



Cisco Hosted Collaboration Solution, Release 12.5 End-to-End Planning Guide

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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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What's Changed in HCS End-to-End Planning Guide, Release 12.5

- [Change History](#), on page xi

Change History

Date	Change Description
7, July 2020	<ul style="list-style-type: none">• These options are removed from the Platform Manager tab in the HCM-F interface:<ul style="list-style-type: none">• Create an Install/Upgrade, Create a Switch-Version, and Create a Restart System from the Task menu.• File Servers from the Inventory menu under the Task List. <p>See Task creation, on page 39 for details.</p> <ul style="list-style-type: none">• The CHPA and UCPA functionality to communicate with UC Applications and Expressway is replaced with CAA services. See Limitations and restrictions, on page 38 for details.
5, November 2019	Rebranded Webex
25, June 2019	Initial document



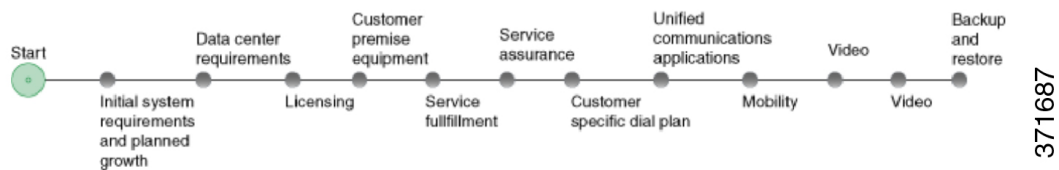
CHAPTER 1

End-to-End Planning Overview

- [Cisco HCS End-to-End Planning Workflow](#) , on page 1

Cisco HCS End-to-End Planning Workflow

The following flow outlines the end-to-end procedures and considerations for planning your HCS deployment. All of these areas require some attention but analysis may not necessarily occur in this order.





CHAPTER 2

Initial System Requirements Planned Growth

- Prerequisites, on page 3
- Initial Requirements Workflow , on page 4
- Determine Initial Requirements , on page 4
- Complete Tenant Matrix , on page 5
- Deployment Comparison HCS, on page 7
- Determine Your HCS Data Center Deployment Model , on page 8
- Identify Planned Services and Applications , on page 11
- Identify Regulatory Services , on page 12
- Plan for High Availability, on page 12
- Identify Geographical Locations for Customer Deployment for Planning , on page 13
- Identify Trunking Services , on page 14

Prerequisites

Before you plan the initial system requirements and the growth of Cisco Hosted Collaboration Solution (HCS), ensure you refer to the Collaboration Sizing Tool: <http://cucst.cloudapps.cisco.com/landing>.

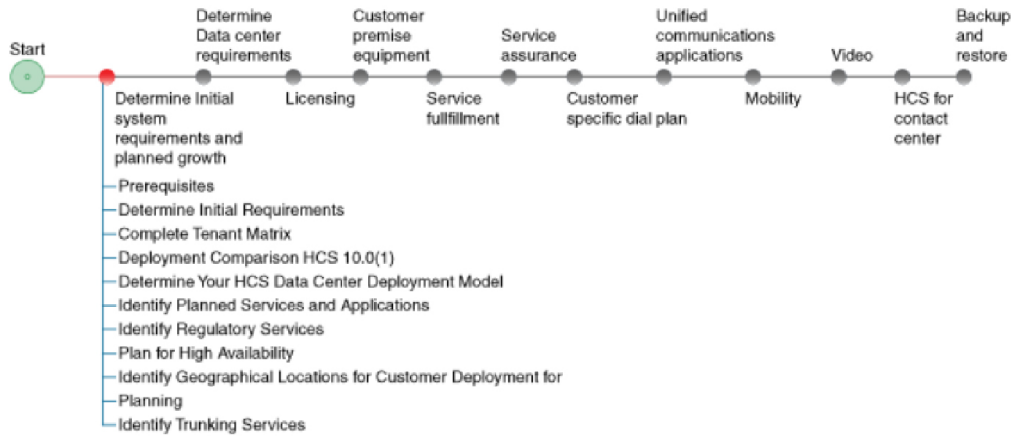
You can review the following documents:

- *Cisco Hosted Collaboration Solution Solution Reference Network Design Guide*
- *Cisco Hosted Collaboration Solution Capacity Planning Guide*



Note In Shared Architecture deployment, if you are planning to add more number of customers or sites, contact A2Q (hcbu-a2q@cisco.com).

Initial Requirements Workflow



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Determine Initial Requirements

The following steps guide you through the critical pieces of planning your initial system requirements and growth. These steps help to frame the overall architecture and design of your system. Be sure to address the prerequisites for this section before proceeding.



Note

The Guided System Selling <https://www-gsc.cisco.com/swc/cisco/ciscoAdvisor.action?sfId=CISCO&configSetAvailable=&scFlag=Y> questionnaire can provide many of the details discussed. This section provides additional information for you to consider during planning. If you have information about your system from this questionnaire, use that information as part of your deployment planning process.

Procedure

Step 1 [Complete Tenant Matrix , on page 5](#)

Step 2 [Determine Your HCS Data Center Deployment Model , on page 8](#)

Note Make sure that you determine the expected latency for the Cisco Unified Communications Domain Manager to UC Application delay tolerance before planning your deployment.

Step 3 [Identify Planned Services and Applications , on page 11](#)

Step 4 [Identify Regulatory Services , on page 12](#)

Step 5 [Plan for High Availability, on page 12](#)

Step 6 [Identify Geographical Locations for Customer Deployment for Planning , on page 13](#)

- Step 7** [Identify Trunking Services](#) , on page 14
- Step 8** Plan for growth and the customer premise equipment site.
For more details, see [Prerequisites](#), on page 29

Complete Tenant Matrix

Collect information about the estimate size of your initial system and use the tenant matrix below to compute the average tenant size for a deployment, along with the total number of tenants.



Note In the context of HCS, a Service Provider is a company that purchases or leases Cisco HCS equipment from Cisco. The Service Provider enlists customers on the same HCS system, and these customers are referred to as tenants and therefore, one Service Provider will, in general, have multiple tenants. Each tenant is a separate entity/company.

Procedure

- Step 1** Determine Percent Distribution and Total Deployment size.
- Step 2** Use the following tenant matrix to collect information about your planned system and to help develop your growth plans.

Number of End Users

Tenant Size	20	50	100	250	500	1,000	2,500	5,000	7,500	10,000	15,000	25,000	30,000	Totals
Percentage Distribution														
Weighted Average														
Number of Tenants														

- Step 3** Enter the following information into the tables above:
- Number of End Users—Represents the total number of users expected for the HCS deployment across all tenants and customers.
 - Tenant Information—Either the Number of Tenants or the Percentage Distribution for each tenant size.
 - Weighted Average— Computed average tenant size using the different percentages (distribution) in the table above.
- Step 4** Review the following results in the table:
- Average tenant size

- Total number of tenants—This number is important for computing limits that are related to the routing table and security contexts, among others.

The following examples can assist you with the construction of the table.

Tenant matrix - Example 1

To deploy a Cisco HCS system for which the exact number of tenants of each size is known, update the Number of Tenants row directly in the table, as shown in the following table:

Table 1: Details included after adding required information - Example 1

Tenant Size	20	50	100	250	500	1,000	2,500	5,000	7,500	10,000	15,000	25,000	Totals
Percentage Distribution													
Weighted Average													
Number of Tenants	0	10	40	20	100	5	3	1	0	0	0	0	179

The total number of tenants in this example is 179.

Because the number of tenants of each size is known, you can calculate the total deployment size (number of end users) as in the following equation:

$$\text{Number End Users} = 10*50 + 40*100 + 20*250 + 100*500 + 5*1,000 + 3*2,500 + 1*5,000 = 500 + 4,000 + 5,000 + 50,000 + 5,000 + 7,500 + 5,000 = 77,000$$

Therefore, the total number of end users is 77,000.

The percentage distribution represents the proportion of tenants of a particular size. It is defined as follows:

$$\text{Percentage Distribution}_{\text{Size}_N} = \text{Number Tenants}_{\text{Size}_N} / \text{Total_Number_of_Tenants}$$

For example, $\text{Percentage Distribution}_{\text{Size}_{50}} = 10/179 = 5.6\%$

By computing the Percentage Distribution for each of the tenant sizes, you receive the following results:

Table 2: Percentage distribution - Example 1

Tenant Size	20	50	100	250	500	1,000	2,500	5,000	7,500	10,000	15,000	25,000	Totals
Percentage Distribution	0.0%	5.6%	11.2%	55.9%	2.8%	1.7%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Weighted Average													
Number of Tenants	0	10	40	20	100	5	3	1	0	0	0	0	179

The final step involves computing the Weighted Average. This value represents the contribution of each tenant size to the total number of end users. The Weighted Average is defined as:

$$\text{Avg_Wt}_{\text{Size}_N} = \text{Percentage Distribution}_{\text{Size}_N} * \text{Tenant_Size}$$



Note Repeat this equation for each tenant size.

This value would be zero if there were not any tenants for that size. In this example, the Weighted Average for the following tenant sizes would be zero:

- 20
- 7,500
- 10,000
- 15,000
- 25,000

The final table can now be calculated:

Table 3: Weighted Average - Example 1

Tenant Size	20	50	100	250	500	1,000	2,500	5,000	7,500	10,000	15,000	25,000	Totals
Percentage Distribution	0.0%	5.6%	11.2%	55.9%	2.8%	1.7%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Weighted Average	0.0	2.8	22.3	27.9	279.3	27.9	41.9	27.9	0.0	0.0	0.0	0.0	430.2
Number of Tenants*	0.0	10	40	20	100	5	3	1	0.0	0.0	0.0	0.0	179

¹

Deployment Comparison HCS

Review the following table to see a comparison of the different options available for each deployment model.

Table 4: Comparison—Data Center Infrastructure Models

Function or Product	Large PoD	Small PoD
Number of tenants***	Up to 940	Approximately 80 Note Storage switches such as Cisco MDS 9000 switches are optional and aren't required for Small PoD deployments.
Aggregation	Nexus 7000, Nexus 9396, Nexus 9508	Nexus 5500
Cisco Unified Compute System (UCS)	UCS with B-series blades	UCS with B-series blades
Storage	Fabric interconnect, SAN or NAS storage	Fabric interconnect, SAN or NAS storage

¹ * Total; Number of Users = Total Deployment Size. Therefore, (430.2) * (179) = 77,005.8. Previously, we had indicated that our Deployment Size was 77,000. The difference between this number and the one calculated from the table is because of rounding.

Function or Product	Large PoD	Small PoD
Media/Signaling Anchoring Device (Multi-VRF-Enabled for Multiple customers)	Third-party SBC	Third-party SBC
Security	ASA 5585-X	ASA 5555-X
(Optional) Site-to-Site VPN Concentrator	SBC	SBC
(Optional) Line Side Access	SBC	SBC
(Optional) Shared Cisco Expressway for Business to Business Dialing with Non HCS Enterprises over Internet	Expressway-C and Expressway-E on UCS B-series	Expressway-C and Expressway-E on UCS B-series
(Optional) Cisco Expressway	Expressway-C and Expressway-E on UCS B-series	Expressway-C and Expressway-E on UCS B-series
Cisco Prime Collaboration Assurance available	Yes	Yes
(Optional) Dedicated Instance	Yes	Yes
(Optional) OTT Remote Access with Expressway	Yes	Yes
(Optional) Shared RMS with Expressway	Yes	Yes
(Optional) Jabber Guest	Yes	Yes
(Optional) Webex CCA	Yes	Yes
(Optional) Business to Business Video through Shared Expressway	Yes	Yes

Determine Your HCS Data Center Deployment Model

Review the detailed descriptions of each type of deployment in the *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide* and the *Cisco Hosted Collaboration Solution Release 12.5 Capacity Planning Guide* before proceeding. Your growth plans will help you determine the best solution for you.

Procedure

Step 1 Review decision-making factors for each of the following deployment models.

Note The details you gathered using the Guided System Selling tool should define which deployment model is right for you. The following details are for reference only.

a) Large PoD

The Large PoD deployment supports a large number of tenants and can also support incremental additions of compute and storage resources.

b) Small PoD

The Small PoD deployment also supports a significant number of tenants, although fewer than the large PoD. This deployment supports incremental additions of compute and storage resources, has only a moderate initial CAPEX and has a smaller data center footprint. If the tenant capacity is used faster than expected, you will need to add another instance of Small PoD. Over time the additional compute resource CAPEX required to expand a Micro Node deployment will exceed the CAPEX for an equivalent Small PoD deployment.

c) Micro Node

Micro Node supports a smaller number of tenants. This deployment supports the incremental addition of compute and has a low initial CAPEX. It also has a smaller data center footprint and supports migration to Small PoD. The addition of compute resources, however, eventually exceeds the CAPEX cost beyond a Small PoD deployment. Micro Node deployment does not support shared storage. Micro Node deployments only support Cisco Prime Collaboration Assurance (PCA) with two virtual machine server instances.

Micro Node supports a smaller number of tenants. This deployment supports the incremental addition of compute and has a low initial CAPEX. It also has a smaller data center footprint and supports migration to Small PoD. The addition of compute resources, however, eventually exceeds the CAPEX cost beyond a Small PoD deployment. Micro Node deployment does not support shared storage.

Note Cisco NX-OS Release 6.2 software requires 8 GB of memory. If you plan to use a Cisco Nexus 7000 Series system you will need to 8 GB of memory. This does not provide any additional performance or scale.

Based on the information that you have gathered and the parameters of each deployment model, you can determine which model is appropriate.

Step 2 Consider the following options site types for your deployment.

Note Site type decisions are made based on a per customer basis. Depending on your customer requirements, you can have one or more site types as part of your HCS.

