

Test Bed 3: Case Study and Test Sites

This topic describes the sample business case study, Retail Business, developed to reflect real-world contact center deployments. This topic also provides information on the relationships, topology, components, and definitions of the Test Bed 3 sites, that was designed and tested as part of Cisco Unified Communications System Release 8.5(1) for the contact center family of products.

This topic contains the following sections:

- [Retail Business Case Study](#)
- [Unified CVP Test Sites](#)

Retail Business Case Study

Sample Business Requirements

This section describes the business profile and requirements of the sample retail business, Siren Supplies and Stores (SS&S), a large distribution and retail operations company. SS&S plans to deploy Cisco Unified Communications contact center family of products to replace aging equipment in distribution branch offices and retail centers nation-wide.

The SS&S business operations is set up as follows in the locations listed below:

- Data Centers—Two (2) data centers support the call centers and agents in the distribution/branch office and retail centers.
- Distribution Center/Branch Office—One (1) central distribution call center supports *Business-to-Business* or *B2B* operations and its agents provide national coverage for SS&S customers.
- Retail Centers—Three (3) retail *super center* support consumer retail operations for three major outlet locations. Each of the locations has call center agents assigned to specific skill groups within the center, based on their areas of product knowledge. Customers can call into the centers and speak to agents directly or use kiosks at various locations in the region.
 - Mid-Atlantic Retail Center
 - North-Central Retail Center
 - South-Central Retail Center

Call Center Agents

In addition to formal call center agents, there are:

- **Blended and Dedicated Agents**—Blended agents are retail center agents who can not only handle incoming calls from customers but who can place outgoing calls to them. Dedicated agents are those that handle only one type of call, inbound or outbound calls only.

In the Mid-Atlantic Retail Center, a small group of 73 blended agents (including 15 mobile agents) in the Retail Credit Account Collections skill group handle inbound retail and outbound credit collections calls.

- **Backline Agents**—Some retail center agents are subject matter experts that act as “backup” to the frontline agents when they are unable to handle certain customer issues. The frontline agents can conference the call with these special agents and, if necessary, transfer the call to them to handle.

In the North-Central Retail Center, a small Unified Communications Manager cluster with 30 agents handle specific conference and transfer calls from the Mid-Atlantic Retail Center and South-Central Retail Center locations (with an approximate BHCA of 540).

In the South-Central Retail Center, 38 backline agents handle specific conference and transfer calls from Mid-Atlantic Retail Center and North-Central Retail Center locations (with an approximate BHCA of 684).

- **Expert Advisors**—Using Unified Expert Advisor functionality, select enterprise employees known as “expert advisors” handle certain incoming calls targeted for the call center. These calls can be treated with a self-service application such as Unified CVP and then either handled by a formal call center agent, or directly queued to an expert advisor.

There are 1,500 expert advisors at the distribution center and 500 expert advisors at each of the retail centers. They use Cisco devices such as Cisco Unified Personal Communicator (Unified Personal Communicator) to interface via a softphone and instant messaging with the agents.

- **Mobile and Remote Agents**—Using Unified Mobile Agent (Unified MA) functionality, SS&S Distribution Operations has assigned 200 agents to a Pandemic Disaster Team as part of a *virtual* call center. These agents can work either from home or at the distribution center. SS&S has set up these mobile agents with local POTS lines to enable them to work from home when a disaster prevents them from being at the distribution center. Each mobile agent has a laptop computer with a Cisco Enterprise Teleworker 881 VPN router attached to a cable modem or DSL connection in their home. Because QoS is not available on the high-speed cable service, SS&S has set up dedicated voice lines to each mobile agent’s home.

Call Centers or Sites

The site names have been mapped to specific site numbers. These sites participate in the Unified CVP Post-Routed call flows testing.

[Table 1](#) lists the various SS&S office sites, number of agents, and Unified Communications Manager clusters at each site, and the Busy Hour Call Attempt (BHCA) at each of the seven sites.



Note

BHCA numbers include all traffic; including inbound, outbound, transfer, and conference call volume.

Table 1 Office Locations and Agents

| Site Name | Site | BHCA | Agents | Unified Communications Manager Clusters |
|-----------------------------|-------|--------|--|---|
| Chicago Data Center/Hub | Site1 | n/a | no agents | X |
| Virtual Call Center | Site2 | 3,600 | 200 mobile agents | |
| Central Branch Office | Site3 | 8,400 | 1800 (300 formal agents and 1,500 expert advisors) | X |
| Dallas Data Center/Hub | Site5 | n/a | no agents | X |
| Mid-Atlantic Retail Center | Site6 | 16,360 | 1,183 (683 formal agents [73 blended agents for handling inbound retail and outbound credit calls, including 15 mobile agents] and 500 expert advisors) | |
| North-Central Retail Center | Site7 | 13,438 | 1,191 (691 formal agents [30 dedicated agents for handling conference/transfers from Site6 and Site8] and 500 expert advisors) | X |
| South-Central Retail Center | Site8 | 12,809 | 1,137 (637 formal agents [38 dedicated agents for handling conference/transfers from Site6 and Site7], and 500 expert advisors) | |

Administrative Phones

Additionally, at each site, there are a number of administrative phones in conference rooms, break rooms, and manager offices. These phones generate a minimal amount of call volume, but need to be represented in the contact center environment to model “real” call center operations.

Table 2 lists the number of administrative phones and the Busy Hour Call Attempt (BHCA) for the administrative phones per site.

Table 2 Number of Administrative Phones/BHCA

| Site Name | Site | Number of Admin Phones | BHCA for Admin Phones |
|--|-------|------------------------|-----------------------|
| Chicago [multisite hub/data center] | Site1 | 20 | 50 |
| Central Distribution Office [distribution center/small hub and remote site] | Site3 | 25 | 62 |
| Dallas [multisite hub/data center] | Site5 | 30 | 75 |
| Mid-Atlantic Retail Center [retail store and remote site] | Site6 | 34 | 85 |
| North-Central Retail Center [retail store/small hub and remote site] | Site7 | 34 | 85 |
| South-Central Retail Center [retail store and remote site] | Site8 | 31 | 65 |

As with any typical Telephony implementation, a standard amount of conferences and transfers are performed using the administrative phones within the same site. To model the traffic appropriately, conferences and transfers are estimated at 5% of the total BHCA for the administrative phones.

Services and Skill Groups

Table 3 lists the services that the agents at the distribution centers and the retail centers provide to the customers of SS&S.

Table 3 Services, Activities, and Locations

| Location Type | Skill # | Service | Activity | Specific Sites/Locations |
|---------------------|---------|-----------------------------------|---|--|
| Distribution Center | 01 | Catalog Orders | Take new orders from the SS&S Catalog | Distribution Center (Site3) |
| Distribution Center | 02 | Order Status | Answer inquiries on prior catalog orders | Distribution Center (Site3) |
| Distribution Center | 03 | Specialty Items | Take orders and handle inquiries on special items not available in all states | Distribution Center (Site3) |
| Retail Center | 04 | Retail Credit Account Collections | Retail Credit account collections | Mid-Atlantic Retail Center only (blended inbound and outbound) (Site6) |
| Retail Center | 05 | Electronics & Personal Computers | Sales specialists trained in the SS&S Consumer Electronics (TV, VCR, etc.) | All Retail Locations |

Table 3 *Services, Activities, and Locations (continued)*

| Location Type | Skill # | Service | Activity | Specific Sites/Locations |
|---------------------------------|---------|--|---|---|
| Retail Center | 06 | Major Appliances | Sales specialists trained in the SS&S Major Appliances lines | All Retail Locations |
| Retail Center | 07 | Music and Movies | Sales specialists trained in the SS&S CD/ DVD/ VCR music and movies | All Retail Locations |
| Retail Center | 08 | Computer Technical Support | Specialists trained to help SS&S customers requiring assistance setting up or using computers and electronics | All Retail Locations |
| Distribution and Retail Centers | 10 | Unified Expert Advisor Technical Support | Experts who provide advice on all services provided by formal call center agents | Distribution Center (Site3) and all Retail Locations (except Site2) |

**Note**

The Speciality Items skill group in the distribution center (Site3) handles specific products that require additional mentoring and training. At these sites, supervisors require access to the *silent monitor*, *barge-in*, and *intercept* features and also the ability to record agent phone calls for quality assurance purposes.

Cross-trained Agents

SS&S has cross-trained the majority of their agents at the various call center sites to provide a variety of account services to customers.

SS&S offers retail call center operations for its customers such as catalog and specialty item sales, retail centers with major appliances and electronics, and computer technical support.

Data Centers

Chicago (Site1) and Dallas (Site5) are data centers. There are no agents handling calls at these sites.

Distribution Center Agents

The distribution center (Site3) is set up to handle customer calls and provide services based on their specific skill groups. This site uses the Cisco Agent Desktop (CAD) to handle call control functions.

Retail Center Agents

The agents in the retail centers in the Mid-Atlantic Retail Center (Site6), North-Central Retail Center (Site7), and South-Central Retail Center (Site8) locations are also set up to handle similar calls, but use CTI OS Desktop Applications for call control functions.

Blended agents (including mobile agents) in the Mid-Atlantic Retail Center (Site6) perform both inbound retail and outbound collection calls on their customer credit card accounts.

Unified Mobile Agents

Mobile agents are associated with Site3 to handle customer calls and are also associated with Site6 for outbound calling. Mobile agents have been assigned to specific mobile skill groups; however, supervisors can reassign mobile agents to a non-mobile skill group if the agent is assigned to work locally at Site3.

Unified Expert Advisor Agents

Specialists in the distribution center (Site3) and the retail centers in the Mid-Atlantic Retail Center (Site6), North-Central Retail Center (Site7), and South-Central Retail Center (Site8) locations are set up as expert advisors.

