



Architectural Overview

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Unified CCE Software Overview

This section provides a high-level overview of Unified CCE software, which must be installed and configured before installing Outbound Option.



Note See Chapters 3-5 for detailed information about installing Unified CCE and Outbound Option software.

Before installing Unified CCE software, the virtual machine guests must have the Microsoft Windows operating system and, for some components, Microsoft SQL Server database management software installed. Also, ensure that there is enough disk space available on each system to install the Unified CCE component.

See the [Compatibility Matrix for Unified CCE](#) for information on operating system and software requirements.

Unified CCE software contains the following components:

- **Router:** The component of the Central Controller that makes routing decisions. It gathers and distributes data to and from remote sites.
- **Logger:** The component of the Central Controller that controls the central database.
- **Administration & Data Server:** Known as the Admin Workstation in previous releases, the Administration & Data Server is the user interface for Unified CCE software. The Administration & Data Server can be located at any central or remote site. It allows users to monitor call handling within the system and change configuration data or routing scripts.
- **Peripheral Gateway:** The interface between the Unified CCE platform and third-party hardware in each call center, such as an ACD. A Peripheral Gateway (PG) is typically located at the call center.

Install the Peripheral Gateway from the PG Setup program; install the other components from the Web Setup program.

Together, the Router and Logger compose the Central Controller and are installed at a central site. At least one Peripheral Gateway is typically installed in each call center. Administration & Data Servers can be installed at a central site, a call center, or at a separate admin site.

Outbound Option Software Components

This section provides details about the server processes of the Outbound Option system:

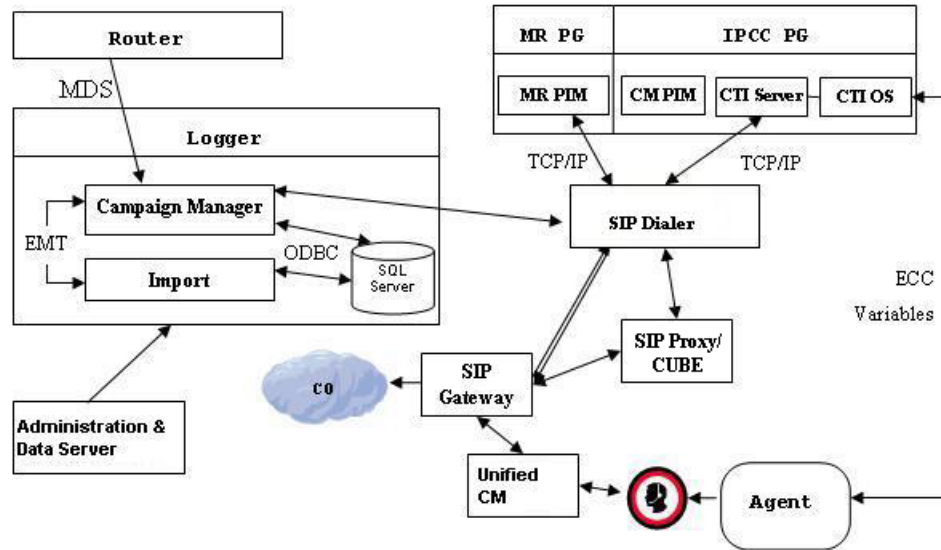
- **Campaign Manager:** Manages lists.
- **Outbound Option Import:** Reads customer import files and generates database lists.
- **Outbound Option Dialer:** Maximizes the resources in a contact center by dialing several customers per agent. This component resides on the PG server, where it performs the following actions:
 - Dials customers
 - Reserves agents
 - Performs call classification
 - Calculates agent availability
 - Keeps outbound dialing at a level where the abandon rate is below the maximum allowed abandon rate

The Outbound Option components provide a user interface where configuration data can be entered. The Outbound Option server processes use this configuration data to configure campaigns.

Outbound Options Component Relationships

The following figure shows the component relationships within an Outbound Option deployment that uses the SIP Dialer. These relationships include the Unified CCE software components that Outbound Option uses.

Figure 1: Outbound Option Network Component Relationship (SIP Dialer)



Outbound Option Campaign Manager Component

The Campaign Manager component, which resides on the Logger, is responsible for:

- Managing when a campaign runs.
- Maintaining system and dialer configurations.
- Deciding which contact records to retrieve from a campaign based on configurable query rules and delivering those contact records to dialers.

Records for callbacks are sent to the Dialer only when agents are logged in, and are controlled by registry values as described in Chapter 5, "Configuration of Campaigns and Imports".

- Distributing configuration data to the import process and all available dialers in the system.
- Collecting real-time and historical data and sending it to the Router.
- Managing the Do Not Call list to ensure that no records on it are sent to the Dialers.
- Performing record queries based on the following order:
 - Callback
 - Retry Zone1
 - Retry Zone2
 - Pending Zone1
 - Pending Zone1 DST
 - Pending Zone2
 - Pending Zone2 DST

Based on this order, the priority for the Retry record is higher than for the Pending record. However, the Pending record priority can be set above the Retry record by setting the “PendingOverRetryEnabled” registry key to **1** (default is 0). If the value is set to **1**, the record query order would be:

- Callback
- Pending Zone1
- Pending Zone1 DST
- Pending Zone2
- Pending Zone2 DST
- Retry Zone1
- Retry Zone2

For more information, see Appendix A, “Registry Settings”.

