



# Deployment Models

---

This chapter provides an overview of the Cisco Unified Communications deployment models that Cisco has tested and verified. These models are not the only ways in which you can deploy the Cisco Unified Communications system, nor are they design recommendations. Rather, they are designed to provide sample configurations that address typical system-level requirements.

For additional guidelines, recommendations, and best practices for implementing enterprise networking solutions, refer to the *Cisco Solution Reference Network Design (SRND)* guides and related documents, which are available at this URL:

[www.cisco.com/go/srnd](http://www.cisco.com/go/srnd)

For additional information about the deployment models, including details about all components in each model, refer to the *Cisco Unified Communications System Architecture Reference Manuals*.

This chapter includes these sections:

- [Deployment Overview, page 2-1](#)
- [Small Single-Site Centralized Model, page 2-2](#)
- [Medium Single-Site Centralized Model, page 2-3](#)
- [Large Single-Site Centralized Model, page 2-5](#)
- [Headquarters with Branches Model, page 2-7](#)
- [Small Multi-Site Distributed Model, page 2-9](#)
- [Large Multi-Site Distributed Model, page 2-11](#)
- [Dedicated Contact Center Model, page 2-13](#)
- [Major Components of Deployment Models, page 2-14](#)

## Deployment Overview

The sample Cisco Unified Communications deployments demonstrate a variety of business applications based on the following criteria:

- End-to-end IP communications requirement
- Interoperability between sites
- Administrative requirements (centralized or distributed)
- Messaging requirements
- Conferencing requirements

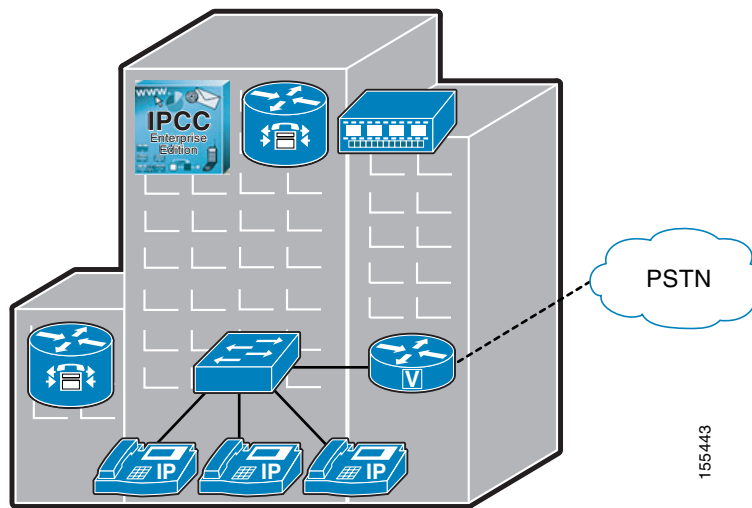
- Availability requirements
- Mobility requirements
- Scalability requirements
- Customer interaction network requirements

## Small Single-Site Centralized Model

The Small Single-Site Centralized model is designed for small autonomous offices in which most or all employees are IPC users. This model supports up to 250 users.

Figure 2-1 shows an example of this model.

**Figure 2-1** *Small Single-Site Centralized Model*



## Organization Suitability

The Small Single-Site Centralized model is suitable for small business operations that reside at one site and that need basic call processing and limited contact center capabilities. Such operations include the sole office of a small company or an independent satellite office of a large company.

## Design Characteristics

The Small Single-Site Centralized model is designed to be locally managed and administered. It can operate on a wired or wireless LAN. Local and long distance calling is achieved through gateway connectivity with the PSTN by various combinations of T1/E1 Channel Associated Signaling (CAS) and Primary Rate Interface (PRI).

## User Roles and Endpoints

The Small Single-Site Centralized model provides flexible communications features for operators and administrative assistants. While there are some executive phones, most employees use digital telephones and a voice messaging system, which this model also provides. In addition, some staff may take orders or provide technical support. This model provides basic contact center capabilities to handle these requirements.