Site and Agent Profiles

All the sites discussed in this section are open 24x7. The number of agents listed in the tables are the number of staffed agents per shift.

Data Centers (Site1 & Site5)

Chicago (Site1) and Dallas (Site5) are data centers. The following is a brief summary of site-relevant information:

- Handle Unified CVP Post-Routed calls
- Use Unified CVP for call treatment and queuing
- Have their own Unified Communications Manager cluster for call processing
- Operate as a hub/data centers only
- Have no agents

Virtual Call Center (Site2)

A *virtual* site was created to “group” all the mobile agents associated with Site3 in the call center. The following is a brief summary of Site2-relevant information:

- Has 200 mobile agents who use regular PSTN or cell phones and CAD Agent Desktop to handle customer calls
- Handles Unified CVP Post-Routed calls
- Uses Unified IP IVR in Site1/Site5 for call treatment and queuing
- Uses the Unified Communications Manager cluster in Site1/Site5 for call processing
- Operates as a virtual call center for inbound calls

Table 4 lists the skill sets of the mobile agents in the virtual call center (total BHCA: 3,600) and the agent to BHCA numbers.

Table 4 Agent Profile for Virtual Call Center (Site2)

| Site | Skills and Services | Number of Agents | BHCA |
|---------------|---|------------------|-------|
| Call Flow #1a | #301M – Distribution Center Catalog Orders | 100 | 1,800 |
| Call Flow #1a | #302M – Distribution Center Order Status | 25 | 450 |
| Call Flow #1a | #303M – Distribution Center Specialty Items | 75 | 1,350 |

Distribution Center (Site3)

The following is a brief summary of Site3-relevant information:

- Has 300 agents who use CAD Desktop Application
- Has 1,500 expert advisors who use Unified Personal Communicator to receive instant messages from formal call center agents
- Handles Unified CVP Post-Routed calls
- Uses Unified CVP in Site1/Site5 for call treatment and queuing
- Has its own Unified Communications Manager cluster for call processing
- Operates as a small data center and call center

Table 5 lists the skill sets of the agents at the distribution center (total BHCA: 8,400) and the agent to BHCA numbers.

Table 5 Agent Profile for Distribution Center (Site3)

| Call Flow | Skills and Services | Number of Agents | BHCA |
|---------------|--|------------------|-------|
| Call Flow #1a | #301 – Catalog Orders | 208 | 3,744 |
| Call Flow #1a | #302 – Order Status | 22 | 396 |
| Call Flow #1a | #303 – Specialty Items | 70 | 1,260 |
| Call Flow #1a | #3010 – Unified Expert Advisor Technical Support | 1,500 | 3,000 |

Mid-Atlantic Retail Center (Site6)

The following is a brief summary of Site6-relevant information:

- Has 683 agents who use CTI OS Desktop Application
- Has 73 blended agents (including 15 mobile agents) who handle both inbound and outbound calls
- Has 500 expert advisors who use Unified Personal Communicator to receive instant messages from formal call center agents
- Handles Unified CVP Post-Routed calls
- Uses Unified CVP in Site1/Site5 for call treatment and queuing
- Uses Unified Communications Manager cluster in Site1/Site5 for call processing
- Operates as a call center
- Outbound agents at this site do not receive transfers or conferences from other sites.

For the outbound agents in this site that are dedicated to the Retail Credit Account Collections skill group, the expected call distribution numbers with customers are as follows:

Calls Answered: 1,314 (30% of call volume)

Calls Busy: 1,533 (35% of call volume)

Calls Not Answered: 1,533 (35% of call volume)

Total Calls Dialed: 4,380

Table 6 lists the skill sets of the agents at the Mid-Atlantic Retail Center (total BHCA:16,360) and the agent to BHCA numbers.

Table 6 Agent Profile for Distribution Center (Site6)

| Site | Skills and Services | Number of Agents | BHCA |
|---------------|--|------------------|-------|
| Call Flow #3 | #604 – Retail Credit Account Collections | 73 | 1,314 |
| Call Flow #2a | #605 – Electronics & Personal Computers | 183 | 3,294 |
| Call Flow #2a | #606 – Major Appliances | 122 | 2,196 |
| Call Flow #2a | #607 – Music and Movies | 61 | 1,098 |
| Call Flow #2a | #608 – Computer Technical Support | 220 | 3,960 |
| Call Flow #2a | #6010 – Unified Expert Advisor Technical Support | 500 | 1,000 |
| Call Flow #2b | #6181X – Transfers to Site7 (by mobile agents) | 4 | 72 |
| Call Flow #2b | #6181C – Conferences to Site7 (by mobile agents) | 4 | 72 |
| Call Flow #2b | #6182X – Transfers to Site8 (by mobile agents) | 8 | 144 |
| Call Flow #2b | #6182C – Conferences to Site8 (by mobile agents) | 8 | 144 |

North-Central Retail Center (Site7)

The following is a brief summary of Site7-relevant information:

- Has 691 agents who use CTI OS Desktop Application
- Has 500 expert advisors who use Unified Personal Communicator to receive instant messages from formal call center agents
- Handles Unified CVP Post-Routed calls
- Uses Unified CVP in Site1/Site5 for call treatment and queuing
- Uses its own Unified Communications Manager cluster for call conference/transfers
- Uses the Unified Communications Manager cluster in Site1/Site5 for call processing
- Operates as a call center

Table 7 lists the skill sets of the agents at the North-Central Retail Center (total BHCA: 13,438) and the agent to BHCA numbers.

Table 7 Agent Profile for North-Central Retail Center (Site7)

| Site | Skills and Services | Number of Agents | BHCA |
|---------------|---|------------------|-------|
| Call Flow #2a | #705 – Electronics & Personal Computers | 197 | 3,546 |
| Call Flow #2a | #706 – Major Appliances | 141 | 2,538 |
| Call Flow #2a | #707 – Music and Movies | 127 | 2,286 |

Table 7 Agent Profile for North-Central Retail Center (Site7) (continued)

| Site | Skills and Services | Number of Agents | BHCA |
|---------------|--|------------------|-------|
| Call Flow #2a | #708 – Computer Technical Support | 196 | 3,528 |
| Call Flow #2a | #7010 – Unified Expert Advisor Technical Support | 500 | 1,000 |
| Call Flow #2b | #7081X – Transfers from Site6 | 4 | 72 |
| Call Flow #2b | #7082C – Conferences from Site6 | 4 | 72 |
| Call Flow #2b | #7082X – Transfers from Site8 | 3 | 54 |
| Call Flow #2b | #7082C – Conferences from Site8 | 4 | 72 |
| Call Flow #2b | #7181X – Transfers to Site8 | 7 | 126 |
| Call Flow #2b | #7181C – Conferences to Site8 | 8 | 144 |

**Note**

Skill groups 7081 and 7082 are hosted locally on the small Unified Communications Manager cluster to support specific conference and transfers from Site6 and Site8.

South-Central Retail Center (Site8)

The following is a brief summary of Site8-relevant information:

- Has 637 agents who use CTI OS Desktop Application
- Has 500 expert advisors who use Unified Personal Communicator to receive instant messages from formal call center agents
- Handles Unified CVP Post-Routed calls
- Uses Unified CVP in Site1/Site5 for call treatment and queuing
- Uses the Unified Communications Manager cluster in Site1/Site5 for call processing
- Operates as a call center

Table 8 lists the skill sets of the agents at the South-Central Retail Center (total BHCA: 12,466) and the agent to BHCA numbers.

Table 8 Agent Profile for South-Central Retail Center (Site8)

| Site | Skills and Services | Number of Agents | BHCA |
|---------------|---|------------------|-------|
| Call Flow #2a | #805 – Electronics & Personal Computers | 207 | 3,726 |
| Call Flow #2a | #806 – Major Appliances | 115 | 2,070 |
| Call Flow #2a | #807 – Music and Movies | 110 | 1,980 |
| Call Flow #2a | #808 – Computer Technical Support | 167 | 3,006 |

Table 8 Agent Profile for South-Central Retail Center (Site8) (continued)

| Site | Skills and Services | Number of Agents | BHCA |
|---------------|--|------------------|-------|
| Call Flow #2a | #8010 – Unified Expert Advisor Technical Support | 500 | 1,000 |
| Call Flow #2b | #8081X – Transfers from Site6 | 8 | 144 |
| Call Flow #2b | #8081C – Conferences from Site6 | 8 | 144 |
| Call Flow #2b | #8082X – Transfers from Site7 | 7 | 126 |
| Call Flow #2b | #8082C – Conferences from Site7 | 8 | 144 |
| Call Flow #2b | #8181X – Transfers to Site7 | 3 | 54 |
| Call Flow #2b | #8181C – Conferences to Site7 | 4 | 72 |

Sample Cisco Unified Customer Voice Portal Post-Routed Call Flows

The sample call flows created for this business case study reflect the typical retail customer business requirements. These sample call flows exercise specific features and functions of the contact center environment.

The three types of sample call flows discussed in this section are as follows:

- [Call Flow #1a: Distribution Center Calls \(Inbound\)](#)
 - Catalog Order Skill Group
 - Order Status Skill Group
 - Specialty Items Skill Group
- [Call Flow #2a: Retail Centers Calls \(Inbound\)](#)
 - Electronics
 - Major Appliances
 - Music and Movies
 - Computer Technical Support
 - Unified Expert Advisor Technical Support
- [Call Flow #2b: Retail Center Calls \(Conference/Transfers\)](#)
- [Call Flow #3: Retail Credit Account Collection Calls \(Outbound\)](#)

Call Handling Overview

Agents and the Unified Communications Manager clusters at the sites handling the call flows are set up as follows:

- Unified Communications Manager Cluster #1:
 - Unified Communications Manager cluster (CoW) at Site1/Site5
 - Agents are at Site6 (including mobile agents), Site7, and Site8

Traffic between Site1/Site5 and Site6 (in Cluster 1) is considered intracluster or occurring within their home cluster.