Related Topics

[Registry Settings](#)

Outbound Option Import Component

The Outbound Option Import component resides on the Unified CCE Logger. The Import component imports a Contact list, which contains the phone numbers that Outbound Option dials. In addition, the Import component uses the scheduling configured in the Outbound Option components to process imports that are scheduled for a particular date and time.

When the Import component processes an import, the following steps occur:

1. Imports a Contact list into a table.
2. Builds a dialing list for a campaign.
3. Performs region prefix matching.



Note Outbound Option can continue to run a campaign while an import is in progress; however, some of the campaign’s query rules might be disabled.

Outbound Option Dialer Component

The Outbound Option SIP Dialer component, which resides on the PG server, performs the following actions:

- Dials customers using the voice gateways.
- Reserves agents through the Media Routing (MR) interface.
- Performs call classification.
- Calculates agent availability by monitoring campaign skill groups through the CTI Server interface to the agent PG.

- Transfers answered customer calls to reserved agents.

For Outbound campaigns, the Voice Gateway handles functions such as dialing, call control, and Call Progress Analysis (CPA).

The following summarizes SIP Dialer features:

- Use the voice gateway or Cisco Unified Border Element (CUBE) dial peers and Unified SIP Proxy routing policies for outbound call routing.
- No need to configure Unified CM translation pattern to support Campaign Automatic Number Identification (ANI).
- Perform CPA at gateway DSP resource.



Note Unlike the physical CUBE, virtual CUBE does not have DSPs and cannot support CPA. Add a dedicated physical gateway for your outbound traffic if you need CPA.

- The following summarizes CPA support:
 - With Voice Gateway (T1/E1), CPA supports G.711 (both a-law and mu-law) and G.729 codecs.
 - With CUBE (IP-IP) flows, CPA only supports G711 (both a-law and mu-law).
 - With Outbound Option SIP dialer, CPA only supports G711 (both a-law and mu-law).
- No need to configure dialer port on Unified CM.
- The dialer does not need to be in proximity of the voice gateway.
- Supports warm standby architecture.
- Requires one MR PIM for MR PG.
- Only connected outbound calls, which are transferred to agents or VRU, go through Agent PG and Unified CM.
- Call Throttling supports 60 CPS per dialer.
- Supports 1500 dialer ports.



Note These performance numbers can vary depending on the details of your deployment and your system configuration. To accurately size your Outbound deployment, use the Cisco Unified Collaboration Sizing Tool (Unified CST) available at <https://tools.cisco.com/cucst/faces>. For detailed instructions, see the online Help system for this tool.

The Unified CST is available to Cisco internal employees and Cisco partners, and proper login authentication is required.

Dialer Port Allocation

The dialer component reserves agents when it sees agents have become available. The Dialer requests skill group statistics from the agent PG every two seconds and attempts to reserve agents based on the number of available agents and the number of dialers active for this PG.

Each dialer checks agent availability to make reservation requests based on the skill group statistic refreshes that occur every two seconds. When skill groups for multiple campaigns are active for one or more of the same agents, then one campaign always reserves that agent or agents. You can avoid this situation by scripting the reservation scripts to queue reservation calls using the same mechanism that is described for queuing personal callback reservation requests. This resolution ensures a more even distribution of calls for active campaigns that share a common agent pool.

For example, in the following scenario where two campaigns are in progress:

- Campaign 1 has four available agents and is dialing two lines per agent, which has a relative weight of eight (two lines each for four agents).
- Campaign 2 has one available agent, but is dialing at four lines per agent, which has a relative weight of four (four lines for one agent).

To dial customers for all available agents requires 12 ports, but only 9 ports are available.

The results:

- Campaign 1 gets 2/3 of the remaining ports, or six of the remaining ports.
- Campaign 2 gets 1/3 of the remaining ports, or three of the remaining ports.
- Each dialer begins dialing using the ports assigned to it, and assigns additional ports to the campaigns when new ports become available.

