



## **Reporting Guide for Cisco Unified Intelligent Contact Management and Unified Contact Center Enterprise & Hosted Release 9.0(1)**

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## Preface

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## Purpose

Welcome to the *Reporting Guide for Cisco Unified Intelligent Contact Management and Unified Contact Center Enterprise & Hosted*. This guide explains how to interpret reporting data that is stored in, and retrieved from, the Cisco Unified Intelligent Contact Management and Contact Center (ICM/CC) database. This guide also helps you understand the importance of planning, configuration, and scripting for accurate reporting data.

## Audience

This guide is written for anyone who uses Cisco Unified Intelligence Center (Unified Intelligence Center) to generate reports from the stock Cisco reporting templates. Stock templates are Cisco templates that are installed with the reporting application, that are populated from the Unified ICM/CC database, and that are qualified by Cisco Systems, Inc.

Contact center supervisors and administrators who are responsible for configuring and scripting Unified ICM will also find this guide useful.

## Organization

This guide is organized into parts as follows:

This Part	Explains
<a href="#">Understanding Call Center Reporting</a>	<p>The reporting applications offered for Unified ICM, Unified Contact Center Enterprise (Unified CCE), and Unified Contact Center Hosted (Unified CCH)</p> <p>Custom reporting: what it is and how it can affect performance</p> <p>Types of reporting data: real-time, historical, configuration, and call detail</p> <p>Reasons reporting data can differ when you compare reports</p> <p>System architecture and reporting</p> <p>The importance of configuration and scripting</p>
<a href="#">Reporting entities and reporting concepts</a>	Key reporting entities and how they are presented in reports
<a href="#">Special reporting environments</a>	<p>Multichannel reporting</p> <p>Parent/child reporting</p>
<a href="#">Reporting implications of data loss and component failover</a>	<p>The data flow from the Logger to the Historical Data Server</p> <p>Preventing data loss.</p> <p>Possible points of failure</p>
<a href="#">Peripheral Gateway processes</a>	Four processes on the Peripheral Gateway
<a href="#">Routing and queuing</a>	Routing and queuing on Unified ICM
<a href="#">Appendix A: Unified ICM/CC Report Templates</a>	Unified ICM, Unified CCE, and Unified CCH report templates, with Unified IC equivalencies as of Release 8.0(1)

## Related documentation

Documentation for Cisco Unified ICM/Unified Contact Center Enterprise & Hosted, as well as related documentation, is accessible from Cisco.com at: <http://www.cisco.com/cisco/web/psa/default.html>.

Related documentation includes the documentation sets for Cisco Computer Telephony Integration (CTI) Object Server (CTI OS), Cisco Agent Desktop (CAD), Cisco Agent Desktop—Browser Edition, Cisco Unified Contact Center Management Portal, Cisco Unified Customer Voice Portal (Unified CVP), Cisco Unified IP IVR, Cisco Unified Intelligence Center, and Cisco Support Tools.

- For documentation for these Cisco Unified Contact Center Products, go to <http://www.cisco.com/cisco/web/psa/default.html>, click **Voice and Unified Communications**, then click **Customer Collaboration**, then click **Cisco Unified Contact Center Products** or **Cisco Unified Voice Self-Service Products**, then click the product/option you are interested in.
- For troubleshooting tips for these Cisco Unified Contact Center Products, go to <http://docwiki.cisco.com/wiki/Category:Troubleshooting>, then click the product/option you are interested in.
- Documentation for Cisco Unified Communications Manager is accessible from: <http://www.cisco.com/cisco/web/psa/default.html>.

- Technical support documentation and tools are accessible from: <http://www.cisco.com/en/US/support/index.html>.
- The Product Alert tool is accessible from (login required): <http://www.cisco.com/cgi-bin/Support/FieldNoticeTool/field-notice>.
- For information on the Cisco software support methodology, see *Software Release and Support Methodology: ICM/IPCC* available at (login required): [http://www.cisco.com/en/US/partner/products/sw/custcosw/ps1844/prod\\_bulletins\\_list.html](http://www.cisco.com/en/US/partner/products/sw/custcosw/ps1844/prod_bulletins_list.html).
- For a detailed list of language localizations, see the *Cisco Unified ICM/Contact Center Product and System Localization Matrix* available near the bottom of the following page: [http://www.cisco.com/en/US/products/sw/custcosw/ps1001/prod\\_technical\\_reference\\_list.html](http://www.cisco.com/en/US/products/sw/custcosw/ps1001/prod_technical_reference_list.html).

## Product naming conventions

In this release, the product names defined in the following table have changed. The New Name (long version) is reserved for the first instance of that product name and in all headings. The New Name (short version) is used for subsequent instances of the product name.



### Note

This document uses the naming conventions provided in each GUI, which means that in some cases the old product name is in use.

**Table 1: Product naming conventions**

Old Product Name	New Name (long version)	New Name (short version)
Cisco IPCC Enterprise Edition	Cisco Unified Contact Center Enterprise	Unified CCE
Cisco IPCC Hosted Edition	Cisco Unified Contact Center Hosted	Unified CCH
Cisco Intelligent Contact Management (ICM) Enterprise Edition	Cisco Unified Intelligent Contact Management Enterprise	Unified ICME
Cisco Intelligent Contact Management (ICM) Hosted Edition	Cisco Unified Intelligent Contact Management Hosted	Unified ICMH
Cisco Call Manager/Cisco Unified Call Manager	Cisco Unified Communications Manager	Unified CM

# Conventions

This manual uses the following conventions:

Convention	Description
<b>boldface font</b>	<p>Boldface font is used to indicate commands, such as user entries, keys, buttons, and folder and submenu names. For example:</p> <ul style="list-style-type: none"> <li>• Choose <b>Edit</b> &gt; <b>Find</b>.</li> <li>• Click <b>Finish</b>.</li> <li>• Navigational text when selecting menu options; for example: <b>ICM Configuration Manager</b> &gt; <b>Tools</b> &gt; <b>Explorer Tools</b> &gt; <b>Agent Explorer</b>.</li> </ul>
<i>italic font</i>	<p>Italic font is used to indicate the following:</p> <ul style="list-style-type: none"> <li>• To introduce a new term; for example: A <i>skill group</i> is a collection of agents who share similar skills.</li> <li>• For emphasis; for example: <i>Do not</i> use the numerical naming convention.</li> <li>• A syntax value that the user must replace; for example: IF (<i>condition, true-value, false-value</i>).</li> <li>• A book title; for example: Refer to the <i>Reporting Guide for Cisco Unified Intelligent Contact Management and Unified Contact Center Enterprise &amp; Hosted</i>.</li> </ul>
window font	<p>Window font, such as Courier, is used for the following:</p> <ul style="list-style-type: none"> <li>• Text as it appears in code or that the window displays; for example:  <pre>&lt;html&gt;&lt;title&gt;Cisco Systems, Inc. &lt;/title&gt;&lt;/html&gt;</pre> </li> </ul>
< >	<p>Angle brackets are used to indicate the following:</p> <ul style="list-style-type: none"> <li>• For arguments where the context does not allow italic, such as ASCII output.</li> <li>• A character string that the user enters but that does not appear on the window such as a password.</li> </ul>

## Documentation and service requests

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>



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## PART I

# Understanding Call Center Reporting

- [Reporting in Unified ICM/CC, page 3](#)
- [Reporting data, page 5](#)
- [Why report data can differ, page 15](#)
- [System architecture and reporting, page 19](#)
- [Importance of configuration and scripting, page 29](#)





# CHAPTER 1

## Reporting in Unified ICM/CC

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This chapter provides an introduction to the reporting application.

- [Cisco Unified Intelligence Center reporting application, page 3](#)
- [Custom reports, page 3](#)

### Cisco Unified Intelligence Center reporting application

Cisco Unified Intelligent Contact Management (Unified ICM), Cisco Unified Contact Center Enterprise (Unified CCE), and Cisco Unified Contact Center Hosted (Unified CCH) offers the Unified Intelligence Center reporting application.

Unified Intelligence Center is a web-based interface that provides stock “all fields” templates—templates that contain *all* database fields. You can also import additional templates. The premium version of Unified Intelligence Center comes with a native Report Designer tool for designing new templates.

[Appendix A](#) contains the list of all Unified Intelligence Center templates.

#### Reporting application installation

- Unified Intelligence Center is a separate installation and is not an option in Unified ICM Web Setup.  
If you plan to use Unified Intelligence Center, you must obtain the Unified Intelligence Center installation DVD. Contact your Cisco Support Provider for assistance.



#### Note

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For information about capacity guidelines for using Unified Intelligence Center, see the *Unified Intelligence Center Hardware and Software Specification (Bill of Materials)*.

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### Custom reports

To determine whether you require custom templates, decide what data you need. Then compare your needs with the data available through Unified Intelligence Center stock report templates as listed in [Appendix A](#).

### What is a custom template?

For Unified Intelligence Center, a custom template is:

- A new template that users with the Report Definition Designer user role have developed, or
- A stock template for which the Report Definition Designer has done a “save as” and has altered the Structured Query Language (SQL).



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**Note**

- You can design report templates and change the SQL queries of existing templates only if you have the Unified Intelligence Center Premium license and the Report Designer user role.
  - Your Cisco Support provider cannot assist you with custom templates.
- 

### Custom templates can affect performance

Custom templates that include the same types of data provided by the stock reports might not impact database or reporting application performance. However, a resource-intensive customization that processes detailed or application-specific data can decrease performance.

For example, no stock Cisco reports contain the [Call Detail data](#) that is stored in the Route\_Call\_Detail and Termination\_Call\_Detail tables. To report on this data, you *must* create custom templates, and reports that process detail data always decrease the performance of the database and of the reporting applications.



## CHAPTER 2

# Reporting data

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Unified CCE manages high volumes of call data, which are processed on the Central Controller. This chapter explains how reporting data are replicated in the system and presented in reports.

- [Real time data collection, page 5](#)
- [Historical and interval data collection, page 6](#)
- [Configuration data, page 11](#)
- [Call Detail data, page 11](#)
- [Database tables that hold reporting data, page 12](#)

## Real time data collection

In real time, each Peripheral Gateway (PG) [Peripherals and peripheral gateways](#) passes current status information to Unified CCE software. This current (real time) data, which is kept in CallRouter memory, includes data about agents, skill groups, services, call types, trunk groups, Precision Queues, and other entities.

Every 15 seconds (by default), the CallRouter forwards the current in-memory data to the Administration & Data Server, where it is stored on a number of real time tables in the local Administration & Data Server databases and then distributed to the Administration Clients. Old real time data is constantly overwritten by new real time data. No history is kept.

Real time data moves from the Peripheral Gateways to the CallRouter to the local database on the Administration & Data Server.

Real time data is stored in tables in data fields that reflect four time increments, as described in the following table.

**Table 2: Real time data time increments**

Real time data time increments	Description
Half	<p>“Half” values contain a value for the current half-hour. Real time half-hour values are not affected by Interval configuration. That is, if you set the historical reporting interval to 15 minutes, the Half values in real time tables represent the current half-hour time period falling between xx:00:00 and xx:29:59, or xx:30:00 and xx:59:59.</p> <p>For example, if it is currently xx:18:33, the CallsOfferedHalf column in the Call_Type_Real_Time table contains a value that reflects the first 18 minutes and 33 seconds of the specific half-hour. When a new half-hour begins, at time (xx:00:00 or xx:30:00), the database element is reset to zero.</p>
Now	<p>“Now” contains a snapshot of the activity at a particular instant (the last check).</p> <p>For example, Unified ICM software tracks CallsQNow, which is the number of calls currently in queue for a service or route. When a call is answered, the CallsQNow count is reduced immediately by one (-1) because the call has left the queue. This change is seen at the next real time update for reports that query for that value.</p>
To5	<p>The “To5” values track data on a rolling five-minute basis. The rolling five-minute data employs a “sliding” five-minute window. The To5 data is updated every ten seconds in the database.</p>
Today	<p>To arrive at values for “Today”, Unified ICM software adds the values at the end of each interval since midnight. It also counts the values for the current half-hour. At the end of each half hour, half-hour data (for example CallsOfferedHalf) is summed into the Today data. At midnight, the real time Today count is cleared in the database. Midnight is defined using the time of the peripheral.</p>

## Historical and interval data collection

Unified CCE stores some historical data in *Half\_Hour* tables and other historical data in *Interval* tables. Interval tables contain either half-hour or 15-minute summaries (but not both), based on Interval flags set in **Configuration Manager**. See [Interval configuration](#).



**Table 3: Historical and interval data**

Historical data	Description
Interval (30- or 15-minute, based on configuration)	<p>Some, but not all, Half_Hour tables now have an equivalent Interval table. For those Half-Hour tables with corresponding Interval tables, the Half_Hour tables still appear in the database but they are no longer populated.</p> <p>For Unified Intelligence Center seven of these Interval tables are populated by either half-hour or 15-minute data, based on configuration. See <a href="#">Interval configuration</a>.</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• Two Interval tables—Dialer_Interval and Campaign_Query_Rule Interval—<i>always</i> contain 30-minute data.</li> <li>• 15-minute intervals are not supported for Outbound Option.</li> </ul> <p>Fields in these Interval tables are no longer appended by <i>ToHalf</i>. For example, the Agent_Half_Hour table has a field named <i>AvailTimeToHalf</i>. In the Agent_Interval table, that field is named <i>AvailTime</i>.</p> <p>Interval tables are :</p> <ul style="list-style-type: none"> <li>• Agent_Interval (15 or 30)</li> <li>• Agent_Skill_Group_Interval (15 or 30)</li> <li>• Peripheral_Interval (15 or 30)</li> <li>• Service_Interval (15 or 30)</li> <li>• Skill_Group_Interval (15 or 30)</li> <li>• Call_Type_Interval (15 or 30)</li> <li>• Call_Type_Skill_Group_Interval (15 or 30)</li> <li>• Campaign_Query_Rule_Interval (30)</li> <li>• Dialer_Interval (30)</li> <li>• Router_Queue_Interval (15 or 30)</li> </ul> <p><b>Note</b> By default, data is captured in 30-minute intervals.</p>

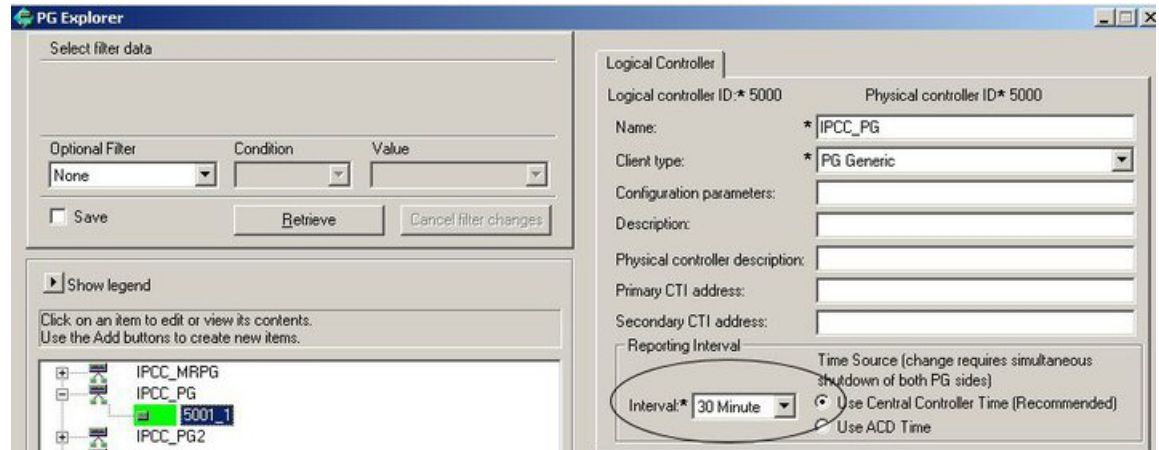
Historical data	Description
Half Hour	<p>The Half_Hour tables that do not have Interval tables are populated for <i>completed</i> half-hour intervals, and the data fields are stored in the database with the extension “ToHalf” (for example, Application_Gateway_Half_Hour.ErrorsToHalf).</p> <p>These elements contain a value for a completed half-hour interval. The completed interval is the time period falling between xx:00:00 and xx:29:59, or xx:30:00 and xx:59:59.</p> <p>For example, it is now 15:50:00. An error occurred at 15:47:00. The half-hour interval reported on right now is for the 15:00:00 to 15:29:59 interval. The error that occurred at 15:47:00 will be written to the database at 16:00:00, when the 15:30:00 to 15:59:59 half-hour interval is complete.</p> <p>Examples of Half_Hour tables that do not have corresponding Interval tables are:</p> <ul style="list-style-type: none"> <li>• Application_Gateway_Half_Hour</li> <li>• Campaign_Half_Hour</li> <li>• Trunk_Group_Half_Hour</li> <li>• Route_Half_Hour</li> </ul>
Five-minute	<p>The five-minute data include many of the same data elements as found in the real-time data. Every five minutes, the CallRouter copies the real-time data to the five-minute tables in the Central Database. In this way, a “snapshot” of the real-time data can be kept in the Central Database and used as historical data.</p> <p><b>Note</b> Enabling five-minute data can have a substantial performance impact on your system. Before you enable reporting on five-minute data, consider the performance impact.</p>

## Interval configuration

Reporting interval configuration is done in two Configuration Manager screens (PG Explorer and System Information).