- Unified Communications Manager Cluster #2:
 - Unified Communications Manager cluster (CoW) at Site3
 - Agents are at Site2 and Site3
- Unified Communications Manager Cluster #3:
 - Unified Communications Manager cluster at Site7
 - Agents are at Site7 and Site8 and handle conference/transfers to and from Site6, Site7, and Site8

Traffic between sites at Cluster 1 and Cluster 2 is considered intercluster or crossing between clusters.

Typically, all call flows have inbound BHCA targeted for each specific site. As such, there should be adequate agents at each site to handle the inbound local BHCA sent to that site.

Furthermore, specific skill groups and sites are identified as targets for call overflow which occurs when agents are not available at the site that the call originally came in at (local site).

When a call arrives at the local site and agents are unavailable, the system checks for available agents in that skill group at other clustered sites. When selecting an overflow site, the agents that belong to the home cluster are preferred over agents in a different cluster.

For instance, using the agent and cluster set up described above, a call that comes into Site6 is first sent to agents at Site6. If agents are unavailable at Site6, then the call is only sent to available agents at Site7 or Site8.

If agents are not available at any of the above sites, the call is usually queued for an agent in that skill group at the local site (Site6 in the example). However, calls can be handled in a variety of ways depending on the call treatment logic and rules.

See [Summary of Call Handling and Queuing](#) to understand how calls are handled for the sample call flows described in this section.

All BHCA and Erlang Calculations are made with the following assumptions across all call flows:

- Average Talk Time for each call is 2 minutes (120 seconds)
- Each inbound call is greeted with a 10-second opening menu/ greeting
- All inbound calls have a 30-second after call work time
- The Service Level Target for SS&S is that 80% of calls are answered within 20 seconds

Call Flow #1a: Distribution Center Calls (Inbound)

SS&S provides customers with local and toll-free phone numbers to call into their regional distribution centers. The toll-free numbers are routed by the long distance carrier based upon the originating location of the caller and presented to the regional site on a local number mapped to that site.

Customers who call into these access numbers are presented with a menu of choices. Based on the selection they make, they are transferred to the local agents who provide that service for that region.

Agents and the Unified Communications Manager clusters at the sites handling the Unified CVP Post-Routed call flow are set up as follows:

- Unified Communications Manager Cluster #1: Agents at Site6, Site7, and Site8
- Unified Communications Manager Cluster #2: Agents at Site2 and Site3

[Table 9](#) lists the distribution center and its local access number, estimated BHCA, and agents for inbound Unified CVP Post-Routed calls.

Table 9 **Distribution Center Local Lines**

| Site | Local Number | Est. BHCA / Site | Agents / Site |
|-----------------------------|--------------|------------------|---------------------|
| Virtual Call Center (Site2) | 785-232-7799 | 3,600 | 200 (mobile agents) |
| Distribution Center (Site3) | 785-232-7777 | 8,400 | 1, 800 |

**Note**

All BHCA numbers above are for inbound Unified CVP Post-Routed calls; outbound, conference and transfer call volume is not included.

Call Flow Logic

Depending on the destination, calls coming into the distribution center are presented with a welcome greeting and then with an opening menu (of 10 second duration):

“Thank you for calling Siren Supplies & Stores’ Distribution Center. Please select from the following services:

- Press 1 if you wish to place a new order from our catalog
- Press 2 if you want to check on the status of an order
- Press 3 for our Speciality Items Catalog
- Or stay on the line and someone will assist you shortly.”

If the caller presses:

- 1, the call is routed to any available agent at the local site who has the ‘x301 – Catalog Order Skill.’
- 2, the call is routed to any available agent at the local site who has the ‘x302 – Order Status Skill.’
- 3, the call is routed to any available agent at the local site who has the ‘x303 – Specialty Items Skill.’
- An invalid selection, the system terminates the call after playing the following message:
“Sorry you are having difficulty. Please try again later. Goodbye.”.

If the user does not make a selection when prompted, after making multiple requests for a response, the system disconnects the user after playing a courtesy message.

Call Handling and Queueing

SS&S has installed the local line calling functionality to encourage local contact with the central distribution center. All calls coming into the local line at the distribution center (Site3) will be answered by an agent in that skill group at that site (based on the longest available or most idle agent).

If there are no agents available in each of the skill groups, the call is held in queue for the next available agent in that skill group at that site.

Unanswered calls remain in their respective queues, regardless of the length of time they are in queue. If there are more than 20 calls in any of these queues, the caller hears an announcement before being put on hold:

“We are experiencing heavier than normal call volumes. There are << *number of calls inserted from real time feed* >> ahead of you in this queue. You may wish to call back later for faster service.”

The system does not terminate this call. Callers who wish to wait are allowed to continue to hold in queue once this message is played. It is up to the caller’s discretion to hang up and terminate the call.

Call Flow #2a: Retail Centers Calls (Inbound)

SS&S provides customers with local and toll-free phone numbers to call into their retail centers. The toll-free numbers are routed by the long distance carrier based upon the originating location of the caller and presented to the retail site on a local number mapped to that site.

Table 10 provides a list of the retail centers and their local access numbers, estimated BHCA, and agents per retail site for inbound Unified CVP Post-Routed calls.

Table 10 **Retail Centers Local Lines**

| Site | Local Number | Est. BHCA / Site | Agents / Site |
|-------------------------------------|--------------|------------------|---------------|
| Mid-Atlantic Retail Center (Site6) | 707-222-7777 | 16,360 | 1,183 |
| North-Central Retail Center (Site7) | 773-222-7777 | 13,438 | 1,191 |
| South-Central Retail Center (Site8) | 972-222-7777 | 12,466 | 1,137 |



Note

All BHCA numbers here are for inbound Unified CVP Post-Routed calls; outbound, conference and transfer call volume is not included.

Call Flow Logic

Calls coming into the retail centers are presented with a welcome greeting and then with an opening menu (of 10 second duration) specific for that site:

“Thank you for calling Siren Supplies & Stores’ (Mid-Atlantic/North-Central/ South-Central) Super Center. Please select from the following departments for assistance:

Press 1 for Electronics and Personal Computers

Press 2 for Major Appliances

Press 3 for Music and Movies

Press 4 for Technical Support for your Siren PC or Electronic Equipment

Or stay on the line and someone will assist you shortly.”

If the caller presses:

- 1, the call is routed to any available agent at the local site who has the ‘x05 – Electronics Skill.’
- 2, the call is routed to any available agent at the local site who has the ‘x06 – Major Appliances Skill.’
- 3, the call is routed to any available agent at the local site who has the ‘x07 – Music and Movies Skill.’
- 4, the call is routed to any available agent at the local site who has the ‘x08 – Technical Support Skill.’
- An invalid selection, the system terminates the call after playing the following message:
“Sorry you are having difficulty. Please try again later. Goodbye.”

Call Handling and Queueing

If there are no agents available in each of the skill groups, the call is held in queue for the next available agent in that skill group for that site.

Unanswered calls remain in their respective queues, regardless of the length of time they are in queue.

If there are more than 20 calls in any of these queues, the caller hears an announcement before being put on hold:

“We are experiencing heavier than normal call volumes. There are << *number of calls inserted from real time feed* >> ahead of you in this queue. You may wish to call back later for faster service.”

The system does not terminate this call. Callers who wish to wait are allowed to continue to hold in queue once this message is played. It is up to the caller’s discretion to hang up and terminate the call.

Call Flow #2b: Retail Center Calls (Conference/Transfers)

The retail centers provide frontline agents who handle the majority of the inbound calls for SS&S. However, when a frontline agent is unable to answer a question or resolve a customer issue, they can conference in or transfer the call to a backup or backline agent. These backup agents are part of Technical Support Escalation groups located at all three retail centers (Site6, Site7, and Site8).

Each location has a dedicated internal phone number for the agents to call to access the escalation groups at the sites. Within each site, specific numbers have been set up for conferences and transfers to individually track these calls.

Table 11 provides the internal numbers for the Technical Support Escalation groups at the retail centers.

Table 11 Retail Centers Internal Numbers for Technical Support Escalation Groups

| Site | Internal Numbers |
|-------------------------------------|---------------------------|
| Mid-Atlantic Retail Center (Site6) | 707-222-8324 (Transfer) |
| | 707-222-8325 (Conference) |
| North-Central Retail Center (Site7) | 773-222-8324 (Transfer) |
| | 773-222-8325 (Conference) |
| South-Central Retail Center (Site8) | 972-222-8324 (Transfer) |
| | 972-222-8325 (Conference) |

If formal call center agents want help from an expert advisor, they broadcast an instant message to all expert advisors who receive the request on their Unified Personal Communicator. If they agree to accept the customer call, the call is transferred or conferenced to the softphone on their Unified Personal Communicator and they provide expert assistance to the customer.

If the system encounters unanswered contacts, it responds with one of the following:

- If the expert advisor refuses/ignores the incoming contact, then the call is routed to other experts until one of them accepts the contact.
- If all expert advisors refuse/ignore incoming contact, then the call is routed back to the system based on the requery option configuration.
- If no expert advisor responds within the allowed time out, then the call maybe dropped depending on how the system requery script is configured.

Unanswered calls remain in queue, and depending on the configuration, may have music on hold playback.

Call Flow #3: Retail Credit Account Collection Calls (Outbound)

The outbound Collections skill group performs follow-up calls to SS&S customers using the Collections campaign.

