Initial System Requirements Planned Growth

Prerequisites

Before you plan the initial system requirements and planned growth for the Cisco Hosted Collaboration Solution (HCS). To make sure you have seen the Collaboration Sizing Tool at tools.cisco.com/cucst

You should also review the following documents:

- *Cisco Hosted Collaboration Solution, Release 10.6(1) Solution Reference Network Design Guide*

- *Cisco Hosted Collaboration Solution, Release 10.6(1) Capacity Planning Guide*

Initial Requirements Workflow
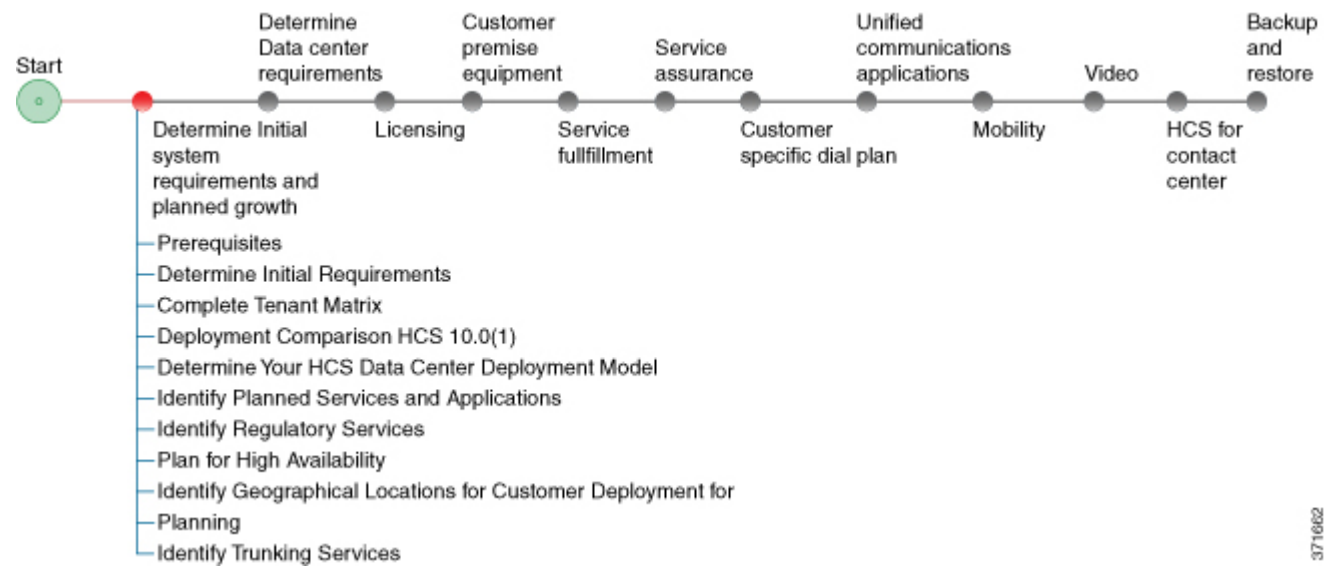
Determine Initial Requirements

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 below. This section provides additional information for you to consider during planning, however 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 3

Step 2   Determine Your HCS Data Center Deployment Model , on page 7

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

Step 8 Plan for growth and the customer premise equipment site.
For more details, see Customer Premise Equipment

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 Partner is a company that purchases or leases HCS equipment from Cisco. The Partner enlists customers on the same HCS system, and these customers of the Partner are referred to as tenants and therefore, one Partner 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:

```
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:

```
Percentage Distribution_Size_N = Number Tenants_Size_N / Total_Number_of_Tenants
```

For example, Percentage Distribution_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:

```
Avg_Wt_Size_N = Percentage Distribution_Size_N * 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

You can deploy the Cisco HCS solution on any of the data center infrastructure models: Large PoD, Small PoD, or Micro Node. Review the following table to see a comparison of the different options available for each deployment model.

---

[1] * Tota; 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.