- The **PG Explorer Tool** has a Reporting Interval field that affects the following five tables: Agent, Agent\_Skill\_Group, Skill\_Group, Service, and Peripheral.

**Figure 1: Interval configuration in PG Explorer**



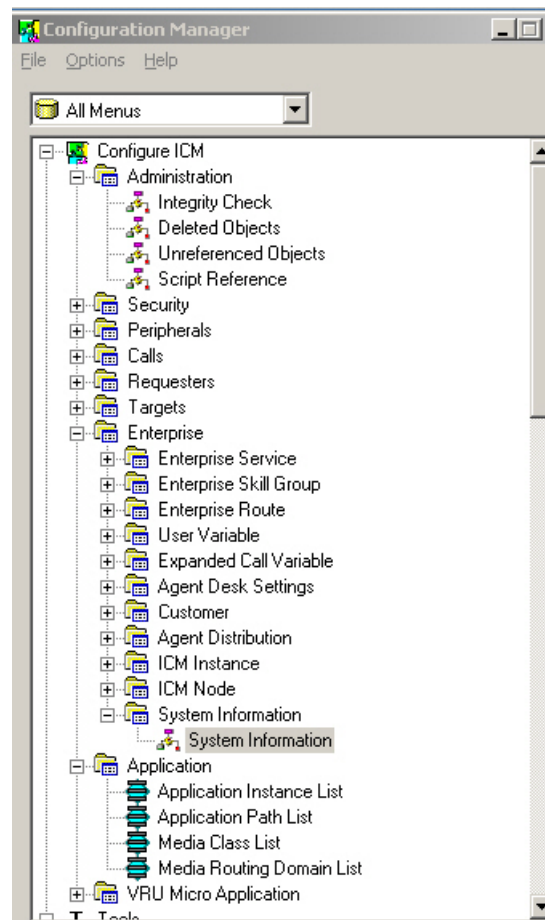
When you change this tool from the default (30) to 15, data starts to be written to the interval tables every 15 minutes. (You cannot pick and choose among the five - for example, you cannot set Agent to 30 and Skill\_Group to 15.)

The PG Explorer configuration for Interval reporting has the Time Source option to use Central Controller time or Automatic Call Distributor (ACD) time. The option to use ACD time is limited to 30-minute data and to certain ACD types, as explained in the Configuration Manager online help for PG Explorer.

- The System Information tool has a Reporting Interval field that affects these three tables: Call\_Type, Call\_Type\_Skill\_Group, and Router\_Queue\_Interval.

To access this tool, select **Configuration Manager > Miscellaneous Tools > System Information**.

**Figure 2: Interval configuration in System Information**



When you change the setting in this tool from the default (30) to 15, data starts to be written to the Call\_Type and Call\_Type\_Skill\_Group Interval tables every 15 minutes.

You can set the PG Explorer Tool to 15 and the System Information Tool to 30, or vice versa. However, Precision Queue interval records are generated from the Router\_Queue\_Interval and Skill\_Group\_Interval records and therefore these intervals need to be the same for complete Precision Queue data.

If you change the Reporting Interval from 15 to 30 or vice versa, data is not written to the corresponding tables until the next 30-minute interval starts. So if you change it at 11:13, data is written to the appropriate tables beginning at 11:30.

**Note**

- 15-minute reporting requires Unified Intelligence Center.
- Although the database contains a Campaign\_Query\_Rule table, there is no interval configuration for it and no data is written to it. All 30-minute data is written to the Campaign\_Query\_Rule\_Half\_Hour table.

## Configuration data

Configuration tables define the entities and entity names that are defined in Configuration Manager. They contain EnterpriseName fields that associate the key values in the historical tables with the text labels that are used in reports.

Examples of configuration tables are the Agent, Agent Team, Skill Group, and Call Type tables. For example, adding a new Agent Team in Configuration Manager, adds an EnterpriseName for that team in the Agent Team database table.

Configuration Data and Routing Scripts are created and edited on the Administration & Data Server, stored on the Administration & Data Server database, replicated to the Central Database, and then to other Administration & Data Servers.

### Related Topics

[Importance of configuration and scripting, on page 29](#)

## Call Detail data

Two database tables store call detail, as described below:

### • Route Call Details

For every call routing request it handles, the Router records detailed data about the call and how it was routed to a peripheral by Unified ICM. This *route call detail data* (RCD record) is stored in the Route\_Call\_Detail table.

RCD data is written to the database when the script ends. Non-routed calls, such as direct dials, transfers, and conferences, have no RCD records.

You can use the data in the Route\_Call\_Detail table to see the starting point of the call. For example, you can see the Automatic Number Identification (ANI), any Called station iDentification (CED) entered, and the type of request made. A typical Route\_Call\_Detail record might describe a call that originated with a Pre-Routing request, had an ANI of 9785551000 and CED such as an account number. In addition, route call detail tells you how long the call was held in an enterprise queue.

### • Termination Call Detail

Detailed *termination call detail data* (a TCD record) is written for each call that arrives at a peripheral (provided the proper monitoring is enabled for the peripheral).

The TCD record is written after the call segment terminates and the after-call work is complete.

Specifically, the CallRouter creates the Termination\_Call\_Detail record when it receives a “ClosedCallInd” message from the Open Peripheral Controller (OPC). OPC generates the ClosedCallInd

message when a call is terminated (that is, when any after-call work associated with the call has completed, or when a call that was not connected to an agent is terminated).

For example, typical Termination\_Call\_Detail data might show that the call was an Inbound ACD Call, that it was handled by a particular Skill Group; and that a particular agent handled the call. The Termination\_Call\_Detail record also describes the final disposition of the call (for example, how the call terminated; abandoned in network, disconnect/drop, and abandoned delay).

There can be many TCDs created per call, and it is possible for a call to have TCDs records but no RCD records

The Termination\_Call\_Detail table includes records that indicate which TCDs were used to create the Call Type, Call Type Precision Queue, and the Call Type Skill Group reports.

Although Call Detail records are stored in the Route\_Call\_Detail and Termination\_Call\_Detail tables, none of the standard (stock) reports retrieve data from these two tables for performance reasons.


**Note**

These two detail tables can become very large. You must extract the data from the Historical Database Server (HDS) into your own custom database on a separate server (one that is not used for other Unified ICM/CC components). Use only DBDateTime (date and time of the record that was written to the HDS database) to perform the extraction. The tables on the custom database can be indexed according to the custom reporting needs.


**Note**

These two detail tables are constrained to 5 weeks. If additional detail record reporting is required, an external database (AW/HDS/DDS) must be added to the configuration.

To use Call Detail data in reports, you must create custom reports that populate from your custom database. These two detail tables are constrained to five weeks. If additional detail record reporting is required, an external database (AW/HDS/DDS) must be added to the configuration.

**Related Topics**

[Custom reports, on page 3](#)

[Pre-routing, on page 185](#)

## Database tables that hold reporting data

All report data is pulled from tables and rows in the Unified CCE/CC database. Many fields are direct database values, as reflected in their displayed column names in the reports.

For example:

- The *direction* of the active task on which the agent is currently working is derived from *Agent\_Real\_Time.Direction*.
- The number of calls to the trunk group that have been abandoned in queue since midnight is derived from *Trunk\_Group\_Real\_Time.CallsAbandonedToday*.

Other report data fields are less obvious—because they represent calculated values, because the same data-entity name is used in multiple contexts, or because they are calling database values whose names are not clearly indicative.

**Calculated Fields.** Many report values are the result of calculated fields. For example, in reports that present Skill Group Real Time activity, the Average Active Time (AAT) is calculated as follows:  $\text{Skill\_Group\_Real\_Time.HandledCallsTalkTimeTo5} / \text{Skill\_Group\_Real\_Time.CallsHandledTo5}$ . Refer to the *Unified Intelligence Center Report Template Guide* for details on the calculated fields.

**Fields Used in Many Tables and Context.** Examples are the fields *Deleted*, *Description*, and *EnterpriseName*, which appear in many tables.

As a best practice, see the [Database Schema Handbook for Cisco Unified ICM/Contact Center Enterprise & Hosted](#) guide and to the *Template Reference guide for Unified Intelligence Center* for descriptions of these database values and any calculations they can take in reports.

The Database Schema Handbook also lists field values such as Agent State values and Call Disposition flags.







## CHAPTER 3

# Why report data can differ

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This chapter explains how and why data can differ in reports.

- [Automatic Call Distributor and Unified Contact Center Enterprise reports](#), page 15
- [Real time and historical reports](#), page 16
- [Interval boundaries](#), page 16
- [Skill Group and Enterprise Skill Group reports](#), page 17
- [Call Type, Skill Group, Precision Queue and Service reports](#), page 17
- [Reports that show base skill and sub-skill groups](#), page 17

## Automatic Call Distributor and Unified Contact Center Enterprise reports

Data collected and presented in Unified CCE reports to measure customer experience and agent performance is expected to differ from data collected and presented in ACD reports. This is also the case for parent/child reporting in a [Reporting in Contact Center Gateway \(parent/child\) deployment](#).

Unified CCE reports give an enterprise-wide view of all your call centers. Each ACD report is specific to a particular call center. **For most accurate data, report at the source.**

Here are some of the reasons that cause variations:

- **Differences due to timing and transmission delays.** All times computed in Unified CCE reports, such as various state transitions, are based upon event arrival time at Unified CCE Central Controller, not on the actual event occurrence on the ACD. Network transmission delays cause variations in reported times between reporting data seen on Unified CCE reports and ACD reports.
- **Differences in supported concepts and terminology.** Differences in supported concepts and the way that similar concepts are implemented can cause variations in the data available to measure agent performance and customer experience.

For example, while Unified CCE and an ACD might both support the concept of agent states, the ACD might not support as many state options as Unified CCE software. In addition, some similarly named agent states might not have the same definition on both systems.

- **Differences in configuration.** Differences in configuration on the ACD and the Configuration Manager can lead to discrepancies in reporting. If devices are not configured in Configuration Manager or if they

are configured with different settings than on the ACD, reports might not track certain statistics at all or might report different metrics.

- **Different methods of measuring and storing data.** Unified CCE and the ACD might differ in the way in which data segments are defined and counted. One example is how the individual agent's time is measured and stored in relation to how that agent's time spent in a conference call is measured and stored.
- **Different methodologies for sampling data.** For example, Unified CCE and the ACD might differ as to when an event is considered to have started and to have ended.
- **Differences in terminology and in the definitions of data elements.** On the surface, naming conventions might appear to be the same but, in fact, are not. For example, Unified CCE and the ACD might use different criteria to evaluate what constitutes an 'offered call'.

Refer to the *ACD Supplement Guides* for details.

## Real time and historical reports

Counts in real time data (for example CallsHandledTo5) do not match up with counts in the historical interval records (for example, CallsHandled) because the real time data is moved to the historical database at the end of each half-hour interval.

Consider this example: at 8:55 a call comes into the contact center and is answered by an agent.

- The real time count for CallsAnswered increases by one (+1).
- Between 8:55 and 9:00, the real time data shows the answered call.
- The answered call does not populate the half-hour data until 9:00, when the 8:00 to 8:29:59 interval ends.

## Interval boundaries

Counts that would typically match up for a day, such as CallsOffered and CallsHandled, might not always match up over specific intervals. This discrepancy occurs because the counts for some data elements might be increased across boundaries.

Consider this example: at 8:55, a call comes in to the contact center and is answered by an agent. The agent completes the call at 9:05.

- In the historical database, the call is counted as offered in the 8:30:00 to 8:59:59 interval.
- The call is counted as handled in the 9:00:00 to 9:29:59 interval.
- If you run a report for the 9:00:00 to 9:29:59 interval, it appears that tasks handled does not equal tasks offered for the interval.

You also might notice that tasks offered does not equal task abandoned + tasks handled for an interval. Tasks offered reflects the number of calls and tasks that were offered to agents in this interval, while tasks handled and tasks abandoned might include calls that were offered in the last interval and completed in this interval. Some historical report templates group statistics into "Completed Tasks" to indicate that the statistics represent all calls and tasks that completed in this interval.

In general, interval boundary issues are reduced if you run daily reports. However, if your contact center runs 24 hours a day, you might still notice discrepancies for intervals such as the 11:30:00 to 11:59:59 and 12:00:00 to 12:29:59 intervals.

## Skill Group and Enterprise Skill Group reports

You can expect double counting in Enterprise Skill Group reports when a call is queued to multiple skill groups on the same peripheral and those skill groups are associated with the same Enterprise Skill Group.

### Related Topics

[Skill groups, on page 61](#)

## Call Type, Skill Group, Precision Queue and Service reports

Do not compare Call Type reports to Skill Group, Precision Queue or Service reports. Skill Group, Precision Queue and Service reports might have statistics for calls that were routed directly to the ACD and not routed by Unified ICM.

Certain statistics are computed differently when Enterprise queues are used.

In Unified CCE with ACD environments, services define call treatment. All skill groups belong to specific services and, therefore, skill group data rolls up to the service. Reports for services provide call treatment information for all of the skill groups assigned to those services.

Call Type reports in Unified CCE primarily provide call routing statistics and contain no other call handling statistics, unless they used translation routing. You might notice that data for a Call Type and the skill groups or Precision Queues related to the Call Type through a routing script do not match. If a skill group or Precision Queue is used in multiple scripts, reporting for that skill group or Precision Queue includes data for all of the Call Types to which it is assigned. If a Call Type routes to multiple skill groups or Precision Queues, data for the Call Type is distributed among those skill groups or Precision Queues.

### Related Topics

[Routing and queuing, on page 185](#)

## Reports that show base skill and sub-skill groups

Some ACDs available to Unified CCE support the concept of prioritized skill groups (sub-skill groups). For these ACDs, Configuration Manager supports this concept and allows you to distinguish priority levels (primary, secondary, and so forth) of a base Skill Group.

The *Configuration Guide for Cisco Unified ICM/Contact Center Enterprise and Hosted* lists these ACDs.

When sub-skill groups are configured, Unified CCE configuration creates a base skill group for these sub-skills. If sub-skill groups exist, when you generate a report from the Agent By Skill Group and Skill Group By Peripheral categories, select the sub-skill groups (and not the base skill groups) from the Skill Groups item-selection list.

If you select both the base skill group and the corresponding sub-skill groups from the Skill Groups item-selection list, the reports display data for both base and sub-skill groups, making the report summaries incorrect. (The data in the base skill group is a roll up of data from the sub-skills.)

If no sub-skill groups are configured, select the base skill group from the Skill Groups item-selection list.

For Skill Group By Enterprise reports, you must determine which skill groups to include in the Enterprise skill group. If you configured sub-skill groups from several peripherals or from different media, group only the sub-skill groups into the Enterprise Skill Group and not both base and sub-skill groups.



**Note**

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Sub-skill groups are not supported for Unified CC.