For more detailed information on the different types of sites, see the *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide*.

a) **Hosted**

Consider this option if you want all of the UC applications to reside in the HCS data center and endpoints located at one or more remote customer sites. This option is simplest to deploy and manage as all the call control and management servers are in the HCS data center.

b) **Remote managed**

Consider this option if you want all Unified Communications applications on premises, with Cisco HCS providing central breakout if necessary, and remote management through Hosted Collaboration Mediation-Fulfillment and Cisco Unified Communications Domain Manager. You will also need a deployment of Small PoD size data center at the remote site to host the UC applications.

c) **Hosted Private Cloud/Large Enterprise**

Consider this option if you need support for a very large customer with multiple clusters, potentially multiple independent organizational units, geographically and distributed operations. Examples include financial institutions or retailers with national coverage or Government organization. This Private Cloud deployment has its own HCS license type (HCS-LE) for UC and Management, which unlike MSP cannot be shared i.e. cannot resell or offer managed services. This one customer typically owns the hardware and manages the system. This deployment may optionally have its aggregation system.

Step 3 Identify OVA sizes to help with growth plans.

Important CPU oversubscription is only allowed for specific VMs where reservations are identified in the *Cisco Hosted Collaboration Solution Compatibility Matrix*. Otherwise, all VMs must map one VM vCPU core to one physical CPU core. The following are **not** supported in Cisco HCS:

- Memory (RAM) oversubscription
- Storage oversubscription
- Storage thin provisioning (at VM layer or storage array layer)
- Hyperthreading

Consider expected customer growth when selecting the initial OVA file for deploying UC Applications. For example, if you do not expect to experience much growth over the next six to 12 months, selecting an OVA that fits your initial deployment should be adequate. If, however, you expect to grow beyond the initial OVA size over the next six to 12 months, Cisco recommends you select a larger OVA to fit the expected growth level and not an OVA that fits your initial deployment level.

Initially, selecting a larger OVA for your deployment consumes more resources, however, the amount of time required to resize a virtual machine is significant. If you are unsure about your growth plans, however, you should evaluate whether the potential cost of allocating resources for a larger OVA is a suitable solution. A time-cost of downsizing also exists.

Small Medium Business Solutions

The classic Service Provider Service Provider Cisco HCS Data Center infrastructure model includes Nexus 7000 switches, SAN, UCS with B-series blade servers, a session border controller (SBC), and so on, that support a large number of end users across a high number of customers. This involves considerable initial cost and is suitable for large service providers.

For service providers with less than 940 tenants or shared clusters, there are a number of ways that you can deploy the data center infrastructure using smaller hardware components and shared application models to optimize scale and cost. You can deploy the Cisco HCS small/medium business solution on any of the data center infrastructure models.

Dedicated Instance

Dedicated instance refers to the model of applications where there is a separate application instance (Cisco Unified Communications Manager) for each customer. In one B or C-series server there can be different customer instances based on how applications are distributed in the server. Any reference to a UC application such as Cisco Unified Communications Manager, Cisco Unified Communications Manager IM and Presence Service, Cisco Unity Connection Cisco Emergency Responder, and CUAC, that does not include "Shared" or "Partitioned" as part of the title implies that it is a dedicated instance. Since the dedicated instance model is the same as in a large enterprise solution, no further description is provided here.

Partitioned Unity Connection

To help the Cisco HCS solution scale more customers on the same hardware, you can partition a single Cisco Unity Connection instance to support multiple customer domains.

Cisco Unity Connection exposes the configuration and provisioning to support multiple customers by REST APIs. The Cisco HCS service fulfillment layer uses the partitioned Unity Connection REST APIs to allow Cisco HCS service providers to configure and provision customers into the partitioned Unity Connection.

Cisco HCS continues to support the dedicated Cisco Unity Connection in addition to the new partitioned instance. Partitioned Unity Connection is not a new product with a new SKU. The HCS administrator and domain managers must decide the role of Unity Connection as either regular or partitioned.

- [Cisco Unity Connection](#)
- [Cisco Unified Communications Domain Manager Maintain and Operate Guide](#)
- [Design Guide for Cisco Unity Connection](#)

The following deployment option is supported:

- Use Cisco Unified Communications Domain Manager to provision partitioned Cisco Unity Connection if you are running version .

The current dedicated Cisco Unity Connection virtual machine (VM) uses an overlapping IP address. The same VM is used for partitioned Cisco Unity Connection with no change in the IP addressing. To provide access to multiple management devices such as Cisco Unified Communications Domain Manager and Prime Collaboration Assurance (which have global IP addresses) a hosted NAT device is required to perform address translations. You can leverage an existing NAT device that currently performs this function.

Because UC applications are not multi-VRF capable, Cisco Unified Communications Manager and partitioned Cisco Unity Connection cannot have a direct interface when Unity Connection is interfacing with multiple instances of Cisco Unified Communications Manager. In that case, third-party SBC is needed. However, it is possible to have a direct interface when only one instance of Cisco Unified Communications Manager is interfacing with Partitioned Unity Connection. The third-party SBC is required to perform this aggregation.

Identify Planned Services and Applications

Procedure

Review the Unified Communications applications and services to determine which you plan to use in your HCS deployment.

a) Voice/Voicemail/IM

- Cisco Unified Communications Manager

Unified Communications Manager is supported across Large PoD, Small PoD, and Micro Node in a dedicated deployment.

Cisco Unified Communications Manager is supported across Large PoD, Small PoD, and Micro Node in a deployment.

- Cisco Unified Communications Manager IM and Presence Service

Cisco Unified Communications Manager IM and Presence Service is supported across Large PoD, Small PoD, and Micro Node in a dedicated instance deployment.

- Cisco Unity Connection

Cisco Unity Connection is supported across Large PoD, Small PoD, and Micro Node in a dedicated deployment.

Cisco Unity Connection is supported across Large PoD, Small PoD, and Micro Node in a deployment.

- b) Paging services
- c) Attendant Console (CUAC) (Server and serverless)
- d) Cisco Emergency Responder
- e) Video

For more information on video planning, see [Prerequisites, on page 69](#).

- f) Mobility

For more information on mobility planning, see [Prerequisites, on page 65](#)

Identify Regulatory Services

Procedure

- Step 1** Determine whether you need to provide Lawful Intercept (LI) services. Verify the LI requirement for the country in which you want to deploy to determine which services you must provide.
 - Step 2** Determine whether you need to provide emergency services. Verify the emergency services requirements for the country in which you want to deploy to determine which services you must provide.
-

Plan for High Availability

When planning for high availability in a Cisco HCS deployment, complete the following Cisco HCS-specific planning steps:

Infrastructure Redundancy (Steps 1-4)

Procedure

- Step 1** Determine single versus multiple and geographic redundancy for data center deployments. Cisco recommends Layer 3 Geo-redundancy for HCS, deploying two data centers without SAN mirroring.
If you use Layer 2 Geo-redundancy instead of clustering over the WAN, you will need to determine whether to deploy the two data centers as active-active (which requires LAN and SAN extension) or active-standby (which requires only SAN extension). This in turn will determine your DC interconnect requirements; active-standby required SAN extension, whereas active-active requires both LAN and SAN extension.
- Step 2** Determine available VMware redundancy and HA options, such as VMware HA and VMware vMotion.
- Step 3** Determine blade and chassis redundancy, including spares and distribution of VM.

Step 4 Determine data center redundancy, data center core, aggregation, access layer, data center UCS platform and data center SAN storage:

- Redundant Platforms (power, cards)
- Redundant Layers: box, box redundancy
- Redundant Fiber Channel storage
- Redundant connections and paths
- Virtualization VM tool set

Application Redundancy (Step 5)

Step 5 Plan for application redundancy, including failover redundancy and redundant links; again, Cisco recommends Layer 3 connectivity between UC applications. You will need to determine the desired round trip time delay for each application.

Note Application redundancy applies to all UC applications as well as Cisco HCS Provisioning, Assurance, and Domain Management applications. If applications are deployed within a single data center, we recommend that you deploy the virtualized applications on a different Unified Communications chassis if possible or at least upon different VMware ESXi hosts (server blades).

See the *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide* for more information and clustering recommendations for Cisco Unified Communications Manager, Cisco Unity Connection, and HCS for Contact Center.

Identify Geographical Locations for Customer Deployment for Planning

Procedure

Identify geographical locations planning considerations for customer deployment. Consider the number of different locations you plan to have as this can impact your initial deployment as well as your options for further growth. In particular, the number of locations, for example can affect the sizing of your Cisco HCM-F. You should also consider distance between various locations as this could affect network latency or potential delay issues.

Identify Trunking Services

Procedure

Depending on what type of provider you are, determine which trunking services to provide, either central, local breakout or a combination of both. For more details on these trunking choices, see *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide*.

- Central Breakout

Choosing central breakout may include obligations such as providing a carrier license, ability to provide emergency services, especially in situations where local breakout is not offered, and enabling Lawful Intercept (LI).

With central breakout, you can use existing carrier grade SBC. For Large Enterprise deployments, use third-party SBC.

You also have a choice of using Cisco Integrated Services Router G2 Series offering SRST or BRI, PSTN, and SIP trunking services.

- Local Breakout

Local breakout is a simple setup, that allows you to rely on another organization to provide the regulatory services for you. Local breakout may be a good alternative if you do not:

- a. Want the expense of investing in centralized aggregation infrastructure such as session border controllers.
 - b. Want the additional burden of complying with and offering regulatory services.
 - c. Have the license or operating in jurisdictions that do not allow certain organizations to offer central interconnect services, such as SIP or SS7.
-



CHAPTER 3

Data Center

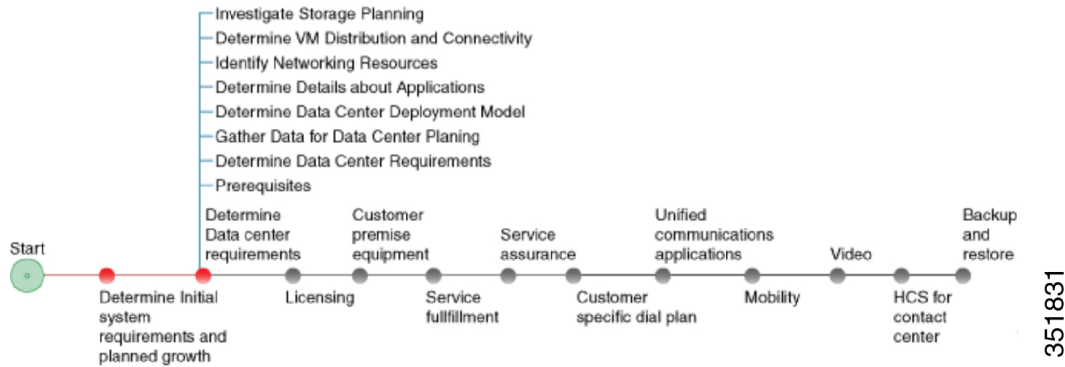
- Prerequisites, on page 15
- Data Center Workflow , on page 16
- Determine Data Center Requirements , on page 16
- Gather Data for Initial Data Center Planning , on page 16
- Determine the Data Center Deployment Model , on page 17
- Determine Details About Applications , on page 18
- Identify the Various Networking Resources , on page 18
- Determine Virtual Machine Distribution and Connectivity , on page 20
- Determine DMZ Requirements, on page 20
- Investigate Storage Planning , on page 21

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 16.
 - Step 2** [Determine the Data Center Deployment Model](#) , on page 17.
 - Step 3** [Determine Details About Applications](#) , on page 18.
 - Step 4** [Identify the Various Networking Resources](#) , on page 18.
 - Step 5** [Determine Virtual Machine Distribution and Connectivity](#) , on page 20.
 - Step 6** [Determine DMZ Requirements](#), on page 20.
 - Step 7** [Investigate Storage Planning](#) , on page 21.
-

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](#) , on page 5.

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](#), on page 8, 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](#), on page 8.

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

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 19](#).
- Management domain addressing.
- NATted address pools in management domain for UC applications: For more details, refer to [NAT Planning Considerations , on page 19](#).
- VLANs: Use the recommended numbering scheme. For more details, refer to [Grouping VLANs and VLAN Numbering, on page 19](#).
- PSTN connectivity: For more details, refer to [Identify Trunking Services , on page 14](#).
- 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 20.

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*.



CHAPTER 4

License Planning

- [Prerequisite](#), on page 23
- [License Planning Workflow](#), on page 24
- [Related Documentation](#), on page 24
- [License Planning Considerations](#), on page 24
- [Determine Data Center Infrastructure Licenses](#), on page 25
- [Determine Data Center Storage Licenses](#), on page 26
- [Determine VMware Licenses](#), on page 26
- [Determine UC Applications](#), on page 26
- [Determine HCS for Contact Center](#), on page 27
- [Third-Party Software Licenses](#), on page 27
- [Determine HCS Management Licenses](#), on page 27
- [License Activation Considerations](#), on page 28

Prerequisite

This chapter provides a high-level overview of the planning that must be done prior to acquiring and activating licenses for applications and management components running on HCS. This plan covers:

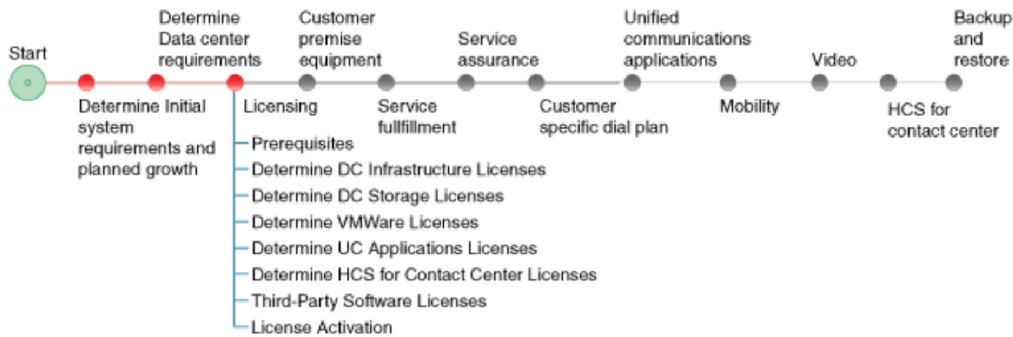
- Identifying licenses that must be ordered for HCS
- Planning for other components or pieces that are not supported by Cisco Prime License Manager
- Determining the costs of licensing, and how those costs impact decision-making

License planning involves the following steps:

1. Determine data center infrastructure licenses.
2. Determine data center storage licenses.
3. Determine VMware licenses.
4. Determine UC Application licenses.
5. Determine HCS for Contact Center licenses.
6. Determine Third Party software licenses.
7. Determine HCS Management licenses.
8. Determine Cisco Expressway licenses.
9. Determine Rich Media Session licenses.
10. Determine Cisco Jabber Guest Server licenses.
11. License activation considerations.