## Supported Applications

The Small Single-Site Centralized model supports applications that provide a wide array of features. These applications include:

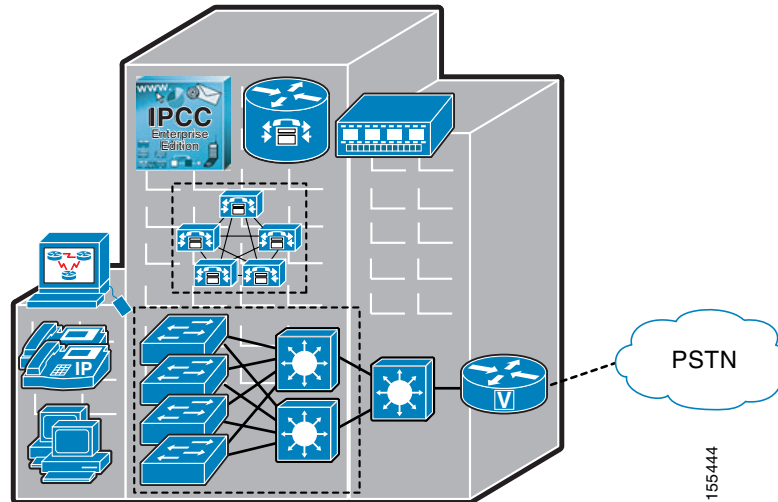
- Call processing:
  - Cisco Unified CallManager
  - Cisco Unified CallManager Express
- Contact Center: Cisco Unified Contact Center Express
- Messaging:
  - Cisco Unity
  - Cisco Unity Express
- Instant messaging and presence: Cisco Unified Presence Server
- Conferencing:
  - Cisco Unified MeetingPlace Express
  - Cisco Unified Videoconferencing
- System management:
  - Cisco Unified CallManager Serviceability Tools
  - Cisco Voice Provisioning Tool

## Medium Single-Site Centralized Model

The Medium Single-Site Centralized model is designed for medium-size autonomous offices in which most or all employees are IPC users. This model supports up to 1,000 users.

[Figure 2-2](#) shows an example of this model.

**Figure 2-2 Medium Single-Site Centralized Model**



## Organization Suitability

The Medium Single-Site Centralized model is suitable for medium-sized businesses and government operations that reside at one site and that need basic call processing, some contact center capabilities, and basic messaging and conferencing. Such operations include legal and financial professional offices, and municipal government offices.

## Design Characteristics

The Medium Single-Site Centralized model is designed to be locally managed and administered. It can operate on a wired or wireless LAN. Local and long distance calling is achieved through gateway connectivity with the PSTN by various combinations of T1/E1 CCAS and PRI.

## User Roles and Endpoints

The Medium Single-Site Centralized model provides flexible communications features for operators and administrative assistants. There are some executive phones, some of which are video-capable. Most other employees use digital telephones, including wireless telephones, and a voice messaging system, which this model also provides. In addition, some staff may take orders or provide technical support. This model provides basic contact center capabilities to handle these requirements.

Some users, such as building services and shipping and receiving employees, may require mobile phones. This model provides on-campus device mobility features for these users.

## Supported Applications

The Medium Single-Site Centralized model supports applications that provide a wide array of advanced features. These applications include:

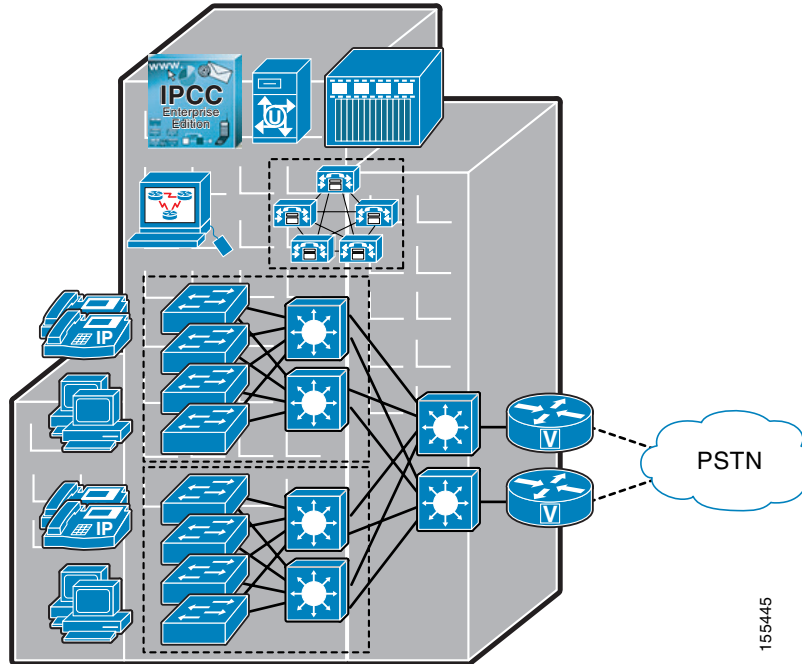
- Call processing: Cisco Unified CallManager
- Contact Center:
  - Cisco Unified Contact Center Express
  - Cisco Unified IP IVR
  - Cisco Unified Voice Portal
- Messaging:
  - Cisco Unity
  - Cisco Unity Connection
- Instant messaging and presence: Cisco Unified Presence Server
- Conferencing:
  - Cisco Unified MeetingPlace Express
  - Cisco Unified Videoconferencing
- System management:
  - Cisco Unified Operations Manager
  - Cisco Unified Service Monitor
  - Cisco Voice Provisioning Tool