Port Allocations for Campaign Modes

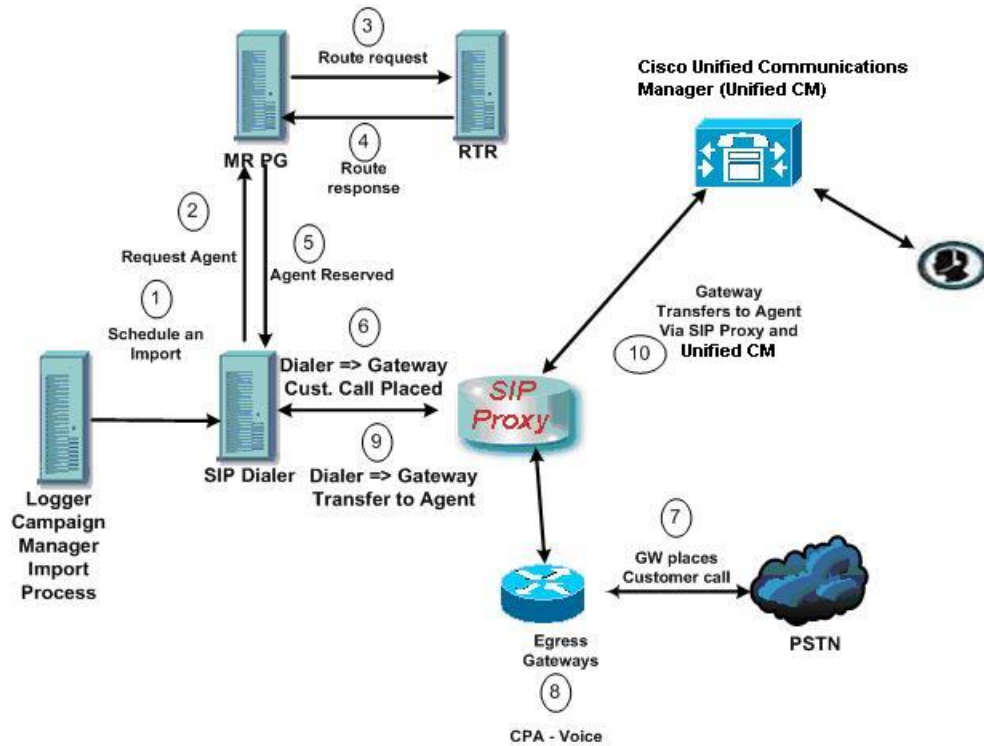
Preview, Predictive, and Progressive campaigns require at least two ports to place calls because they require at least one port to reserve the agent and one port to dial the customer. Because campaigns are shared across active dialers that service a PG, this maximum number of active campaigns applies to the PG.

Transfer to VRU and Direct Preview calls only require one port. Transfer to VRU calls do not reserve the VRU port before dialing, and Direct Preview calls use the agent's phone to place the call.

Transfer to Agent Call Flow: SIP Dialer with SIP Proxy

The following figure illustrates a Transfer to Agent Call Flow in a deployment with a SIP Dialer that is connected to a SIP Proxy.

Figure 2: Transfer to Agent Call Flow - SIP Dialer with SIP Proxy

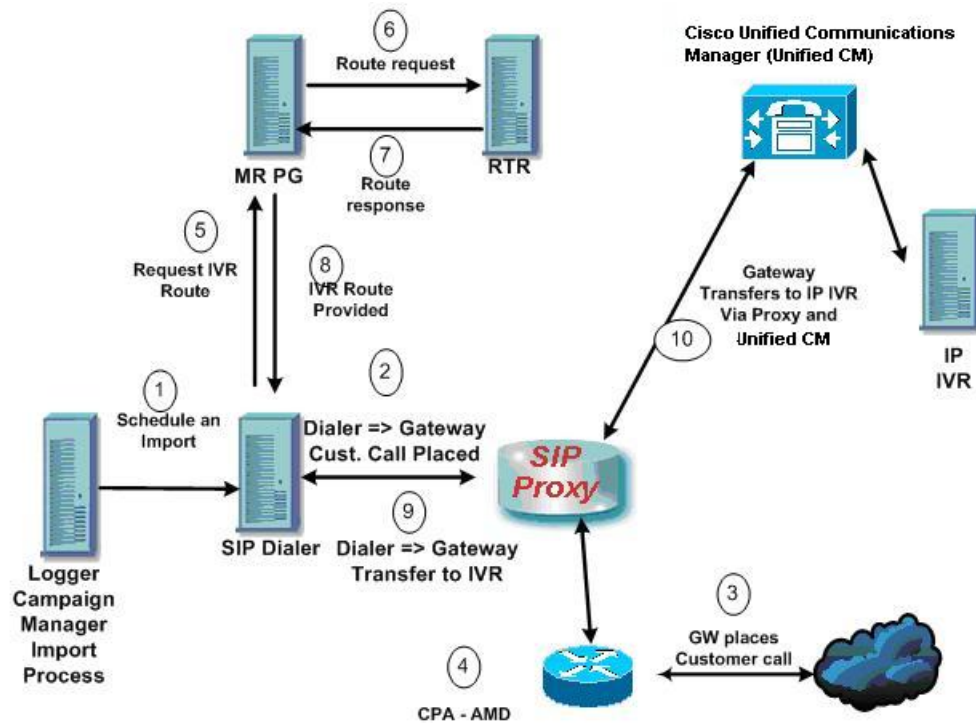


1. An agent campaign starts. Customer records are delivered to the Dialer.
- 2 to 5. An agent is reserved with a virtual placeholder call.
- 6 to 7. The dialer asks the gateway (via proxy) to place a call, and it does.
8. The Voice Gateway performs Call Progress Analysis and detects live voice. Media is terminated at the VGW until the CPA completes.
9. The dialer is notified and asks the voice gateway (via proxy) to transfer the call to the agent.
10. The Voice Gateway sets up the customer call with the voice agent (via proxy) and the UC Manager.

Transfer to VRU Call Flow: SIP Dialer with SIP Proxy

The following figure illustrates a Transfer to VRU Call Flow in an Outbound Option deployment with a SIP Dialer connected to a SIP Proxy.