For more information on Licensing for Cisco HCS, see *Cisco Hosted Collaboration Solution Release 12.5 License Management*

License Planning Workflow



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Related Documentation

Refer to the following document for further information about related licensing applications and products:

- *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide*

License Planning Considerations

This section describes about the different license manager.

HCS License Manager (HLM) Planning Considerations

HCS License Manager (HLM) is an HCM-F service that provides centralized license management for HCS. HLM extends the functionality of Prime License Manager beyond the scope of one enterprise for use by service providers. HLM is used to assign each customer and its clusters to an Prime License Manager. HLM aggregates license usage by each cluster from each Prime License Manager into a License Summary report. In HCS 10.0(1) and later, Unified Communications Manager and Cisco Unity Connection are the only UC applications supported by HLM.

Consider the steps in the following procedure for HLM planning:

- Use one HLM for each installation of HCS.
- Set up each Prime License Manager in the HLM.
- Load HCS licenses on a Prime License Manager before configuring the Prime License Manager on an HLM

- When new customers are onboarded, they and their clusters must be assigned to an Prime License Manager through the HLM. Do not use the native management interface of Prime License Manager to assign a cluster. Always use the HLM to assign clusters to a Prime License Manager.

Prime License Manager Planning Considerations

Prime License Manager manages licensing for Unified Communications Manager clusters, and Cisco Unity Connection servers for multiple customers deployed in HCS. Typically, multiple customers are assigned to the same Prime License Manager server. If you have multiple clusters, all the clusters must be assigned to the same Prime License Manager server. That is, you cannot assign some of the clusters to one Prime License Manager and the rest to another Prime License Manager.

HCS licenses are registered to and loaded and activated onto the Prime License Managers deployed in HCS. The Prime License Managers deploy the HCS licenses to the UCM clusters and Unity Connection servers those are assigned by the HLM.

Take the following actions for Prime License Manager planning:

Procedure

-
- Step 1** Determine if you need multiple instances of Prime License Manager, which can be the case in either of the following scenarios:
- If a Service Provider has resellers and wants to segregate the HCS licenses it provides to each reseller
 - If there are more than 1000 Unified Communications application clusters in the HCS deployment
- Step 2** Install the Prime License Manager on the same management network as HCM-F so that Prime License Manager can access all Unified Communications application clusters. Prime License Manager can be coresiding with CUCM or can be installed as a stand-alone Prime License Manager residing at Application Space. If Prime License Manager is coresiding with CUCM, then that Prime License Manager can be dedicated for a customer.
- Step 3** Install standalone Prime License Managers in the HCS Management domain. Set up each customer domain firewall to allow Prime License Manager to connect to UCM and Unity Connection through the HTTPS port 443 from the HCS management domain.
- Step 4** Plan for appropriate usage of the Prime License Manager web interface:
- For initial configuration, to generate license requests, to load license files, and to display license usage by cluster if desired.
 - To assign a cluster, when using only the HLM, to a Prime License Manager instance so that the HLM can aggregate license usage for all customers and clusters.
-

Determine Data Center Infrastructure Licenses

The following data center infrastructure components require specific licensing with the hardware feature capabilities:

- Nexus switches (5500, 5600, 7000)
- Session Border Controller

- SAN
- UCS Manager
- ACS
- VNMC
- Prime Network Services Controller
- Adaptive Security Device Manager (ASDM) Device Manager
- Cisco Prime Network Registrar (formerly CNR)
- Open Source TACACS (alternate for ACS Appliance)

For more information on these components, refer to the *Cisco Hosted Collaboration Solution Release 12.5 License Management*.

Determine Data Center Storage Licenses

The following data center storage components require specific licensing:

- SAN
- Nexus switches (5000, 5500, 7000)
- MDS switches
- UCS Manager



Note If you are using SAN-based storage, you must have storage access licensing for your Cisco components and for your SAN-based storage.

For more information, contact your Cisco sales engineer.

Determine VMware Licenses

For VMware licensing information, refer to the *License Management for Cisco Hosted Collaboration Solution*.

Determine UC Applications

The following UC applications require specific licensing:

- HCS software licensing bundles
- HCS end customer license
- Cisco Telepresence
- Jabber clients
- Jabber server

- Add-On licenses:
 - CUAC (server based and serverless)
 - CER



Note Cisco Expressway Server, Jabber Guest and Cisco Expressway Rich Media Session Licenses are add-on, session based licenses. They are managed separately from HLM/PLM and installed in Cisco Expressway. For more information see <http://www.cisco.com/c/en/us/support/unified-communications/expressway-series/tsd-products-support-series-home.html>

For information on determining licensing requirements for HCS License Manager and Prime License Manager, see [License Planning Considerations, on page 24](#).

Determine HCS for Contact Center

HCS for Contact Center is an Add On license. For more information, see http://www.cisco.com/en/US/products/ps12796/prod_installation_guides_list.html.

Third-Party Software Licenses

The following third-party software requires licensing:

- CUAC
- Cisco Paging Server (also known as Singlewire - InformaCast Basic Paging)
- Prime Collaboration Assurance
- VMware Virtual Center (vCenter)
- HCS for Contact Center
- Identity Providers - CA SiteMinder, Shibboleth, Microsoft AD FS, OpenAM, Oracle Identity Manager

For more information on Third-Party Software Licenses, see *Cisco Hosted Collaboration Solution Release 12.5 License Management*.

Determine HCS Management Licenses

The following HCS Management components require specific licensing:

- Fulfillment licenses
 - CCDM
 - Cisco Unified CDM
 - HCM-F - HLM
- Assurance licenses

- Cisco Prime Collaboration Assurance

For more information, see the *License Ordering for Cisco Hosted Collaboration Solution* guide.

License Activation Considerations

The following must be considered for license activation:

- eFulfillment uses an Enterprise License Manager or Prime License Manager to connect directly to the Cisco License website to fulfill licenses from a PAK. Therefore, the Enterprise License Manager or Prime License Manager must have access to the Internet. If the Enterprise License Manager or Prime License Manager does not have direct access to the Cisco License website, then offline fulfillment can be used. For details on both methods, see *Cisco Hosted Collaboration Solution Release 12.5 License Management*.

For information on the conversion from ELM to PLM, see Cisco Prime License Manager User Guide, Release 10.5(1).

- Unified Communications Software Subscription (UCSS) activation - In HCS there are ways to purchase licenses and delay autoactivation. Consider UCSS activation when you are adding customers.

For more information on license activation, refer to the *Cisco Hosted Collaboration Solution Release 12.5 License Management*



CHAPTER 5

Customer Premise Equipment

- Prerequisites, on page 29
- Customer Premise Equipment Workflow , on page 30
- Determine the Type of Site(s) , on page 30
- Determine Customer Premise Equipment Router Model , on page 30
- Determine Services on Router Model and Location of Services , on page 31
- Determine Analog Gateways , on page 31
- Determine Endpoints , on page 31
- Determine Access Methods , on page 32
- Determine Standalone Firewalls , on page 32
- Determine Networks for Customer Premise Equipment , on page 33

Prerequisites

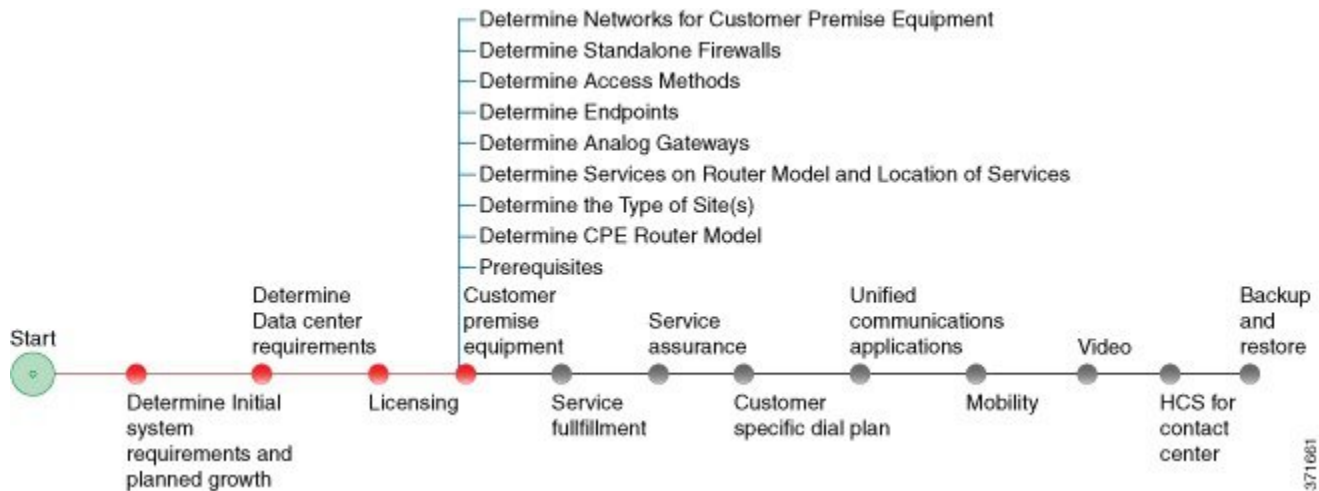
Before you plan the customer premise equipment, make sure that you:

- 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 requirements



Note Make sure to review the *Cisco Hosted Collaboration Solution Compatibility Matrix* for a full list of licensing details.

Customer Premise Equipment Workflow



Determine the Type of Site(s)

Determine the type of site(s) that you plan to deploy. For detailed information on the different sites, refer to [Determine Your HCS Data Center Deployment Model](#), on page 8.

Dedicated Server

Dedicated server refers to an Cisco HCS model of applications available for Micro Node deployments where one C-series server contains only one customer, but may have one or more UC applications running on the same server for that customer (for example Cisco Unified Communications Manager or Cisco Unity Connection).

Determine Customer Premise Equipment Router Model

Procedure

Determine your router model based on the following UC application criteria:

- Cisco Unified Survivable Remote Site Telephony (SRST)
- Session Border Controller
- PSTN Local Breakout - VoiceXML gateway
- Cisco Unified Communications Domain Manager media resources such as conferencing, transcoding and Media Termination Point

Your HCS system needs a router, such as ISR G2 series. Make sure you have accurate cards, licensing and so forth for this router. You should take all of these considerations into the type of router you choose as this device does many of the key functions of your customer premise system. Many different models are available with a wide range of performance and scale capacities. For more details, refer to <http://www.cisco.com/go/isr>.

Determine Services on Router Model and Location of Services

Procedure

- Step 1** Determine what services you need to run on your router model:
- Session Border Controller
 - SRST
- Step 2** Determine if these services will reside on your router model, typically ISR G2, or on other standalone routers.
- Step 3** Determine customer premise conferencing resources.
-

Determine Analog Gateways

Procedure

Determine the analog gateways that you need based on the devices that will be used:

- ATA series
 - VG series
 - ISR router models
-

Determine Endpoints

Procedure

Determine the TelePresence and video endpoints that will be used:

- Desktop hard phones

- Desktop clients
 - Mobile clients
 - Video endpoints
-

Determine Access Methods

Procedure

Determine access methods:

- MPLS: This is typical preferred choice for an HCS deployment.
 - Site-to-Site VPN: The customer premise router must be enabled and capable of supporting IPsec VPN.
 - Flex VPN: FlexVPN is deployed in HCS as a site-to-site VPN, between the customer site and the hosted HCS datacenter.
 - AnyConnect: Cisco AnyConnect VPN Client provides secure SSL connections for remote users.
 - Expressway OTT
-

Determine Standalone Firewalls

Procedure

Determine your standalone firewalls. Consider the following for customer premise equipment:

- NATting is or is not performed at the customer premise
- Multiple routers or single router at customer premise
- IP addressing at customer premise

Make sure that whatever set up you choose, that all ports are open for the Cisco HCS system, refer to *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide*.