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## CHAPTER 4

# System architecture and reporting

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Unified ICM software distributes incoming telephone calls and web-initiated requests to skill-appropriate, available agents across multiple contact centers.

It does this by tracking activity on all monitored devices. This includes tracking the current call handling state of each agent, the number of agents in a particular state, and the time that agents spend in these states.

Unified ICM also collects data about call status and activity at each contact center, such as the number of calls in progress, the number of calls in queue, calls handled, and how calls were routed.

These collected data, which are essential to intelligent enterprise *routing*, are also made available for enterprise-wide *reporting* of agent performance, customer experience, and system operations.

This chapter provides a high-level overview of the system components that make up the Unified ICM/CC architecture and explains how those components are relevant for routing and reporting.



### Note

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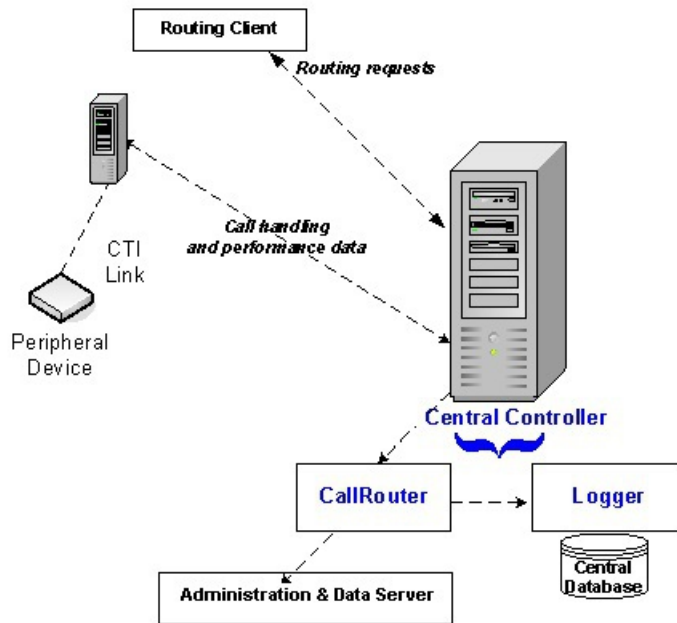
For clarity, the content and illustrations in this chapter describe the interaction of *logical* components. They do not represent *physical* models, which are typically provisioned in a duplexed manner.

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- [Central Controller, page 20](#)
- [Peripherals and peripheral gateways, page 21](#)
- [Administration & Data Server and Administration Client, page 23](#)
- [Historical Data Server, page 25](#)
- [Cisco Unified Communications Manager, page 26](#)
- [Reporting servers, page 26](#)
- [Agent and supervisor desktops, page 26](#)
- [Voice Response Units, page 27](#)

## Central Controller

Figure 3: Central Controller



The Central Controller serves as the clearinghouse for routing and reporting data. It does this by receiving route requests, making routing decisions, and monitoring data messages about what is happening in the system.

The Central Controller is installed on one or more servers and comprises three major components: the CallRouter (Router), the Logger, and the Central Database.



### Note

The CallRouter, the Logger, and the Central Database can be installed on the same computer—or—the CallRouter can be installed on one computer, and the Logger/Central Database can be installed on another computer. The Logger and the Central Database are always co-located on the same computer.

#### • CallRouter (Router)

The CallRouter receives notification from a routing client (such as a Network Interface Controller or a Peripheral Gateway) that a call is in need of some form of routing. It then executes a user-defined routing script that specifies how the routing client is to handle the call.

These routing scripts are created on the Administration & Data Server, replicated and stored in the Central Database, and loaded into CallRouter program memory.

In addition to receiving routing requests, the CallRouter receives messages from all Peripheral Gateways that monitor real-time status events in the network.

These messages update the system's current representation of agents and system resources. Awareness of the current status of these resources is essential to the routing scripts.

The CallRouter serves as a real-time server by immediately forwarding this data directly to the Administration & Data Server so that it is available to appear in reports. The CallRouter also writes records to the Central Database on the Logger.

#### • **Logger and Central Database**

The Logger receives data from the CallRouter (such as detail messages about calls and summary messages that have been computed by the Peripheral Gateways) and serves as the interface between the CallRouter and the SQL Server database manager.

The following data-management processes occur at the Logger:

- Data is written first to temporary tables.
- Data is then written to actual tables on the Central Database.
- Historical records on the Central Database are replicated to the Historical Data Servers on one or more Administration & Data Servers.

The Central Database serves as a buffer where data is committed to quickly support the performance of the CallRouter. The Central Database stores the following data:

- Configuration data, as entered and changed on the Administration & Data Server
- Routing scripts, as entered and changed on the Administration & Data Server
- Summary historical data passed from the CallRouter
- Termination and CallRouter call detail data




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**Note** The Central Controller Database stores no real-time data.

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#### **Related Topics**

[Call Detail data, on page 11](#)

[Historical Data Server, on page 25](#)

[Historical and interval data collection, on page 6](#)

[Peripherals and peripheral gateways, on page 21](#)

## **Peripherals and peripheral gateways**

The Central Controller obtains the routing and reporting data that it processes by communicating with each network peripheral.

A peripheral is a device (such as an ACD, a Private Branch Exchange (PBX), or an Interactive Voice Response (IVR)) that receives calls that have been routed by Unified ICM software. A peripheral can also distribute calls or non-voice media contacts.

The Central Controller communicates with each peripheral through a monitoring node called the *peripheral gateway* (PG).

Each peripheral requires a connection to a PG, and Unified ICM software has unique PGs for each device it supports. PGs connect to Voice Response Units (VRUs). Media Routing (MR) PGs send routing requests from multichannel options that are integrated into the system.

Specific PGs that connect to ACDs.

For example:

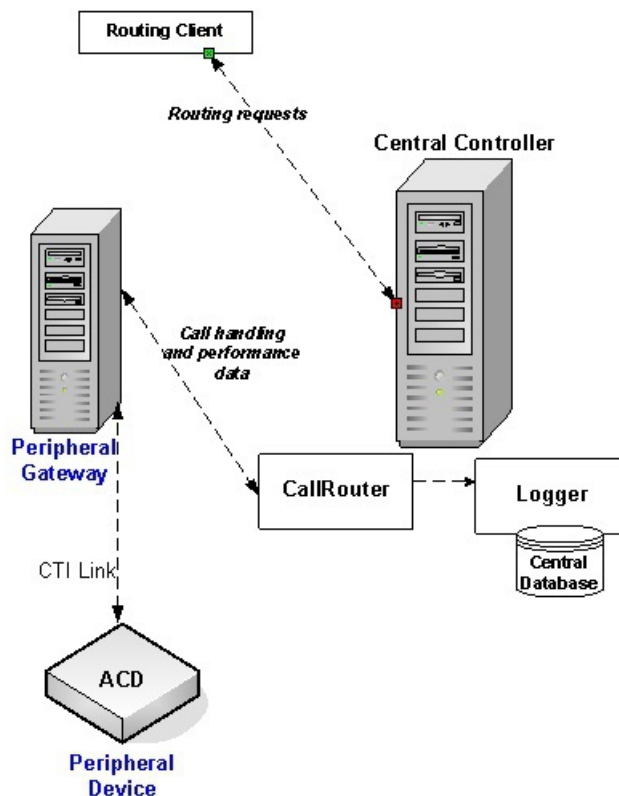
- The Definity Enterprise Communications Server (ECS) PG connects to an Aspect and Avaya ACD, respectively, for enterprise routing and reporting.
- The Automatic Route Selection (ARS) PG connects to an ACD/PBX. This deployment allows for enterprise queuing and agent-level routing.

If multichannel options and/or Outbound Option have been integrated into the system, the configuration also includes Media Routing Peripheral Gateways (MR PGs) used to send routing requests from the multichannel applications to Unified ICM/CC software. A single MR PG can support multiple applications; you configure a separate Protocol Independent Multicast (PIM) for each application.

It is important to understand the type of peripheral gateway used in your deployment. In real time, the CallRouter receives performance and monitoring information from each PG every few seconds. The CallRouter holds this data in memory and uses it to make routing decisions. This real-time information is constantly overwritten in the CallRouter memory by new data.

The illustration below shows a Unified ICM, and the peripheral is an ACD.

**Figure 4: Peripherals and peripheral gateways**





Processes on the PG interpret messages on the peripheral and provide data to Unified ICM as follows:

- 1 By extracting status information from the peripheral through the peripheral's proprietary CTI interface,
- 2 By normalizing that information and converting it into the format that Unified ICM uses,
- 3 By forming database objects (Call object, Agent objects, Routing objects, and so forth) from the information, and
- 4 By passing the normalized data to the CallRouter.

#### Related Topics

[Different Unified ICM deployments, on page 197](#)

[Peripheral gateway processes](#)

## Peripherals in Cisco Unified Contact Center deployments

In Unified CC deployments that use a Generic PG (which allows multiple peripherals of different types to reside inside a single PG), or separate PGs for Unified CM and the VRU, Unified CM and the VRU appear as separate peripherals to the software. Each time a task switches between Unified CM and VRU peripherals, it appears as a new task to the system.

From a reporting perspective, this separation has an impact on how and when data is collected:

- A call that comes into Unified CM, is then transferred to the VRU, and then back to an agent looks like three separate tasks (calls). A Termination\_Call\_Detail is written for each call.
- A call that is queued to a skill group or Precision Queue and later answered by an agent is not considered as offered to a skill group or Precision Queue until the call is answered.

In this deployment, data is collected as follows:

- A call that comes into Unified CM, is then transferred to the VRU, and then transferred back to an agent, looks like a single call to the Unified ICM/Unified CCE/Unified CCH software. A single Termination\_Call\_Detail is written.
- A call is considered as offered to a skill group or Precision Queue when the call is queued to a skill group or Precision Queue.

## Administration & Data Server and Administration Client

### Administration & Data Server

The data that is available for reports is determined by the role selected at setup for the Administration & Data Server. The Administration & Data Server was formerly named the Distributor Admin Workstation (AW).

Depending on the setup selection, the Administration & Data Server can capture some or all of the following:

- Real time data
- Historical data
- Configuration data

- Detail Data Store (DDS)

A DDS comprises:

- Call Detail data (Termination Call Detail and Route Call Detail for custom reporting)
- Support for additional indexes for the System Call Trace tool
- Call Variable data
- Agent State Trace data

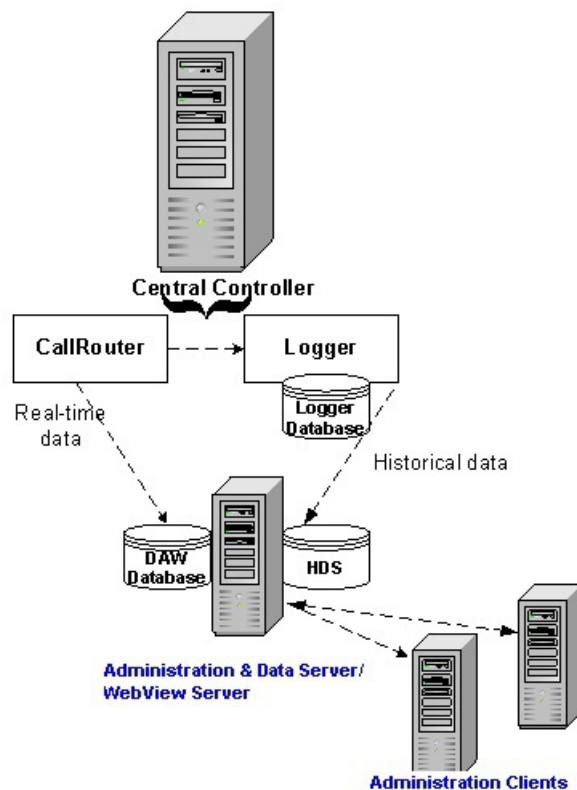
Unified ICM software can support multiple Administration & Data Servers.

### Administration Client

The Administration Client—formerly named the Client AW—allows you to access the Configuration Manager tools without installing a full Administration & Data Server with databases. The Administration Client must point to an Administration & Data Server.

The Administration Client is typically installed on a laptop or personal desktop where installation of a full Administration & Data Server is not desirable. There is a separate, small installer for the Administration Client, which provides a configuration utility specific to the Administration Client.

**Figure 5: Administration & Data Server**



# Historical Data Server

A Historical Data Server (HDS) is required if you plan to use historical reports. The Historical Data Server (HDS) must reside on an Administration & Data Server.

The HDS is enabled at setup and created using the Intelligent Contact Management database administration (ICMDBA) tool.



## Note

As a fault-tolerant strategy, two Administration & Data Servers are typically set up at a site as HDS machines, each with its own HDS database.

Depending on your selection at setup, the HDS can contain only historical data or both historical data and call detail data forwarded from the Logger.

This historical data is not accessed directly, but rather through views that exist in the local Administration & Data Server database. To retrieve information for historical reports, the reporting application connects to the Administration & Data Server where the HDS resides.

Follow these guidelines to ensure that your Historical Data Server is configured to meet reporting needs:

### 1 Decide how many Historical Data Servers you require.

The number of Historical Data Servers that you configure depends on how long the HDS takes to back up and on your reporting demands. If you store large amounts of data, backup can take several hours. If you want to run reports while the HDS is backing up, configure at least one additional HDS to use to run reports.

### 2 Determine the types of HDS, based on the deployment size and the role of the Administration & Data Server.

### 3 Determine the size of the HDS.

The size of the database depends on the size of your configuration and on how long you want to retain data.

Configuration that affects the size of the HDS includes the number of call types, skill groups, agents, skills per agent, routing clients, trunk groups, services, peripherals, scripts, calls routed daily, and calls terminated daily.

The larger the configuration, the bigger the HDS must be to store data. For example, the historical call type database tables store data for each call type for each 5-minute and 15- or 30-minute interval.

The amount of time that you want to retain data on the HDS also affects database size. Decide how long you want to retain reporting data before it is automatically purged from the databases. Data beyond the configured retention time is purged each day at 12:30 PM.

You can use the ICMDBA tool to estimate the sizes of your databases. The tool prompts you for your configuration information and the amount of time that data is retained in the databases.

### 4 Determine how you want to back up the HDS.

You can back up the HDS either while the HDS is running or while it is offline (generally when the contact center is closed or during a time with low call volume).

Performing a backup during peak hours while the HDS is running can impact performance, especially if you are backing up a large amount of data. While the HDS database is being backed up, new data from the Logger is stored in the transaction log. If the transaction log reaches maximum capacity before the

HDS has completed the backup, updates to the database stop until an administrator manually empties the log.

It is preferable to back up at a regularly scheduled time when the contact center is not busy. You can also take the HDS offline and perform a backup. However, the HDS is not available for reporting when it is offline. If you plan to back up the HDS database while it is offline, you might want to configure a secondary HDS to use for reporting during the backup interval.

## **5 Determine the HDS backup schedule and the number of days for which data is retained on the Logger.**

You can configure the number of days for which data is stored in the Logger Central Database and the HDS.

The Logger stores data for less time than the HDS. For example, you might store two weeks of data on the Logger and a year of data on the HDS. Configure the amount of time that data is stored on the Logger in relation to the schedule for HDS backups to ensure that you do not lose data in the event that the HDS goes offline.

### **Related Topics**

[Administration & Data Server and Administration Client, on page 23](#)

[Call Detail data, on page 11](#)

[Data flow from Logger to Historical Data Server, on page 169](#)

[Historical and interval data collection, on page 6](#)

# **Cisco Unified Communications Manager**

For the Unified CC environment, Cisco Unified Communications Manager (Unified CM) provides features comparable to those of a traditional PBX system to Voice over IP telephony devices such as Cisco IP phones and VoIP gateways.

Unified CM handles the switching requirements of the Unified Contact Center system and allows deployment of voice applications and the integration of telephony systems with Intranet applications.

## **Reporting servers**

Depending on the deployment model, there might be from one to eight Unified Intelligence Center servers.

The Unified Intelligence Center web server application on the Unified Intelligence Center server(s) is configured to connect to a Unified ICM/Unified CCE Administration & Data Server and to populate reports with the databases on that data source.