Table 4: Comparison—Data Center Infrastructure Models

Function or Product	Large PoD	Small PoD	Micro Node
Number of tenants***	Up to 940	Approximately 80 **Note** Storage switches such as Cisco MDS 9000 switches are optional and are not required for Small PoD deployments.	Up to 20
Aggregation	Nexus 7000, Nexus 9396, Nexus 9508	Nexus 5500	Nexus 5500
Cisco Unified Compute System (UCS)	UCS with B-series blades	UCS with B-series blades	UCS C-series servers
Storage	Fabric interconnect, SAN or NAS storage	Fabric interconnect, SAN or NAS storage	DAS (Local) storage
Media/Signaling Anchoring Device	Cisco Unified Border Element (SP Edition) or Perimeta SBC	(Optional) Cisco Unified Border Element (SP Edition) or Cisco Unified Border Element Enterprise Edition** or Perimeta SBC	(Optional) Cisco Unified Border Element Enterprise Edition)** (Two if redundancy is required) or Perimeta SBC
Security	ASA 5585-X	ASA 5555-X	ASA 5555-X
(Optional) Site-to-Site VPN Concentrator	ASR 1000	ASR 1000	ASR 1000
(Optional) Line Side Access	Cisco Unified Border Element Enterprise Edition for Cisco ASR 1000 Series	Cisco Unified Border Element Enterprise Edition for Cisco ASR 1000 Series	Cisco Unified Border Element Enterprise Edition for Cisco ASR 1000 Series
(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	Expressway-C and Expressway-E on UCS C-series
(Optional) Cisco Expressway	Expressway-C and Expressway-E on UCS B-series	Expressway-C and Expressway-E on UCS B-series	Expressway-C and Expressway-E on UCS C-series
Cisco Prime Collaboration Assurance available	Yes	Yes	Yes*
(Optional) Shared Instance	Yes	Yes	Yes
(Optional) Dedicated Instance	Yes	Yes	Yes
(Optional) OTT Remote Access with Expressway	Yes	Yes	Yes

Function or Product	Large PoD	Small PoD	Micro Node
(Optional) Shared RMS with Expressway	Yes	Yes	Yes
(Optional) Jabber Guest	Yes	Yes	Yes
(Optional) WebEx CCA	Yes	Yes	Yes
(Optional) Business to Business Video through Shared Expressway	Yes	Yes	Yes

**Cisco Unified Border Element Enterprise Edition for the enterprise version is suitable for a small number of clusters because a separate Cisco Unified Border Element Enterprise Edition is needed for each cluster (one Cisco Unified Border Element Enterprise Edition can support multiple customers in one shared instance cluster). When a large number of clusters are in the Micro Node, Cisco Unified Border Element (SP Edition) or Perimeta SBC with large enterprises, may provide better operational flexibility and cost benefits.

*Micro Node deployments only support Cisco Prime Collaboration Assurance with two virtual machine server instances.

Determine Your HCS Data Center Deployment Model

Review the detailed descriptions of each type of deployment in the *Cisco Hosted Collaboration Solution, Release 10.6(1) Solution Reference Network Design Guide* and the *Cisco Hosted Collaboration Solution, Release 10.6(1) 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.

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 10.6(1) 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) **HCS Extender**

Consider this option if you want to have some or all of the Unified Communications applications on premises and some constraints on the server types, ESXi, C-series servers, and so on. Central breakout is also supported with this option. This option provides flexibility and is described in detail in the "HCS Extender" section of the *Cisco Hosted Collaboration Solution, Release 10.6(1) Solution Reference Network Design Guide*.

c) **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.

d) **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.

If your assumptions and considerations do not help to identify the accurate OVA sizes, information from the Ordering Tool can help validate your system information. For more information about the tool, see http://www.cisco.com/en/US/partner/docs/voice_ip_comm/hcs/9_2_1/Renditions/GSS_Ordering_Tool_Guide_for_Hosted_Collaboration_Solution.pdf.

Small Medium Business Solutions

The classic Cisco HCS data center infrastructure model includes Nexus 7000 switches, SAN, UCS with B-series blade servers, Cisco Unified Border Element (SP Edition) or Perimeta 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 partners.