Determine Networks for Customer Premise Equipment

Procedure

- Step 1** Determine LAN network, refer to http://www.cisco.com/en/US/partner/tech/tk722/tk809/tsd_technology_support_protocol_home.html for more information.
- Step 2** Determine wireless LAN (WLAN) network including Access Points (APs), refer to http://docwiki.cisco.com/wiki/Internetworking_Technology_Handbook#LAN_Technologies for more information.
-



CHAPTER 6

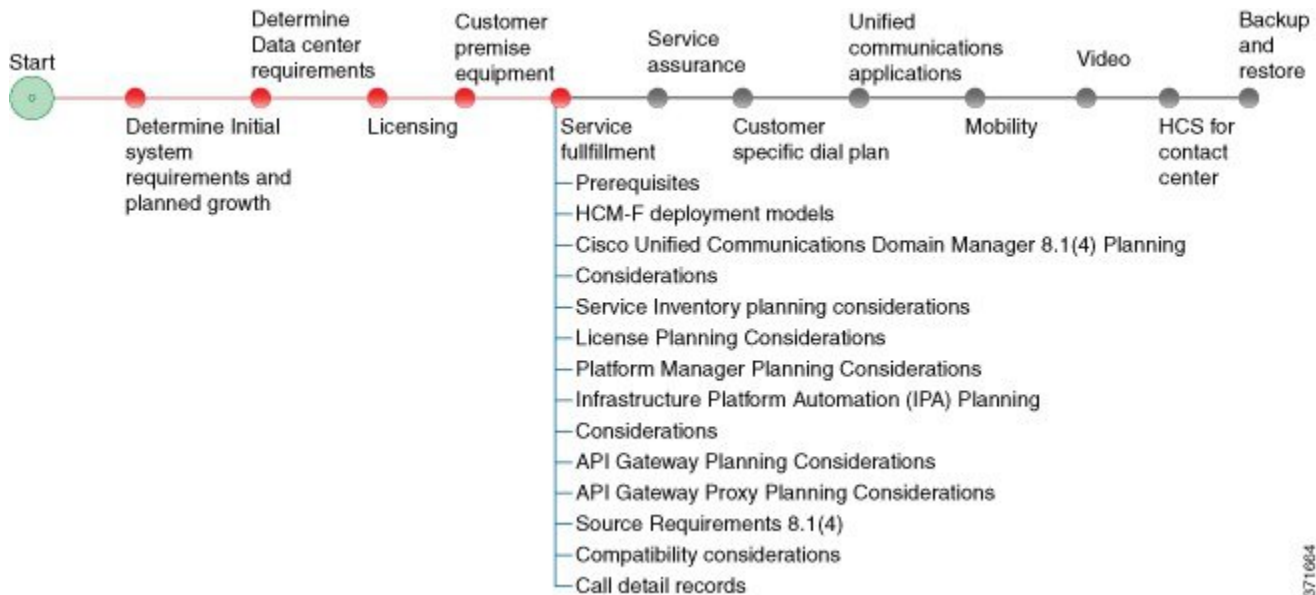
Service Fulfillment Planning

- [Prerequisites, on page 35](#)
- [Service Fulfillment Workflow , on page 36](#)
- [HCM-F Deployment Models, on page 36](#)
- [Service Inventory Planning Considerations , on page 36](#)
- [Platform Manager Planning Considerations , on page 37](#)
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- [Compatibility Considerations, on page 41](#)
- [Call Detail Records, on page 41](#)
- [LDAP Integration Considerations, on page 42](#)
- [Single Sign On Considerations, on page 42](#)
- [Cisco Unified Communications Domain Manager Planning Considerations, on page 42](#)
- [Cisco Unified Communications Domain Manager Resource Requirements, on page 43](#)

Prerequisites

Before you plan Service Fulfillment for your Cisco HCS installation, make sure that you:

Service Fulfillment Workflow



HCM-F Deployment Models

HCM-F scales to the following deployment models:

1. Default Deployment
 - Node 1: SDR + Core HCM-F applications
 - SBI (apps + dm) direct access
2. Transitional Deployment (two Nodes (transition to three nodes or API trial)
 - Node 1: SDR + Core HCM-F applications (App Node)
 - HCM-F API access directly to NBI-WS
3. Full Deployment (N Nodes (three or more HCM-F nodes)
 - Node 1: SDR + Core HCM-F applications
 - Load Balancer

Service Inventory Planning Considerations

Service Inventory is a Cisco HCM-F service that queries Cisco Unified Communications Domain Manager daily. It reports detailed configurations of customers, subscribers, and devices for all Unified Communications Manager and Cisco Unity Connection application instances. The Service Inventory report also provides a summary of all customers, UC clusters, users, and end devices deployed within HCS.



Note Service Inventory pulls customer information from the Cisco Unified Communications Domain Manager, and generates a report file (or files) for all the customers.

Complete the following steps when planning service inventory:

Procedure

- Step 1** Plan to deploy an SFTP server (and an optional backup SFTP server) with adequate capacity to receive Service Inventory report files. A typical compressed file size would be 8-10 MB for 200,000 users.
- Step 2** Decide whether the files will be pushed, or pulled, scheduled, or automatic.
- Step 3** Decide which application can be used to parse the detailed inventory data into a form that can be used by your business system.

For more details on Service Inventory reports and their formatting, see *Cisco Hosted Collaboration Mediation Fulfillment Maintain and Operate Guide*.

Platform Manager Planning Considerations

Platform Manager is a Cisco Hosted Collaboration Mediation Fulfillment service that allows you to schedule and monitor the automated installation, upgrade, restart, and backup of multiple application instances across customers for the following applications:

- Cisco Unified Communications Manager
- Cisco Unity Connection
- Cisco Unified Presence / Cisco Unified IM and Presence

Take the following actions for Platform Manager planning as you onboard each customer or cluster:

- Determine the number of server groups needed.
- Select server groups for backup tasks that avoid overloading blade hardware or I/O bandwidth to data storage LUNs.
- Put all servers (for example, Publishers) on a specific ESXi-Host or blade into a common server group. This way the backup of the servers on the host is done serially, minimizing the backup CPU load on the host.
- Spread the SFTP servers that are assigned to backup groups across different storage LUNs so that backup transfer load is spread out.
- Ensure that no more than two applications are backed up on a specific blade at any one time.

For details on Platform Manager, see the *Cisco Hosted Collaboration Mediation Fulfillment Install and Configure Guide, Release 12.5*.

Limitations and restrictions

The following list describes the current limitations for Platform Manager.

- Platform Manager is not a diagnostic tool. An error message does appear on the task list page if a task fails; however, you should use your usual set of tools and procedures to diagnose and correct the problem.
- The SOAP services do not replace the existing OS Administration and CLI upgrade processes.

Servers functionality classification

Platform Manager offers a wide range of different user-defined servers types to accommodate the management of potentially thousands of servers. You can tag servers with one or more roles such as publisher, subscriber, TFTP, music on hold, secondary TFTP, secondary music on hold to help classify the different servers in your system. You can then tag your servers with one or more server roles for easier identification. Server roles allow you to classify each server in your Platform Manager, making your task creation and viewing more efficient.

Server roles include:

- Call Processing
- Backup Call Processing
- Music on Hold
- TFTP
- Backup TFTP
- Primary Presence
- Secondary Presence
- Primary Voicemail
- Secondary Voicemail



Note Server roles are labels to help users identify a server. Setting a server role does not activate any services. Mislabeling a server does not cause any service outages.

Server group usage

Server groups allow you to logically join together different servers that you want to perform tasks on as a group. You have the flexibility to group servers to accommodate the varied requests for installation, backup, upgrades and restart tasks.



Note A task is applied to all servers under the same server group. If you do not want to lose a service, do not put your Active Call Control server in the same server group as its backup when you run a switch version or reboot task.

Server groups allow you to logically combine various servers; for example, you can create server groups for the following areas:

- Server Group by Role - Create call processing server groups and a backup processing server group.
- Server Group by Product - Create product A and product B groups.
- Server Group by Customer and Product - Create customer A-product A and customer A-product B groups.



Note You can have as many servers as you like in a group; however, all servers must be of the same product type. A server can be a member of more than one group.

Limitation in server groups

The following limitations apply when you create server groups:

- You cannot have multiple products in the same server group. For example, if you have a customer that has Cisco Unified Communications Manager and Cisco Unified Communications Manager IM and Presence Service, you must create two groups for this customer.
- You cannot have publisher servers in the same group as subscriber servers if you want to run upgrade or switch version tasks on the group. For example, if you want to upgrade all of a customer's services, you must create at least two groups: a publisher server group and at least one subscriber server group to execute the task on the publisher servers before the subscriber servers. This does not apply to restart server tasks. Publishers and subscribers can be in the same group if that group is used for restart server task.

Task creation

Tasks are the main function of Platform Manager. For example, you may want your publisher servers to back up your subscriber servers within a certain application group. The create tasks pages can help you with this.

The Backup Schedule task feature provides a central location to schedule and monitor backups while reusing of the existing backup infrastructure-the Disaster Recovery System. This feature also enables backup load balancing.

Data filtering

Platform Manager has a powerful filtering capabilities to allow you to view specific information. The following pages have filter options available:

- Servers
- Server Groups
- Task List

Field	Description
Quick Filter	View the data by any column on the page. For example, if you want to only see a specific customer servers, you can filter on a customer name. If you want to see all of your Unified Communications Manager servers, you can filter on product and only your Unified Communications Manager servers appear.

Field	Description
Advanced Filter	View data by multiple columns and multiple terms in the same column. For example, perhaps you want to see all the Unified Communications Manager and Cisco Unified Presence server groups for customer A and customer B. Add all of the details in the search boxes and your results appear.
Set Default Filter	Set a default view for your content. For example, you may want the Quick Filter screen to be the default view on the servers page to it does not have to load all of servers every time to you go the page.

Best practices

The following are recommendations for configuring your systems as suggested by Cisco development and testing teams.

- Use the SDR Synchronization, the Server Import functionality, or the VCenter Sync operation to populate the servers in your system if possible.
 - You can perform the VCenter Sync operation through a manual sync request from the **Administration** menu, or by enabling **vCenter Sync** from the **Data Center Management** menu.



Note Ensure that the cluster applications are associated with the correct VMs in the **Cluster Applications** page of **Application Management** menu. For more information, see the *Configure HCMF* section in *Cisco Hosted Collaboration Mediation Fulfillment Install and Configure Guide*.

- Create groups with multiple servers that you perform similar tasks on.
- When you name groups, keep the terminology simple and use easy-to-recognize names.
- Use the sequencing feature in a task when you want a second group of servers to wait until the first group is done before performing that task.
- Use the Backup Schedule task for a more efficient and powerful way to run backups. It helps to control multiple servers that are backed up at the same time and enables load balancing. SFTP servers for DRS backup are configured in Disaster Recovery System (DRS). All the first nodes that use the same SFTP server should be assigned to the same server group for backup, or should be scheduled for backups on different days of the week.

For more information, refer to the HCS Maintain and Operate Guide at <http://www.cisco.com/c/en/us/support/unified-communications/hosted-collaboration-solution-hcs/tsd-products-support-series-home.html>.

Prime Collaboration Deployment for UC Applications

Cisco Prime Collaboration Deployment helps you to manage Unified Communications (UC) applications. Its functions are to:

- Migrate a cluster of UC servers to a new cluster (such as MCS to virtual, or virtual to virtual).



Tip Cisco Prime Collaboration Deployment does not delete the source cluster VMs after migration is complete. You can fail over to the source VMs if there is a problem with the new VMs. When you are satisfied with the migration, you can manually delete the source VMs.

- Perform operations on clusters, such as:
 - Upgrade
 - Switch version
 - Restart
- Fresh install a new release UC cluster
- Change IP addresses or hostnames in clusters (for a network migration).

Cisco Prime Collaboration Deployment supports simple migration and network migration. Changing IP addresses or hostnames is not required for a simple migration. For more information, see the [Prime Collaboration Deployment Guide](#).

The functions that are supported by the Cisco Prime Collaboration Deployment can be found in the [Prime Collaboration Deployment Administration Guide](#).

Use the **Cluster Discovery** feature to find application clusters on which to perform fresh installs, migration, and upgrade functions. Perform this discovery on a blade-by-blade basis.

For more information about features, installation, configuration and administration, best practices, and troubleshooting, see the following documents:

- [Prime Collaboration Deployment Administration Guide](#)
- [Release Notes for Cisco Prime Collaboration Deployment](#)

Compatibility Considerations

See the Service Fulfillment compatibility table in the *Cisco Hosted Collaboration Solution Compatibility Matrix*.

Call Detail Records

Service Providers (SPs) can use Usage-based billing, using call detail records (CDRs) or Call Manager Management Records (CMRs) for the enterprise.

If a service provider is interested in usage type billing, they can direct CDRs from Unified Communications Manager to their billing system. If Cisco Prime Collaboration Assurance is configured as a management application, the Cisco HCS CAA CUCM Service configures any CUCM (release 9.0(1) or higher) to send CDRs to Cisco Prime Collaboration Assurance. The option also exists to work with our third-party vendor to consume CDRs and CMRs to produce necessary billing information or invoices.



Note Cisco Prime Collaboration Assurance uses CDR and CMR for diagnostic purpose only (not for billing).

The Cisco TelePresence Exchange System collects and displays call detail records (CDRs) for calls that are placed on the system. From the administration console, you can view CDR details for the system and export a comma-separated value (.csv) file of that information.

The Cisco TelePresence Exchange System retains CDRs for up to 30 days from the recorded end time of the CDR. The system automatically purges CDRs that exceed this 30-day limit. If the total number of CDRs retained by the system reaches 100,000, the system retains only the most recent 100,000 records and automatically purges the rest.

The Cisco TelePresence Exchange System also provides an Application Programming Interface (API) for managing and retrieving call records. For more details, see the *API User Guide for the Cisco TelePresence Exchange System*.

LDAP Integration Considerations

If you intend to integrate LDAP users into Cisco Unified Communications Domain Manager, you need to identify the LDAP servers that will be used. LDAP servers can be integrated at the provider, reseller, customer, or site level in Cisco Unified Communications Domain Manager. The User Distinguished Name and Base Distinguished Name for LDAP search must be identified for LDAP servers being integrated.

Single Sign On Considerations

If you intend to deploy Single Sign On (SSO) in Cisco Unified Communications Domain Manager, you need to identify the Identity Provider (IdP) servers that will be used. IdPs can be located at the provider, reseller, or customer levels in Cisco Unified Communications Domain Manager. You will need to be able to upload Service Provider metadata to the IdP and also download IdP metadata.

Cisco Unified Communications Domain Manager Planning Considerations

Cisco Unified Communications Domain Manager is an integral part of the service fulfillment subsystem. It is primarily responsible for the configuration and registration of users, subscribers, and endpoints with the back-end Cisco Unified Communications Manager, Cisco Unity Connection, and IM and Presence Service servers. Cisco Unified Communications Domain Manager provides the day-to-day service and device provisioning and management tools. One instance supports all deployment sizes up to 200,000 subscribers.