To select and generate reports, reporting users log in to the Unified Intelligence Center web application from their browser.

## **Agent and supervisor desktops**

Unified ICM supports two server-based Computer Telephony Integration (CTI) solutions that provide desktops for contact center agents and supervisors. These are CTI Object Server (CTI OS) and Cisco Agent Desktop (CAD).

Certain settings must be configured on the agent desktops to match corresponding settings configured in Configuration Manager.

An example of agent desktop settings that must synchronize with Configuration Manager settings are Logout and Not Ready reason codes—if they are supported for the ACD.

## Voice Response Units

Voice Response Units (VRUs) are computers that run Interactive Voice Response telephony applications.

Your enterprise might implement one or more types of IVR applications on a VRU platform to serve several purposes:

- **Information gathering.** The IVR prompts for certain information through dual-tone multi-frequency (DTMF) digit or ASR (Automatic Speech Recognition) collection. The information is used in the routing decision and is passed to the agent desktop.
- **Self service.** The IVR prompts for and provides certain information to the caller, such as account balance. The entire call transaction might take place within the VRU.
- **Queuing.** The VRU serves as the queue point by playing announcements or music to the caller until an agent is available.

VRUs can be integrated into Unified ICM software in several ways: at an enterprise (network) level, as a premise-based VRU for an ACD, or as a Virtual VRU on an ACD/PBX if that feature is supported on the ARS PG. The way in which a VRU is integrated into Unified ICM systems affects the flow of call processing and determines the type of data Unified ICM can collect from the IVR.

For example, a Network VRU provides data used in call routing, monitoring, and reporting. Only Service Control VRUs can be used as Network VRUs. A Service Control VRU is a VRU that implements the Service Control Interface protocol. The Service control protocol allows the VRU to utilize ICM to control call treatment and queuing; for example, by providing the capability of executing VRU scripts as commanded by the ICM. A VRU that has an interface only to the ACD has more limited capabilities.

Because VRUs support different features and behave differently, reporting data is affected by the type of VRU you have deployed in your system.

### Related Topics

[Network queuing and reporting, on page 191](#)

[VRU application reporting, on page 136](#)





## CHAPTER 5

# Importance of configuration and scripting

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This chapter provides information about configuration and scripting.

You can report on contact center data as soon as the system administrator has (1) completed configuration and (2) created routing scripts, in that order.

Configuration Data and Routing Scripts are created and edited on the Administration & Data Server, stored on the Administration & Data Server database, replicated to the Central Database, and then replicated to other Administration & Data Servers.

- [Configuration, page 29](#)
- [Scripting, page 30](#)

## Configuration

Open the Configuration Manager from the Unified CCE Tools folder on your desktop to enter and update information about the entities that are part of your enterprise.

Configured entities are stored as records in the Central Controller database tables. These entities include agents, call types, devices, PGs, services and service members, skill groups, and translation routes.

For error-free routing and accurate reporting, it is crucial to configure all peripheral targets—that is, any and all destinations to which a call can be sent. Reports show no data for devices that are not configured and monitored.

Changes and additions that you make in Configuration Manager are immediately applied to the Central Database on the Logger and are copied to all local databases.

## Naming conventions in configuration

Before configuring the system, consider how you want to name the reporting entities that you will be configuring—such as peripherals, skill groups, and agents.

The configured names for these entities appear in the Unified IC user interface as selection criteria for filtering reports. They are selected from Value Lists and Collections.

Use meaningful naming conventions to help reporting users interpret and locate the appropriate report selection items. For example, append the same prefix for all items associated with a particular site and use descriptive text to identify call types.

## Scripting

After your configuration is defined, create routing scripts using the Script Editor. Unified ICM software uses these routing scripts to determine the best destination for a call by assessing the current call center activity that is extracted and forwarded by the PGs. The call flow defined in the script determines the data that is gathered for reporting.

Routing scripts contain instructions that:

- 1 Examine the call information provided by the routing client and use that information to classify the call as a particular call type.
- 2 Determine the best destination for the call.
- 3 Direct the call to an appropriate routing target; for example, to an individual agent, to a skill group, or to an appropriate announcement.
- 4 Post-route transfers and conferences.

**Routing scripts are a representation of your business rules.** You can create a specific set of scripts to be executed for each call type, such as Sales or Support. For more granular reports, you might want to create multiple scripts; for example, you might create a script for initial call classification and create scripts that route calls that are sent to particular services or skill groups on different ACDs.

You can also schedule different scripts to be used at different times of the day or different days of the week and year for each call type, and you can use dialed numbers to direct calls to scripts that handle transfers.

Routing script data are stored in the Central Controller database. Scripting changes that you make are applied to the local database, immediately update the Central Database on the Logger, and are copied to all local databases. You cannot alter scripts directly. Instead, you create and maintain routing scripts with the Script Editor, one of the tools on the Administration & Data Server.

See also the *Scripting and Media Routing Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted*.

### ACD script considerations

Refer to your *ACD Supplement Guide* for any modifications you need to make in your ACD scripts. For example, you might need to modify your ACD scripts to include *SEND INFO* commands that notify Unified ICM when a call state transition occurs.

Also, ensure that the script the ACD follows to route the call to the appropriate agent takes into account the Services and the Service Members (skill groups) that are configured in Unified ICM.

### Unexpected scripting conditions

Decide whether you want calls that encounter unexpected scripting conditions to be counted as default-routed or as errors.

If you want the calls to count as default-routed:

- Plan to configure default labels for each dialed number. When a call is routed to a default label, the call is added to the count of default-routed calls for the call type. If the call cannot be routed and a default label is not assigned, the call is counted as an error.



- Also, plan to include a Termination Node with Termination type of default label for all scripts in which there is some unexpected input (else condition).

In all scripts, account for failure by creating a path for calls that encounter unexpected conditions. You might want to route these calls to voicemail, an announcement, or a busy signal.





## PART II

# Reporting entities and reporting concepts

- [Agents, page 35](#)
- [Skill groups, page 61](#)
- [Agent teams and supervisors, page 69](#)
- [Average Speed of Answer, page 75](#)
- [Redirection on No Answer, page 79](#)
- [Call types and services, page 83](#)
- [Bucket Intervals \(Unified Intelligence Center\), page 97](#)
- [Service levels, page 101](#)
- [Short calls, abandoned calls, and overflow calls, page 113](#)
- [Outbound Option, page 119](#)
- [Transfers and conferencing, page 123](#)
- [Operational reporting, page 131](#)
- [IVR/VRU Self-Service, page 135](#)





## CHAPTER 6

# Agents

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A call center agent is the person who handles incoming or outgoing customer calls for a business. An agent is associated with a peripheral and is a member of one or more skill groups. Agents might also be organized into teams. Mobile agents who connect to the call center by phone and VPN are treated like any other agents.

Reporting on agents can assist with measuring performance, determining incentives, and identifying training needs.

Agent names are retrieved from the *Person* and *Agent* tables as follows:

**For Agents and Skill Groups:** The last and first name from *Person*.

**For Agent Team:** The agent's last name and first name from *Person* and agent's skill target ID from *Agent*.

- [Agent states, page 35](#)
- [Agent Logout Reason codes, page 41](#)
- [Agent Not Ready reason codes, page 42](#)
- [Agent reporting for Outbound Option campaigns, page 45](#)
- [Agent task handling, page 45](#)
- [Agent utilization: Full-time equivalents and percent utilization, page 52](#)
- [Configuration for agent reporting, page 53](#)

## Agent states

Agent states are determined from an agent's activity *within a skill group*. Agent state is recorded in numerous database tables and is presented in reports as both a number (*Not Ready*) and as a percentage (*% Not Ready*).

You can monitor agent states in real time to view current agent activity. You can also review past performance data to identify trends in agent states. For example, historical reports can show how much time an agent spends in Not Ready state, which indicates whether the agent is adhering to the schedule.

**Note**

For Unified ICM, agent state data is forwarded from the peripheral. Agent states reported by the ACD might not be equivalent to agent states reported by Unified ICM. And for some ACDs, certain agent states might not be applicable at all. For example, an ACD might support the *Work Ready* state but not the *Work Not Ready* state. See the appropriate *ACD Supplement Guide* for information on ACD agent state definitions and how they correspond to Unified ICM Agent States.

Information for some states is different for the chat Media Routing Domain (MRD). This table highlights these differences.

**Table 4: Agent states that appear in reports**

State in Skill Group	Description for all MRDs except chat	Description for chat MRD
Active/Talking	<p>The agent is working on a task or a call in this skill group.</p> <p>For agents who handle non-voice tasks, this state is reported as <i>Active</i>.</p> <p>For agents who handle voice tasks, this state is reported as <i>Talking</i>.</p>	<p>The agent is working on one or more chat requests associated with this skill group. For these agents, the state is reported as <i>Active</i>.</p>
Work Ready	<p>The agent is performing wrap-up work for a call or task in this skill group.</p> <p>If the agent is handling a voice call, the agent enters Not Active state when wrap is complete.</p> <p>If the agent is handling a non-voice task, the agent might enter Not Active or Not Ready state when wrap up is complete.</p>	<p>The agent is performing wrap-up work for a task associated with this skill group. The agent is not in the Active state with respect to a task associated with this skill group.</p>
Work Not Ready	<p>The agent is performing wrap-up work for a call in this skill group. The agent enters Not Ready state when wrap up is complete.</p>	<p>The agent is performing wrap-up work for a call in this skill group. The agent enters Not Ready state when wrap up is complete.</p>
Paused/Hold	<p>For agents who handle non-voice tasks, the state is reported as <i>Paused</i>.</p> <p>For agents who handle voice tasks, the state is reported as <i>Hold</i>.</p> <p>For agents handling Outbound Option calls, the Hold state indicates that the agent has been reserved for a call because the Outbound Dialer puts on the agent on hold while connecting the call.</p>	<p>The agent is <i>Paused</i> with respect to a chat task associated with this skill group.</p>

State in Skill Group	Description for all MRDs except chat	Description for chat MRD
Reserved	<p>The agent has been offered a call or task associated with the skill group.</p> <p>For voice calls, agents are Reserved when their phones are ringing.</p> <p>Agents handling Outbound Option calls are never placed in Reserved state; the Outbound Option Dialer puts the agent on hold when reserving the agent for a call.</p>	The agent is not in Active, Work Ready, or Paused state in this skill group. The agent has been offered one or more tasks associated with this skill group.
<p>Busy Other</p> <p>Busy Other is a state in which the agent handling calls is assigned to other skill groups during the interval.</p> <p>For example, an agent might be talking on an inbound call in one skill group while simultaneously logged on to, and ready to accept calls from, other skill groups.</p> <p>The agent can be active (talking on or handling calls) in only one skill group at a time. Therefore, while active in one skill group, for the other skill group the agent is considered to be in the Busy Other state.</p>	The agent is Active, Work Ready, Reserved, or on Hold/Paused in another skill group in the same MRD.	The agent is not in Active, Work Ready, Reserved, or Paused state with respect to a task associated with this skill group. The agent is in Active, Work Ready, Reserved, or Paused in another skill group in the same MRD.
Not Active	The agent is not working on any task or call associated with this skill group.	The agent is not working on any task or call associated with this skill group.
Not Ready	The agent is not available to be assigned a task. If an agent is Not Ready in one skill group, the agent is Not Ready in all skill groups within the same MRD.	The agent is not available to be assigned a task. If an agent is Not Ready in one skill group, the agent is Not Ready in all skill groups within the same MRD.

## How agent states are calculated in reports

Agent States are presented in many reports as percentages.

**Table 5: Calculations for agent state percentages**

Table.Field	Calculation
%Active	$\text{Agent\_Skill\_Group\_Interval.TalkInTime} + \text{Agent\_Skill\_Group\_Interval.TalkOutTime} + \text{Agent\_Skill\_Group\_Interval.TalkOtherTime} + \text{Agent\_Skill\_Group\_Interval.TalkAutoOutTime} + \text{Agent\_Skill\_Group\_Interval.TalkPreviewTime} + \text{Agent\_Skill\_Group\_Interval.TalkReserveTime} / \text{Agent\_Skill\_Group\_Interval.LoggedOnTime}$
%BusyOther	$\text{Agent\_Skill\_Group\_Interval.BusyOtherTime} / \text{Agent\_Skill\_Group\_Interval.LoggedOnTime}$
%Hold	$\text{Agent\_Skill\_Group\_Interval.HoldTime} / \text{Agent\_Interval.LoggedOnTime}$
%NotActive	Historical: $\text{Agent\_Skill\_Group\_Interval.AvailTime} / \text{Agent\_Interval.LoggedOnTime}$ Real Time: $\text{Skill\_Group\_Real\_Time.Avail} / \text{Skill\_Group\_Real\_Time.LoggedOn}$
%Reserved	$\text{Agent\_Skill\_Group\_Interval.ReservedStateTime} / \text{Agent\_Skill\_Group\_Interval.LoggedOnTime}$
%WrapUp	$(\text{Agent\_Skill\_Group\_Interval.WorkReadyTime} + \text{Agent\_Skill\_Group\_Interval.WorkNotReadyTime}) / \text{Agent\_Skill\_Group\_Interval.LoggedOnTime}$
%Not Ready	$\text{Agent\_Skill\_Group\_Interval.NotReadyTime} / \text{Agent\_Skill\_Group\_Interval.LoggedOnTime}$

## Agent states, skill groups, and precision queues

Agents can belong to multiple skill groups or Precision Queues in an MRD. When an agent is handling a task that was routed to a skill group, the agent is Active in that skill group.

- For Unified ICM/CC routed calls or transferred Unified ICM routed calls that use the dialed number, the active skill group or precision queue is the skill group or precision queue to which the task was queued.
- For direct incoming calls or transferred routed calls on the ACD, the active skill group is the first skill group defined for the agent or the skill group assigned by the ACD.
- For direct incoming calls or transferred routed calls that do not use the dialed number, the active skill group is the default or first skill group defined for the agent.
- For new outgoing calls (AgentOutCalls or InternalCalls) or transferred outbound calls, the active skill group is either the ACD-picked skill group or the first skill group defined for the agent.

If you are reporting on agents who handle chat tasks (and who can work on more than one task at a time), gather agent state information from both the Available in MRD and Agent State columns.

The agents' state in the active skill group or precision queue dictates their state in other skill groups or precision queues in the MRD to which they belong, as follows:



- If the agent is Active, Work Ready, Reserved, or Hold/Paused in one skill group or Precision Queue in the MRD, the agent state is Busy Other for all other skill groups or Precision Queues in the MRD.
- If the agent is Not Ready in one skill group or Precision Queue in the MRD, the agent is Not Ready in all skill groups or Precision Queues in the MRD.

### Related Topics

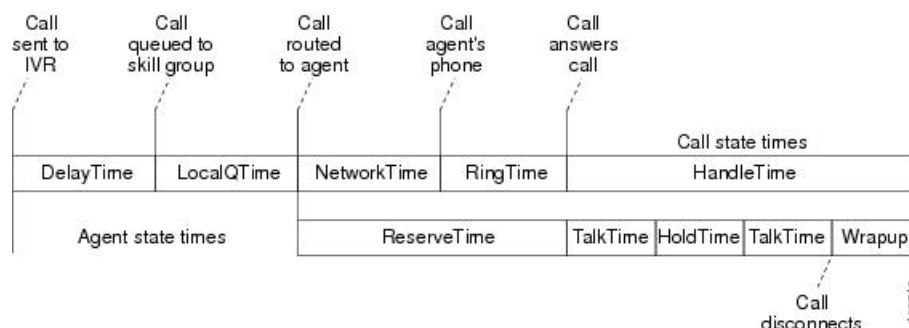
[Reporting in a multichannel environment, on page 147](#)

## Agent state and task state relationship

Agent state times are reported on interval boundaries regardless of whether or not the call or task is finished. Call and task state times are reported only when the task ends. The call/task ends when wrap up is complete.

The following figure illustrates the correlation between agent state and call state for a voice call. The agent reserve time includes the time it took the call to arrive at the agent's phone or desktop (network time) as well as the amount of time that the call rang on the agent's phone or waited on the agent's desktop (offer/ring time).