The group of 73 (including 15 mobile) blended agents make an estimated 1,314 BHCA outbound calls. This number refers to the number of successful calls, which is estimated at 30% of the total calls placed by the Outbound Option as shown below:

Calls Answered: 1,314 (30% of call volume)

Calls Busy: 1,533 (35% of call volume)

Calls Not Answered: 1,533 (35% of call volume)

Total Calls Dialed: 4,380

Call Handling and Queueing

Outbound calls are handled by a predictive dialer where the system dials several calls at once. This is done since some of the calls do not complete due to bad numbers, busy lines, etc. When a customer answers the call, an agent is immediately connected to the customer to perform the collections request.

At the Mid-Atlantic Retail Center (Site6), calls are made in the Predictive Mode, using agents from the '604 – Retail Credit Account Collections' group to make the outbound calls.

If the outbound Campaign detects an answering machine (or call answering service), the system plays the following message to the customer before terminating the call:

“We have an important message for you from Siren Supplies and Stores. Please call us at 1-866-747-3677 as soon as you can. Thank you.”

Summary of Call Handling and Queueing

Based on routing scripts defined by the business logic, it can be seen that the contact center system handles and queues different types of calls in a variety of ways.

[Table 12](#) summarizes this information and lists the different types of sample Unified CVP Post-Routed call flows discussed previously, the sites that are eligible to handle them, and their treatment by the contact center system.

Table 12 Summary of Call Handling and Queueing for Unified CVP Sites

| Call Flow# | Call Type | Eligible Sites | Call Treatment by System |
|---------------|---|---|---|
| Call Flow #1a | Distribution Center Inbound Unified CVP calls | Local site only | <ul style="list-style-type: none"> • If agent is logged on and available, transfers directly to agent. • Once queued locally, not permitted to cross to other sites, even within the same cluster. • If more than 20 calls in queue, plays message to call back. • Caller must terminate call by hanging up. |
| Call Flow #2a | Retail Center Inbound Unified CVP calls | Local site only | <ul style="list-style-type: none"> • If agent is logged on and available, transfers directly to agent. • Once queued locally, not permitted to cross to other sites, even within the same cluster. • If more than 20 calls in queue, plays message to call back. • Caller must terminate call by hanging up. |
| Call Flow #2b | Retail Center Conferences/ Transfers | All sites (wherever the agent is located) | <ul style="list-style-type: none"> • If agent is logged on and available, transfers directly to agent. • If agent is logged on but taking another call, places in queue for that agent and plays message to wait or terminate call. |
| Call Flow #3 | Retail Credit Account Collections | Only Site6 handles outbound calls | <ul style="list-style-type: none"> • Uses predictive Outbound Option. • If called party answers, connects call to agent. • If called party does not answer, does not try the call again within campaign time. • If called party asks agent to call back, uses personal callback or system callback features to call customer back at scheduled time. • If answering machine is detected, system leaves message asking customer to call back and terminates call. |

Unified CVP Test Sites

The following seven sites make up the multisite centralized and multisite distributed configurations for testing Unified CVP call flows in Test Bed 3:

- Chicago Distribution Center/[Site1: Data Center](#)
- Unified Mobile Agents/[Site2: Virtual Call Center](#)
- Central Branch/[Site3: Distribution Center](#)
- Dallas Distribution Center/[Site5: Data Center](#)
- Mid-Atlantic Retail Center/[Site6: Mid-Atlantic Retail Center](#)
- North Central Retail Center/[Site7: North-Central Retail Center](#)
- South Central Retail Center/[Site8: South-Central Retail Center](#)

See [Topology of Unified CVP Sites](#) for a complete map of the seven sites, their individual topologies, and the relationship between the sites. See [Table 13](#) for a comprehensive view of the different components deployed at the various Unified CVP sites. See [Unified CVP Site Definitions](#) for more information on the individual sites and topologies in Test Bed 3.

Site Relationships and Call Routing

Listed below are the relationships of the seven sites and the call routing deployed in Test Bed 3.

Multisite Centralized Site Relationships

- Site1 and Site5 participate in the multisite centralized configuration and *share* several contact center components over the WAN (CoW).
- Site1 and Site5 are data centers and act as hubs for Site6 and Site8.
- Site3 and Site7 have their own Unified Communications Manager clusters for call processing.
- Site2 acts as a virtual call center for mobile agents.

Multisite Distributed Site Relationships

- In addition to Site1 and Site5, Site3 (distribution center/branch office) and Site7 (retail center) have Unified Communications Manager clusters resident at their sites for independent call processing locally and are connected by ICT trunks to the data centers.
- Site7 handles conferences/ transfers for Site6 and Site8.

Call Routing

- General call flow—Customer calls come in from the gateways in the remote sites, get sent to the data centers (Site1/Site5) for processing, and then routed to agents at the appropriate remote sites, including self-service call flows that do not involve agents.

Calls coming into an Unified Border Element gateway (either SIP or H.323) are converted to SIP traffic and sent to the data centers (Site1/Site5) for processing, and then routed to agents at the appropriate remote sites.

- Unified CVP Post-Routed Call Flow—Site1 and Site5 participate in this type of call flow.
- Outbound Option Call Flow—Site6 with blended agents participates in this call flow and the Unified Mobile Agent call flow.

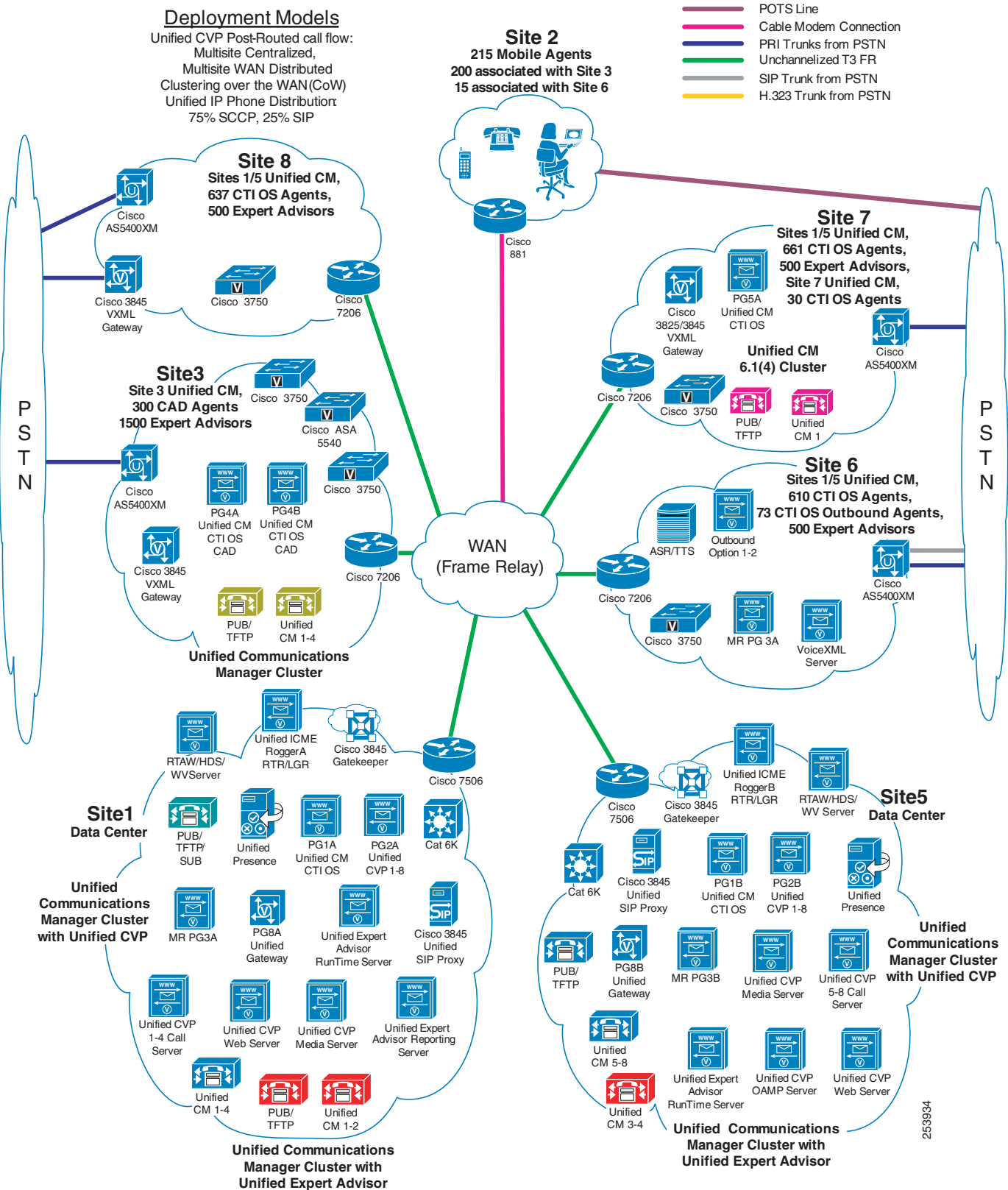
- Unified Mobile Agent Call Flow—Site3 and Site6 mobile agents use their PSTN or cell phones to handle calls based on their skill groups. Calls are routed via Site1/Site5 gateways to mobile agents' phones.

[Tested Call Flows](#) discusses these call flows in greater detail.

Topology of Unified CVP Sites

The topology and relationships of the seven Unified CVP sites where Unified CCE with Unified CVP is deployed are shown in [Figure 1](#).

Figure 1 Unified CVP Sites in Test Bed 3



Snapshot of Unified CVP Sites Components

Table 13 provides a comprehensive view of the different components deployed at the various Unified CVP sites. For specific component names and quantities, see the individual site descriptions in this section.