## Large Single-Site Centralized Model

The Large Single-Site Centralized model is designed for large autonomous offices in which most or all employees are IPC users. Employees include those who work on site and those who telecommute. This model supports up to 20,000 users, some of whom will use legacy phones connected to legacy PBX systems.

[Figure 2-3](#) shows an example of this model.

Figure 2-3 Large Single-Site Centralized Model



## Organization Suitability

The Large Single-Site Centralized model is suitable for a large business and government operations that reside at one site and that require extensive call processing and contact center capabilities. Such operations include universities, insurance companies, and large manufactures.

## Design Characteristics

The Large Single-Site Centralized model is designed to be locally managed and administered. It can operate on a wired or wireless LAN.

Connectivity with legacy PBXs can be provided through T1/E1 CAS, PRI, QSIG, and DPNSS. Local and long distance calling is achieved through gateway connectivity with the PSTN by various combinations of CAS and PRI.

## User Roles and Endpoints

The Large Single-Site Centralized model provides flexible communications features for operators and administrative assistants. There are some executive phones, some of which are video-capable. Most other employees use digital telephones and a voice messaging system, which this model also provides. Some employees are telecommuters and require the ability to connect to the IP network via legacy phones or PC-based softphone clients. There is a staffed switchboard for operator services and an attendant console.

In addition, this model provides extensive contact center functions. It incorporates enterprise customer interaction network features to handle the contact center capabilities that are required for operations such as support or reservations.

Some users, such as building services and shipping and receiving employees, may require mobile phones. This model provides on-campus device mobility features for these users. Also, some employees may need to use a mobile phone for access to the corporate network when on-site and to the public wireless network when traveling or at home. Callers must be able to reach these employees at any location. This model provides these capabilities.

## Supported Applications

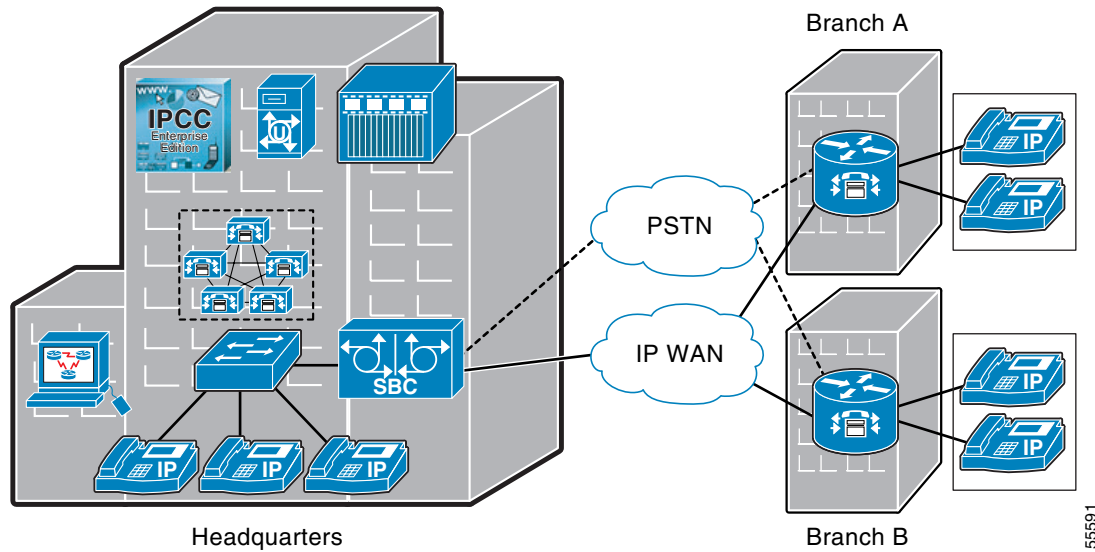
The Large Single-Site Centralized model supports applications that provide powerful and scalable advanced features. These applications include:

- Call processing: Cisco Unified CallManager
- Contact Center:
  - Cisco Unified Contact Center Enterprise
  - Cisco Unified IP IVR
  - Cisco Unified Voice Portal
- Messaging: Cisco Unity
- Instant messaging and presence: Cisco Unified Presence Server
- Conferencing:
  - Cisco Unified MeetingPlace
  - Cisco Unified Videoconferencing
- System management:
  - Cisco Unified Operations Manager
  - Cisco Unified Service Monitor
  - Cisco Voice Provisioning Tool
  - LAN Management Solution

## Headquarters with Branches Model

The Headquarters with Branches model is designed for distributed operations with a large central, or headquarters, site and multiple remote, or branch, sites. This model can support one or two large sites with up to 20,000 users in each and approximately 2,500 branch sites with up to 1,000 users in each site.

Figure 2-4 shows an example of this model.

**Figure 2-4** *Headquarters with Branches Model*

## Organization Suitability

The Headquarters with Branches model is suitable for businesses such as banks, which include a corporate headquarters and many local or regional offices.

## Design Characteristics

In the Headquarters with Branches model, each branch site connects to the headquarters site or sites through a WAN. Branch sites receive call processing functions from the headquarters site. Failover capabilities at each branch site ensure that it can continue to operate if the WAN connection to the headquarters site is lost. Branch sites include small contact center capabilities.

The WAN connection between the headquarters and branch sites can be frame relay, MPLS, or site-to-site VPN. Each branch site can operate on a wired or wireless LAN.

Connectivity with legacy PBXs in the headquarters site can be provided T1/E1 CAS, PRI, Q SIG, and DPNSS. Connectivity to the PSTN in the headquarters site is provided through various combinations of T1/E1 CAS and PRI.

Local calling is achieved through gateway connectivity. Long distance calling for branch sites uses the WAN for on-net calling. Off-net long distance traffic is backhauled over the WAN to one or more drop-off gateways.

This model is designed to be administered at the headquarters location.



## User Roles and Endpoints

Headquarters roles and endpoints are identical to those described in the “[Large Single-Site Centralized Model](#)” section on page 2-5. Branch sites access the call processing capabilities in the headquarters site. While there are some executive phones, most employees use digital telephones and the central voice messaging system.

Some staff may take orders or provide technical support. This model provides basic contact center capabilities in the branches to handle these requirements.

## Supported Applications

The Headquarters with Branches model supports applications that provide comprehensive features for all sites. These applications include:

- Call processing:
  - Cisco Unified CallManager (in headquarters)
  - Unified SRST (in branches)
- Contact Center:
  - Cisco Unified Contact Center Enterprise (in headquarters)
  - Cisco Unified Voice Portal (for queueing and self-service at headquarters or branches)
- Messaging:
  - Cisco Unity (based in headquarters)
  - Cisco Unity Connection
- Instant messaging and presence: Cisco Unified Presence Server (based in headquarters)
- Conferencing:
  - Cisco Unified MeetingPlace (based in headquarters)
  - Cisco Unified Videoconferencing
- System management:
  - Cisco Unified Operations Manager (based in headquarters)
  - Cisco Unified Service Monitor (based in headquarters)
  - Cisco Voice Provisioning Tool
  - LAN Management Solution