**Figure 6: Agent state and task state relationship**



If the interval boundary ends when the call is ringing on the agent's phone, the reserved time for the agent includes the network time and part of the ring time. At the next interval, the remaining ring time is reported in the reserved time of the agent. However, the call's time does not appear on a report until wrap up has been completed on the call.

## Agent state hierarchy for a chat MRD

Agent state on a task determines the agent state in a skill group, and agent state in a skill group determines agent state in the MRD. For example, if an agent is Active on a call for Skill Group A, then the agent state is Active in Skill Group A, and the agent state is Active for the MRD to which Skill Group A belongs.

However, agents handling chat tasks can work on more than one task in the same skill group, and more than one skill group can belong to a MRD. In this case, a state hierarchy is used to determine how the agent's state in the skill group and in the MRD is reported.

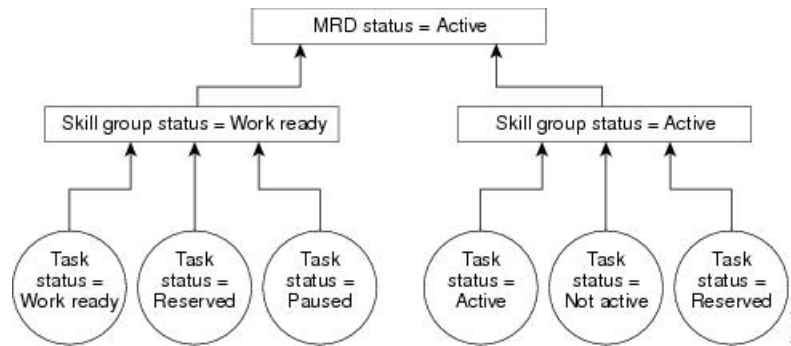
The agent state hierarchy is:

- 1 Active
- 2 Work Ready

- 3 Paused
- 4 Reserved
- 5 Busy Other (for different skill groups in the same MRD)
- 6 Not Active

Consider the following diagram:

**Figure 7: Agent state hierarchy in skill group and MRD**



In the previous diagram, an agent belongs to two skill groups in the chat MRD and is configured to work on up to six simultaneous chat tasks in each MRD.

In the first skill group, the agent is working on three tasks, and the agent's states for those tasks are Work Ready, Reserved, and Paused. Work Ready is the state reported for the agent at the skill group level, because Work Ready is higher than Reserved and Paused in the state hierarchy.

In the second skill group, the agent is working on two tasks, and the agent's states for those tasks are Active and Reserved. Active is the state reported for the agent at the skill group level, because Active is higher than Reserved in the state hierarchy.

For the chat MRD, the agent's state is Active because Active is higher than Work Ready in the hierarchy.

## Reports that show agent states

These are some reports that show information on Agent State:

- Unified IC Agent Team State Counts Real Time
- Unified IC Agent Real Time All Fields
- Unified IC Agent Historical All Fields

### Related Topics

[Unified ICM/CC Report Templates](#)

## Agent Logout Reason codes

Agent Logout Reason codes are defined in the agent desktop software and appear in historical reports as their numeric equivalent, with no text code. For example, if reason code 1 equals “end of shift” and the agent selects that reason for logging out, the report displays “1”.

In addition to the codes configured at the desktop, some codes are generated automatically when the agent is logged out by the software. The following table describes these predefined Logout Reason codes, which are available for both Unified CCE and Unified CC.


**Note**

Check your *ACD Supplement Guide* to make sure that Agent Logout Reasons codes are supported for your ACD.

**Table 6: Agent Logout Reason codes**

Predefined Logout Reason Code	Description
-1	The agent reinitialized due to peripheral restart.
-2	The PG reset the agent, normally due to a PG failure.
-3	An administrator modified the agent's extension while the agent was logged in.
50002	A CTI OS component failed, causing the agent to be logged out. This could be due to closing the agent desktop application, heartbeat time out, a CTI OS Server failure, or a CTI OS failure.
50003	The agent was logged out because the ACD reported the agent's device as out of service.
50004	The agent was logged out due to agent inactivity as configured in agent desk settings.
50020	The agent was logged out when the agent's skill group assignment dynamically changed.
50030	The agent was logged out when the agent's skill group assignment dynamically changed on the Administration & DataServer.
50040	The mobile agent was logged out because the call failed.
50042	The mobile agent was logged out because the phone line disconnected when using nailed connection mode.
20001—applicable if you are using Cisco Agent Desktop	The agent's state was changed to NOT READY.

Predefined Logout Reason Code	Description
20002—applicable if you are using Cisco Agent Desktop	<p>Forces the logout request; for example, when Agent A attempts to login to Cisco Agent Desktop and Agent B is already logged in under that agent ID, Agent A is asked whether or not to force the login.</p> <p>If Agent A answers yes, Agent B is logged out and Agent A is logged in. Reports would then show that Agent B logged out at a certain time with a reason code of 20002 (Agent B was forcibly logged out).</p> <p><b>Note</b> Cisco Unified Mobile Agent is the only exception, where CAD will not allow you to log out a login name/ID that is already in use.</p>
20003—applicable if you are using Cisco Agent Desktop	Not Ready for logout.

**Related Topics**

[Configure Agent Logout reason codes, on page 59](#)

**Reports that show Agent Logout Reason codes**

These are some reports that contain information on Agent Logout reason codes:

- Unified IC Agent Real Time All Fields
- Unified IC Agent Not Ready Detail

**Related Topics**

[Unified ICM/CC Report Templates](#)

**Agent Not Ready reason codes**

There are reports that show the codes agents select when entering Not Ready state, that calculate the percentage of time spent in the Not Ready state, and that show specific Not Ready reasons based on the time range you specify.

These reports help you identify whether agents are taking the appropriate number of breaks and whether their breaks are the appropriate length.

Some reports display both the text of the reason code (if configured) *and* the corresponding number. For example, if an agent enters Not Ready state and selects “Break” as the reason code, and if you have configured text for this code in Configuration Manager, reports display “Break [1]”. Other reports display the numeric Not Ready reason code only.

If an agent's total login session is not included in the specified time range (for example, the agent was still logged in at the end of the time range), an asterisk (\*) appears next to the agent's name in the report to indicate that data for that agent is not complete for the range.

For Unified CC, in addition to Not Ready reason codes that you define, there are predefined Not Ready reason codes for situations in which the agent is made Not Ready automatically by the software. The following table describes these predefined Not Ready reason codes.

There are no predefined Not Ready Reason codes for Unified ICM.

**Table 7: Predefined Not Ready reason codes for Unified CC**

Predefined Not Ready Reason Code	Description
50001	The CTI OS client disconnected, logging the agent out. <b>Note</b> This reason code is converted to a 50002, so 50001 does not display in the agent log out records.
50002	A CTI OS component failed, causing the agent to be logged out. This could be due to closing the agent desktop application, heartbeat time out, a CTI OS Server failure, or a CTI OS failure.
50003	Agent was logged out because Unified CM reported the device out of service.
50004	Agent was logged out due to agent inactivity as configured in agent desk settings.
50005	For a Unified CCE deployment where the Multi-line Agent Control is enabled in the peripheral, and the Multi-line Agent Behavior is configured to impact agent state, the Agent will be set to Not Ready with this code while talking on a call on the Non-ACD line.
50010	The agent did not receive multiple consecutive routed calls. The system makes the agent Not Ready automatically so that additional calls are not routed to the agent. By default, the number of consecutive calls missed before the agent is made Not Ready is 2.
50020	Agent was logged out when the agent's skill group dynamically changed on the Administration & Data Server.
50030	If an agent is logged in to a dynamic device target that is using the same dialed number (DN) as the PG static device target, the agent is logged out.
50040	Mobile agent was logged out because the call failed.
50041	Mobile agent state changed to Not Ready because the call failed when the mobile agent's phone line rang busy.
50042	Mobile agent was logged out because the phone line disconnected while using nailed connection mode.
50041	The agent's state was changed to Not Ready because the call fails when the agent's phone line rings busy.

Predefined Not Ready Reason Code	Description
32767	The agent's state was changed to Not Ready because the agent did not answer a call and the call was redirected to a different agent or skill group.
20001 - applicable if you are using Cisco Agent Desktop	Places the agent in the Not Ready state first before forcibly logging the agent off.
20002 - applicable if you are using Cisco Agent Desktop	Forces the logout request; for example, when Agent A attempts to log in to Cisco Agent Desktop and Agent B is already logged in under that agent ID, Agent A is asked whether or not to force the login.  If Agent A answers yes, Agent B is logged out and Agent A is logged in. Reports would then show that Agent B logged out at a certain time with a reason code of 20002 (Agent B was forcibly logged out).
20003 - applicable if you are using Cisco Agent Desktop	Not Ready for logout.  If not already in the Logout state, request is made to place agent in the Not Ready state. Then logout request is made to log the agent out.
Supervisor Not Ready	This code is reserved.
Supervisor Logout	This code is reserved.
-1	Agent reinitialized (used if peripheral restarts).
-2	PG reset the agent, normally due to a PG failure.
-3	An administrator modified the agent's extension while the agent was logged in.

By default, predefined Not Ready reason codes do not have associated textual reason codes. They appear as numbers in reports. If you want to see a textual code for these Not Ready reason codes, enter the predefined Not Ready reason code into the Reason Code list tool with the related text. For example, you might want to label the 32767 Not Ready reason code "Redirection on No Answer".

**Note**

- To report on Not Ready reason codes, ensure that the reporting of agent event detail data is enabled on the PG with the Unified CM peripheral. This is enabled by default.
- For Unified ICM deployments, check your *ACD Supplement Guide* to make sure that Not Ready Reasons codes are supported for your ACD.

**Related Topics**

[Configure Agent Not Ready reason codes, on page 57](#)

**Reports that show Agent Not Ready reason codes**

These are some of the reports that contain information on Not Ready codes and the time spent as Not Ready:

- Unified IC Agent Skill Group Real Time All Fields
- Unified IC Agent Skill Group Historical All Fields

**Related Topics**

[Unified ICM/CC Report Templates](#)

**Agent reporting for Outbound Option campaigns**

For agent reporting per campaign, Outbound Option provides report templates that accurately represent the outbound agent activity for a contact center, including information grouped by skill group.

**Agent task handling**

Agents can receive and place many different types of tasks. There are reports that show you what kind of tasks agents are handling and how well they are handling them. For example, there are reports that display statistics for calls placed, received, transferred, and conferenced, and there are reports that indicate how many calls were rerouted when the agent failed to answer the call.

**Types of tasks**

Tasks can be internal or external, incoming or outgoing.

- **Internal tasks** are calls made to an agent from another person on the same ACD (for Unified CCE) or on the same cluster (for Unified CC).
- **External tasks** are calls that are placed off-switch, go through a voice gateway or Media Routing PG, or tasks that are routed to an agent from a person on a different ACD or cluster. For example, calls from the call center to customers are considered external.
- **Incoming tasks** are tasks that an agent receives. Chat, email, and Blended Collaboration tasks are always incoming.
- **Outgoing tasks** are calls that an agent places. For example, if a customer calls an agent, the call is incoming for the agent. If an agent calls a supervisor, the call is outgoing for the agent.

For voice calls only, agents can also transfer calls, receive transferred calls, place consultative calls, and engage in conference calls.

The following table describes the tasks that an agent can receive and place and how those tasks are reported.

**Table 8: Types of tasks**

Type of task	Description	Reported As
Incoming direct/internal	<p>Incoming Direct Tasks are tasks that come directly to the agent's extension. These calls can be either internal (agent or device on same ACD) or within the network from another switch.</p> <p>Examples of this kind of call include calls that are directly transferred by another agent without going through a script and calls that resulted from agent-to-agent calling.</p> <p>Data for these calls are stored in the InternalCallsRcvd fields of the Agent_Skill_Group_Interval historical database table.</p>	Internal In
Outgoing external	<p>These are calls initiated by agents from their extension that are placed off-switch or pass through a voice gateway. Outgoing External Tasks are always voice tasks.</p> <p>Consultative, conference out, and transfer out calls are counted as outgoing external calls if they are placed off-switch or to remote agent extensions at another site.</p> <p>Agent-to-Agent dialing is outgoing external for the agent initiating the call if the call has to be placed off-switch to get to the destination agent.</p> <p>Data for these calls are stored in the AgentOutCalls fields of the Agent_Skill_Group_Interval historical database table.</p>	External Out Tasks
Outgoing internal	<p>These are calls initiated by agents from their extension to another extension within the ACD or to another ACD within the network. Outgoing Internal Tasks are always voice tasks.</p> <p>Consultative, conference out, and transfer out calls are counted as outgoing internal calls if they are placed to another device. The device could be another agent line or any other extensions to the VRU.</p> <p>Agent-to-Agent calls are outgoing internal for the agent initiating the call if the destination agent is on the same ACD as the source agent.</p> <p>Data for these calls are stored in the InternalCalls fields of the Agent_Skill_Group_Interval historical database table.</p>	Internal Out Tasks



Type of task	Description	Reported As
Unified CCE-routed/ACD calls	<p>All calls that are routed by the ACD to the agent.</p> <p>Outbound Option calls are considered Unified CCE-routed/incoming calls.</p> <p>Data for these calls are stored in the CallsHandled fields of the Agent_Skill_Group_Interval historical database table.</p>	<p>Tasks Handled</p> <p><b>Note</b> Tasks Handled includes all ACD calls and ICM-routed calls, including calls that are transferred and conferenced, and consultative calls. Tasks Handled provides a high level view of routed tasks. Other report columns such as Transfer In and Conf Out provide more details about how the task was handled.</p>
Transferred in	<p>Calls transferred to an agent from another agent. Calls that are blind transferred by one agent to CVP for re-routing <b>are</b> counted in this column.</p> <p><b>Note</b> Calls that are transferred to IP-IVR or other vendor IVRs for rerouting are <b>not</b> included in this column for the agent who receives the rerouted calls. Those calls appear as new incoming calls.</p> <p>mn for the agent who receives the rerouted call.</p> <p><b>Note</b></p> <p>Data for these calls are stored in the TransferredIn fields of the Agent_Skill_Group_Interval historical database table.</p>	Transfer In

Type of task	Description	Reported As
Transferred out	Calls that are transferred from an agent. An agent can transfer both incoming and outgoing calls.  Data for these calls are stored in the TransferredOut fields of the Agent_Skill_Group_Interval historical database table.	Transfer Out
Consultative	Calls in which an agent consulted with another agent or supervisor while having another call on hold.  Data for these calls are stored in the ConsultativeCalls fields of the Agent_Skill_Group_Interval historical database table.	Cons Out
Conference in	Incoming calls that are conferenced.  Data for these calls are stored in the ConferencedInCalls fields of the Agent_Skill_Group_Interval historical database table.  <b>Note</b> For blind conferences, this field is updated when the call that was blind conferenced to an IVR is subsequently answered by another agent. Calls that are transferred to IP-IVR or other vendor IVRs for rerouting are <b>not</b> included in this column for the agent who receives the rerouted calls. Those calls appear as new incoming calls.	Conf In
Conference out	Outgoing calls that are conferenced.  Data for these calls are stored in the ConferencedOutCalls fields of the Agent_Skill_Group_Interval historical database table.	Conf Out

## Task times

For each type of task that an agent can place, the amount of time that the agent spent working on that task is recorded in the Agent\_Skill\_Group\_Interval database table, as follows:

- Unified CCE–routed tasks and ACD–routed tasks - The time for these tasks begins when the agent answers the task and ends when the agent completes wrap up. The time is stored in the HandledCallsTime field.
- Incoming direct tasks - The time for these tasks begins when the agent answers the task and ends when the task disconnects. The time is stored in the InternalCallsRcvdTime field.
- External outgoing tasks - The time for these tasks begins when the agent initiates the task and ends when the task disconnects. The time is stored in the AgentOutCallsTime field.
- Internal outgoing tasks- The time for these tasks begins when the agent initiates the task and ends when the task disconnects. The time is stored in the InternalCallsTime field.
- Transferred-in tasks - The time for these tasks begins when the agent answers the transferred task and ends when the task disconnects. The time is stored in the TransferredInCallsTime field.
- Transferred-out tasks - The time for these tasks begins when the agent activates the transfer button and ends when the transfer is complete. The time is stored in the TransferredOutCallsTime field.