Figure 3: Transfer to VRU Call Flow - SIP Dialer with SIP Proxy

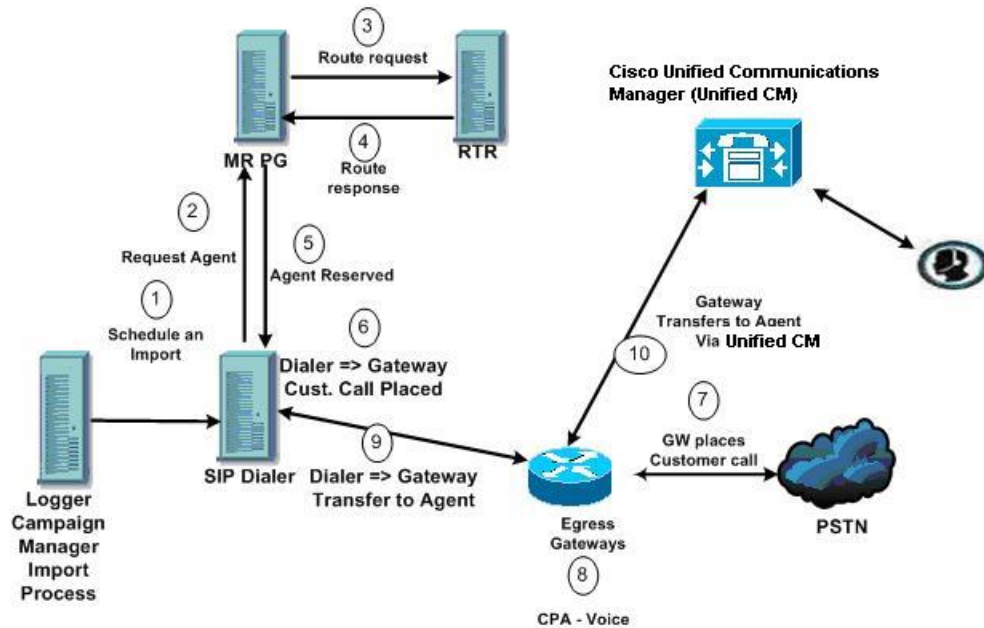


1. An unattended VRU campaign starts. Customer records are delivered to the Dialer.
2. The Dialer asks the SIP Proxy to forward an invitation to an available gateway to start a call.
3. The Gateway places the call.
4. Voice Gateway does Call Progress Analysis and detects an answering machine. The Dialer is notified.
5. The Dialer asks the MR PG where the VRU is.
6. MR PG forwards the request to the Router.
7. The routing script identifies the VRU and notifies the MR PG.
8. The MR PG forwards the route response to the Dialer.
9. The Dialer notifies the voice gateway to transfer the call to the VRU.
10. The Gateway starts the transfer to the SIP Proxy, and the SIP Proxy forwards the invitation to the Unified CM. Unified CM forwards the call invitation to the VRU, and media is set up between the Gateway and the VRU.

Transfer to Agent - SIP Dialer with No SIP Proxy

The following figure illustrates a transfer to agent call flow in an Outbound Option deployment with a SIP Dialer without a SIP Proxy.

Figure 4: Transfer to Agent - SIP Dialer with No SIP Proxy



1. Import is scheduled and campaign starts. Records are delivered to Dialer.
2. The Dialer looks for an available agent via the Media Routing Interface.
3. MR PG forwards the request to the Router.
4. The routing script identifies an agent and responds to the MR PG.
5. Media Routing PIM notifies the Dialer that the agent is available.
6. Dialer signals the gateway to place a call to the customer.
7. The Gateway places a call to the customer, and the Dialer is notified it is trying.
8. Call Progress Analysis is performed at the gateway. Voice is detected, and Dialer is notified.
9. The Dialer asks the voice gateway to transfer the call to the reserved agent by its agent extension.
10. The Gateway directs the call to the agent via Unified CM using dial peer configuration to locate the Unified CM. Media is set up between the Gateway and the agent's phone.

Peripheral Gateway (PG)

The peripheral gateways (PGs) are redundant in a SideA - SideB configuration; one side is active and the other side runs in standby while waiting to be activated. The dialers are co-located with the agent PGs with the dialers running in a peer model.

Agent PG

The agent PG is a primary data collection point for agent and skill group statistics. The Dialer connects to the agent PG through the CTI Server interface to monitor skill groups associated with campaigns. It uses the number of working agents and available agents to determine when to reserve agents and when to dial for agent campaigns. For 'Transfer to VRU' campaigns, the Dialer monitors the number of calls queued to determine when the Dialer component has reached the limit of VRU ports for this campaign as specified in the campaign skill group.

The agent PG also monitors all calls placed to the Dialer ports. The Dialer uses the PG representation of the call to push customer call context to the agent. The Dialer also provides information about call results so that the PG can report Outbound Option statistics for the campaign skill group.

Campaign statistics and skill group statistics both report the number of Outbound Option calls that reach agents. The Campaign Manager collects and reports campaign statistics. The PG collects and reports skill group statistics. The two reports can differ by a call or two for a given half hour, but they are reconciled at the end of the campaign.

Media Routing PG

The Media Routing PG (MR PG) is the interface the Dialer uses to make route requests to the Central Controller to find and reserve available agents. Each Dialer uses its own MR controller (MR PIM), and a separate dialed number is configured to differentiate requests for different campaign skill groups for agent campaigns.

For a quick reference on configuration limits and scalability constraints, see the *Solution Design Guide for Cisco Unified Contact Center Enterprise* at <https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-implementation-design-guides-list.html>.