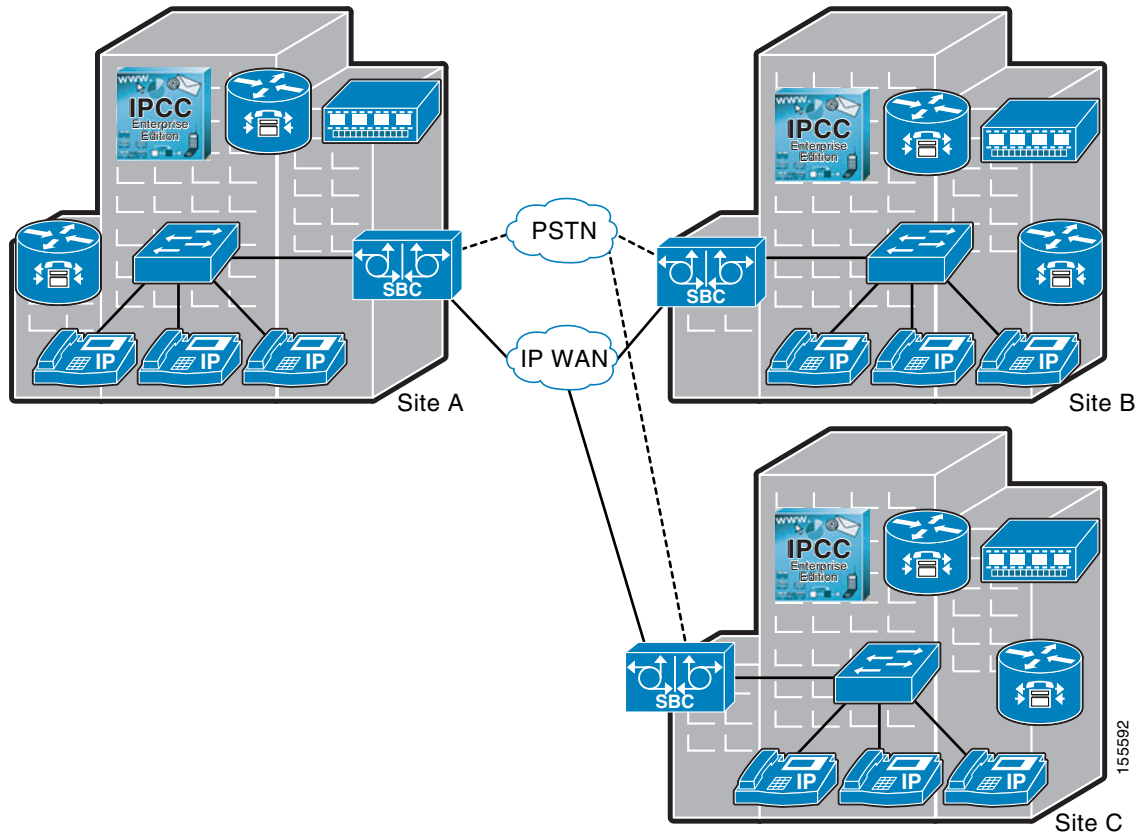
## Small Multi-Site Distributed Model

The Small Multi-Site Distributed model is designed for multiple small to medium-size autonomous locations that are connected to each other through a WAN. Each location contains the call processing functions and applications that are necessary for full business operations. Most provisioning and configuration information is the same in each site, and not all employees are IPC users.

This model can support approximately 2,500 interconnected small sites with up to 250 users in each site.

[Figure 2-5](#) shows an example of this model.

Figure 2-5 Small Multi-Site Distributed Model



## Organization Suitability

The Small Multi-Site Distributed model is suitable for a variety of operations that consist of multiple small or medium-size sites. Such operations include retail businesses with multiple locations (such as pharmacies, department stores, home improvement stores), state government agencies, and federal government agencies.

## Design Characteristics

Each site in the Small Multi-Site Distributed model can operate on a wired or wireless LAN. Local calling is achieved through gateway connectivity at each site. Long distance calling for each site uses the WAN for on-net calling. Off-net long distance traffic is backhauled over the WAN to one or more drop-off gateways.

## User Roles and Endpoints

The Small Multi-Site Distributed model provides communications and basic voice messaging capabilities. It is appropriate in situations where IP phones are shared by more than one employee and there is a need to connect legacy phones to the IP communications network.

Some users, such as building services and shipping and receiving employees, may require mobile phones. This model provides on-campus device mobility features for these users.

## Supported Applications

The Small Multi-Site Distributed model supports applications that provide a variety of features. These applications include:

- Call processing: Cisco Unified CallManager Express
- Messaging: Cisco Unity Express
- Conferencing:
  - Cisco Unified MeetingPlace Express
  - Cisco Unified Videoconferencing
- System management:
  - Cisco Unified Operations Manager
  - Cisco Unified Service Monitor (based in headquarters)
  - Cisco Voice Provisioning Tool
  - LAN Management Solution