- Consultative tasks - The time for these tasks begins when the agent activates the transfer button and ends when the target agent answers and the held task is restored (drop consultative call) or consult party drops. The time is stored in the ConsultativeCallsTime field.
- Conferenced-in tasks - The time for these tasks begins when the agent answers the task and ends when the task disconnects. The time is stored in the ConferenceInCallsTime field.
- Conferenced-out tasks - The time for these tasks begins when the agent activates the conference button and ends when the agent disconnects from the conference call and the supervisor drops out of the call. The time is stored in the ConferenceOutCallsTime field.

You might notice overlapping data in your reports for the amount of time for different types of calls. This happens because incoming tasks, such as ACD routed tasks and calls directly to an agent, can be Transferred In and Conferenced In. Both incoming calls and outgoing calls placed by agents can be Transferred Out and Conferenced Out. The total time for the incoming or outgoing call includes transfer and conference time.


**Note**

Agents can transfer and conference incoming calls both in and out. However, they can transfer and conference outgoing calls out only. This difference means that if an agent transfers an outgoing task to another agent, it is still considered an outgoing task.

## Agent routability and availability for multichannel tasks

The ability for Unified CCE to route a call or multichannel task to an agent depends on the agent's routability and availability within the MRD of the call or task.

### Routability

Routability refers to whether Unified CCE or the Unified E-mail Interaction Manager (EIM) or Unified Web Interaction Manager (WIM) is configured *to assign tasks to the agent*. For example, your system might be configured to allow Unified WIM to select an agent to handle a task. In this case, Unified CCE gathers reporting data for those tasks, but does not perform the routing. If Unified CCE is configured to assign the task, it both routes and reports on the task.

An agent might be in Routable or Not Routable mode for each MRD to which the agent belongs.

For voice calls, Unified CCE is always configured to route the call. Therefore, the agent is always Routable.

**Table 9: Agent modes**

Term	Description
Routable	Unified CCE is configured to assign tasks to the agent.
Not Routable	Unified EIM and Unified WIM are configured to assign tasks to the agent.

### Availability

While Routability determines whether the CallRouter is allowed to assign tasks for this MRD, the agent's availability determines *whether the agent is capable of handling new tasks*.

Unified IC reports contain fields indicating agents' availability in the MRD.

The following table describes the criteria that determine whether the agent is Available or Not Available.

**Table 10: Agent availability**

<b>An agent is Available (eligible to be assigned a task in an MRD) if the agent:</b>	<b>An agent is Not Available (not eligible to be assigned a task in an MRD) if the agent:</b>
Is in any state other than the Not Ready state for this MRD.	Is in Not Ready state.
Is not working on a non-interruptible task in another MRD. <b>Note</b> Only email tasks are interruptible, meaning that Unified CCE can assign the agent another task while the agent is working on an email. Voice calls, chat sessions, and Blended Collaboration sessions cannot be interrupted.	Is working on a voice, chat, or email task.
Has not reached the maximum task limit for this MRD. For voice, email and Blended Collaboration MRDs, the task limit is always one task. For email and chat MRDs, the task limit is customized through the Unified WIM administration application.	Has reached the agent's maximum task limit.

Therefore, an agent is:

- *CCE-available* if Routable and Available for the MRD. This means that the agent can be routed a task by Unified CCE.
- *Application-available* if Not Routable and Available for the MRD. This means that the agent can be routed a task by Unified EIM or Unified WIM.

Consider the following call/task scenarios and how they affect agent mode and availability.

**Table 11: Scenario 1: Not Routable—Chat, then voice**

<b>Scenario</b>	<b>Result</b>
The agent is logged into two MRDs, chat and voice. The agent is <i>not routable</i> in the chat MRD. The agent is assigned a task in the chat MRD by the Unified WIM.	Unified CCE does not assign a task to the agent from the Voice MRD, because the agent is working on a non-interruptible task in the chat MRD. The agent is <i>Not Available</i> in Voice.

**Table 12: Scenario 2: Not Routable—Voice then email**

Scenario	Result
<p>The agent is logged into two MRDs, chat and voice.</p> <p>The agent is <i>not routable</i> in the email MRD.</p> <p>The agent is assigned a call in the Voice MRD.</p>	<p>Unified CCE does not assign email tasks to the agent. The agent is <i>Not Available</i> in the email MRD.</p> <p>Email tasks can still be placed in the agent's personal queue in this scenario by Unified EIM. Email tasks might also be sent to the agent's queue as a result of a customer responding to an email from the agent. See the Cisco Unified E-Mail Interaction Manager documentation for complete information on routing email tasks.</p>

**Table 13: Scenario 3: Not Routable—Voice then chat**

Scenario	Result
<p>The agent is logged into two MRDs, chat and voice.</p> <p>The maximum task limit for the agent in this MRD is 1.</p> <p>The agent is <i>not routable</i> in the chat MRD.</p> <p>The agent is assigned a call in the Voice MRD.</p>	<p>Unified WIM does not assign chat tasks to the agent. The agent is <i>Not Available</i> in chat.</p>

**Table 14: Scenario 4: Routable—Maximum task limit**

Scenario	Result
<p>The agent is logged into a chat MRD (maximum task limit for the agent in this MRD is 6).</p> <p>The agent is <i>routable</i> in the chat MRD.</p> <p>The agent is assigned a task in the chat MRD.</p>	<p>Unified CCE continues to assign tasks to the agent until the agent has reached the maximum task limit. The agent is <i>CCE-Available</i> in the chat MRD, even though the agent is Active on a task.</p>

**Table 15: Scenario 5: Routable (busy on non-interruptible task)**

Scenario	Result
<p>The agent is logged into two MRDs, chat and voice.</p> <p>The agent is <i>routable</i> in the chat MRD.</p> <p>The agent is assigned a voice call in the voice MRD.</p>	<p>Unified CCE does not assign a chat task to the agent, since the agent is working on a non-interruptible task in the voice MRD. The agent is <i>Not Available</i> in the chat MRD even though the agent is Not Active in chat skill groups.</p>

**Table 16: Scenario 6: Routable (busy on interruptible task)**

Scenario	Result
<p>The agent is logged into two MRDs, email and voice.</p> <p>The agent is <i>routable</i> in the email MRD.</p> <p>The agent is assigned a task in the email MRD</p>	<p>Unified CCE can assign a voice call to the agent, since the agent is working on an interruptible task in the email MRD. The agent is <i>CCE-Available</i> in Voice MRD.</p>

## Reports that show agent task handling

The Unified IC Agent Historical All Fields report contains information on Not Ready codes and the time spent as Not Ready.

### Related Topics

[Unified ICM/CC Report Templates](#)

## Agent utilization: Full-time equivalents and percent utilization

Because agents can work on multiple media and in multiple skill groups, they typically do not spend all of their time handling tasks for a single skill group. Determining staffing needs based on agents whose time is divided among skill groups and media can be difficult.

You can use a combination of attributes to create multidimensional precision queues based on predefined business criteria. Using Unified CCE scripting, you can dynamically map the precision queues to direct a call to the agent that best matches the precise needs of the caller. Agents automatically become members of these precision queues based on their attributes, dramatically simplifying configuration and scripting.

Report templates provide two types of statistics that give you a better view of how agents are being utilized and how many full-time agents would be required to handle the amount of work performed during an interval for a particular skill group.

These statistics are:

- % Utilization (percent utilization)

- FTE (full-time equivalent)

**Percent utilization** (% Utilization in reports) is computed in reports by dividing the total time agents spend handling calls in a skill group by the total time agents were ready to handle tasks. To calculate the time that an agent was ready, the system subtracts the Not Ready time from the total time that agents were logged on. Percent utilization shows you how well agents are being utilized within a skill group. For example, if the agent spent 20 minutes of the log on duration handling calls and was available to handle calls for 40 minutes, the percent utilization is 50%.

The **full-time equivalent** (FTE in reports) is the number of full-time agents that would be required to perform the work done during that interval for a skill group. To calculate the FTE, the system divides the total time that work was performed by the total time in the interval. For example, if agents spent a total of 3 hours (180 minutes) handling tasks during an interval (30 minutes), the FTE for task handling during the interval is 180 minutes / 30 minutes, which equals 6 full-time persons. This means that if all agents handled tasks full-time, the work could have been done by 6 agents.

Reports also provide FTE values based on an 8 hour shift calculation. It is assumed that agents work an 8-hour shift for the day. To calculate the FTE, the system divides the total time that work was performed by 8 hours. For example, if agents spent a total of 48 hours (2880 minutes) handling tasks during an 8 hour work shift (480 minutes), the FTE for task handling during the interval is 2880 minutes / 480 minutes, which equals 6 full-time persons. This means that if all agents handled tasks full time, the work could have been done by 6 agents.


**Note**

If you select a report interval that is less than 8 hours, the resulting value will be lower than expected.

## Reports that show Percent Utilization and FTE metrics

These are some of the reports that contain operational information on Percent Utilization and FTE:

- Enterprise Skill Group Historical All Fields
- Peripheral Skill Group Historical All Fields Report
- Peripheral Skill Group Real Time All Fields Report
- Precision Queue Real Time All Fields
- Precision Queue Historical All Fields

### Related Topics

[Unified ICM/CC Report Templates](#)

# Configuration for agent reporting

## Enable agent reporting

For Unified ICM and Unified CCE, viewing agent data in reports is a configurable option. If you plan to use Unified IC to generate agent reports, you *must* enable agent reporting in Configuration Manager. You must also identify the Administration & Data Server to which the agent data is sent.

For Unified ICM and for a parent/child deployment, you may prefer to use ACD reports for agent activity, or your ACD might not support Unified ICM agent reporting. In that case, do not enable agent reporting in Unified ICM.

To view agent data in reports:

## Procedure

- Step 1** From the Configuration Manager, select **Tools > Explorer Tools > PG Explorer**.
- Step 2** Click **Retrieve** and select the peripheral.
- Step 3** Click the **Agent Distribution** tab.
- Step 4** Check **Enable agent reporting**.
- Step 5** If you intend to report on Agent Not Ready reason codes, ensure that **Agent event detail** is checked.

**Example:**

**Figure 8: Enable agent reporting**

The screenshot shows the 'Agent Distribution' tab in the PG Explorer. The 'Advanced' sub-tab is selected. Under the 'Agent Distribution' section, 'Enable agent reporting' and 'Agent event detail' are both checked. Below this is a table titled 'Agent distribution entries' with columns 'Site name', 'Agent real time data', and 'Agent historical data'. The table contains two rows: 'BxB' and 'NYC'. The 'BxB' row has 'Y' for real time data and 'N' for historical data. The 'NYC' row has 'Y' for real time data and 'N' for historical data. To the right of the table are 'New' and 'Delete' buttons. At the bottom, there is a 'Currently selected site' section with a text box for 'Distributor site name' containing 'BxB'. Below this, 'Agent real time data' is checked and 'Agent historical data' is unchecked.

Site name	Agent real time data	Agent historical data
BxB	Y	N
NYC	Y	N

- Note**
- When Agent reporting is enabled, Auto Configuration automatically becomes enabled. If you disable Agent auto-configuration, Agent reporting automatically becomes disabled. However, enabling Agent auto-configuration does not automatically enable Agent reporting.
  - Agent Reporting without auto-configuration is *not* supported. Unified ICM does not support Agent Reporting on manually configured agents.

## Related Topics

[Configure Agent Not Ready reason codes, on page 57](#)

[Enable agent auto-configuration, on page 55](#)



## Configure agent data distribution

The flow of agent data from a specific peripheral is called an *agent distribution*. You can define just the agent distributions you want and where you want that data delivered.

You can enable or disable an agent distribution at any time. For example, you can stop the flow of all agent real time data to a distributor when you are not viewing real time agent reports.

To configure agent data distribution:

### Procedure

- Step 1** From the Configuration Manager, select **Tools > Explorer Tools > PG Explorer**.
- Step 2** Click **Retrieve** and select the peripheral.
- Step 3** In the **Agent Distribution** panel, select the Administration & Data Server site name to which the agent report data is to be distributed.
- Step 4** Check boxes to specify whether you want both real time and historical data, only real time data, only historical data, or neither.

**Example:**

**Figure 9: Configure agent data distribution**

Site name	Agent real time data	Agent historical data
BxB	Y	N
NYC	Y	N

Currently selected site  
Distributor site name \* BxB

Agent real time data ☒ Agent historical data ☐

## Enable agent auto-configuration

Auto-configuration is mandatory for agent reporting. When agent reporting is enabled, agent auto-configuration becomes enabled. If you disable agent auto-configuration, agent reporting automatically becomes disabled.

When autoconfigure agents is enabled, agents are “noticed” by the PIM when they sign on and are dynamically created in Unified ICM database.

To enable the **Agent auto-configuration** option:

### Procedure

- Step 1** From the Configuration Manager, select **Explorer Tools > PG Explorer**.
- Step 2** Click **Retrieve** and select the peripheral.
- Step 3** Click the **Advanced** tab.
- Step 4** Check **Agent auto-configuration**.

**Example:**

**Figure 10: Enable agent auto-configuration**

Skill Group Mask	Routing client	Default route	Peripheral Monitor
Peripheral	Advanced	Agent Distribution	
Available holdoff delay: * 0			
Answered short calls threshold: 0			
Network VRU: NONE			
Agent auto-configuration: <input checked="" type="checkbox"/> Internal IPTA Only: <input type="checkbox"/>			
Agent targeting mode: * Device Target Preferred			

## Enable agent state trace

This option allows you to track every state an agent passes through. You might do this if you have concerns about the productivity or performance of one or more agents. It is an option you enable on a per-agent basis, and enabling it can impact system performance.



### Note

Enabling agent state trace for many agents can impact system performance and database sizing, as the option causes more records to be written to the database. If you notice a performance problem, consider disabling agent state trace or enabling it for certain agents only.

Perform these steps to enable the **agent state trace** option, which tracks every state an agent passes through:

## Procedure

- Step 1** From the Configuration Manager, select **Tools > Explorer Tools > Agent Explorer**.
- Step 2** Click **Retrieve** and select the agent.
- Step 3** Click the **Advanced** tab.
- Step 4** Check **Agent state trace**.

**Example:**

**Figure 11: Enable agent state trace**

The screenshot shows the 'Agent Explorer' configuration window with the 'Advanced' tab selected. The window has four tabs: 'Agent', 'Advanced', 'Skill group membership', and 'Supervisor'. Under the 'Advanced' tab, there are three input fields: 'Desk setting:' (a dropdown menu), 'Configuration parameters:' (a text box), and 'Description:' (a text box). Below these fields is a checkbox labeled 'Agent state trace', which is checked and circled with a red oval.

## Configure Agent Not Ready reason codes

There are reports that show the reason codes that agents select when entering the Not Ready state. These reports help you identify whether agents are taking the appropriate number of breaks and whether their breaks are of the appropriate duration.

In addition to Agent Not Ready reason codes that you define, Unified CC uses predefined Not Ready reason codes for situations in which the agent is automatically made Not Ready by the software.



**Note** Unified ICM does not use these predefined Agent Not Ready Reason codes.

Configure the Not Ready Reason codes both in Configuration Manager and on the agent desktop software (CTI OS or CAD).

The codes configured on the desktop software are the codes that the agent selects when entering the Not Ready state. To avoid confusion and to interpret reports consistently, configure reason codes to have the *same meaning* in Configuration Manager that they have in the agent desktop software.

Configuration Manager allows you to specify alphanumeric reason codes and their numeric equivalent. For example, you might configure Break and Lunch reason codes with numeric values of 1 and 2, respectively. Both the number and the text appear in reports.