Table 13 *Comprehensive Unified CVP Sites Components List*

| Components | Site1 | Site3 | Site5 | Site6 | Site7 | Site8 |
|--|-------|-------|-------|--------|--------|--------|
| Hub/Data Center | X | | X | | | |
| Distribution Center | | X | | | | |
| Retail Center | | | | X | X | X |
| Agents (formal, outbound, mobile, expert advisors) | 0 | 1,800 | 0 | 1,183 | 1,191 | 1,137 |
| BHCA (formal, outbound, mobile, expert advisors) | n/a | 8,400 | n/a | 16,360 | 13,438 | 12,466 |
| Unified Communications Manager Cluster | X | X | X | | X | |
| HW Conference/MTP/Transcoder | X | X | X | | X | |
| Unified ICME Rogger | X | | X | | | |
| RT AW/HDS/Webview | X | | X | | | |
| Generic Peripheral Gateway (PG) | X | X | X | | X | |
| Hybrid IOS (H.323 and SIP) Gateway | | X | | X | X | X |
| Unified CVP (VXML) Gateway | | X | | X | X | X |
| H.323 Gatekeeper | X | | X | | | |
| Unified Presence (as SIP Proxy Server) | X | | X | | | |
| Unified SIP Proxy | X | | X | | | |
| Access Switch | X | X | X | X | X | X |
| Access Router | X | | | | | |
| Cisco Content Switch | X | | X | | | |
| CTI/CTI OS Servers (coresident on Generic PG) | X | X | X | | X | |
| CAD Server (coresident on Generic PG) | | X | | | | |
| MR PG (coresident on Generic PG) | X | | X | | | |
| DHCP Server (on router) | X | X | X | X | X | X |
| Unified CVP Servers (Call/Web/HTTP Media) | X | | X | | | |
| ASR/TTS | | | | X | | |
| Cisco Unified Expert Advisor (product option) | X | | X | | | |

Table 13 Comprehensive Unified CVP Sites Components List (continued)

| Components | Site1 | Site3 | Site5 | Site6 | Site7 | Site8 |
|---|-------|-------|-------|-------|-------|-------|
| Runtime Server | X | | X | | | |
| Reporting Server | X | | X | | | |
| Cisco Unified Personal Communicator | | X | | X | X | X |
| Unified Gateway (Unified Expert Advisor) | X | | X | | | |
| Outbound Option | | | | X | | |
| Cisco Unified IP Phones (SCCP and SIP) | X | X | X | X | X | X |
| CAD Agent/Supervisor Desktop | | X | | | | |
| CTI OS Agent/ Supervisor Desktop | | | | X | | X |
| Cisco Security Agent | X | X | X | X | X | X |
| Cisco Adaptive Security Appliance Series 5400 | | X | | | | |
| Cisco Unified Operations Manager | X | X | X | X | X | X |
| WAN Router | X | X | X | X | X | X |
| Third-Party Software | X | X | X | X | X | X |

**Note**

Cisco 7507 is the core switch that provides Frame Relay services Test Bed 3 sites. 215 mobile agents in Site3 and Site6 use regular PSTN or cell phones to accept and handle customer calls.

Unified CVP Site Definitions

The following section describes the sites that were created to deploy the various test deployment models in Test Bed 3 for testing Unified CVP Post-Routed call flows. Each topic in this section defines the design characteristics of an individual site and includes a logical topology map and a site equipment table.

Side A:

- Participating sites include Site1, Site2, and Site3.
- Site1 has the following configuration:
 - Side A of the Unified ICME Rogger.
 - Unified CVP systems that service this side of the test bed.
 - PGs of which PG1, PG2 and PG3 also service Side B of the test bed.
 - A Unified Communications Manager cluster has 4 subsequent nodes for Side A (the first node and TFTP server are in Side B).
 - Cisco Unified Expert Advisor (Unified Expert Advisor) and its Unified Gateway (PG).
- Site2 acts as a virtual call center for mobile agents.

- Site3 has its own Unified Communications Manager cluster for call processing, but uses Unified CVP in Site1/Site5 for call treatment and queuing. Agents in Site3 use CAD Agent Desktop applications. Site3 also has 200 mobile agents associated with it.

Side B:

- Participating sites include Site5, Site6, Site7, and Site8.
- Site5 has the following configuration:
 - Side B of the Unified ICME Rogger.
 - Unified CVP systems that service this side of the test bed.
 - PGs of which PG1, PG2 and PG3 also service Side A of the test bed.
 - A Unified Communications Manager cluster has a first node/TFTP and 4 subsequent nodes for Side B.
 - Cisco Unified Expert Advisor (Unified Expert Advisor) and its Unified Gateway (PG).
- Site6 has Outbound Option with ASR/TTS capabilities and mobile agents are associated with this site.
- Site7 has its own Unified Communications Manager cluster (running a previous version of the software to verify interoperability) for call processing, but uses Unified CVP in Site1/Site5 for call treatment and queuing.
- Agents in this part of the test bed use CTI OS Agent Desktop applications.

Site1: Data Center

Site Profile

Site1 is the hub and the data center in a multisite centralized configuration along with Site5 as its backup data center and redundant hub. It also participates in the multisite distributed WAN configuration.

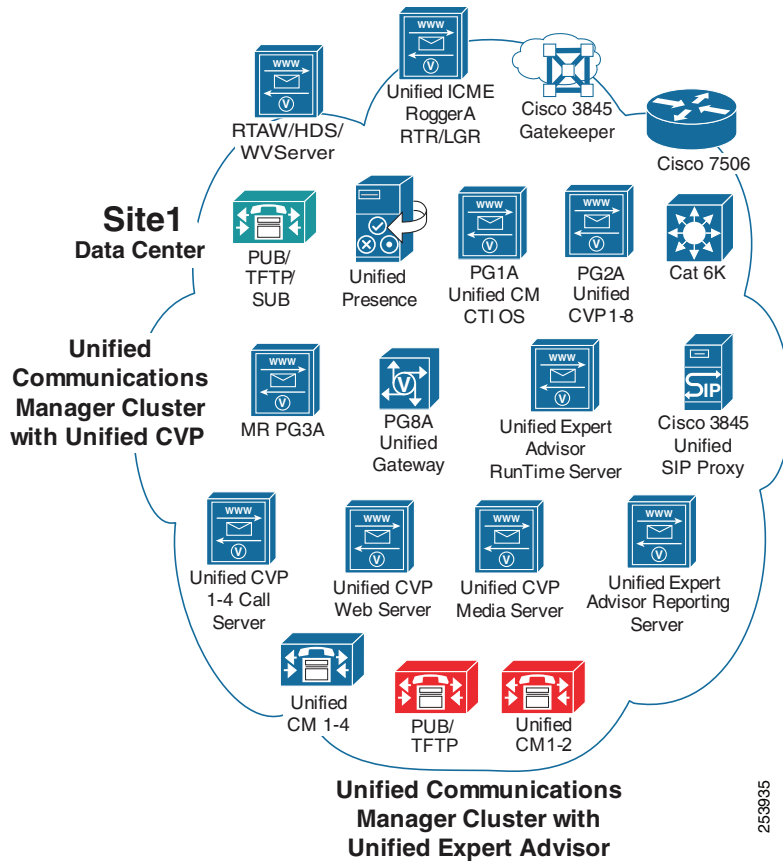
The test site is deployed as follows:

- Agents:
 - No agents are located at this site and no calls are answered at this site.
- Call Flows:
 - The Unified CVP Call servers and Unified CVP Voice Browsers are co-located on a single Unified CVP server. Additionally, there are separate Unified CVP Web and HTTP Media Servers.
 - Two of the Unified CVP Call servers are configured in a comprehensive mode to provide call treatment and queuing functionality.
 - The third Unified CVP Call server is used to support transfer to IVR outbound campaigns and warm consultative transfers.
- Call Processing/Routing:
 - The CallRouter and Logger are coresident (known as a Rogger) on Unified ICME and provide enterprise-wide Unified ICME capability by distributing voice and data from multiple channels to enterprise resources.
 - Unified ICME Rogger (Side A) is located at this hub. There is a dedicated private WAN connection used for clustering over the WAN (CoW) to Site5. In addition, there is also a visible WAN connection to the other sites.

- The central database is associated with the Logger. The Historical Database Server (HDS) and the WebView Server (WVS) are installed on the Real-Time Admin Workstation (RT AW).
- Infrastructure:
 - The first Unified Communications Manager cluster, which process calls to formal agents, has 4 subsequent nodes (the first node/TFTP server is in the other data center Site5). The second cluster, which process calls to expert advisors, has the first node/TFTP server and 2 subsequent nodes in this site.
 - The gatekeepers handle the transfers done by Unified CVP.
 - The Unified Expert Advisor publisher (primary runtime server) publishes data. The Unified Expert Advisor subscribers (high availability and reporting servers) subscribe to the data.
 - The PGs in this data center (as Side A) are configured as follows:
 - a. PG1 is configured with the Unified Communications Manager PIM and the CTI/CTI OS server which handles 1,320 agents (at Site6 and Site8).
 - b. PG2 is configured to handle the IVR PIMs for which the Unified CVP servers are the peripherals.
 - c. PG3 is configured as a Media Routing Peripheral Gateway (MR PG) to handle the Outbound Option located in Site6.
 - d. PG8 is configured as a Unified Gateway on the Unified ICME software. The Unified Gateway provides for the integration of the Unified ICME system with Unified Expert Advisor.
 - One Catalyst switch acts as a Layer2 access switch for Site1.
 - A WAN router and DS3 link provide clustering over the WAN (CoW) private connectivity to the backup data center in Site5.
 - A DHCP Server (on the router) provides IP addresses to the Unified IP Phones.
 - Windows 2003 Active Directory provides the active directory structure and DNS services.
- Unified IP Phones:
 - There are 20 admin phones at this site.
- Network Management:
 - Unified Operations Manager is used to monitor the entire network in Test Bed 3.
 - Perfmon is used for network reporting.
- Redundancy and Failover:
 - For the Unified Communications Manager cluster in Side A, there are 4 subsequent nodes in a 1:1 load sharing mode.
 - The second Rogger at Site5 provides data center redundancy for this site.
 - Side B PGs located in Site5 also provide data center redundancy for this site.
 - Failover capabilities are in place for the Unified Communications Manager and the PG systems.
 - A Content Switch is used for load-balancing the Unified CVP servers.
- Security:
 - Cisco Security Agent is implemented as core endpoint security on all the servers.
 - McAfee Antivirus is installed on all the Windows-based servers.