Consider the steps in the following procedure for Cisco Unified Communications Domain Manager planning:

Procedure

Step 1 Determine if Webex and Contact Center will be integrated.

Step 2 Cisco Unified Communications Domain Manager is deployed either as a single node, or a cluster of multiple nodes with High Availability (HA) and/or Disaster Recovery (DR) qualities. Each node can be assigned one or more of the following functional roles:

- WebProxy – load balancing across multiple application roles
- Application – transactional business logic
- Database – persistent storage of data

The following combined roles are defined:

- Standalone – combines the Application and Database roles for use in a non-clustered environment
- Unified – similar to the Standalone role combining Application and Database roles, but clustered with other nodes to provide HA and DR capabilities.

Step 3 Determine which dial plan to use. See *Cisco Hosted Collaboration Solution End-to-End Planning Guide*.

Step 4 For user activations, decide if you will use automated system activations based on system inventory or the Cisco Unified Communications Domain Manager admin interface.

Step 5 Decide if you want to use the Cisco Unified Communications Domain Manager user self service portal. If yes, you should allow access for customers or end-users.

Step 6 Check to see what the static deployment requirements are on Cisco Unified Communications Manager clusters before managing a cluster from Cisco Unified Communications Domain Manager. Gather the following information:

- a) Location of the Cisco Unified Communications Domain Manager
- b) Determine latency between Cisco Unified Communications Domain Manager and UC applications, which must be within defined limits. The maximum supported latency is 200-ms Round Trip Time (RTT).

Note A higher latency (e.g. 250-ms RTT) may work in certain instances, but this must be tested prior to deployment.

Step 7 Determine if additional languages are required for the system other than English.

Step 8 Determine if custom branding is desired.

Cisco Unified Communications Domain Manager Resource Requirements

The following table lists the resource requirements for the listed service fulfillment components.

HCS 11.5(x)/12.5(x)					
Fulfillment component	vCPU	RAM (GB)	Storage	IOPS	OS

HCS 11.5(x)/12.5(x)					
Unified CDM Multi-node	4 vCPU @ 2 GHz	8 GB	370 GB partitioned as follows: <ul style="list-style-type: none"> • 20 GB for OS • 50 GB for application • 10 GB for logs • 50 GB for compressed backups • 250 GB for database 	300	
WebProxy Nodes	2 vCPU @ 2 GHz	4 GB	150 GB		
HCM-F	4 x 1.8 GHz	16 (Res)	80	200	
PLM	1 vCPU x 1.8 GHz	4	50	-	
CCDM	8	32	100	775 (DB server) 565 (web server)	Microsoft Windows

The Database storage partition is sized at the initial installation to support the maximum deployment size for the release. Further increase in the size of the partition is not required as new customers are on-boarded.

To set up the disk requirements, the disk has to be set up on the VMWare GUI **Resources** tab where a disk can be created. This task can be done after the OVA import but prior to the system boots.



CHAPTER 7

Service Assurance

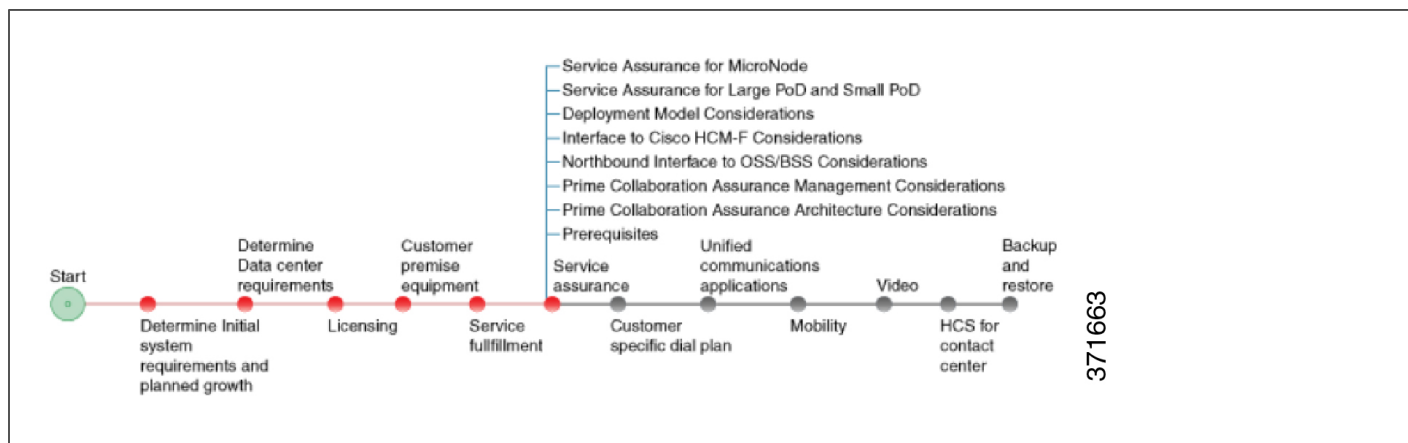
- [Prerequisites, on page 45](#)
- [Prime Collaboration Assurance Workflow, on page 46](#)
- [Prime Collaboration Assurance Architecture Considerations, on page 46](#)
- [Prime Collaboration Assurance Management Considerations, on page 46](#)
- [Northbound Interface to OSS/BSS Considerations, on page 47](#)
- [Interface to Cisco HCM-F Considerations, on page 47](#)
- [Prime Collaboration Assurance for all Deployments, on page 48](#)

Prerequisites

Before you plan the service assurance subsystem 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 requirements
 - Licensing
 - Customer premise equipment
 - Service fulfilment requirements

Prime Collaboration Assurance Workflow



Prime Collaboration Assurance Architecture Considerations

As you develop your plan for Prime Collaboration Assurance consider these key aspects :

- Required interfaces to the Cisco Hosted Collaboration Fulfilment system.
- Cisco Prime Collaboration Assurance NBI. Information on the Prime Collaboration Assurance northbound interfaces, and how to use them is available at: <http://<pc-server-ip>/emsam/nbi/nbiDocumentation>.
- Service assurance management when using Cisco Prime Collaboration Assurance.

Prime Collaboration Assurance Management Considerations

Prime Collaboration Assurance helps you manage Cisco Hosted Collaboration Solution components. Features include:

- Support for Unified Communications components including Cisco Unified CM, Unity Connection, and Cisco IM and Presence
- End to end monitoring and real-time diagnostics
- Multi-customer support in Prime Collaboration voice and video assurance
- Customer summary dashboard for per customer summaries- devices and endpoints, alarms, video sessions with alarms, and voice calls with poor quality
- Voice and Video assurance - Telepresence Exchange dashboard shows the health of TelePresence Hosted Infrastructure; CTX cluster, SBC, Conference Hardware, IVR, Regions, and Resource Pools
- Full Contact Center View - dashboard and topology

Northbound Interface to OSS/BSS Considerations

The Northbound interface to OSS/BSS systems is a key aspect of service assurance as it provides an interface between Prime Collaboration Assurance and MSP systems such as trouble ticketing, and manager of managers (MoM). Its functions include delivering events to MSP systems regardless of the component or device manager from which the event originated. This includes:

- The ability to integrate with a MoM to proactively notify operators of issues and facilitates rapid resolution of problems.
- SNMP Traps integrate with existing MoM
- MoM integration for trouble ticketing

In addition event correlation with alarms computed using:

- Time-based correlation
- Threshold-based correlation
- Root cause correlation

Voice, Video, and Contact Center Correlation with Built-in rules for the most common use cases.

Custom Correlation relation rules feature:

- The ability to configure correlation engine to generate events based on user defined criteria (for example selecting metrics and setting up violation rules based on an expected range of values).
- The ability to add event correlation rules on-demand.

Interface to Cisco HCM-F Considerations

When planning, the relationship between service assurance and service fulfilment is a key relationship to consider. Key functions of this relationship are:

- HCM-F through DMA-SA interacts with the Shared Data Repository (SDR) to a source of information about services, devices, and relationships used by Prime Collaboration Assurance.
- HCM-F interacts directly with Prime Collaboration Assurance to provide information from SDR about users.
- To monitor the Prime Collaboration Assurance device discovery process and to highlight any errors that take place during this discovery process.



Note

- Information about devices added directly through the Prime Collaboration Assurance GUI will not be propagated back through HCM-F to the SDR and as a result HCS will not be aware of these devices.
- Changes made in the Prime Collaboration Assurance GUI to an existing device may be overwritten by subsequent updates to the device from HCM-F.
- Basic IP phones (non-Telepresence) are discovered and monitored directly by Prime Collaboration Assurance. TelePresence devices are configured in HCM-F and information about these devices is provided to Prime Collaboration Assurance through DMA-SA.

For information on the interface to between Prime Collaboration Assurance and HCM-F see the *Cisco Hosted Collaboration Mediation Fulfillment Planning Guide*.

Prime Collaboration Assurance for all Deployments

Prime Collaboration Assurance interacts with the service assurance domain manager (DMA-SA) on the Hosted Collaboration Mediation Fulfillment (HCM-F) system to collect information about customers, clusters, and applications. Cisco Prime Collaboration Assurance is a required component for all HCS deployments.

Planning considerations:

- Prime Collaboration Assurance runs on any VMware-certified hardware with ESXi 4.1, 5.0, and 5.1 installed. Large and very large deployment models require ESXi 5.0 or later.
- One virtual machine is required to install Prime Collaboration Assurance.
- Northbound Interfaces are via Web Services API and SNMP gateway.
- Use HCM-F for provisioning customers and devices.
- Cisco recommends that Prime Collaboration Assurance be installed in the management VLAN.
- Disable hyperthreading in the server (BIOS level) for better performance of Prime Collaboration. This is to avoid CPU-related issues that may occur when hyperthreading is enabled. See your hardware documentation for information about disabling hyperthreading.
- vCPU speed depends on the UCS server or the virtualized hardware.
- We do not support oversubscribing server parameters (not using a 1:1 ratio of physical to virtual resources), such as, vCPU and memory.



Note

- The OVA defines configuration of the virtual machine that includes the CPU, memory, disk, and network resources.
 - We recommend that you install and run Prime Collaboration on Cisco Unified Computing System (UCS), which is VMware-certified.
 - Prime Collaboration Assurance allows you to configure a second NIC (network adapter). See the *Cisco Hosted Collaboration Solution, Customer Onboarding Guide* for details.
-

Cisco Prime Collaboration Assurance NBI

For details on Cisco Prime Collaboration Assurance NBI support, see [Cisco Prime Collaboration Assurance Guide - Advanced](#).

NAT Planning Considerations

In an HCS-LE deployment (single customer only), implementing a NAT between your management applications and Unified Communications applications is not required. Be aware that if a NAT is implemented in this scenario that the synthetic call feature will not be available.

Provisioning Considerations

When you are planning an HCS installation, provisioning is an important consideration. Determine if auto or manual provisioning will be used. Auto-provisioning of customers and services is available using HCM-F as opposed to manual provisioning.

For Cisco Prime Collaboration Assurance to monitor Unified Communications applications and customer equipment devices, these devices must be configured with event destinations (SNMP trap, syslog, or RTMT API) to the Prime Collaborations Assurance server. The Cisco HCS Provisioning Adapter (CHPA) service automatically configures event destinations on the Cisco Unified Communications Manager. You must manually set up other applications and devices to forward events to the Prime Collaboration Assurance server.

Estimate Prime Collaboration Assurance OVA Requirements

For information on the OVA requirements for Prime Collaboration Assurance application, see the *Cisco Hosted Collaboration Solution Release 12.5 Capacity Planning Guide* at <http://www.cisco.com/c/en/us/support/unified-communications/hosted-collaboration-solution-hcs/products-implementation-design-guides-list.html>.

Estimate Prime Collaboration Assurance Scale Numbers

For Prime Collaboration Assurance scale numbers see the *Cisco Hosted Collaboration Solution Release 12.5 Capacity Planning Guide* at <http://www.cisco.com/c/en/us/support/unified-communications/hosted-collaboration-solution-hcs/products-implementation-design-guides-list.html>.

Acquire Prime Collaboration Assurance Licenses

As a part of service assurance planning, be sure to acquire the necessary Cisco Prime Collaboration Assurance license files. Prime Collaboration Assurance images are delivered using the Cisco electronic software delivery site and are delivered the same way as the Cisco Unified Communication Manager software. The licenses are also pulled from this site as a PAK to be registered to the PC server MAC.

This includes license for Prime Collaboration Analytics if you are using Prime Collaboration Assurance - Advanced 11.5 in MSP mode. For information on Cisco Prime Collaboration Analytics Licensing, see [Cisco Prime Collaboration Analytics](#) guide.

Licensing is ordered based on the endpoint type (Phone or Cisco TelePresence) and the quantity of those endpoints. The type of an endpoint determines which licenses you need, and the quantity of the endpoints determines the tier and number of licenses that you need to purchase to manage your network.

Determine Required Bandwidth

Bandwidth considerations are particularly relevant when considering a split data center with on-premise equipment. For more information on bandwidth considerations, see the Data center requirements chapter.

Determine Necessary Ports and Protocols Requirements

For details on ports and protocols, see the System Security chapter in the *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide*.

For details on ports and protocols, see http://docwiki.cisco.com/wiki/Required_Ports_for_Prime_Collaboration.



CHAPTER 8

Customer Specific Dial Plan

- [Prerequisites](#), on page 51
- [Dial Plan Workflow](#), on page 51
- [Determine Customer-Specific Dial Plan Requirements for Cisco Unified Communications Domain Manager 10.x/11.5\(x\)](#), on page 52

Prerequisites

Before you plan the dial plan processes 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 requirements
 - Licensing requirements
 - Customer premise equipment requirements
 - Service assurance requirements
 - Service fulfillment requirements

Dial Plan Workflow



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Determine Customer-Specific Dial Plan Requirements for Cisco Unified Communications Domain Manager 10.x/11.5(x)

The Dial Plan Model is redesigned for Cisco Unified Communications Domain Manager 10.x/11.5(x) to leverage templates and workflows using json files to implement the model. The new model is flexible and is designed to simplify dial plan management wherever possible.