VRU

The Dialer uses the VRU for unassisted treatment of customer calls depending on campaign configuration for abandoned calls, answering machine treatment in an agent campaign, or for unassisted transfer to VRU campaigns.

VRU scripting is flexible in playing prompts to the user and collecting other data. It can also be a queue point to wait for the next available agent.

Partition the ports accordingly when using the same VRU for inbound and outbound campaigns. For inbound calls, do not use ports allocated for the transfer to VRU feature. For VRU ports shared between inbound and outbound applications, the Dialer might transfer customers to a VRU which does not have any available ports left. In this case, the called party hears a fast busy signal or a 'ring no answer' message. To avoid this situation, ensure that the VRU has enough ports for both inbound and outbound traffic.



Note The transfer speed between the Dialer and the VRU is usually under two seconds, but can be longer depending on the network design and configuration.

Administration and Data Server: Configuration

Use the Administration & Data Server configuration tools to configure the Unified CCE system. Enable the tools for configuring Outbound Option by editing the Administration & Data Server setup.

Cisco Unified Intelligence Center

Cisco Unified Intelligence Center (CUIC) is the standard Unified CCE reporting interface.

For details about Unified Intelligence Center, see the [Cisco Unified Intelligence Center Documentation](#).

Dialer Reports

The Outbound Option Dialer reports provide information about the dialer platform. These predefined templates include information about performance and resource usage. The templates also enable you to determine whether you need more dialer ports to support more outbound calls.

For more information, see chapter 6, "Administrative and Supervisory Tasks".

Outbound Option Agent Desktops

Cisco Finesse supports Outbound Option-enabled agents.

Cisco Finesse

Cisco Finesse provides the following applications and tools:

- A web-based desktop application for agents and supervisors. Agents and supervisors access their desktops by entering the following URL in their browsers: `http://hostname`, where `hostname` is the hostname or IP address of the Finesse server.
- A web service that provides contact center agent desktop functionality through a REST-like interface.
- An administration console for configuring system settings, desktop layout, wrap-up reasons, and reason codes. Administrators access this console by entering the following URL in their browsers: `http://hostname/cfadmin`, where `hostname` is the hostname or IP address of the primary Finesse server.



Note Cisco Finesse supports Outbound Option as follows:

- Finesse supports Progressive mode, Predictive mode, Preview mode, and Direct Preview mode.
- You can schedule both regular callbacks and personal callbacks.



Note Agents who are on Progressive or Predictive Outbound Option calls do not appear in the Talking - Outbound column of the Queue Statistics gadget on the supervisor desktop. This number only includes agents who are talking on outbound calls placed by those agents.

Outbound Option Extended Call Context Variables

The Outbound Option Dialer uses CTI Extended Call Context (ECC) variables to exchange information with the Finesse desktop. The following table lists the ECC variables Outbound Option uses.



Note You can use a custom ECC payload to pass the Dialer ECC Variables to a VRU.

Table 1: ECC Variables for Outbound Option

ECC Variable	Description
BACampaign	Indicates the name of the Outbound Option campaign to which the call belongs.
BAAccountNumber	Identifies a customer account number and can be used by the desktop application to perform a database lookup to obtain more customer data. This ECC variable is displayed only if the data was available in the customer import file. Note The maximum character length of this ECC variable is 30 characters.
BAResponse	Multipurpose placeholder that sends data from the Finesse desktop to the Outbound Option Dialer. This variable responds to the reservation call to schedule and cancel callbacks, and to changes to the callback phone number. See the following rows for more information about BAResponse.

ECC Variable	Description												
BAResponse for Preview mode	<p>On the Finesse desktop, when an agent uses the Accept, Reject, and Reject-Close buttons in Preview mode, BAResponse is set to one of the following values:</p> <ul style="list-style-type: none"> • Accept: Accepts the current preview call. • Reject: Rejects the current preview call. Sets record to “R” for retry. • Reject-Close: Rejects the current preview call and closes the record so it will not be called again. <p>On the Finesse desktop, an agent in Preview mode can respond with the following options:</p> <table border="1" data-bbox="704 682 1521 1100"> <thead> <tr> <th data-bbox="704 682 979 735">Agent Action</th> <th data-bbox="984 682 1252 735">BAResponse setting</th> <th data-bbox="1256 682 1521 735">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="704 741 979 827">Accept</td> <td data-bbox="984 741 1252 827">Accept</td> <td data-bbox="1256 741 1521 827">Accepts the current preview call.</td> </tr> <tr> <td data-bbox="704 833 979 947">Decline > Reject</td> <td data-bbox="984 833 1252 947">Reject</td> <td data-bbox="1256 833 1521 947">Rejects the current preview call. Sets record to “R” for retry.</td> </tr> <tr> <td data-bbox="704 953 979 1100">Decline > Close</td> <td data-bbox="984 953 1252 1100">Reject-Close</td> <td data-bbox="1256 953 1521 1100">Rejects the current preview call and closes the record so it will not be called again.</td> </tr> </tbody> </table>	Agent Action	BAResponse setting	Description	Accept	Accept	Accepts the current preview call.	Decline > Reject	Reject	Rejects the current preview call. Sets record to “R” for retry.	Decline > Close	Reject-Close	Rejects the current preview call and closes the record so it will not be called again.
Agent Action	BAResponse setting	Description											
Accept	Accept	Accepts the current preview call.											
Decline > Reject	Reject	Rejects the current preview call. Sets record to “R” for retry.											
Decline > Close	Reject-Close	Rejects the current preview call and closes the record so it will not be called again.											
BAResponse for the Callback button	<p>When an agent uses the Callback button, BAResponse is set to one of the following values:</p> <p>Note Spaces are relevant and must be included in these commands.</p> <ul style="list-style-type: none"> • Callback mmddyyyy hh:mm: Schedules a callback for the indicated date and time • Callback Cancel: Cancels a previously scheduled callback for this call • P#xxxxxxxxxxxxxxxxxxxxxx: Changes the callback phone number to the number specified by xxxx <p>For Preview modes, cancel the reservation call by clicking Reject.</p> <p>For Predictive mode, cancel the reservation call by clicking Not Ready and then hang up the reservation call.</p>												