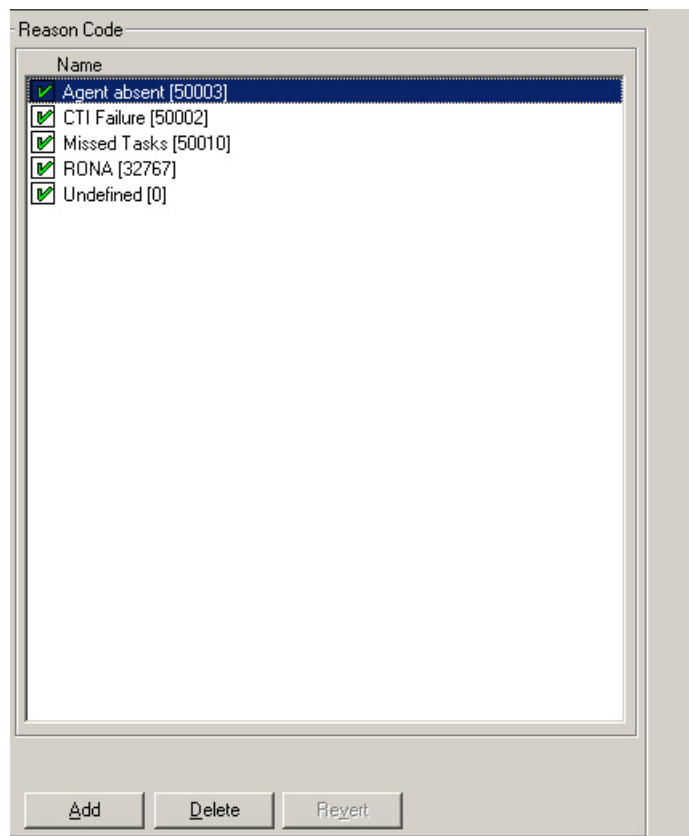
To configure Agent Not Ready reason codes:

## Procedure

- Step 1** Configure the Not Ready reason codes in the agent desktop software (CTI OS or Cisco Agent Desktop).
- Step 2** Using the exact same reason codes as in the desktop software, configure the Not Ready reason codes in Configuration Manager by selecting **Tools > List Tools > Reason Code List**.

### Example:

**Figure 12: Configure Agent Not Ready reason codes**



**Note** Use this tool to enter Not Ready reason codes with text descriptions. If no text descriptions are configured, then the reports that show Not Ready reasons display the numeric code only.

- Step 3** Ensure that Agent Event Detail is enabled on the PG.
- From Configuration Manager, select **Tools > Explorer Tools > PG Explorer**.
  - Retrieve and select the PG.
  - Click the **Agent Distribution** tab.
  - Check that **Agent event detail** is enabled. If it is not, then enable it.

## Related Topics

[Agent Not Ready reason codes](#), on page 42

## Configure Agent Logout reason codes

Agent Logout reason codes are defined in the agent desktop software (CTI OS or CAD) and appear in historical reports as their numeric equivalent, with no text code. For example, if reason code 1 equals “end of shift” and the agent selects that reason for logging out, the report displays “1”.

In addition to the codes configured at the desktop, some codes are generated automatically when the agent is logged out by the software.

The only configuration for Agent Logout reason codes in Configuration Manager is the setting for Logout non-activity time.

To configure Logout non-activity time:

### Procedure

- Step 1** From Configuration Manager, click **Tools > List Tools > Agent Desk Settings List**.
- Step 2** Click **Retrieve**. Then select an existing code, or click **Add** to define a new one.
- Step 3** On the **Attributes** tab, enter a value in seconds for **Logout non-activity time**.  
This is the number of seconds an agent can be inactive while in the Not Ready state before the system software logs out the agent. This number can be from 10 seconds to 7200 seconds (2 hours). A blank entry will disable the timer.

### Example:

**Figure 13: Configure Agent Logout reason codes**

The screenshot shows the 'Attributes' tab for configuring agent settings. The 'Logout non-activity time' field is highlighted with a red oval and contains the value '500' with the unit 'seconds (10 - 7200)'. Other visible fields include 'Name' (BXB\_01), 'Ring no answer time' (10 seconds), 'Ring no answer dialed number' (<None>), 'Work mode on incoming' (Required), 'Work mode on outgoing' (Required), 'Wrap up time' (7200 seconds), 'Assist call method' (Consult), and 'Emergency alert method' (Blind Conference).

### Related Topics

[Agent Logout Reason codes, on page 41](#)



## CHAPTER 7

# Skill groups

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This chapter provides information about skill groups.

A skill group is a collection of agents at a single contact center who share a common set of competencies that equip them to handle the same types of requests. Some examples of skill groups are a collection of agents who speak a specific language or who can assist callers with billing questions.

Each skill group belongs to a Media Routing Domain.

An agent can be a member of zero, one, or more skill groups (depending on the peripheral) up to a maximum specified in *Cisco Unified Contact Center Enterprise Solution Reference Network Design (SRND)*.

To monitor agent performance, you can report on agents individually or you can report on all of the agents in one or more skill groups.

You can generate reports for skill groups that show agent activity (for example, the number of agents talking, available, or in wrap-up for a particular skill group).

In addition to generating Agent Skill Group reports, you can also use Skill Group reports to monitor operational performance. For example, you might want to see how a skill group is performing compared to other skill groups or to see if calls are being distributed evenly by your routing scripts and configuration.

You can use Precision Queues to provide multidimensional routing with simple configuration, scripting, and reporting. Agents are represented through multiple attributes with proficiencies so that the capabilities of each agent are accurately exposed, bringing more value to the business.

- [Enterprise skill groups, page 62](#)
- [Base skill groups and sub-skill groups, page 62](#)
- [Default skill group, page 62](#)
- [Reports on skill group operations, page 64](#)
- [Reports on agent activity in skill groups, page 65](#)
- [Skill group reporting for Outbound Option campaigns, page 66](#)
- [Skill group configuration, page 66](#)

## Enterprise skill groups

An Enterprise skill group is a configured entity that serves to group a collection of skill groups on different peripherals.

For example, you may have a skill group called `Boston_Sales` on one peripheral and a skill group called `NewYork_Sales` on another peripheral. You could create an Enterprise skill group called `Enterprise_Sales`.

In a Unified ICM environment, configuring Enterprise Skill Groups allows you to report on skill groups across all ACDs, thus providing an enterprise view.

If you are using a Cisco Contact Center Gateway deployment, in which Unified CC acts as an IP ACD to a parent Unified ICM system, decide which skill groups on the Unified CC system are to be grouped into Enterprise skill groups at the parent level.



### Note

If you group skill groups from the same peripheral into an Enterprise skill group, you will see double counting of some metrics in your reports.

## Base skill groups and sub-skill groups

For Unified CC deployments, you can configure only one type of skill group: base skill groups.

For Unified ICM, established sub-skill configurations in place for Unified ICM and time-division multiplex(TDM) based ACDs will be supported to facilitate controlled customer phase-out.

Sub-skill groups are not supported in Unified CCE 9.0(1).

Refer to the *Administration Guide for Cisco Unified Contact Center Enterprise & Hosted* for instructions on manually removing sub-skill groups.

## Default skill group

The default skill group acts as a bucket to capture information about voice calls and non-voice tasks.

You do not have to create a default skill group—one is automatically created when you establish MRD/peripheral gateways pairs. The default skill group has a peripheral number of 0.

### Role of default skill group in reporting

The default skill group acts as a bucket to capture information in these situations:

- For calls that are not routed by Unified CCE routing script
- If a skill group is not specified in a routing script
- If the Agent to Agent node is used in a routing script for agent-to-agent dialing
- When the Queue to Agent node queues a task to an agent and the agent is not logged into the skill group specified in the Queue to Agent node

Using a default skill group helps to:



- Ensure the agent/skill group reports balance with the service and call type reports, since service and call type reports include only Unified CCE-routed calls, and
- Isolate/identify non-Unified CCE-routed calls within the agent and skill group report.

Statistics for the default skill group are affected by different types of calls, including new calls, agent-to-agent-dialing, and transferred and conferenced calls.

You do not have to create a default skill group - one is automatically created when you establish MRD/peripheral gateways pairs. The default skill group has a peripheral number of 0.

If you deploy Multichannel options in a Unified CCE system, default skill groups are created for each Media Routing Domain that is configured.

### Related Topics

[Reporting in a multichannel environment, on page 147](#)

## How new calls increment default skill group statistics

Call statistics for all new outbound and incoming direct calls are incremented for the default skill group as follows:

- AgentOutCalls for external outbound calls



**Note** When an agent makes an outbound call as part of a consultative call, the call is not attributed to the Default skill group. It is attributed to the skill group for the consulting agent on the original call.

- InternalCalls for the internal outbound calls
- InternalCallRcvd for the direct incoming calls



**Note** CallsHandled is not incremented for the default skill group, since the default skill group can not be referenced in any script.

## How agent-to-agent dialing increments default skill group statistics

Agent to agent dialing using the agent to agent node in the script also affects the default skill group. OutgoingExternal or OutgoingInternal are incremented for the default skill group of the agent initiating the agent to agent call. The default skill group InternalCallsReceived is incremented for the default skill group of the agent receiving the agent to agent call.

## How transferred and conferenced calls increment default skill group statistics

The default skill group is also affected by transferred and conferenced calls. If agent A transfers or conferences a Unified CCE/IPCC-routed call to another agent directly without using a script, OutgoingExternal or OutgoingInternal for agent A are incremented against the skill group of the Unified CCE-routed call. However, IncomingDirect calls for agent B are incremented against the default skill group.

However, if the agent (agent A) transfers or conferences a Unified CCE/IPCC–routed call to a dialed number that accesses a transfer or conference script that has an agent to agent node, `OutgoingExternal` or `OutgoingInternal` for the agent A is incremented for the skill group of the Unified CCE/IPCC routed call. `IncomingDirect` calls for agent B are incremented for the default skill group.

The default skill group will also be incremented for emergency and supervisor assist calls when there is no existing call.

## Reports on skill group operations

Use the skill group templates to gain insight into operations, to see how one skill group is performing compared to other skill groups, and to track whether calls are being distributed evenly by your routing scripts and configuration.

- In a Unified ICM environment, you can select and report on data for base skill groups only, when sub-skill group are configured.



**Note** If you have configured sub-skill groups, data from sub-skill groups automatically rolls up into base skill groups.

Sub-skill groups are not supported in Unified Contact Center Enterprise 9.0(1).

- You can report on skill groups associated with a specific single peripheral in Unified CCE.
- You can report on call statistics by agent skill group assignments
- You can report on enterprise skill groups. An enterprise skill group is a collection of skill groups, mapped across multiple peripherals.

If you group skill groups from the same peripheral into an enterprise skill group, you might see double-counting of some metrics in your reports.



**Note** For agents in more than one skill group, you can also use the agent by skill group templates as a tool for monitoring agent performance.

## How Calls Offered is calculated for skill group

The completed state for `RouterCallsOffered` at the skill group is calculated using these fields from the `Skill_Group_Interval` table:

- `RouterCallsAbandToAgent`
- `CallsHandled`
- `RouterCallsDequeued`
- `RedirectNoAnsCalls`
- `RouterError`
- `ReserveCalls`

- RouterCallsAbandQ
- RouterCallsAbandDequeued

## Reports that show skill group operations

These are some of the reports that contain operational information on Skill Groups:

- Unified IC Enterprise Skill Group Historical All Fields
- Unified IC Enterprise Skill Group Real Time All Fields
- Unified IC Peripheral Skill Group Historical All Fields
- Unified IC Peripheral Skill Group Real Time All Fields

### Related Topics

[Unified ICM/CC Report Templates](#)

## Reports on agent activity in skill groups

A skill group is a collection of agents at a single contact center who share a common set of competencies that equip them to handle the same types of requests. Some examples of skill groups are a collection of agents who speak a specific language or who can assist callers with billing questions.

An agent can be a member of zero, one, or more skill groups (depending on the peripheral) up to a maximum specified in the *Cisco Unified Contact Center Enterprise Solution Reference Network Design (SRND)* document.

You can generate reports for skill groups that show agent activity (for example, the number of agents talking, available, or in wrap-up for a particular skill group).

In addition to generating Agent Skill Group reports, you can also use Skill Group reports to monitor operational performance. For example, you might want to see how a skill group is performing compared to other skill groups or to see if calls are being distributed evenly by your routing scripts and configuration.

### Related Topics

[Reports on skill group operations, on page 64](#)

## Reports that show agent skill group activity

These are some reports that show information on Agents by Skill Group:

- Agent Skill Group Real Time All Fields
- Agent Skill Group Historical All Fields
- agtskg21: Agent Skill Group Summary Half Hour
- agtskg03: Agent Skill Group Media Status Logout Report

### Related Topics

[Unified ICM/CC Report Templates](#)

## Skill group reporting for Outbound Option campaigns

For skill group reporting per campaign, Outbound Option provides report templates that accurately represent the skill group activity for a contact center.

Skill group reports provide information on agent activity for outbound and inbound agents.

If the same skill group is used for both inbound and outbound, then the campaign consolidated reports will provide a consolidated overview of business activity for both inbound and outbound calls.

### Reports that show skill group activity on Outbound Option campaigns

These are some of the reports that show skill group activity per campaign:

- Perskg11: Outbound Option (Blended Agent) Statistics By Skill Group Report
- Perskg12: Outbound Option (Blended Agent) Task Detail Performance In Skill Groups Half Hour Report

#### Related Topics

[Agent reporting for Outbound Option campaigns, on page 45](#)

[Outbound Option, on page 119](#)

[Unified ICM/CC Report Templates](#)

## Skill group configuration

### Configure a skill group

#### Procedure

- 
- Step 1** From Configuration Manager, select **Tools > Explorer Tools > Skill Group Explorer**.
  - Step 2** When the **Skill Group Explorer** window appears, click **Add** to create a new skill group, or click **Retrieve** and select an existing skill group.
  - Step 3** Complete the configuration fields on all tabs.
-

## Configure an enterprise skill group

### Procedure

- 
- Step 1** From Configuration Manager, select **Tools > List Tools > Enterprise Skill Group List**.
  - Step 2** When the **Enterprise Skill Group List** window appears, click **Add** to define a new enterprise skill group or click **Retrieve** and select an existing one.
  - Step 3** On the **Attributes** tab, click **Add** to add skill groups as members.
- 

## Add agent to a skill group

Planning for agent reporting also involves planning how you want to group agents into skill groups.

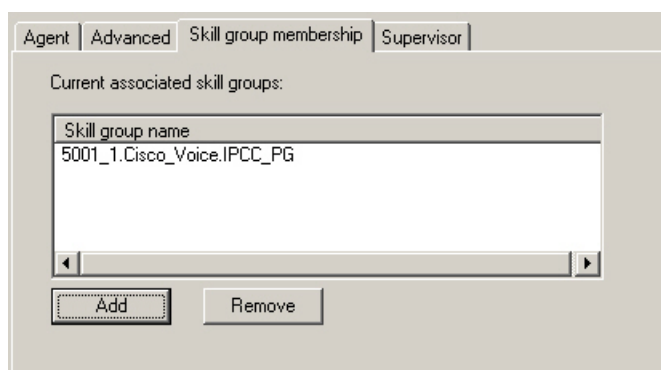
Unified ICM and Unified CC impose a default limit on the number of skill groups to which a single agent can be assigned. This limit is defined in the *Cisco Unified Contact Center Enterprise Solution Reference Network Design (SRND)*. You can define your own default limit, which can be lower than system default.

### Procedure

- 
- Step 1** From the Configuration Manager, select **Tools > Explorer Tools > Agent Explorer**.
  - Step 2** Click **Retrieve** and select the agent.
  - Step 3** Click the **Skill Group Membership** tab.
  - Step 4** Click **Add** to select a skill group.

**Example:**

**Figure 14: Add agent to a skill group**







## CHAPTER 8

# Agent teams and supervisors

This chapter provides information about agent teams and supervisors.

- [About agent teams and supervisors, page 69](#)
- [Agent team reports, page 70](#)
- [Supervisor action reports, page 70](#)
- [Agent team and supervisor configuration, page 73](#)

## About agent teams and supervisors

An agent team is an organizational tool that is configured to reflect the reporting structure in a contact center. Agent teams are peripheral-specific: all agents on a team and the supervisor(s) for the team must reside on the same peripheral. An individual agent can be assigned to one team only.