The Dial Plan Model in Cisco Unified Communications Domain Manager 10.x/11.5(x) consists of four basic, predefined call types:

- Directory Number = Site Location Code (SLC) + Extension, no Inter Site Prefix (ISP) in SLC
- Directory Number = SLC + Extension with ISP as part of SLC
- Directory Number = SLC + Extension and without ISP, can be with or without Extension Dialing Prefix (EDP)
- Directory Number = Flat Dial Plan (no SLC)

These four dial model types encompass all the functionality that was available on the previous Dial Plan Model. In order to offer flexibility for service providers, the four types can be extended to develop custom schemas. Customization is managed through discrete, selectable elements in Cisco Unified Communications Domain Manager 10.x/11.5(x).

The Dial Plan Model provides flexible features such as

- Dynamic Class of Service (COS)
- Country Dial Plans
- Blocked / Nonblocked numbers
- CallManager service groups
- Flexible routing
- Per-site PSTN prefix

In Cisco Unified Communications Domain Manager 10.x/11.5(x), the administrator is asked at either the customer or site level to fill in a template which determines the Dial Plan model that is delivered to the Cisco Unified Communications Manager and sites.

Procedure

Step 1

For each customer, do the following:

- a) Determine which type, or types, of dial plans (Type 1 to Type 4) you require.
- b) [Multiple Service Provider Support for Cisco Unified Communications Domain Manager 10.x/11.5\(x\)](#), on page 53, if necessary.
- c) [Determine Country-Specific Dial Plans for Cisco Unified Communications Domain Manager 10.x/11.5\(x\)](#), on page 54, if necessary.
- d) [Plan a New Country Dial Plan](#), on page 55, if necessary.

- e) [Determine Customer Dialing Requirements for Cisco Unified Communications Domain Manager 10.x/11.5\(x\), on page 58.](#)
- f) [Determine Extension Addressing for Cisco Unified Communications Domain Manager 10.x/11.5\(x\), on page 58.](#)
- g) [Determine Voice Mail Numbering in Cisco Unified Communications Domain Manager 10.x/11.5\(x\), on page 59.](#)

Step 2 Define the following:

This step is performed at the customer level in Cisco Unified Communications Domain Manager 10.x/11.5(x).

- a) [Determine Time of Day Routing, on page 60.](#)
- b) [Determine Class of Service and Restrictions in Cisco Unified Communications Domain Manager 10.x/11.5\(x\), on page 60.](#)

Multiple Service Provider Support for Cisco Unified Communications Domain Manager 10.x/11.5(x)

There is no support for multiple service providers in Cisco Unified Communications Domain Manager 10.x/11.5(x).

Role-Based Access Control (RBAC)

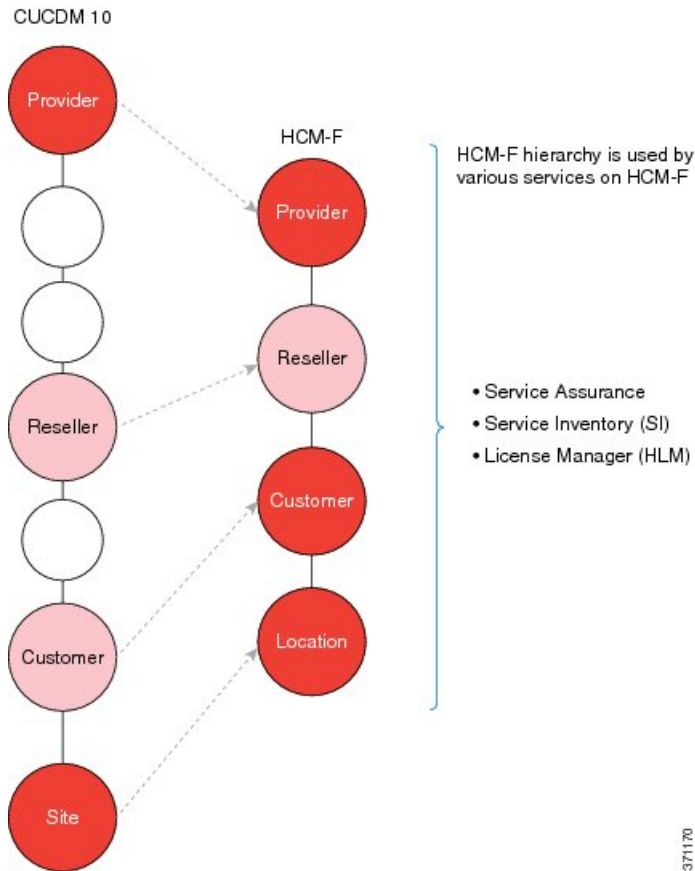
Service providers deploying Cisco HCS require the ability to be able to restrict certain management actions to a specific set of users.

The following roles are predefined for use in Cisco HCS:

Role	FF	SA	Read Permission	Update Permission
Service Provider Admin	Y	Y	Y	Y
Service Provider Operator	Y	Y	Y	N
Service Provider FF Admin	Y	N	Y	Y
Service Provider FF Operator	Y	N	Y	N
Service Provider SA Admin	N	Y	Y	Y
Service Provider SA Operator	N	Y	Y	N
Reseller Admin	Y	Y	Y	Y
Reseller Operator	Y	Y	Y	N
Reseller FF Admin	Y	N	Y	Y
Reseller FF Operator	Y	N	Y	N
Reseller SA Admin	N	Y	Y	Y
Reseller SA Operator	N	Y	Y	N
Customer Admin	Y	Y	Y	Y
Customer Operator	Y	Y	Y	N

Role	FF	SA	Read Permission	Update Permission
Customer FF Admin	Y	N	Y	Y
Customer FF Operator	Y	N	Y	N
Customer SA Admin	N	Y	Y	Y
Customer SA Operator	N	Y	Y	N

Figure 1: Role-Based Access Control Hierarchy



In the preceding figure, note that administrators of each level have access to the information in all hierarchy levels below them.

See the *Cisco Hosted Collaboration Solution Release 12.5 Customer Onboarding Guide* for more information.

Determine Country-Specific Dial Plans for Cisco Unified Communications Domain Manager 10.x/11.5(x)

In Cisco Unified Communications Domain Manager 10.x/11.5(x), a country dial plan consists of translation and route patterns to handle the following:

- All local, long distance, and international calls
- Emergency calls

- Call blocking based on class of service
- Call routing through local gateway and or central breakout

At the provider level, you need to determine the countries to be supported. By default, the base data and country dial plan model file package contains the dial plan model files for North America and Great Britain. If you are a service provider with a customer in another country, you must also plan to use country-specific dial plan model files.

If you are multi-country provider who requires multiple country dial plans, you need to determine the additional country dial plans required.

If a country-specific dial plan model file does not exist for the country, you can download the dial plan model file for a country that has a similar dial plan, and then customize it, or you can contact your Cisco representative to have a new country dial plan created.

Table 5: Country Dial Plans Available for Cisco Unified Communications Domain Manager 10.x/11.5(x)

Great Britain (GBR)	United States (USA)
---------------------	---------------------

If a new country dial plan is required, contact your Cisco representative for assistance. Provide the information that is outlined in [Plan a New Country Dial Plan](#) , on page 55 to your Cisco representative.



Note The available country dial plans adhere to the specific country dial plan rules and Cisco HCS model best practices. However, it is a service provider's responsibility to validate and fully test these country modules in the specific country prior to any commercial launch.

Plan a New Country Dial Plan

You can build your own country dial plan instead of using one of the country dial plan templates.



Note Do not modify the default models; contact Cisco for assistance.

If you need to create a new customized country dial plan, determine the information about your plan using this procedure. Contact your Cisco representative and provide the following information.

Procedure

Step 1

Gather basic contact information:

- Company name and ID
- Primary contact name, telephone number and email address

Step 2

Gather basic country dial plan information:

- ISO 3166 Alpha-3 country code. This is a 3-digit code. Example: Australia = AUS. Refer to <http://countrycodes.org/>.

- ISO 3166-1 Numerical country code, for example Belize = 84. Refer to <http://countrycodes.org/>.
- Dialing plan type:
 - OPEN—Uses different dialing arrangement for local and long distance telephone calls.
 - CLOSED—The subscriber's full number is used for all calls, even in the same area.

Step 3 Determine the user locale for the country.

<http://software.cisco.com/download/release.html?mdfid=284329957&flowid=33682&softwareid=282074333&release=9.0%281.1000-1%29&relind=AVAILABLE&rellifecycle=&reltype=all>

Step 4 Determine the network locale for the country.

These are the tones and cadence for a particular country. Default is English, United States. Network locale is identified in the Cisco Unified Communications Manager.

Step 5 Determine the PSTN access number used in the country.

The PSTN prefix is defined on a country basis. It is specified for each service provider for each country and applies to all customer locations in a country. When the caller dials a PSTN number with a PSTN access prefix (typically a 9 in the United Kingdom and United States), this tells the dial plan that the caller is making an off-net call. When the caller dials the PSTN breakout number, the dial plan routes the call to the correct PSTN breakout location, whether it is a central or a local PSTN gateway.

Step 6 Determine National Dialing prefix (NDD) used in the country.

The NDD prefix is the access code used to place a call within that country from one city to another (when calling another city in the same vicinity, this may not be necessary). Refer to http://www.exportbureau.com/telephone_codes/international_dialcode.html.

Step 7 Determine International Dialing prefix (International Direct Dialing) used in the country.

An international call prefix is the part of a telephone number used to dial out of a country when making an international call. It is synonymous with international access code or exit code. Refer to http://en.wikipedia.org/wiki/List_of_international_call_prefixes.

Step 8 Determine which of the following call types will be used for local breakout (LBO):

- International Dialing—Dialing to another country
- National Dialing—Dialing within the country
- Subscriber Dialing—Local dialing
- Emergency Dialing—Dialing to emergency services such as police, fire, ambulance
- Freephone/Toll free Dialing/Special Services—Any customers can dial the same number to reach a business subscribing to a number with no charge to the calling party. For example, 800 or 866 toll-free dialing in Canada and the United States, or Freephone service in most other countries.
- Mobile Dialing—In many countries, mobile phones are assigned dedicated mobile phone codes within the country's telephone numbering plan. Some countries that do not use area codes allocate specific number ranges to mobile phones that are easily distinguishable from landlines. One exception is the North American Numbering Plan which assigns subscriber numbers to mobile phones within geographic area codes, and are not easily distinguishable from landlines.
- Personal Communications Service (PCS) networking—Several types of wireless voice and wireless data communications systems, typically incorporating digital technology, providing services similar to

advanced cellular mobile or paging services. PCS can also be used to provide other wireless communications services, including services that allow people to place and receive communications while away from their home or office, as well as wireless communications to homes, office buildings and other fixed locations.

- **Premium Rate Dialing (blocked)**—Telephone numbers for telephone calls during which certain services are provided that create additional charges to the caller's bill. Blocking services are offered to allow telephone customers to prevent access to these number ranges from their telephones.
- **Service Calls**—Number assignments that are typically distributed to public safety professionals in order to resolve, correct or assist in a particular situation. This may be emergency services, or information or assistance services such as Operator assistance.

- Step 9** For each of the selected Call Types, determine which of the following prefixes you require (as many as apply):
- **Carrier Access Code (CAC)**—Gives telephone users the possibility of opting for a different carrier on a call-by-call basis - sometimes called 10-10 calls.
 - **Calling Line Identification Presentation (CLIP)**—Transmits a caller's number to the called party's telephone equipment during the ringing signal or when the call is being set up but before the call is answered.
 - **Calling Line Identification Restriction (CLIR)**— Enables restriction of the per-line calling line identification presentation setting.
 - **Combination CAC and CLIR.**
 - **Combination CAC and CLIP.**
- Step 10** For each pattern, determine if you want AllDay hours or StandardHours in this partition. The generic Cisco HCS model supports two time periods: AllDay (Monday - Sunday: 00:00 to 24:00) or StandardHours (Monday - Friday: 07:00 to 18:00).
- Step 11** For each pattern, determine if you want blocking in this partition.
- Step 12** Determine Carrier Access Code (CAC) if applicable. Gives telephone users the possibility of opting for a different carrier on a call-by-call basis. These consist of the digits 101 followed by the four-digit CIC. The CAC is dialed as a prefix immediately before dialing a long-distance phone number.
- Step 13** Determine subscriber (local dialing) dial plan patterns.
- Step 14** Determine service codes dial plan pattern, if applicable.
- Step 15** Determine Freephone /Toll Free dial plan patterns, if applicable.
- Step 16** Determine Premium Dialing dial plan patterns, if applicable.
- Step 17** Determine Mobile Dialing dial plan patterns, if applicable.
- Step 18** Determine Carrier Select dial plan patterns, if applicable.
- Step 19** Determine Special Rate dial plan patterns, if applicable.
- Step 20** Determine Personal Communications Service (PCS) Number dial plan patterns, if applicable.
- Step 21** Determine if you require Calling Line Identification Presentation (CLIP) If applicable. Transmits a caller's number to the called party's telephone equipment during the ringing signal or when the call is being set up but before the call is answered.
- Step 22** Determine your Primary Emergency Number.
- Different countries around the world have a single emergency number that is used throughout the entire country; for example, 911 in the USA, 999 in the UK, and 000 in Australia. If your country has several emergency numbers, you need to know the most important emergency number.