Figure 2 shows the logical topology of Site1.

Figure 2 Site1 Logical Topology



Site1 in Test Bed 3 was also set up as a virtualized environment running Unified Communications applications on a virtual machine on a Unified Computing System (UCS). Figure 3 shows the logical topology with Unified Computing System hardware deployed in Site1.

For additional details, including UCS hardware information and third-party requirements, see: www.cisco.com/go/uc-virtualized

Figure 3 Site1 Logical Topology with UCS deployment

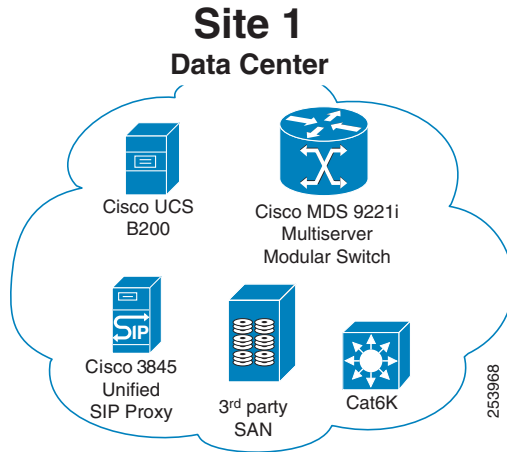


Figure 4 shows the B-series chassis blade layout for Site1:

Figure 4 UCS B-series Server Chassis Blade Layout for Site1

| Blade 1 | | | | Blade 2 | | | | |
|--------------------------|---------------------|-----------------|----------------|--------------------------|------------------|--|--|--------------------------|
| CPU-1 | | CPU-2 | | CPU-1 | | CPU-2 | | |
| PUB1 Core 1 | AW Core 2 | CCMP Core 3 | SUB1 Core 4 | PG1 Core 1 | MOH Core 2 | SUB2 Core 3 | Unified Presence (Unified CVP SIP Proxy) Core 4 | |
| Blade 3 | | | | Blade 4 | | | | |
| CPU-1 | | CPU-2 | | CPU-1 | | CPU-2 | | |
| Unified CVP1 Core 1-4 | | | | SUB3 Core 1-2 | TFTP Core 3-4 | Unified ICME Rogger Core 1-4 | | |
| SUB4 Core 1-4 | | | | | | | | |
| Blade 5 | | | | Blade 6 | | | | |
| CPU-1 | | CPU-2 | | CPU-1 | | CPU-2 | | |
| PG2/CTI OS Core 1 | PG4 (VRU) Core 2 | RT-AW Core 3 | SUB5 Core 4 | HDS Core 1-4 | | Unified CVP2 Core 1-4 | | |
| Blade 7 | | | | Blade 8 | | | | |
| CPU-1 | | CPU-2 | | CPU-1 | | CPU-2 | | |
| SUB6 Core 1-4 | | | | Unified CVP3 Core 1-4 | | Unified CVP Call/OAMP/Media Server Core 1-2 | SUB7 Core 3-4 | Unified CVP4 Core 1-4 |

Table 14 lists the equipment, quantity and hardware platforms used in Site1. Use the reference information in the table to access corresponding software versions and model numbers.

Table 14 Site1 Equipment List

| Component | Hardware Platform | Quantity |
|--|--------------------|----------|
| Access/Distribution Switch | WS-C6509 | 1 |
| Gatekeeper | CISCO3845 | 1 |
| Peripheral Gateway (MR PG) | MCS-7845 | 1 |
| Peripheral Gateway (Unified Communications Manager/CTI OS) | MCS-7845 | 1 |
| Rogger | MCS-7845 | 1 |
| RT AW/HDS/WebView | MCS-7845 | 2 |
| Unified Communications Manager | MCS-7845/UCS B200 | 5/1 |
| Peripheral Gateway (VRU/Unified CVP) | MCS-7845 | 1 |
| Unified CVP Call Server | MCS-7845/UCS B200 | 2/1 |
| Unified CVP Web Server/HTTP Media Server | MCS-7845 | 1 |
| Unified Operations Manager | MCS-7845 | 1 |
| Unified Presence (SIP Proxy) | MCS-7845/UCS B200 | 1/1 |
| Unified SIP Proxy | MCS-7845 + NME 522 | 1 |
| WAN Router | Cisco 7506VXR | 1 |
| Unified Expert Advisor Components | | 1 |
| Reporting Server | MCS-7845 | 1 |
| Runtime Server | MCS-7845 | 1 |
| Unified Communications Manager | MCS-7845 | 3 |
| Unified Gateway | MCS-7845 | |
| Unified Presence (SIP Proxy) | MCS-7845 + NME 522 | 1 |

For installation and configuration documentation on these components, see Components Installation and Configuration Guides at:

http://www.cisco.com/cisco/web/docs/iam/unified/ipcc851/Component_Installation_and_Configuration_Guides.html

Additional configuration information for contact center call flows and components is available at: http://docwiki.cisco.com/wiki/Category:Unified_Communications_System_Implementation

Site2: Virtual Call Center

Site Profile

Site2 is the virtual site of mobile agents. Site2 participates in the multisite centralized configuration with Site1 and in the multisite distributed WAN configuration.

The test site is deployed as follows:

- Agents:

- There are 215 mobile agents that are logically grouped in Site2 who use their regular PSTN and cell phones to handle customer calls.
- 200 of these mobile agents are associated with agents in Site3. 15 mobile agents participate in making outbound calls along with local agents at Site6.
- Calls arriving and being processed at Site2 have a BHCA of 3,600.
- Infrastructure:
 - A WAN router and DS3 link provide connectivity to other sites through a Frame Relay cloud.
- Remote Phones:
 - Mobile agents use regular PSTN and cell phones that are not controlled by Unified CCE.

Figure 5 shows the logical topology of Site2.

Figure 5 Site2 Logical Topology



Table 15 lists the equipment, quantity and hardware platforms used in Site2. Use the reference information in the table to access corresponding software versions and model numbers.

Table 15 Site2 Equipment List

| Component | Hardware Platform | Quantity |
|-------------------------------------|----------------------|----------|
| Teleworker Access Router | Cisco Teleworker 881 | 1 |
| CTI OS Agent and Supervisor Desktop | Windows XP and Vista | n/a |

For installation and configuration documentation on these components, see Components Installation and Configuration Guides at:

http://www.cisco.com/cisco/web/docs/iam/unified/ipcc851/Component_Installation_and_Configuration_Guides.html

Additional configuration information for contact center call flows and components is available at:

http://docwiki.cisco.com/wiki/Category:Unified_Communications_System_Implementation

Site3: Distribution Center

Site Profile

Site3 is a distribution center in the multisite centralized configuration of this test bed. It participates in the multisite distributed WAN configuration.

The test site is deployed as follows:

- Agents:
 - 300 formal agents use Cisco Agent Desktop (CAD) application for call control.
 - 500 expert advisors receive instant messages from formal call center agents and use Unified Personal Communicator as their desktops.
 - Calls arriving at Site3 have a BHCA of 8,400.
 - 200 mobile agents in Site2 are associated with this site.
- Call Flows:
 - The Unified CVP PSTN gateways are used to terminate the Unified CVP Post-Routed traffic from the PSTN.
 - The Unified CVP (VXML) gateways are used to process the Unified CVP Post-Routed traffic from the PSTN gateways and provide menu prompting and call queuing functionality.
- Call Processing/Routing:
 - For call control and processing, this site communicates with the data centers (Site1/Site5) over the WAN link.
- Infrastructure:
 - A Unified Communications Manager cluster consisting of 1 first node/TFTP server and 4 subsequent nodes is used for ICT transfers.
 - A Generic PG provides the Unified Communications Manager PIM for the Unified Communications Manager cluster at this site, and CTI OS and CAD services. It communicates with the Central Controller (Rogger) at the data centers (Site1/Site5) over the WAN.
 - A WAN router and DS3 link provided connectivity for call processing at Site1.
 - A DHCP Server (on the router) provides IP addresses to the Unified IP Phones.
 - The CAD Desktop application communicates with the CAD services located in the PG at this site.
 - CAD Desktop administrator tool is loaded on the Windows XP machine.
- Unified IP Phones:
 - 375 SCCP phones are located at this site.
 - 125 agent and 25 admin SIP phones are located at this site.

For installation and configuration documentation on these components, see Components Installation and Configuration Guides at:

http://www.cisco.com/cisco/web/docs/iam/unified/ipcc851/Component_Installation_and_Configuration_Guides.html

Additional configuration information for contact center call flows and components is available at:

http://docwiki.cisco.com/wiki/Category:Unified_Communications_System_Implementation

Site5: Data Center

Site Profile

Site5 is the backup data center and hub of Site1 in a multisite centralized configuration. It participates in the multisite distributed WAN configuration.