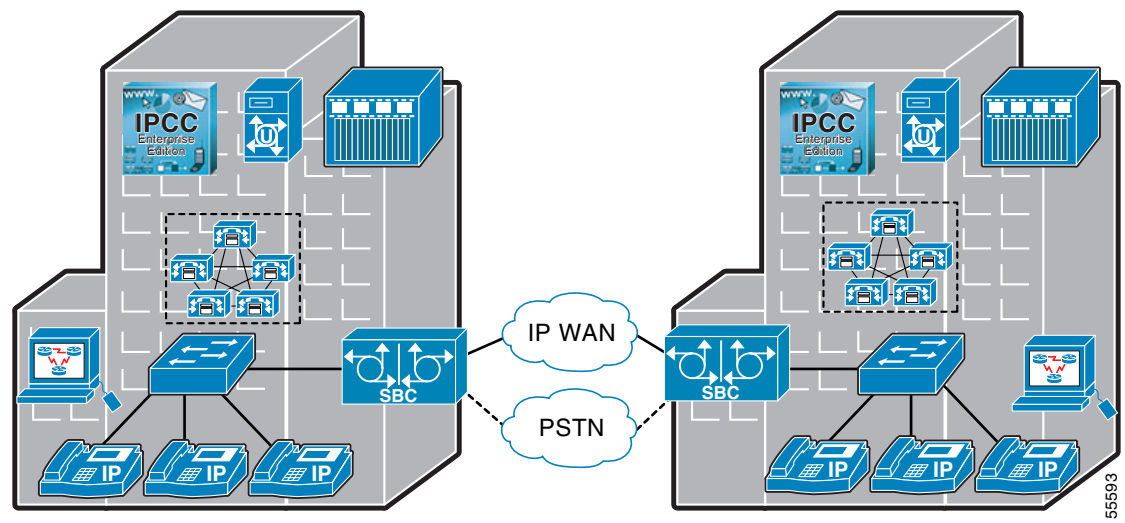
## Large Multi-Site Distributed Model

The Large Multi-Site Distributed model is designed for national or international organizations with multiple large sites (such as campuses or factories) that are connected to each other through a WAN. Each site is configured as a Large Single Site Centralized Model (see the [“Large Single-Site Centralized Model”](#) section on page 2-5), and each site has a common dial plan and feature set.

This model can support approximately up to 10 interconnected large sites.

Figure 2-6 shows an example of this model.

**Figure 2-6** Large Multi-Site Distributed Model



## Organization Suitability

The Large Multi-Site Distributed model is suitable for business operations that consist of multiple large sites in various regions. Such operations include large technology, large manufacturing, large transportation, and large distribution and logistics companies.

## Design Characteristics

Each site in the Large Multi-Site Distributed model can operate on a wired or wireless LAN. The intersite WAN connection can be frame relay, MPLS, or site-to-site VPN. Each branch site can operate on a wired or wireless LAN.

Local calling is achieved through gateway connectivity at each site. Long distance calling for each site uses the WAN for on-net calling. Off-net long distance traffic is backhauled over the WAN to one or more drop-off gateways.

## User Roles and Endpoints

Each site in the Large Multi-Site Distributed model has the same user roles and endpoints that are described in the [“Large Single-Site Centralized Model” section on page 2-5](#).

## Supported Applications

The Large Multi-Site Distributed model supports applications that provide powerful, flexible, and scalable features. These applications include:

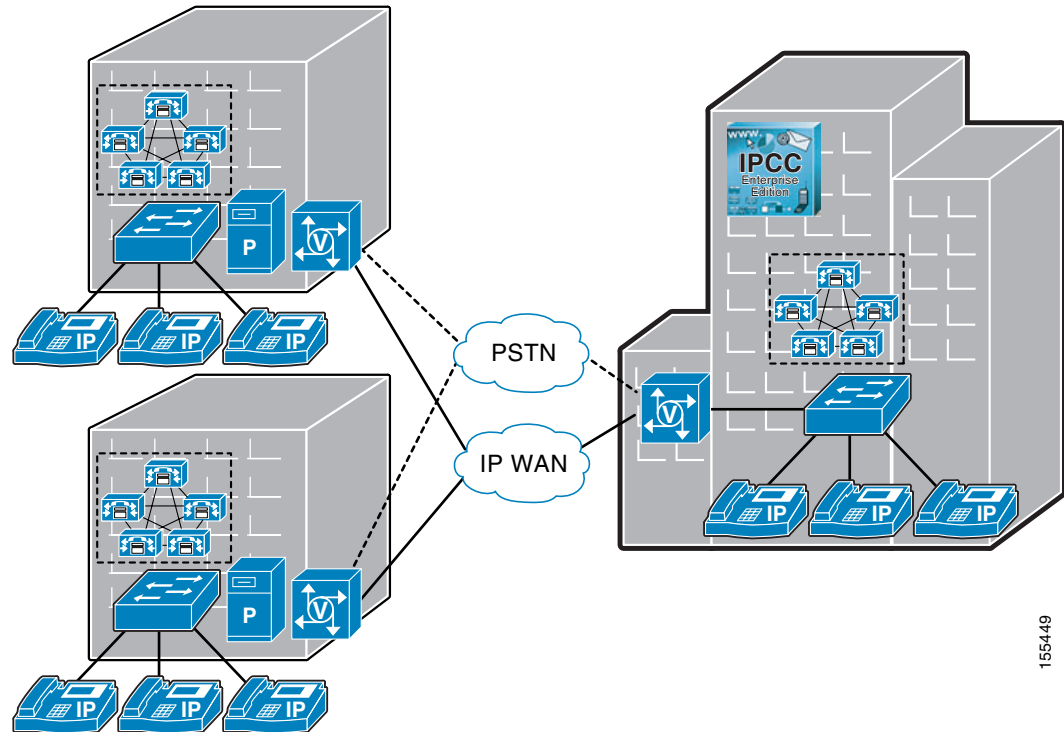
- Call processing: Cisco Unified CallManager
- Contact Center:
  - Cisco Unified Contact Center Enterprise
  - Cisco Unified IP IVR (for centralized queueing)
  - Cisco Unified Voice Portal (for centralized or distributed queueing and self-service)
- Messaging:
  - Cisco Unity
  - Cisco Unity Connection
- Instant messaging and presence: Cisco Unified Presence Server
- Conferencing:
  - Cisco Unified MeetingPlace
  - Cisco Unified Videoconferencing
- System management:
  - Cisco Unified Operations Manager
  - Cisco Unified Service Monitor
  - Cisco Voice Provisioning Tool
  - LAN Management Solution

# Dedicated Contact Center Model

The Dedicated Contact Center model is designed for organizations in which the primary business focus is the processing of inbound or outbound calls. Typically, this model is composed of some to many large sites with up to several hundred agents at each site. Calls are routed between sites over a WAN based on business logic such as skill set and time-of-day.

Figure 2-7 shows an example of this model.

**Figure 2-7** *Dedicated Contact Center Model*



## Organization Suitability

The Dedicated Contact Center model is suitable for business operations that are focused on customer service, such as reservations, customer support, outbound marketing, fulfillment, and dispatch companies. This model applies a variety of industries, including financial services, manufacturing, travel, entertainment, contact center outsourcers, and wholesalers.

## Design Characteristics

Each site in the large Dedicated Contact Center model can operate on a wired or wireless LAN. The intersite WAN connection can be frame relay, MPLS, or site-to-site VPN. Each branch site can operate on a wired or wireless LAN.

Local calling is achieved through gateway connectivity at each site. Long distance calling for each site uses the WAN for on-net calling. Off-net long distance traffic is backhauled over the WAN to one or more drop-off gateways.

Each location provides gateway access, enabling customer indial. Intersite calling is achieved through IP WAN, IP carrier, or TDM network routing.

## User Roles and Endpoints

On-site agents in the Dedicated Contact Center model use digital telephones. Some agents connect to the IP network from home and require legacy telephone and or softphone client support. Voice messaging and audio conferencing are supported. Multimedia contact centers may also require collaboration technologies such as web collaboration or web conferencing. This model supports these applications.

## Supported Applications

The Dedicated Contact Center model supports applications that provide powerful, flexible, and scalable features. These applications include:

- Call processing: Cisco Unified CallManager
- Contact Center: Cisco Unified Contact Center Enterprise
- Messaging: Cisco Unity
- Instant messaging and presence: Cisco Unified Presence Server
- Conferencing:
  - Cisco Unified MeetingPlace
  - Cisco Unified Videoconferencing
- System management:
  - Cisco Unified Operations Manager
  - Cisco Unified Service Monitor

## Major Components of Deployment Models

Table 2-1 shows the major Cisco components in each Cisco Unified Communications deployment model.