For service providers with less than 940 customers, 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: Large PoD, Small PoD, or Micro Node.

The Cisco HCS small/medium business solution also supports both Dedicated Instance and Shared Instance models for applications.

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.

Shared Instance

In the HCS small-to-medium business environment, the Shared Instance model of applications is supported, where multiple small customers can be served by one Cisco Unified Communications Manager cluster. This approach reduces the hardware and operational costs for smaller customer sizes. The Cisco Unified Communications Domain Manager customer-based provisioning capability is used, along with the Shared Instance G3 dial plan. With Shared Instance, you get a much better resource utilization for smaller customer

deployments. You can enable Shared Instance on any of the data center infrastructure models: Large PoD, Small PoD, or Micro Node.

Figure 1: Shared Instance Deployment
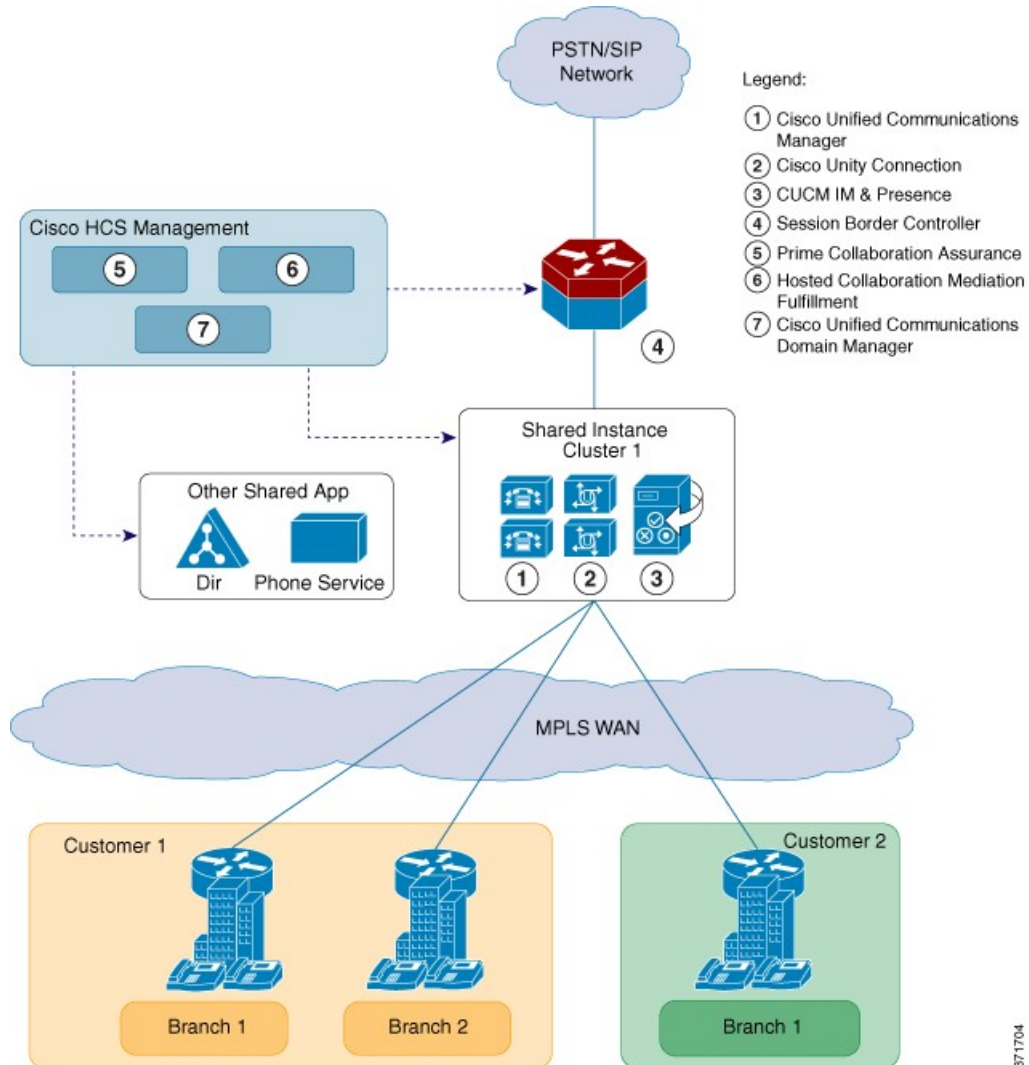
In this approach, one Cisco Unified Communications Manager instance has multiple customers, each in their own partitions, and the dial plan forces inter-customer calls to go through the telephony aggregation layer and service provider softswitch. Similarly, one instance of Cisco Unified Communications Manager IM and Presence Service also can be shared by multiple customers.