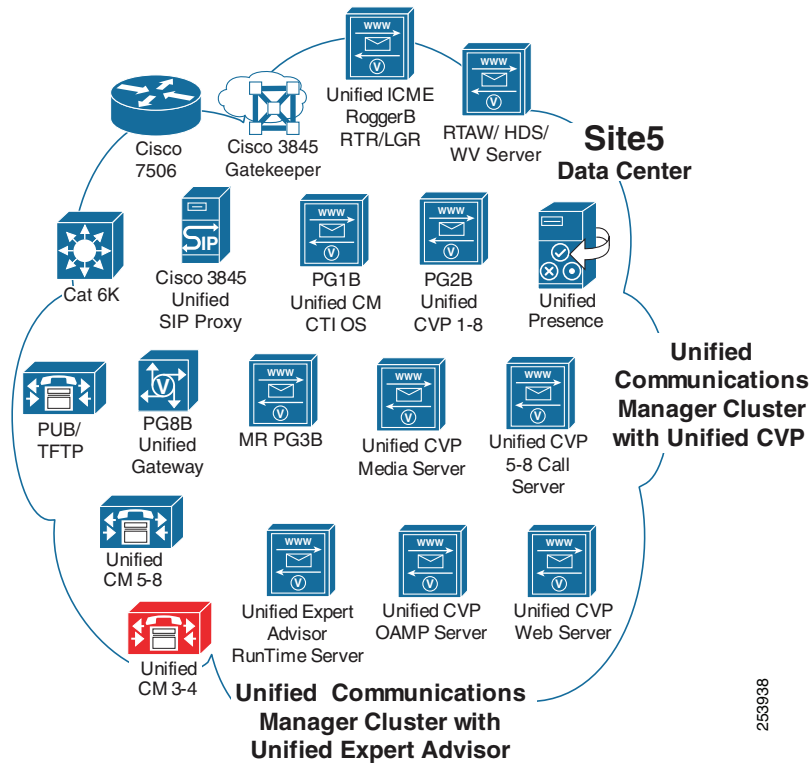
The test site is deployed as follows:

- Agents:
 - No agents are located at this site and no calls are answered at this site.
- Call Flows:
 - The Unified CVP Call server and Unified CVP Voice Browser are co-located on a single Unified CVP server. Additionally, there are separate Unified CVP Web and HTTP Media Servers.
 - Two Unified CVP Call servers are configured in a comprehensive mode to provide call treatment and queuing functionality at Site5's remote branches (Site6, Site7, and Site8).
 - The third Unified CVP Call server is used to support transfer to IVR outbound campaigns and warm consultative transfers.
- Call Processing/Routing:
 - Unified ICME Rogger (Side B) is located at this hub. There is a dedicated private WAN connection used for clustering over the WAN (CoW) to Site1. In addition, there is also a visible WAN connection to the other sites.
 - The central database is associated with the Logger. The Historical Database Server (HDS) and WebView Server (WVS) are installed on the Real-Time Admin Workstation (RT AW).
- Infrastructure:
 - The first Unified Communications Manager cluster, which process calls to formal agents, has 1 first node/ TFTP and 4 subsequent nodes (this first node/ TFTP also supports the Site1 data center). The second cluster, which process calls to expert advisors, has 2 subsequent nodes in this site and has the first node/ TFTP in Site1 data center.
 - The gatekeepers handle transfers by Unified CVP.
 - The Unified Expert Advisor publisher (primary runtime server) publishes data. The Unified Expert Advisor subscribers (high availability and reporting servers) subscribe to the data.
 - The PGs in this data center (as Side B) are configured as follows:
 - a. PG1 is configured with the first Unified Communications Manager PIM and the CTI/CTI OS server which handles 2,011 agents (at Site6, Site7 and Site8).
 - b. PG2 is configured to handle the IVR PIMs for which the Unified CVP servers are the peripherals.
 - c. PG3 is configured as a Media Routing Peripheral Gateway (MR PG) to handle the Outbound Option located in Site6.

- d. PG8 is configured as a Unified Gateway on the Unified ICME software. The Unified Gateway provides for the integration of the Unified ICME system with Unified Expert Advisor.
 - One Catalyst switch acts as a Layer2 access switch for Site5.
 - A WAN router and DS3 link provide clustering over the WAN (CoW) private connectivity to the backup data center in Site5.
 - A DHCP Server (on the router) provides IP addresses to the Unified IP Phones.
 - Windows 2003 Active Directory provides the active directory structure and DNS services.
- Unified IP Phones:
 - There are 30 admin phones at this site.
- Network Management:
 - Perfmon and Unified Operations Manager are used for network monitoring.
- Redundancy and Failover:
 - For the Unified Communications Manager cluster in Side B, there are 1 first node/TFTP and 4 subsequent nodes in a 1:1 load-sharing mode.
 - Failover capabilities are in place for the Unified Communications Manager and the Generic PG systems.
 - The Rogger located in Site1 provides redundancy for the Rogger in this site.
 - Side A PGs located in Site1 also provide data center redundancy for this site.
 - A Content Switch is used for load-balancing the Unified CVP Servers.
- Security:
 - Cisco Security Agent is implemented as core endpoint security on all the servers.
 - McAfee Antivirus is installed on all the Windows-based servers.

Figure 7 shows the logical topology of Site5.

Figure 7 Site5 Logical Topology



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Table 17 lists the equipment, quantity and hardware platforms used in Site5. Use the reference information in the table to access corresponding software versions and model numbers.

Table 17 Site5 Equipment List

| Component | Hardware Platform | Quantity |
|--|-------------------|----------|
| Access/Distribution Switch | WS-C6509 | 1 |
| Gatekeeper | CISCO3845 | 1 |
| Peripheral Gateway (MR PG) | MCS-7845 | 1 |
| Peripheral Gateway (Unified Communications Manager/CTI OS) | MCS-7845 | 1 |
| Rogger | MCS-7845 | 1 |
| RT AW/HDS/WebView | MCS-7845 | 2 |
| Unified Communications Manager | MCS-7845/UCS B200 | 4/1 |
| Peripheral Gateway (VRU/Unified CVP) | MCS-7845 | 1 |
| Unified CVP Call Server | MCS-7845/UCS B200 | 2/1 |
| Unified CVP OAMP Server | MCS-7845 | 1 |

Table 17 **Site5 Equipment List (continued)**

| Component | Hardware Platform | Quantity |
|--|--------------------|----------|
| Unified CVP Web Server/HTTP Media Server | MCS-7845 | 1 |
| Unified Presence (SIP Proxy) | MCS-7845/UCS B200 | 1/1 |
| Unified SIP Proxy | MCS-7845 + NME 522 | 1 |
| WAN Router | Cisco 7506VXR | 1 |
| Unified Expert Advisor Components | | 1 |
| Runtime Server | MCS-7845 | 1 |
| Unified Communications Manager | MCS-7845 | 2 |
| Unified Gateway | MCS-7845 | |
| Unified Presence (SIP Proxy) | MCS-7845 + NME 522 | 1 |

For installation and configuration documentation on these components, see Components Installation and Configuration Guides at:

http://www.cisco.com/cisco/web/docs/iam/unified/ipcc851/Component_Installation_and_Configuration_Guides.html

Additional configuration information for contact center call flows and components is available at:

http://docwiki.cisco.com/wiki/Category:Unified_Communications_System_Implementation

Site6: Mid-Atlantic Retail Center

Site Profile

Site6 is a remote retail site in a multisite centralized configuration in this test bed. It participates in the multisite distributed WAN configuration. The test site is deployed as follows:

- Agents:
 - 683 agents use CTI OS Agent Desktop application for call control functions to handle both inbound calls from the PSTN and Unified ICME–initiated outbound calls.
 - 610 agents handle the inbound calls and 73 blended agents (including 15 mobile agents) handle both inbound retail and outbound credit collections calls.
 - Mobile agents use their regular PSTN and cell phones to make outbound calls.
 - 500 expert advisors receive instant messages from formal call center agents and use Unified Personal Communicator as their desktops.
 - Calls arriving at this site have a BHCA of 16,360 and outbound calls leaving Site6 have a BHCA of 4,380.
- Call Flows:
 - The Unified CVP PSTN gateways are used to terminate the Unified CVP Post-Routed traffic from the PSTN.
 - The Unified CVP (VXML) gateways are used to process the Unified CVP Post-Routed traffic from the PSTN gateways and provide menu prompting and call queuing functionality.
- Call Processing/Routing:

- For call control and processing, this site communicates with the data center (Site1/Site5) over the WAN link.
- Cisco Unified SIP Proxy (Unified SIP Proxy) routes incoming calls to the Unified CVP Call Server.
- Infrastructure:
 - A WAN router and DS3 link provide connectivity for call processing at Site1/Site5.
 - A DHCP Server (on the router) provides IP addresses to the Unified IP Phones.
 - Outbound Option is installed at this site to provide required outbound campaigns.
 - A duplexed MR PG, which supports 1 PIM, communicates with the SIP Proxy (on Unified SIP Proxy or Unified Presence) to select available agents and routes calls to them.
 - The VXML ingress gateway supports the self service portion of Unified CVP call flows.
 - The Unified CVP VXML Server runs self service applications such as messages, recorded music, voice responses, etc. which are invoked by the VXML Gateway for the self service portion of the call.
 - ASR/TTS is installed at this site to provide the required Automated Speech Recognition and Text to Speech functionality.
- Unified IP Phones:
 - 512 SCCP phones are located at this site.
 - 171 agent and 34 admin SIP phones are located at this site.
- Security:
 - Cisco Security Agent is implemented as core endpoint security on the Outbound Option and all the servers.
 - McAfee Antivirus is installed on all the Windows-based servers and the agent desktops.

Figure 8 shows the logical topology of Site6.