Table 2-1 *Deployment Models Components Summary*

	<b>Scale</b>	<b>Call Processing</b>	<b>Contact Center</b>	<b>Messaging</b>	<b>Instant Messaging and Presence</b>	<b>Conferencing</b>	<b>System Management</b>	<b>Off-Premises Calling</b>
<b>Small Single-Site Centralized Model</b>	Up to 250 phones	Cisco Unified CallManager Cisco Unified CallManager Express	Cisco Unified Contact Center Express	Cisco Unity Cisco Unity Express	Cisco Unified Presence Server	Cisco Unified Meeting-Place Express Cisco Unified Video-conferencing	Cisco Unified CallManager Service-ability Tools Cisco Voice Provisioning Tool	PSTN via gateway
<b>Medium Single-Site Centralized Model</b>	250 to 1,000 phones	Cisco Unified CallManager	Cisco Unified Contact Center Express Cisco Unified IP IVR Cisco Unified Voice Portal	Cisco Unity Cisco Unity Connection	Cisco Unified Presence Server	Cisco Unified Meeting-Place Express Cisco Unified Video-conferencing	Cisco Unified Operations Manager Cisco Unified Service Monitor Cisco Voice Provisioning Tool	PSTN via gateway
<b>Large Single-Site Centralized Model</b>	1,000 phones to 20,000 phone	Cisco Unified CallManager	Cisco Unified Contact Center Enterprise Cisco Unified IP IVR Cisco Unified Voice Portal	Cisco Unity	Cisco Unified Presence Server	Cisco Unified Meeting-Place Cisco Unified Video-conferencing	Cisco Unified Operations Manager Cisco Unified Service Monitor Cisco Voice Provisioning Tool LAN Management Solution	PSTN via gateway

Table 2-1 Deployment Models Components Summary (continued)

	Scale	Call Processing	Contact Center	Messaging	Instant Messaging and Presence	Conferencing	System Management	Off-Premises Calling
<b>Head-quarters with Branches Model</b>	Up to 3 head-quarters sites Up to 2,500 branch sites	Cisco Unified CallManager (in head-quarters) Unified SRST (in branches)	Cisco Unified Contact Center Enterprise (based in head-quarters) Cisco Unified Voice Portal (in head-quarters or branches)	Cisco Unity (based in head-quarters) Cisco Unity Connection	Cisco Unified Presence Server (in head-quarters)	Cisco Unified MeetingPlace (based in head-quarters) Cisco Unified Video-conferencing	Based in head-quarters: Cisco Unified Operations Manager Cisco Unified Service Monitor Cisco Voice Provisioning Tool LAN Management Solution	Site to Site over IP WAN  PSTN as backup for branch sites
<b>Small Multi-Site Distributed Model</b>	Up to 2,500 networked small sites	Cisco Unified CallManager Express (in each location)	—	Cisco Unity Express (in each location)	—	Cisco Unified MeetingPlace Express (in each location) Cisco Unified Video-conferencing	Cisco Unified Operations Manager Cisco Unified Service Monitor Cisco Voice Provisioning Tool LAN Management Solution Provisioning “cloned”	Site to Site over IP WAN  PSTN for off-network calling



Table 2-1 Deployment Models Components Summary (continued)

	Scale	Call Processing	Contact Center	Messaging	Instant Messaging and Presence	Conferencing	System Management	Off-Premises Calling
<b>Large Multi-Site Distributed Model</b>	Up to 10 networked large sites	Cisco Unified CallManager (in each location, clustered over a WAN)	Cisco Unified Contact Center Enterprise (in each location)  Cisco Unified IP IVR  Cisco Unified Voice Portal	Cisco Unity (in each location)  Cisco Unity Connection	Cisco Unified Presence Server (in each location)	Cisco Unified MeetingPlace (in each location)  Cisco Unified Video-conferencing	Distributed:  Cisco Unified Operations Manager  Cisco Unified Service Monitor  Cisco Voice Provisioning Tool  LAN Management Solution	Site to Site over IP WAN  PSTN for off-network calling
<b>Dedicated Contact Center Model</b>	Many large sites with several hundred agents at each site	Cisco Unified CallManager (in each location)	Cisco Unified Contact Center Enterprise (in each location)	Cisco Unity (in each location)	Cisco Unified Presence Server (in each location)	Cisco Unified MeetingPlace (in each location)  Cisco Unified Video-conferencing	Distributed:  Cisco Unified Operations Manager  Cisco Unified Service Monitor	Site to Site over IP WAN  PSTN for off-network calling