With the Share Instance deployments, OTT Remote access is supported through the Cisco Unified Border Element Enterprise Edition or the Cisco Expressway.

Note The Shared Instance approach has feature restrictions and customer requirements that should be carefully considered. For details on these restrictions, see the *Cisco Hosted Collaboration Solution, Release 10.6(1) Features for Cisco Unified Communications Manager*.

Shared Instance and Management

When multiple customers are supported in one Cisco Unified Communications Domain Manager 8.1(x) cluster, the following management guidelines apply:

- In a Cisco HCS management, both Shared Instance clusters and Dedicated Instance clusters are supported.

- Cisco HCS Management services to customers on a Dedicated Instance Cisco HCS cluster are not affected.

- Cisco HCS Management services to customers on a Shared Instance cluster may not be fully available; refer to workarounds and restrictions described in the deployment model descriptions later in this chapter.

- A single Cisco Unified Communications Domain Manager 8.1(x) can manage both types of clusters (Dedicated and Shared Instance) in one Cisco HCS deployment.

- In order to support both shared and dedicated clusters on the same Cisco Unified Communications Domain Manager 8.1(x), Cisco recommends that you create two different service providers. You can, however, support a single customer in one cluster with the same Shared Instance dial plan with just one service provider created on Cisco Unified Communications Domain Manager 8.1(x).

Shared Instance and Cisco Unified Communications Manager

The following Cisco Unified Communications Manager guidelines apply to deployments with Shared Instance:

- In Shared Instance, customers are provisioned in their own partitions. Provisioning through Cisco Unified Communications Domain Manager with Shared Instance dial plan ensures customer separation.

- Dial plan is modified to support Shared Instance. A Shared Instance (G3) Dial Plan is added for Cisco Unified Communications Domain Manager 8.1(x), and there are some restrictions with the Shared Instance (G3) Dial Plan. For example, ISC trunks are not supported in G3. For more information, refer to the appropriate version of the *Cisco Hosted Collaboration Solution, Release 10.6(1) Dial Plan Management Guide for Cisco Unified Communications Domain Manager, Release 8.1(x)* for your system, available at http://www.cisco.com/c/en/us/support/unified-communications/hosted-collaboration-solution-hcs/products-installation-and-configuration-guides-list.html.

- Dial plan is modified for Cisco Unified Communications Domain Manager 10.6(1). There are four basic pre-defined call types supported:

  ◦ 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)

The four dial plan model types supported in Cisco Unified Communications Domain Manager 10.6(1) encompass all the functionality that was available on the previous Dial Plan Model, but in order to offer flexibility for partners, the four types can be extended to develop custom schemas. Customization is managed through discrete, selectable elements in Cisco Unified Communications Domain Manager 10.6(1).

- Inter-customer calls on the Shared Instance are not natively completed, but routed through the PSTN aggregation layer for Lawful Intercept and regulatory reasons.

- Cisco Unified Communications Domain Manager provides customer separation for feature provisioning purposes. The features under Location in Cisco Unified Communications Domain Manager (hunt groups, pickup group, and so on) ensure that customer specific attributes (such as partitions and group codes) are used while provisioning the Cisco Unified Communications Manager. While the function of Cisco Unified Communications Domain Manager is the same for Dedicated or Shared Instance, it is essential for Shared Instance because Cisco Unified Communications Manager provides the separation between customers based only on these attributes (partitions, codes, and so on). In Dedicated Instance, the question of customer separation does not arise because there is only one customer.