- Step 23** Determine the three highest priority emergency numbers.
- Step 24** Determine the rest of the emergency numbers required (as many as apply to a maximum of 12).
- Step 25** Determine whether each pattern is needed for Survivable Remote Site Telephony (SRST).
- Step 26** Determine if you plan to enforce E.164 rules for a new country dial plan. If yes, determine the following:
- Minimum area code length
 - Maximum area code length
 - Minimum local number length
 - Maximum local number length
- Step 27** Determine if you want outgoing prefix digits converted to E.164.
- Step 28** Determine if you want Cisco to manage routing transformation for the called number.
- Note** If you want customized routing, you will need to contact Cisco Advanced Services.
- Step 29** Determine if you want Cisco to generate a Plus Dialing National pattern.
- Step 30** Determine if you want Cisco to generate a Plus Dialing International pattern.

Determine Customer Dialing Requirements for Cisco Unified Communications Domain Manager 10.x/11.5(x)

1. If you selected Type 1 to Type 3 Dial Plan model, determine Site Location Code (SLC) for the customer.
2. For Type 1 Dial Plan, determine if intersite prefix (ISP) is used (Optional) and the ISP number for the customer. For Type 2, determine the ISP number for the customer. This information will be required during customer onboarding.

The ISP is a single digit number in the range 0 to 9 and must be unique within the customer's network. The ISP is deployment-configurable to any value, but must not overlap with the PSTN dialing prefix or emergency number. The ISP is an optional configurable value within a customer's dial plan.



Note Customer-wide means that the same ISP must be used for all of a customer's sites. If the first site that is provisioned begins with the digit 8, then all other sites should also begin with the digit 8. Under one service provider, you can have the ISP as 7 for one customer and 8 for another customer.

Determine Extension Addressing for Cisco Unified Communications Domain Manager 10.x/11.5(x)

When planning to add a site, determine extension addressing to specify how many digits are used to identify extensions.

Extension number ranges chosen should not overlap with the intersite prefix or with the PSTN access number. To prevent overlap, do not use extension number ranges starting with a PSTN access prefix such as 9, or the

chosen intersite prefix, commonly 8. Overlap between extension numbers and the emergency number at any location must be avoided.

Refer to the following table for an example directory number format for the Type 1 to 3 dial plans. Note that a standalone ISP is not supported, but instead, you would implement the ISP as the first digit of the Site Location Code (SLC) (shown as 8 in the table). You can also have various digits as the first digits of the SLC; an ISP does not have to be used.

Table 6: Type 1 to Type 3 Dial Plan example directory number format

Customer	SLC	Extension	Cisco Unified Communications Manager Configured DN range
Customer 1			
Site 1	80101	1000-1999	801011000-801011999
Site 2	80102	2000-2999	801022000-801022999
Customer 2			
Site 1	80201	1000-1999	802011000-802011999
Site 2	80202	2000-2999	802022000-802022999

Refer to the following table for an example directory number format for the Type 4 dial plan. Note that the number range is not site-specific. Extension numbers can be comingled; some of the numbers from Location 1 can be assigned to Location 2 and vice versa.

Table 7: Type 4 Dial Plan example directory number format

Customer	Extension	Example of a DN configured on Cisco Unified Communications Manager
Customer 1		
Site 1	16023421000-16023429999	16023429236
Site 2	13363421000-13363429999	13363425022
Customer 2		
Site 1	12123423000-12123423999	12123423044
Site 2	2000-2999	2050

Determine Voice Mail Numbering in Cisco Unified Communications Domain Manager 10.x/11.5(x)

Determine the voice mail numbering scheme for forwarding calls to voice mail and accessing voice mail messages from the PSTN. For each Cisco Unified IP Phone line that exists on the leaf cluster that requires

voicemail, there is also a voice mailbox definition on the Cisco Unity Connection. On Cisco Unity Connection, the voice mailbox definition is associated to the telephony integration/leaf cluster that contains the line definition. The leaf clusters have a voicemail Pilot Number defined that helps to route calls to the Cisco Unity Connection. With this scenario, each leaf cluster can use the same number for the voicemail pilot number.

Determine if you require a short code (internal speed call number) for voice mail access. For Cisco Unified Communications Domain Manager 10.x/11.5(x), short code dialing customization requirements are specified by the administrator at the customer level.

Determine Time of Day Routing

The Dial Plan Model is completely customizable at the customer level. Each custom time schedule appears on the Cisco Unified Communications Manager Admin Time Schedule as a customer ID-name given to the schedule (for example CU7-workdayschedule).

Determine Class of Service and Restrictions in Cisco Unified Communications Domain Manager 10.x/11.5(x)

Cisco Unified Communications Domain Manager uses class of service to assign calling restrictions to an end user. The class of service is mapped by the dial plan model to a calling search space and partitions that are understood by Cisco Unified Communications Manager.

For Cisco Unified Communications Domain Manager 10.x/11.5(x) customers, Classes of Service are defined at the customer level and can be used site-to-site. Call Types and Route Options (Allowed, Blocked) are defined for the Class of Service. When Class of Service is specified for a particular site (must have been previously defined in "Add a Class of Service" and "Define Call Types" at the site level, this sends partitions, translation patterns and calling search spaces to the Cisco Unified Communications Domain Manager.



CHAPTER 9

Unified Communications Application Planning

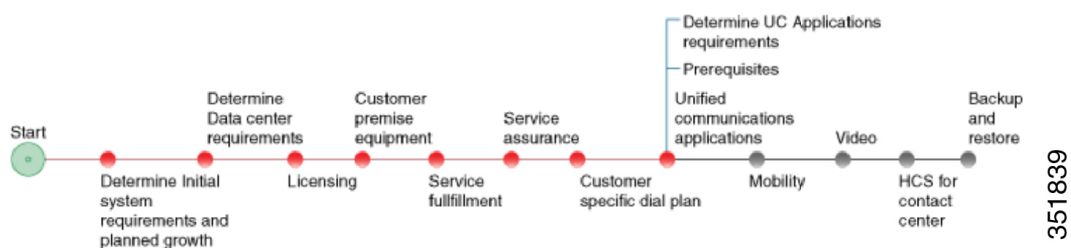
- Prerequisites, on page 61
- UC Applications Workflow , on page 61
- Determine UC Applications Requirements, on page 62

Prerequisites

Before you plan the UC applications processes for your Cisco HCS installation, make sure that you:

- Review the *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide*.
- Have completed the actions outlined in previous sections of this guide including:
 - Initial system requirements and planned growth
 - Data center requirements
 - Licensing
 - Customer premise equipment
 - Service fulfillment
 - Service assurance
 - Customer-specific dial plan

UC Applications Workflow



Determine UC Applications Requirements

Procedure

Step 1 Identify customer size.

This size relies on the choice of deployment model.

For instance, if you anticipate a low usage for voicemail, for example, consider partitioning Cisco Unity Connection while keeping Cisco Unified Communications Manager and Cisco Unified Communications Manager IM and Presence Service dedicated to one server.

Step 2 Based on criteria collected, determine if the system requires central aggregation or if only local breakout is required.

Step 3 Determine redundancy consideration based on your data center.

Based on previous steps, you should have made some decisions about redundancy for your system. You will also need to take these factors into consideration specific to your customers. To streamline your processes, you may decide to have every customer set up the same. Alternatively, if you need more flexibility, you may decide to address each customer and each customer site on a case-by-case basis. For local sites, be sure to consider using SRST.

Step 4 Determine requirements for applications and services

Detailed background information about each of these applications is described in the *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide*.

a) Cisco Unified Communications Manager

You can set up your Cisco Unified Communications Manager in a number of different ways, depending on your deployment model. Consider the following:

- Decide if you want the Cisco Unified Communications Manager to reside on a dedicated server or a shared server. For more information on the different deployment models and the differences, see [Determine Your HCS Data Center Deployment Model](#), on page 8.
- Call admissions control
- Dial Plan
- Voice gateways
- SIP trunks
- Media resources

Consider these factors concerning media resources:

- The various resources for either local Customer Premise Equipment (ISR based), data center-based or software-based system deployment.
- Conference Hardware for ad-hoc video conferencing.
- Bandwidth considerations for non-local resources.

- LDAP

Decide if you plan to have LDAP synchronization enabled. With synchronization, consider what information you want to synchronize initially and what information comes across in the subsequent synchs. If the LDAP server does not have synchronization enabled, then the administrator should ensure consistent configurations across Unified Communications Manager and LDAP when configuring user directory number associations. You also need to consider LDAP for endpoints as well as authentication purpose, and location of LDAP, whether on premises provided by customers or in your data center. There are also NAT considerations for location of LDAP.

- Extension Mobility

- Attendant Console

- Cisco Paging Server - also known as Singlewire - InformaCast Basic Paging

b) Cisco Unity Connection

You can set up your Unity Connection in a number of different ways, depending on your deployment model. Consider the following:

- Decide if you want the Unity Connection to reside on a dedicated server or a shared server. For more information on the different deployment models and the differences, [Determine Your HCS Data Center Deployment Model](#), on page 8.

- Partitioned Unity Connection

Decide if you want to partition Unity Connection to support multiple small medium businesses as tenants on a single Cisco Unity Connection installation. For more information on partitioned Unity Connection, see [Partitioned Unity Connection](#), on page 10.

- Voice messaging.

Depending on how flexible you want the system to be, consider integrated messaging versus unified messaging.

c) Cisco Unified Communications Manager IM and Presence Service

Your Cisco Unified Communications Manager IM and Presence Service can be set up in a number of different ways, depending on your deployment model. You will want to consider aspects such as compliance and logging. Also, consider the following:

- Cisco Unified Communications Manager IM and Presence Service and federation consideration for MSFT .

- Cisco Unified Communications Manager IM and Presence Service inter-domain federation.

d) Cisco Emergency Responder.

e) Attendant Console (CUAC).

Step 5

Determine requirements for software endpoints, such as Jabber.

a) Determine E911 support for mobile clients, factoring in capacity impacts. You can find more details about capacity in the *Cisco Hosted Collaboration Solution Capacity Planning Guide*.

You have two different choices for determining the support for E911:

- Inform users if 911 will not work.

- Force users to identify the location. With the location information, the system can either find an location to connect the emergency services or have the phone alert the user that they are not allowed to place the call.

Make sure that you understand what you are required to do from a legal perspective. Your requirements will depend on the size of company, type of service, and so forth.

- b) Determine support for software install and upgrade of mobile and desktop clients.
- Phone support: Determine the clients that you plan to support, such as user downloading clients from the Apple app store or Google Play.
 - Desktop client support: Determine the software applications that you plan to support. These applications are stored on servers, and will factor into your data center planning. For more details on data center requirements, see [Determine Data Center Requirements](#) , on page 16.
-



CHAPTER 10

Mobility

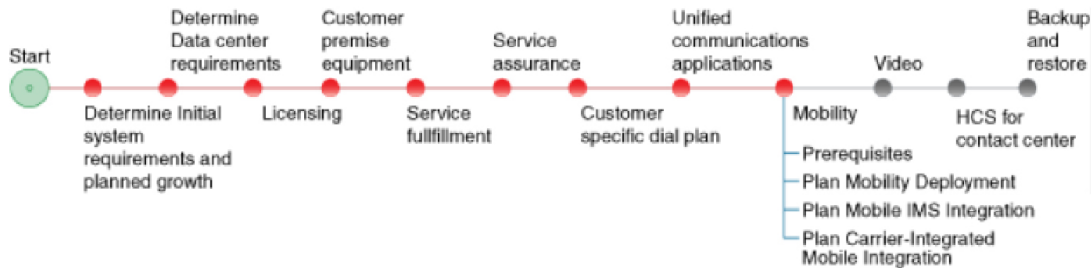
- [Prerequisites](#), on page 65
- [Mobility Workflow](#), on page 66
- [Plan the Mobility Deployment](#), on page 66

Prerequisites

Before you plan the mobility deployment, make sure that you:

- Review and have access to the *Cisco Hosted Collaboration Solution Release 12.5 Solution Reference Network Design Guide*. Review these specific sections:
 - “Mobility” in the Applications chapter
 - “IMS network integration” in the Network infrastructure chapter
- Complete the actions outlined in previous sections of this guide including:
 - Initial system requirements and planned growth
 - Data Center requirements
 - Licensing
 - Customer premise equipment
 - Service fulfillment
 - Service assurance
 - Unified Communications applications

Mobility Workflow



Plan the Mobility Deployment

Procedure

- Step 1** Determine which mobile networks that you will support. Cisco HCS offers the following network choices:
- Carrier-integrated mobile
 - IP Multimedia Subsystem (IMS)
 - VoLTE and 4G
 - WiFi
- Step 2** Determine the mobility offerings for your Cisco HCS deployment model.
- Determine how you want to implement mobility in your deployment.
 - Determine how Cisco HCS integrates with the mobile network. Different integrations have different ways of obtaining the call from the mobile network, for example, Intelligent Network trigger or routing configuration.
- Step 3** Determine the mobility endpoints that will be provisioned.
- Jabber.
 - Users will want a VPN when they are outside of the enterprise network.
 - Carrier-integrated mobile.
 - WiFi.
- See the *Cisco Hosted Collaboration Solution Release 12.5 Features for Cisco Unified Communications Manager* at http://www.cisco.com/en/US/partner/products/ps11363/prod_maintenance_guides_list.html for more information on endpoints.
- Step 4** Identify the UC application-based mobility features to be implemented.
- Dial via Office Reverse Callback
 - Dial via Office Forward

- Reroute Remote Destination Call to enterprise network
- Mobile Connect
- IVR
- Enterprise Feature Access
- Redial
- Hand-in
- Hand-out
- Least Cost Routing with Dial via Office Reverse Callback
- Least Cost Routing with Dial via Office Forward
- Send Call to Mobile
- Session Handoff

Step 5 Identify the cloud-based collaboration applications to implement with Cisco HCS.

Webex, the Cisco Collaboration cloud-based infrastructure, is a collaboration solution that does not require any hardware deployment on the enterprise premises. All services (audio, video, and content sharing) are securely hosted in the Internet or the cloud. All the content, voice, and video traffic from every client traverses the Internet and is mixed and managed in the cloud at the Webex data center.