ECC Variable	Description
BAResponse for Direct Preview calls	<p>For Direct Preview calls, any connected customer call is classified as VOICE by the Dialer (default). To reclassify the call result, the agent can click the following buttons:</p> <ul style="list-style-type: none"> • Voice: To reclassify a call as a voice call, set the BAResponse variable to REX_VOICE. Enable the Voice button only after pressing one of the other buttons first. Pressing one of the other buttons first enables an agent to reclassify the call if needed. • Answering Machine: To reclassify the call as an answering machine call, set the BAResponse variable to REX_ANS_MACHINE. • Fax/Modem: To reclassify the call as a fax/modem call, set the BAResponse variable to REX_FAX. • Invalid: To reclassify the call as an invalid call, set the BAResponse variable to REX_INVALID.
BAResponse for answering machine detection in a transfer to VRU campaign	<p>For answering machine detection on a transfer to VRU campaign, the BAResponse variable is evaluated to carry the CPA result of the customer call. Two new IF node configurations are supported:</p> <ul style="list-style-type: none"> • Call.BAResponse="CPA_AnswerMachine" • Call.BAResponse="CPA_Voice" <p>These IF nodes route to separate External Scripts to allow for different treatment depending on whether a voice or an answering machine was detected.</p>
BAStatus	<p>Contains two characters indicating the mode and direction of the Outbound Option Dialer initiated call. The first character identifies the call mode:</p> <ul style="list-style-type: none"> • R: Reservation call, Predictive mode • R: Reservation call, Predictive mode • G: Reservation call, Progressive mode • P: Reservation call, Preview mode • D: Direct Preview reservation call • C: Customer call • A: Reservation call, personal callback. <p>During a reservation call, the first character is P, R, G, or A. When a customer call is transferred to an agent, the first character is C.</p> <p>The second character of BASTatus indicates the call direction:</p> <ul style="list-style-type: none"> • O: Outbound • I: Inbound • B: Blended

ECC Variable	Description
BADialedListID	Unique key identifying a specific customer record within the Dialing List table in the Outbound Option private database.
BATimeZone	<p>Indicates the GMT offset, in minutes, for the customer’s time zone and obtains the customer’s local time. The format of this ECC variable is +/-#####.</p> <p>This field’s first character is either a positive or negative sign, followed by 5 digits. For example:</p> <ul style="list-style-type: none"> This example indicates that the customer is one hour behind GMT: BATimeZone = -00060 This example indicates that the customer is two hours ahead of GMT: BATimeZone = +00120
BABuddyName	Contains the customer’s last and first name separated by a comma, which is compiled using the imported LastName, FirstName that was configured on the Import Rule Definition tab page.

Desktop Button Behavior

The following table explains the desktop button behavior when a call is placed using Outbound Option.

For more information about dialing modes, refer to [Dialer Reports](#).

Dialing Mode / Other Conditions	Call Description	Buttons Enabled
Preview	Reservation calls: Dialer places the call and agent is available.	Accept , Reject , and Reject-Close buttons are enabled if the reservation call has not yet been accepted.
	Initial customer calls: Agent accepts the call and Dialer calls the customer.	No buttons are enabled if the customer does not answer the call.
	Transferred customer calls: Agent is talking to a customer.	Callback button is enabled.
Predictive and Progressive	Reservation calls: Dialer places the call and agent is available.	No buttons are enabled.
	Initial customer calls: Dialer calls the customer.	No buttons are enabled if the customer does not answer the call.
	Transferred customer calls: Agent is talking to a customer.	Callback button is enabled.

Dialing Mode / Other Conditions	Call Description	Buttons Enabled
Direct Preview	Reservation calls: Dialer places the call and agent is available.	Accept , Reject , and Reject-Close buttons are enabled if the reservation call has not yet been accepted.
	Initial customer calls: Agent accepts the call and calls a customer.	No buttons are enabled if the customer does not answer the call.
	Transferred customer calls: Agent is talking to a customer.	Callback , AnsMach , Fax , and Invalid buttons are enabled. Note You can revert to voice if you make a mistake.
Personal Callback	BAStatus is set to A and O or A and B for a reservation call.	Accept and Reject buttons are enabled, if the reservation call has not been accepted yet.
	Initial customer calls: Agent accepts the call and calls a customer.	No buttons are enabled if the customer does not answer the call.
	Transferred customer calls: Agent is talking to a customer.	Callback button is enabled.