For more information on the Shared Instance features, see the *Cisco Hosted Collaboration Solution, Release 10.6(1) Features for Cisco Unified Communications Manager*.

Shared Instance and Cisco Unified Communications Manager IM and Presence Service

The following restriction applies to Shared Instance and Cisco Unified Communications Manager IM and Presence Service:

- LDAP Directory is recommended for Cisco Jabber contact resolution. With Cisco Unified Communications Domain Manager 8.1(x), LDAP Directory must be in the service provider domain. With Cisco Unified Communications Domain Manager 10.1(x), LDAP Directory can be in the service provider domain or customer domain. Note that Cisco Unified Communications Domain Manager 10.1(x) supports syncing with multiple LDAP Directories, so each customer can have separate directories in the customer domain. Note that Expressway does not support LDAP for Directory lookup. Only UDS is supported and UDS-based directory lookup is served from Cisco Unified Communications Manager. For more information, see the *Cisco Hosted Collaboration Solution, Release 10.6(1) Features for Cisco Unified Communications Manager*.

Shared Instance and Telephony Aggregation

The following optional telephony aggregation layer support is provided for the Shared Instance application model:

- Aggregation layer with Cisco Unified Border Element (SP Edition), Cisco Unified Border Element Enterprise Edition, Perimeta SBC or third-party SBC and PGW or service provider's softswitch is supported.

- Inter-customer routing goes through the aggregation layer softswitch.

- Cisco Unified Border Element (SP Edition) to service provider network routing is through a single aggregated trunk for the traffic of all customers on one Shared Instance Cisco Unified Communications Manager cluster. Per-customer SIP trunks are also supported when PGW is not used.

- PGW to service provider network routing is through a separate trunks for each Cisco Unified Communications Manager cluster for the traffic of all customers on one Shared Instance.

- Local Breakout (LBO) PSTN gateway is supported in cases where you do not wish to offer any other options or cannot comply or does not wish to comply with regulatory requirements of emergency or lawful intercept within the Cisco HCS network.

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 means of REST APIs. The Cisco HCS service fulfillment layer uses the partitioned Unity Connection REST APIs to allow Cisco HCS partners 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.

The following deployment option is supported:

- Use Cisco Unified Communications Domain Manager to provision partitioned Cisco Unity Connection if you are running version Cisco Unified Communications Domain Manager 10.6(1).

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, CUBESP or Perimeta SBC is needed. However, it is possible to have a direct inteface when only one instance of Cisco Unified Communications Manager is interfacing with Partitioned Unity Connection. The Cisco Unified Border Element (SP Edition) or Perimeta 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 Shared Instance deployment.

- Cisco Unified Communications Manager IM and Presence Service

Unified Communications Manager IM and Presence 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 Shared Instance deployment.

b) Paging services
c) Attendant Console (CUAC) (Server and serverless)
d) Cisco Emergency Responder
e) Video
    For more information on video planning, see Video.
f) Mobility
    For more information on mobility planning, see Mobility.
g) HCS for Contact Center
    For more information on HCS for Contact Center planning, see HCS for Contact Center.

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 10.6(1) 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 you will need to provide, either central, local breakout or a combination of both. For additional details on these trunking choices, see *Cisco Hosted Collaboration Solution, Release 10.6(1) Solution Reference Network Design Guide*.

- Central Breakout
Choosing central breakout may include additional 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 have a choice of using Cisco Unified Border Element (SP Edition), Perimeta SBC or an existing carrier grade session border controller. Additionally, if SS7 interconnect or softswitch functionality is required, you can use the Cisco vPGW in addition to Cisco Unified Border Element (SP Edition) or Perimeta SBC. For Large Enterprise deployments, Cisco Unified Border Element (SP Edition) or Perimeta SBC is optional.

  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 set up, that allows you to rely on another organization to provide the regulatory services for you. Local breakout maybe a good alternative if you do not:

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