Micro Node deployments must use local storage.
- Important** There is no shared storage array switch interoperability requirement for a Micro Node deployment. Micro Node leverages local Direct-attached storage (DAS) within the UCS C-series. Currently only UC on UCS Tested Reference Configuration servers are supported within HCS. Therefore, a shared storage array is not applicable for a Micro Node installation. A VMware Virtual SAN (VSAN), software-defined shared storage using the local DAS within the C-Series server for virtual machines, is not a supported deployment model and should not be implemented.
- Step 3** Determine approved storage vendors for UCS with SAN or NAS.
- See *UCS Hardware and Software Interoperability Technical References* at <http://www.cisco.com/c/en/us/support/servers-unified-computing/unified-computing-system/products-technical-reference-list.html> for details on approved storage vendors for UCS with SAN or NAS.
- Step 4** Determine storage tier, either multi-tier or single tier.
- Using tiers lets you distribute capacity across multiple tiers. Larger deployments should consider their capacity distribution carefully.
- Step 5** Consider storage raid array recommendations. For more details, see *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide* for more details.

**Step 6** Determine LUN sizing. For more details, see *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide*.

---