Scripts for Outbound Option

Outbound Option uses Unified CCE scripting configured on the Administrative Workstation to manage campaigns.

There are two types of scripts:

- Administrative scripts to enable, disable, or throttle campaign skill groups for outbound campaigns.
- Agent reservation routing scripts to reserve agents for specific outbound campaigns and personal callbacks. These scripts can also transfer calls to VRU campaign or transfer calls to non-VRU campaigns for answering machine or abandons.

Related Topics

[Administrative Scripts for Outbound Option](#)

[Routing Scripts for Outbound Option](#)

Fault Recovery

This section describes Outbound Option behavior when specific components fail and recover.

Outbound Option High Availability

If you use the optional Outbound Option High Availability deployment, the active Outbound Option components manage all updates to the database (importing new records and updating Dialing Lists). The data is replicated

to the standby side using Microsoft SQL Server transactional replication. In a process or network failure, the active Campaign Manager fails over, and the standby campaign Manager becomes active. Dialers then connect to the newly active side, and operations continue, using the data that was replicated. All the updates to the database are again made by the newly active Campaign Manager, and data is replicated to the standby side. If a Logger server goes down, Outbound Option database updates pending until the server recovers. That data is then replicated to the database.

When Not to Use SQL Server Transactional Replication

As part of its high availability, Outbound Option uses Microsoft SQL Server transactional replication between the redundant databases. Transactional replication uses a best effort approach that might not replicate fast enough for high volumes of database updates. You might see replication delays under these conditions:

- Overwrite imports while a campaign is in progress.
- Consistently high CPS on the SIP Dialer, such as for a campaign that expects a low hit rate.
- Longer WAN delays on the public network between the Loggers with the Campaign Managers.
- High disk I/O operations.

If you experience persistent SQL Server replication delays of campaign data, consider disabling Outbound Option High Availability replication. During a failure of Logger A, your solution still fails over to the Campaign Manager on Logger B for redundancy. However, you must do a fresh campaign import at this point.

To disable Outbound Option High Availability, run **Web Setup** to disable it. But, leave Outbound Option enabled on Side B.



Important If you import more than a million records each day, disable SQL Server transactional replication.

Campaign Manager Fault Recovery

Campaign Manager is an MDS client for the router and is enabled on the router. The duplex structure for high availability requires a Side B router that replicates Side A. When Campaign Manager on the Side A fails over, the Campaign Manager on Side B is moved to Active state.

The Campaign Manager resides on the Logger.

If the Unified CCE Router and MR PG are still accessible when the Campaign Manager process shuts down, the Dialer can still reserve agents for an agent campaign. In this case, the Dialer continues to dial contacts and saves the results until it processes all the cached calls in memory.

After processing all its cached records, the Dialer cannot dial more calls until the Campaign Manager process recovers and sends it more records.

When the Campaign Manager is back online, it updates call results based on the information it receives from the Dialer. A few records can be lost when the Campaign Manager is not available. If High Availability is enabled, CampaignManager resumes the replication of pending records from the active side to idle side.

Dialer Fault Recovery

You deploy the SIP Dialer in redundant pairs in warm-standby mode. You can have one redundant pair for each Agent PG. To install multiple Dialers, install each on a separate PG VM, but assign them the same Dialer Name.

When the Campaign Manager detects that a Dialer state change from ready to not ready or that the connection from the active Dialer is lost, the Campaign Manager activates the standby Dialer, if there is a standby Dialer in ready state.

For regulatory compliance, the SIP Dialer does not automatically re-attempt calls that were in progress during a failover. Instead, the Dialer sends all active and pending customer records to the Campaign Manager. If the Campaign Manager is not available, the dialer closes them internally.

Active calls are handled as follows:

- Canceled if the call is not connected.
- Abandoned if the call is connected but not yet transferred to the agent or VRU.
- Continued if the call is already transferred and the PG/CG does not fail during that time.

If the standby Dialer does not respond during a set period, the Campaign Manager marks all outstanding records with an Unknown status and returns them to Pending status.



Note Calls, that were already connected to an agent, continue during failover. However, the Dialer Detail table changes the call from Closed to Dialed (D) state while the agent is still talking to the customer. When the call ends, the Dialer Detail record for that call may show an earlier end time than the actual end of the call.

Dialer Redundancy in Outbound Option High Availability

The Dialer updates the Campaign Manager with the intermediate Dialed (D) state of the customer records. This ensures that the Campaign Manager tracks the next set of actions for the dialed calls when the active dialer fails and the standby dialer is activated.

When the dialer calls a customer by sending a SIP Invite, it updates the state of the customer record in the Campaign Manager to the D (Dialed) state. The Campaign Manager receives the D state message and updates the CallStatus of the record to the D state in the DialingList (DL) table.

The Campaign Manager again updates the state of the customer record in the DL table and the DialerDetail table in the following events:

- **When the call is successful:** The Campaign Manager receives a message to close the customer records and it updates the state to the C state.
- **When the communication between the Dialer and Campaign Manager breaks:** The Campaign Manager does not receive any message to close the customer records. Here, all the D state records remain in the D state and the A state records move to the U state.
- **When the communication between the dialer and the CTI server breaks:** The Campaign Manager receives a close customer record message for all the customer calls that are in progress and updates these records to the C state. Next, the Campaign Manager sends the dialer disconnected status and all the A state records move to the U state and the D state records remain in the D state.