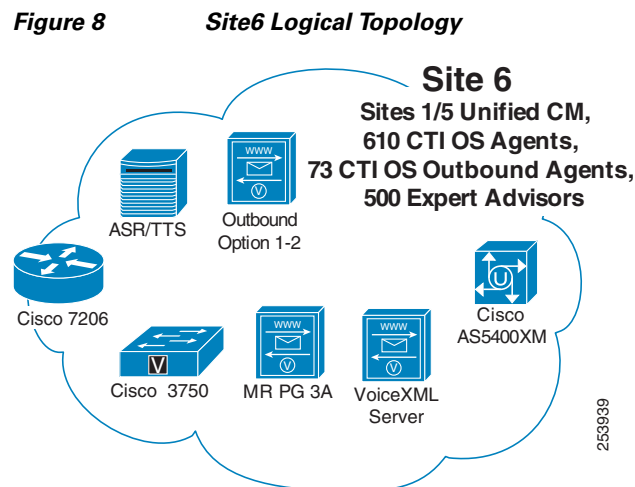


Table 18 lists the equipment, quantity and hardware platforms used in Site6. Use the reference information in the table to access corresponding software versions and model numbers.

Table 18 Site6 Equipment List

| Component | Hardware Platform | Quantity |
|--|--|----------|
| Access/Distribution Switch | WS-C3750 | 1 |
| CTI OS Agent and Supervisor Desktop | Windows XP and Vista | n/a |
| Media Routing Peripheral Gateway (MR PG) | MCS-7845 | 1 |
| Unified CVP PSTN/VXML Gateway | Cisco AS5400XM | 3 |
| Unified CVP VXML Gateway (Self Service) | Cisco AS5400XM | 1 |
| Unified CVP VXML Server (Self Service) | MCS-7845 | 1 |
| Unified Personal Communicator | Windows XP | 1 |
| Unified IP Phones | Unified IP Phones (SCCP and SIP) 794x/796x/797x | n/a |
| Outbound Option | MCS-7845 | 1 |
| WAN Router | Cisco 7206VXR | 1 |

For installation and configuration documentation on these components, see Components Installation and Configuration Guides at:

http://www.cisco.com/cisco/web/docs/iam/unified/ipcc851/Component_Installation_and_Configuration_Guides.html

Additional configuration information for contact center call flows and components is available at:

http://docwiki.cisco.com/wiki/Category:Unified_Communications_System_Implementation

Site7: North-Central Retail Center

Site Profile

Site7 is a medium remote retail site in a multisite centralized configuration in this test bed. It participates in the multisite distributed WAN configuration.

The test site is deployed as follows:

- Agents:
 - 691 agents use CTI OS Desktop applications for call control functions.
 - 500 expert advisors receive instant messages from formal call center agents and use Unified Personal Communicator as their desktops.
 - Calls arriving at this site have a BHCA of 13,438.
 - Agents in this site receive transfers and conferences from Site6 and Site8.
- Call Flows:
 - The Unified CVP PSTN gateway is used to terminate the Unified CVP Post-Routed traffic from the PSTN.
 - Cisco Unified Presence (Unified Presence) routes incoming calls to the Unified CVP Call Server.

- The Unified CVP VXML Gateway is used to process the Unified CVP Post-Routed traffic from the PSTN gateway. It also provides the menu prompting and call queuing functionality for the local site.
- Infrastructure:
 - A Unified Communications Manager cluster (running a previous release of the software to verify interoperability) consisting of 1 first node/TFTP server and 1 subsequent node handles the ICT transfers.
 - A Generic PG server provides the Unified Communications Manager PIM for the Unified Communications Manager cluster and CTI OS server at this site. It communicates with the Central Controller (Rogger) at the data centers (Site1/Site5) over the WAN link.
 - The CTI OS Desktop applications communicate with the CTI services located on the PG at this site and the data centers.
 - A WAN router and DS3 link provide connectivity for call processing at Site1/Site5.
 - A DHCP Server (on the router) provides IP addresses to the Unified IP Phones.
- Unified IP Phones:
 - 518 SCCP phones are located at this site.
 - 173 agent and 34 admin SIP phones are located at this site.
- Security:
 - Cisco Security Agent is implemented as core endpoint security on all the servers.
 - McAfee Antivirus is installed on all the Windows-based servers and the agent desktops.

Figure 9 shows the logical topology of Site7.

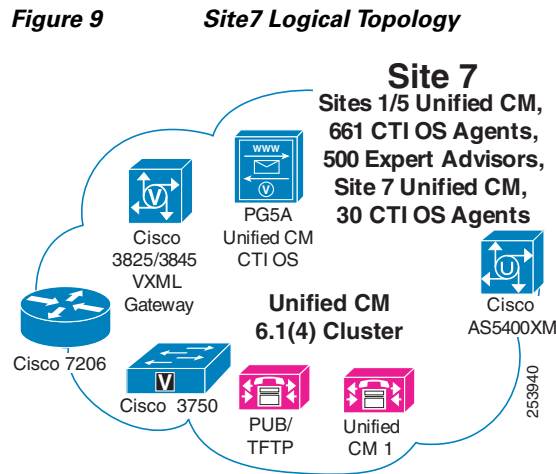


Table 19 lists the equipment, quantity and hardware platforms used in Site7. Use the reference information in the table to access corresponding software versions and model numbers.

Table 19 Site7 Equipment List

| Component | Hardware Platform | Quantity |
|----------------------------|-------------------|----------|
| Access/Distribution Switch | WS-C3750 | 1 |

Table 19 Site7 Equipment List (continued)

| | | |
|--|--|-----|
| Peripheral Gateway (Unified Communications Manager/CTI OS) | MCS-7845 | 1 |
| PSTN Gateway | Cisco AS5400XM | 2 |
| Unified CVP VXML Gateway | CISCO3825 | 1 |
| Unified CVP VXML Gateway | CISCO3845 | 1 |
| Unified Communications Manager | MCS-7845 | 3 |
| Unified IP Phones | Unified IP Phones (SCCP and SIP) 794x/796x/797x | n/a |
| Unified Personal Communicator | Windows XP | 1 |
| WAN Router | Cisco 7206VXR | 1 |

For installation and configuration documentation on these components, see Components Installation and Configuration Guides at:

http://www.cisco.com/cisco/web/docs/iam/unified/ipcc851/Component_Installation_and_Configuration_Guides.html

Additional configuration information for contact center call flows and components is available at:

http://docwiki.cisco.com/wiki/Category:Unified_Communications_System_Implementation

Site8: South-Central Retail Center

Site Profile

Site8 is a remote retail site in a multisite centralized configuration in this test bed. It participates in the multisite distributed WAN configuration.

The test site is deployed as follows:

- Agents:
 - 637 agents use CTI OS Desktop applications for call control functions.
 - 500 expert advisors receive instant messages from formal call center agents and use Unified Personal Communicator as their desktops.
 - Calls arriving at this site have a BHCA of 12,466.
 - Agents in this site receive transfers and conferences from Site6 and Site7.
- Call Flows:
 - The Unified CVP PSTN gateways are used to terminate the Unified CVP Post-Routed traffic from the PSTN.
 - Unified SIP Proxy routes incoming calls to the Unified CVP Call Server.
 - The Unified CVP VXML Gateway is used to process the Unified CVP Post-Routed traffic from the PSTN gateways. It also provides the menu prompting and call queuing functionality for the local site.
- Call Processing/Routing:
 - For call control and processing, this site communicates with the data centers (Site1/Site5) over the WAN link.
- Infrastructure:

- A WAN router and DS3 link provide connectivity for call processing at Site5.
- A DHCP Server (on the router) provides IP addresses to the Unified IP Phones at the site.
- Unified IP Phones:
 - 477 SCCP phones are located at this site.
 - 160 agent and 31 admin SIP phones are located at this site.
- Security:
 - Cisco Security Agent is implemented as core endpoint security on all the servers.
 - McAfee Antivirus is installed on all the Windows-based servers and the agent desktops.

Figure 10 shows the logical topology of Site8.

Figure 10 Site8 Logical Topology

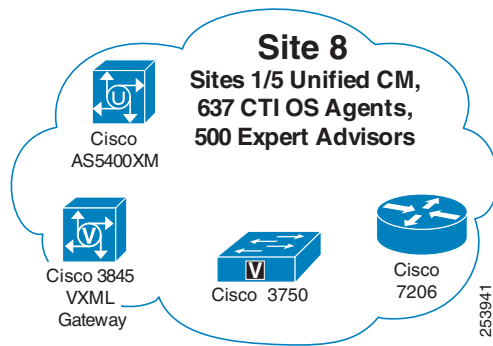


Table 20 lists the equipment, quantity and hardware platforms used in Site8. Use the reference information in the table to access corresponding software versions and model numbers.

Table 20 Site8 Equipment List

| Component | Hardware Platform | Quantity |
|-------------------------------------|--|----------|
| Access/Distribution Switch | WS-C3750 | 1 |
| CTI OS Agent and Supervisor Desktop | XP and Vista | n/a |
| PSTN Gateway | Cisco AS5400XM | 2 |
| Unified CVP VXML Gateway | CISCO3845 | 2 |
| Unified IP Phones | Unified IP Phones (SCCP and SIP) 794x/796x/797x | n/a |
| Unified Personal Communicator | Windows XP | 1 |
| WAN Router | Cisco 7206VXR | 1 |

For installation and configuration documentation on these components, see Components Installation and Configuration Guides at:

http://www.cisco.com/cisco/web/docs/iam/unified/ipcc851/Component_Installation_and_Configuration_Guides.html

Additional configuration information for contact center call flows and components is available at:

http://docwiki.cisco.com/wiki/Category:Unified_Communications_System_Implementation