The Cisco Collaboration cloud infrastructure provides WebEx capabilities to mobile clients and devices. Webex Meetings provides web-based voice and video conferencing with content sharing. Webex Messenger provides XMPP-based IM and presence as well as point-to-point audio and video calling.



CHAPTER 11

Video

- [Prerequisites](#), on page 69
- [Video Workflow](#), on page 69
- [Plan the Video Network](#), on page 70

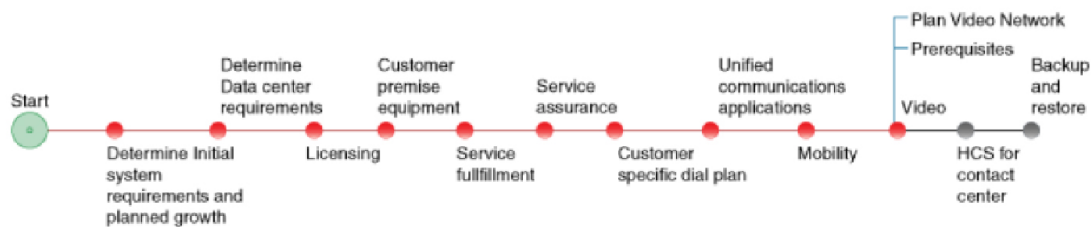
Prerequisites

Before you plan the video deployment, make sure that you review 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 requirements
- Licensing
- Customer premise equipment
- Service fulfillment
- Service assurance

Video Workflow



Plan the Video Network

Procedure

-
- Step 1** Cisco Hosted Collaboration Solution supports dedicated deployment of Video Conferencing on a per tenant basis using TMS, Conductor, and Telepresence Servers (virtual and Physical). Determine whether you intend to offer dedicated TP services along with Centralized TP services using CTX.
- Step 2** Plan the capacity requirements for dedicated and shared deployment.
- Step 3** Determine the inter-enterprise and intra-enterprise networking requirements for video dialing.
- Determine if you want to allow video calls between enterprises. To allow outside video calls, set up your video network and set up the SBCs to allow users to place calls outside of the enterprise.
 - Decide if you want to do the inter-enterprise routing within the SBC or in the service provider's softswitch.
 - Consider policies on selectively enabling inter-enterprise video dialing.
 - Investigate and understand the limitations of Lawful Intercept (LI) for inter-enterprise video dialing and the LI exemption for video dialing.
- Step 4** Determine if you will use scheduled conferencing or virtual meeting rooms.
- Cisco offers virtual meeting rooms only for Cisco HCS. Scheduled meetings with Cisco HCS are done through a third-party portal. This portal is supported, but is not validated.
- Scheduled Conferencing, Rendezvous Conferencing, and Adhoc Video Conferencing are supported when there are dedicated deployments of Conductor, TMS, and TelePresence servers. For CTX-based Video deployment, Scheduled Video Conferencing is not natively supported in HCS. However, with the use of a third-party portal with CTX, Scheduled Conferencing can be supported.
- If you are planning for a third-party portal, evaluate the third-party portal and validate it against your requirements.
- Step 5** Determine your port capacity for video conferencing based on the following estimations. These estimates provide you with an estimate of the number of users that are expected to take part in a video conference at any time. Base these considerations on whether a centralized or dedicated video conferencing solution is being planned.
- Number of customers using video conferencing.
 - Number of video endpoints each customer will use.
 - Number of simultaneous video conferences that you expect.
 - The average number of participants in each video conference.
 - Average duration of video conference.
- Use the following calculation to determine the port capacity.
- Number of ports needed. This is the (number of video-enabled customers) x (number of simultaneous video meetings per customer) x (number of participants per meeting) x (average number of ports per participant).
 - For example: (10 customers) x (2 simultaneous meetings per customer) x (6 participants per meeting) x (1 port per participant) = 120 ports.

The average number of ports per participant must take into account the distribution of different types of endpoints (number of screens), the quality of the video (HD, SD, Audio only), and presentation sharing. Each port is assumed to provide a 1080p HD quality video.

Step 6 Determine the type of video endpoints supported in the network.

- Immersive video endpoints.
- Nonimmersive video endpoints.

Immersive video endpoints enable the best possible in-person TelePresence video collaboration experience, where attendees across multiple locations feel as though they are in the same room. Due to the high quality of the video media, immersive video endpoints consume higher amounts of bandwidth and network resources than nonimmersive video endpoints.

Step 7 Determine whether to provide video dialing between different service providers.

- To provide video dialing between different service providers, set up the SBC to provide connectivity between the different service providers.
- Make sure that agreements and routing policies are in place for interprovider video dialing.

Step 8 Determine whether you want to support over-the-top (OTT) connectivity for guest clients from other enterprises and integrate Microsoft Lync along with Dedicated Video Conferencing with Conductor/TMS/Virtual TS.

You can use Cisco Expressway to set up connectivity.

Step 9 Determine if you need to transcode codecs within your video network.

- If yes, you need to implement the Cisco TelePresence MSE 8710 server for transcoding.
- If no, you can use Multipoint Switch (CTMS). CTMS is a less expensive option than the MSE, but DTLS is not supported with CTMS. Any CTX-based calls are unsecure if you choose CTMS.

Step 10 Determine your bandwidth and QoS requirements for video, using the following information:

- Number of ports
- Number of endpoints
- Immersive or nonimmersive video.

Note Immersive video has higher bandwidth requirements.

- Types of endpoints.

Use the following guidelines to evaluate bandwidth requirements:

- For every (shared) three-screen TelePresence room at 1080p, add 16.7 Mbps (assumes 100-percent utilization because these are shared services).
- For every single-screen TelePresence at 1080p, add 4.5 Mbps (assumes 100-percent utilization).
- For every single-screen TelePresence at 720p, add 1.68 Mbps (assumes 100-percent utilization).
- For shared EX90 at 720p, add 1.5 Mbps (assumes 100-percent utilization).
- For personal (nonshared) EX90 at 720p, add 136 Kbps (assumes much lower utilization).

Step 11 Determine your security requirements for signaling and media.

- TLS for signaling encryption.
- DTLS for media encryption.
- SRTP media encryption.

Step 12 Determine the CTX model to use.

- Starter Package—If you choose the Starter Package, there is a maximum of 250 ports with no active meeting management license. Active video calls are not preserved. ACE is not required with the Starter Package.
- Classic Package—If you choose the Classic Package, ACE is implemented.

Step 13 Consider the following when determining networking requirements:

- Data Center Network for video infrastructure.
 - VLANs.
 - Virtual routing and forwarding (VRF).
 - TPaas network devices and applications which are deployed in a shared environment.
-



CHAPTER 12

Backup and Restore

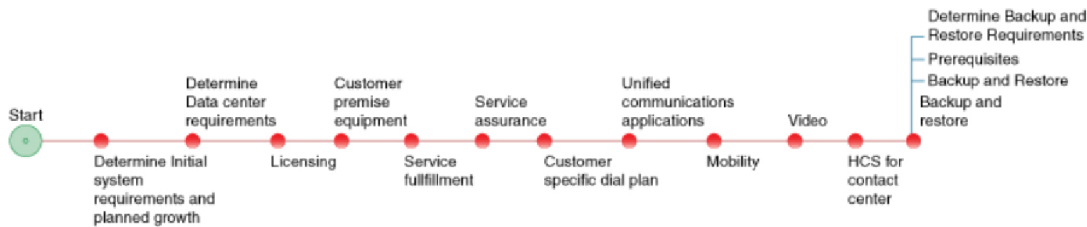
- [Prerequisites, on page 73](#)
- [Backup and Restore Workflow , on page 74](#)
- [Determine Backup and Restore Requirements , on page 74](#)
- [Backup Strategy, on page 76](#)

Prerequisites

Before you plan the backup and restore processes 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*.
- Review and have access to the *Cisco Hosted Collaboration Solution Release 12.5 Maintain and Operate Guide*.
- Complete the actions outlined in previous sections of this guide including:
 - Initial system requirements and planned growth
 - Data center requirements
 - Service fulfilment requirements
 - Service assurance requirements
 - Customer specific dial plan
 - Unified Communications Applications
 - Mobility
 - Video
 - HCS for Contact Center

Backup and Restore Workflow



Determine Backup and Restore Requirements

Procedure

Step 1 Determine which backup and replication technologies you will use in your system. You may have the following options:

- Consolidated Backup, which is the least expensive option but with the slowest recovery time.
- High availability storage networks--A storage area network (SAN) can overcome local server failures by providing access to a standby or clustered server system to ensure continuous operation.
- Remote point-in-time update replication--Point-in-time update replication copies the changes made to data in another building or city. The system can replicate changes at scheduled times during the day or whenever changes occur. With no latency limitations to overcome, this technology accommodates any distance requirements. It offers faster recovery times than tape backup, but it cannot guarantee zero data loss.
- Synchronous disk replication--Suitable for applications that require the fastest recovery with zero data loss. This method synchronously copies all disk writes to a remote site across a high-performance network before a transaction is acknowledged, eliminating any transaction loss. This technology is sensitive to network latency, which limits the practical distance between sites.
- Asynchronous replication--Offers significantly lower data loss than point-in-time update replication and reduces bandwidth costs compared to synchronous replication. Asynchronous replication allows the primary and remote copies to be out of synchronization by a range of seconds to minutes.

Step 2 Include these operational parameters in your planning:

- Backup frequency--Depends on the frequency of changes in the network. Changes may include platform configurations or user data provisioning activities. Schedule additional backups before any major configuration and software updates.
- Disk space requirements--Calculated by multiplying the frequency of backups and disk space requirements per backup by the number of backups the service provider maintains per UC cluster, as specified in the Service Level Agreement (SLA).

- Backup and restore duration--Depends directly on the amount of disk space required for the backup or restore and the network bandwidth. Frequent backups and restores can adversely affect network traffic performance.
- Input/output operations per second (IOPS)--Used to determine backup demands on the system. The higher the IOPS, the faster that the backups are completed.

Step 3 Determine your FTP server usage. We recommend that you have a dedicated FTP server (or dedicated servers) per UC cluster. Schedule HCS component backups so that they do not overwhelm FTP server input/output operations per second (IOPS) capabilities and available bandwidth.

Step 4 Plan to use the Cisco Disaster Recovery System (DRS) for the Unified Communications applications. Be aware of the following when using DRS:

- Use DRS in coresident mode to back up and restore Unified Communications Manager and Cisco Unity Connection. In the current DRS release, IM and Presence Service servers must be backed up and restored separately.
- Each backup of a UC application is considered as one backup.
- DRS does not delete or overwrite phone images if DRS is used with upgrades, so disk space requirements will vary with each Unified Communications Manager upgrade.
- Consider scheduling backup and restoration tasks during off peak hours.

Step 5 Plan to use Platform Manager in conjunction with DRS for these applications: Cisco Unified Communications Manager IM and Presence Service, Cisco Unified Communications Manager, Cisco Unity Connection, and Cisco Unified Contact Center.

Be aware of the following when using DRS:

- When setting up server groups, all of the servers in a particular group must have the same product. For example, you cannot mix Cisco Unified Communications Manager and Cisco Unified Communications Manager IM and Presence Service nodes in the same server group.
- After you schedule backups on your servers and configure all of your servers and server groups within Platform Manager, you can manage and monitor backup tasks of your system using the Backup Schedule feature to perform DRS backups on groups of servers.

Step 6 You may also use virtual machine (VM) backups. Full VM backups include both the binaries and configuration data, while DRS backs up only the configuration data of the application. For information on how to perform a full VM backup, refer to <http://www.VMware.com>.

VM backup options consist of the following:

- A crash-consistent backup includes an entire virtual machine while it is running, and there is no shutdown of the application for the backup.
- An application-consistent backup includes an entire virtual machine when the VM is powered off, or if the application can and does quiesce before the backup.
- A full VM backup is any backup done on a full virtual machine. It might be crash-consistent or application-consistent.
- The VMware Data Recovery (VDR) feature backs up entire virtual machines, in other words, a full VM backup.

Note Full VM backups are not a replacement for Cisco DRS and are not supported as backup of the application, only as a method to recover the VM quickly without having to deploy from ISO or Template. Customers must take DRS backups to protect and restore the configuration and data within the application.

Step 7 Consider these disk and time requirements for backups:

- Network and data center element backups require 1 to 10 kilobytes of disk space per device.
- Assuming appropriate bandwidth availability (10/100 Mbit/sec or higher), a network and data center element restore can take from 3 to 15 seconds.

Step 8 If using Micro Node deployment, plan for the following:

- Dedicate one or more C-series servers to host FTP servers, using the C-series server disk (local storage) for backup.
 - Provide for offsite backup to address Data Center loss.
 - You can back up multiple applications to the same FTP server, but do not store a backup on the same server (disk) that hosts the application or component itself.
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Backup Strategy

You need to develop a Backup and Restore plan to match your implementation by reviewing the components in your implementation to identify the backup requirements and sequence for backups. Refer to the *Cisco Hosted Collaboration Solution Release 12.5 Maintain and Operate Guide* to identify the components that are backed up occasionally and those that are backed up daily.

Procedure

Step 1 Group the components in your deployment under the following groups:

- Data Center Infrastructure Components
- Aggregation / Shared Component Elements
- Cisco HCS Service Fulfillment
- Cisco HCS Service Assurance
- Cisco UC Applications
- Endpoints
- SRST and Voice Gateways Components
- Cisco HCS for Contact Center Components
- Third Party Applications

The components in each group have similar backup requirements.

Step 2 Review the component tables in the *Cisco Hosted Collaboration Solution Release 12.5 Maintain and Operate Guide* to identify and record the backup requirements for the components in your installation.

Step 3 For components that require occasional backup, identify the backup mechanism you will use.

Step 4 For components that require frequent (daily) backup, identify the backup mechanism you will use.