- **When the communication between the dialer, and the SIP gateway (GW), breaks:** All the calls that were in progress get disconnected from the phone but the call remains on the Agent Desktop. Campaign Manager receives Close customer record message once the call is released from the Agent Desktop. In this condition, all the D state records moves to C state once the call is released from Agent Desktop and the A state records move to the U state.
- **When the communication between the dialer and the MR PIM breaks:** The Campaign Manager receives only the dialer status when the MR interface fails. The ongoing calls continue. When the call is complete, the record is updated to the Closed (C) state.

The callresult statistic for records in D state is zero.

Campaign Manager Congestion Control

The Campaign Manager depends on an internal dispatch thread to process messages between the Campaign Manager and its registered Dialers. At times of high call rates, the Campaign Manager cannot process the volume of inbound messages from the Dialers fast enough and the number of messages queued to the dispatch thread, the *queue depth*, increases. Under these conditions, the Campaign Manager performance can be decreased, and if the queue depth becomes too large, the Campaign Manager restarts.

To protect the Campaign Manager from these overload conditions, the Congestion Control feature dynamically reduces the dialing rate of the registered Dialers as the queue depth increases. Congestion control is triggered when the Campaign Manager message queue depth reaches predefined thresholds, the Congestion Levels. As each level is reached, the Campaign Manager instructs all the registered Dialers to reduce their dialing rate by a specified percentage of the configured Port Throttle value, reducing the number of records dialed. As the congestion eases, the Campaign Manager updates the dialers to a lower Congestion Level and a reduced throttle percentage until the system returns to usual state and no additional throttling is applied.

The following table summarizes the Congestion Levels, the queue depth threshold for each level, and the throttle percentage applied at each level.

Congestion Level	Queue Depth Thresholds to Increase Level	Throttle Percentage	Queue Depth Thresholds to Decrease Level
0 - Normal operation	Queue depth is below 3,000 messages	No throttling	N/A
1 - Slightly congested	Queue depth increases to 3,000 messages	25%	Level 1 decreases to Level 0 when queue depth decreases to 1,500 messages
2 - Moderately congested	Queue depth increases to 5,000 messages	50%	Level 2 decreases to Level 1 when queue depth decreases to 2,500 messages
3 - Heavily congested	Queue depth increases to 7,500 messages	90%	Level 3 decreases to Level 2 when queue depth decreases to 4,500 messages

Two-Way Replication Performance

By default, Outbound Option High Availability uses default replication performance parameters. In most cases, these default parameters produce acceptable performance results.

Microsoft SQL Server Replication, however, allows tuning of these parameters, which may, in some cases, improve performance:

- Log Reader parameters.
- Distribution Agent parameter.

Tune Log Reader Parameters

The Log Reader Agent and Distribution Agent support batch sizes for transaction read and commit operations. Batch sizes default to 500 transactions.

The Log Reader Agent reads the specific number of transactions from the log. You can increase this parameter to up to 10,000 transactions.

The `-PollingInterval` parameter specifies how often the transaction log of a published database is queried for transactions to replicate. The default is five seconds. If you decrease this value, the log is polled more frequently. More frequent polling can result in lower latency for the delivery of transactions from the publication database to the distribution database.

Tune the Log Reader job parameters by following these steps.

Procedure

- Step 1** Locate the Log Reader job in SQL Server Management Studio, under SQL Server Agent jobs. The title of the job is `<Publisher Name>-<instance name>_baA-N`.
- Step 2** Right-click on the job and select **Properties**; the job **Property** page appears.
- Step 3** Select the **Steps** page, and double-click the **Run Agent** step.
- Step 4** In the command window, position the cursor at the end of the command and add the desired parameters.

For example, you can:

- Increase the value of the `-ReadBatchSize` parameter for the Log Reader Agent. To set the read batch size to 10,000, for example, set `-ReadBatchSize 10000`.
- Decrease the value of the `-PollingInterval` parameter for the Log Reader Agent. To set the polling interval to one second, for example, set `-PollingInterval 1`.

Related Topics

[Tune Distribution Agent Parameter](#), on page 21

Tune Distribution Agent Parameter

The Distribution Agent and Log Reader Agent support batch sizes for transaction commit and read operations. Batch sizes default to 500 transactions.

Committing a set of transactions has a fixed overhead. The overhead is spread across a larger volume of data. This parameter defaults to 500 but can be increased to 10,000, by committing a larger number of transactions less frequently.

Tune the Distribution Agent job parameter by following these steps.

Procedure

- Step 1** Locate the Distribution Agent job in SQL Server Management Studio, under SQL Server Agent jobs. The title of the job is <Publisher Name>-<instance name> PubBA-<Subscriber>-N.
 - Step 2** Right-click on the job and select **Properties**; the job **Property** page appears.
 - Step 3** Select the **Steps** page, and double-click the **Run Agent** step.
 - Step 4** In the command window, position the cursor at the end of the command and add the desired parameter.
To increase the value of the -CommitBatchSize parameter for the Distribution Agent to 10,000, for example, set `-CommitBatchSize 10000`.
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Related Topics

[Tune Log Reader Parameters](#), on page 20