Supervisors are agents who are configured to have supervisor status. With this status, they can generate reports and view data for their team(s) and the agents on their teams. A supervisor can be a supervisor for any number of teams and can be both a supervisor and a member of an agent team.

When supervisors attempt to generate a report for teams other than the teams they supervise, they see an error message indicating that they are not authorized to run the report.

Agents who are specified as supervisors are treated as supervisors when they log into Unified IC and are restricted as such.

Agents who are specified as supervisors are treated as supervisors when they log into Unified IC and are restricted as such.



### Note

For Unified ICM deployments, you might prefer to use your ACD configuration to designate supervisors.

Supervisory features apply only to Unified CCE voice contact. They are not available for Unified ICM and they are not available on Unified CC for agents using Media Routing Domains (MRDs) other than voice.

Supervisory features include:

- Supervisor and emergency assist: Allows agents to activate supervisor assist or emergency assist buttons on their desktop.

- Barge-In: Allows a supervisor to conference into an agent call from their desktop.
- Intercept: Allows a supervisor to intercept (take over) a call from their desktop.

### Related Topics

[Agent team and supervisor configuration, on page 73](#)

[Agent team reports, on page 70](#)

[Supervisor action reports, on page 70](#)

## Agent team reports

Supervisors can report on the agents in teams that they supervise to monitor the performance of a particular team.

Teams are peripheral-specific. That is, all agents on a team and the supervisor(s) for the team must reside on the same peripheral. An individual agent can be assigned to one team only.

Supervisors are a special type of agents who have been configured in the Configuration Manager with limited reporting privileges to see information in the agent report categories, and within those categories, to see data for only those agents on teams that they supervise.

You can select 0 or 1 primary supervisor for an agent team, and you can select multiple secondary supervisors for each team. Each supervisor can be a supervisor for multiple teams.



### Note

To use agent team reports, you must configure teams and supervisors in Configuration Manager. The team structure you choose is up to you. You might prefer to use your ACD configuration. You might also prefer to use your ACD reports to monitor agent teams.

### Related Topics

[Agent team and supervisor configuration, on page 73](#)

## Supervisor action reports

Agent team supervisors can take advantage of supervisory features available on their desktops. These features include Supervisor Assist, Emergency Assist, Barge-In, and Intercept. There are two kinds of Supervisor and Emergency Assist: existing call and no call.

If you are using Unified ICME as the VRU, data is not captured for Barge-In or Intercept calls.



### Note

These supervisory features are not available to agents using MRDs other than Voice.

## Supervisor Assist and Emergency Assist for existing call (Unified Intelligence Center)

For Unified Intelligence Center, you can enable Supervisor Assist and Emergency Assist.

Agents can activate supervisor assist or emergency assist buttons on their desktop when they need special assistance from the primary or secondary supervisor assigned to their team.



**Note**

Blind transfer is not supported for Supervisor Assist and Emergency Assist.

Follow these guidelines to ensure that you can obtain accurate and useful data from these features:

- Plan to configure skill groups for supervisors handling Supervisor Assist and Emergency Assist requests. For example, you might configure one skill group for the primary and secondary supervisors of each agent team. This way, you can direct requests to these skill groups and report on Supervisor and Emergency Assist call activity for these skill groups.
- Plan to create call types and configure dialed numbers that map to the created call type.
- Run scripts that direct the requests to the appropriate supervisor skill group. In the script, first target the primary supervisor and then, if you have configured secondary supervisors, queue to secondary supervisors.

**If consult is selected as an option on the agent desktop settings for supervisor or emergency assist.** If the agent is on a call when the agent activates either the Supervisor or Emergency Assist desktop feature, the CTI software activates the conference key on behalf of the agent's phone and calls the supervisor using the Supervisor or Emergency Assist script. (This example assumes the emergency or supervisor assist script has an Agent-to-Agent node to find a supervisor. See *Configuration and Scripting Considerations for Reporting on Supervisor Action*.) The supervisor answers the call and consults privately with the agent. The following fields are incremented within the Agent Skill Group and Skill group tables.

**Table 17: Existing call: Consultative**

Fields incremented for Agent's skill group to which the call was routed	Fields incremented for Supervisor's default skill group
CallsHandled, InternalCall, SupervisorAssistCalls/EmergencyAssist	InternalCallsRcvd

For the agent, the call is reported in Tasks Handled and either Sup Assist or Emergency report fields. For the supervisor, the call is reported in Tasks Handled report fields.

**Note**

During the consultation, the supervisor can decide to barge-in to the call using the supervisor desktop Barge-In feature.

## Supervisor Assist and Emergency Assist reporting (Unified CC)

For Unified CC, you can enable Supervisor Assist and Emergency Assist.

## Barge-In (Unified Intelligence Center)

When the supervisor activates the Barge-In desktop feature, the agent's desktop completes a conference to the supervisor so that the supervisor can join into the conversation with the call. The following fields are incremented for both the agent and the supervisor when the Barge-In feature is activated in the agent skill group and skill group tables.

**Note**

If you have deployed Unified ICME as the VRU, data is not gathered for Barge-In.

**Table 18: Supervisor Barge-In**

Fields incremented for Agent's skill group to which the call was routed	Fields incremented for Supervisor's default skill group
CallsHandled, InternalCalls, BargeInCalls	BargeInCalls, InternalCallsRcvd

For the agent, the call is reported in Tasks Handled and Barge-In report fields. For the supervisor, the call is reported in Tasks Handled and Barge-In report fields.

## Intercept (Unified Intelligence Center)

If the supervisor decides to intercept (take over) the call, the supervisor activates the Intercept desktop button. This causes the agent to be dropped out of the conference, thereby allowing the supervisor to take over the call. The following fields are incremented during the intercept operation for both the agent skill group and skill group tables.

**Note**

If you have deployed Unified ICME as the VRU, data is not gathered for Intercept.

**Table 19: Supervisor intercept**

Fields incremented for Agent's skill group to which the call was routed	Fields incremented for Supervisor's default skill group
InterceptCalls	InterceptCalls

For the agent, the call is reported in the Intercept report field. For the supervisor, the call is reported in the Intercept report field.

## Reports that show information on agent teams

These are some of the reports that contain information on Agent Teams

- Unified IC Agent Team Real Time All Fields
- Unified IC Agent Team Historical All Fields
- Agent Team State Counts Real Time

### Related Topics

[Unified ICM/CC Report Templates](#)

## Agent team and supervisor configuration

### Configure agent team

To add an agent team or to add agent members to an existing team:

#### Procedure

- 
- Step 1** From Configuration Manager, click **Tools > List Tools > Agent Team List**.
  - Step 2** Click **Retrieve**. Then select an existing team, or click **Add** to define a new one.
  - Step 3** Work in the appropriate tabs to configure attributes, to add members, and to assign a supervisor.
- 

### Configure agent to be a supervisor

#### Procedure

- 
- Step 1** From Configuration Manager, click **Tools > Explorer Tools > Agent Explorer**.
  - Step 2** Click **Retrieve** and select the agent.
  - Step 3** Click the **Supervisor** tab.
  - Step 4** Check **Supervisor Agent**.
  - Step 5** Maintain supervisor data from **Tools > List Tools > Supervisor List**.
- 

### Select primary supervisor

A team can have one primary supervisor and an unlimited number of secondary supervisors. To review and change the primary supervisor for a team.

#### Procedure

- 
- Step 1** From Configuration Manager, click **Tools > List Tools > Agent Team List**.
  - Step 2** Click **Retrieve** and select the team.
  - Step 3** Select the agent who is the primary supervisor from the **Primary Supervisor** dropdown.
-





## CHAPTER 9

# Average Speed of Answer

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This chapter provides information about the Average Speed of Answer (ASA).

ASA, also called average answer wait time, is the average of the sum of the time that all incoming tasks to the service waited before being answered. This includes delay time, queue time, and ring time.

ASA starts when the call enters the queue and is set at these levels:

- Agent
- Skill Group
- Call Type
- Service
- Precision Queue

At the agent and skill group levels, the ASA metric is useful for monitoring agent and skill group performance.

At the Call Type and Service levels, the ASA metric provides insight into how callers experience the system and how quickly calls are being answered.

**For Agents:** The agent's average speed of answer in HH:MM:SS (hours, minutes, seconds) calculated by dividing the total time that callers spent in queue and while the call was ringing at the agent's desktop before the task is answered by the number of calls that the agent answered.

**For Skill Groups:** The skill groups's average speed of answer in HH:MM:SS (hour, minutes, seconds) calculated from the time spent by callers when placed in queue and ringing at the agent's desktop before the task is answered divided by the number of tasks answered.

**For Call Types:** The average answer wait time from when first queue to skill group or longest available agent (LAA) select node was executed for this call to when this call was answered. This is an important measure of service quality because the time can vary, even over the course of one day, due to call volumes and staff levels.

**For Routes:** The average answer wait time, for all tasks offered to the route during the interval waited before being answered.

### For Services:

(Hist) The average answer wait time for all tasks offered to the route during the interval waited before being answered.

(RT) The average speed of answer for all tasks associated with the service during the last five minutes waited before being answered.

**For Precision Queues:** The Precision Queue's average speed of answer in HH:MM:SS (hour, minutes, seconds) calculated from the time spent by callers when placed in queue and ringing at the agent's desktop before the task is answered divided by the number of tasks answered.

- [How ASA is calculated, page 76](#)
- [ASA for agent and skill group, page 77](#)
- [ASA for call type and service, page 78](#)

## How ASA is calculated

Calculations for ASA differ based on the type of system associated with the reporting object.

**Table 20: Calculating ASA**

Table.Field	Calculation
Skill_Group_Interval	$\text{Skill\_Group\_Interval.AnswerWaitTime} / \text{Skill\_Group\_Interval.CallsAnswered}$
CallType_Interval	$\text{Call\_Type\_Interval.AnswerWaitTime} / \text{Call\_Type\_Interval.CallsHandled}$
Call_Type_Skill_Group_Interval	$\text{Call\_Type\_Skill\_Group\_Interval.AnswerWaitTime} / \text{Call\_Type\_Skill\_Group\_Interval.CallsAnswered}$
Route_Real_Time. AvgSpeedAnswerTo5	N/A
Route_Half_Hour	$\text{Route\_Half\_Hour.AnswerWait TimeToHalf} / \text{Route\_Half\_Hour.CallsAnswered ToHalf}$
Service_Real_Time Service_Real_Time. AvgSpeedToAnswerTo5	$\text{Service\_Real\_Time.AnswerWaitTimeTo5} / \text{Service\_Real\_Time.CallsAnsweredTo5}$
Service_Interval. AnswerWaitTime Service_Interval. AvgSpeedToAnswer	N/A
Precision_Queue_Interval	$\text{Skill\_Group.AnswerWaitTime} / \text{Skill\_Group\_Interval.CallsAnswered}$



**Note**

Calculations ASA differ based on the type of system associated with the reporting object (Unified CC or Unified ICM). The following table shows the calculations. X means the value is included in the calculation.

**Table 21: Calculations for ASA**

	Call_Type _Skill_Group	Call_Type _Interval	Skill_Group _Interval (Unified ICM)	Skill_Group (Unified CC)	Service_Interval (Unified ICM)	Service_Interval (Unified CC)
Delay Time/ Switch Time				Contains Network Delay	X	Contains Network Delay
Local Queue Time	X	X	X	Not Avail	X	Not Avail
Network Queue Time	SG Time	X	X	SG Time		X
Ring Time	X	X	X	X	X	X
Network Delay Time	X	X	X			

## ASA for agent and skill group

**Agent.** The ASA is calculated for the agent at the PG level.

The internal queuing time is sent to the PG by Unified CCE when an agent becomes available for the call. The PG adds up the internal queue time, ring time, and network time and adds that into AnswerWaitTime in the agent skill group table. AnswerWaitTime is then divided by the CallsAnswered for the agent.

**skill group.** The ASA is calculated for the skill group at the PG level.

For Unified CCE Enterprise Queuing, the time spent in the enterprise queue is not used in the calculation of AnswerWaitTime. The calculation includes the ACD queue time only.

For ACD queuing, the queue time is reported by the PG based on events received from the ACD.

Consider this example:

- A call is queued at skill group X.
- At Time T, the call is then queued at skill group Y at time T+30 seconds.
- An additional 10 seconds transpire before the call is answered by an agent at skill group Y.

In this case, the internal queuing time will be 40 seconds. This is the total length that the call has been queued even though it was only queued at skill group Y for 10 seconds.

The agent's PG adds the internal queue time, ring time, and network time to create the total AnswerWaitTime for the call and adds it to AnswerWaitTime in the skill group table. AnswerWaitTime is then divided by CallsAnswered within the skill group table to arrive at the ASA for the skill group.

**Precision Queue.** The ASA is calculated for the Precision Queue by summing Skill Groups across PGs which are associated with the Precision Queue.

## Reports that show ASA for agents

These are some reports that show ASA statistics for Agents and Skill Groups:

- Unified IC Peripheral Skill Group Real Time All Fields
- Unified IC Peripheral Skill Group Historical All Fields

### Related Topics

[Unified ICM/CC Report Templates](#)

## ASA for call type and service

The Call Type ASA is calculated as AnswerWaitTime divided by CallsAnswered.

Call Type ASA is applicable only when calls are translation routed and includes time spent in the Enterprise Queue as well as time spent in the ACD queue.

ASA for the Service is computed based on the AnswerWaitTime as reported from the peripheral. This value includes the time spent on the ACD after the call was offered up until the time the call was answered. If an Enterprise Queue is used, ASA reported for the service does not include time spent in the Enterprise Queue.

## Reports that show ASA for call type and service

The following report contains ASA statistics:

- Unified IC Call Type Historical All Fields

### Related Topics

[Unified ICM/CC Report Templates](#)





## CHAPTER 10

# Redirection on No Answer

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This chapter provides information about Redirection on No Answer (RONA).

You can use two methods to manage calls that are delivered to agents who do not answer calls. Both methods can report on the number of times an agent does not answer a call. These methods are called Redirection on No Answer (RONA) and Requery. The RONA feature ensures that if an agent does not answer a call within a configurable amount of time, the call is assigned to a different skill group or agent. The original agent is made Not Ready with a reason code of 32767 so that additional calls are not routed to that agent.

For agent reporting, you can see how many calls experienced RONA through the Redirect No Answer report field in agent and skill group reports. A high number of RONA calls for an agent might indicate that the agent is not responding quickly enough to incoming calls. If multiple agents have a high number of reroute on RONA, it might indicate that the Ring No Answer time is too low.

For Call Type reporting, the *Calls RONA* database field is updated for the call type when a call redirects on no answer. In Call Type reports, these calls are grouped into the “Other” category.

- [Best practices for RONA, page 79](#)
- [RONA for IPCC System PG, page 80](#)
- [RONA metric reports, page 80](#)
- [RONA configuration, page 80](#)

## Best practices for RONA

Follow these guidelines to obtain accurate and useful data from Redirection on No Answer situations:

- Within the routing script, plan to enable the Target Requery option in the routing script. Target Requery is available from the Queue, Queue to Agent, Label, Select, and RouteSelect nodes.
- Decide and configure how long a call is to ring before being redirected to a new agent or skill group.  
When deciding this, consider how RONA calls are to affect the Service Level. If you want RONA calls to adversely affect the Service Level, the amount of time the call is allowed to ring before being redirected must be above the Service Level threshold time.
- Decide and configure the number to dial to redirect calls that are not answered by agents within the ring no answer time. You configure the ring no answer dialed number in the Agent Desk Settings tool in Configuration Manager.

- Plan to create a separate call type for RONA situations and to associate this call type with the ring no answer dialed number.

Using a separate call type enables you to redirect calls that are not answered to a script that queues the calls at a higher priority. It also enables you to report on activity for the RONA call type. Viewing data for this call type helps you gain insight into the number of calls that redirect on no answer and to see how the calls are finally handled.

- Plan to create a separate script that is associated with the RONA call type.

In the Redirection on No Answer Script, queue the calls at a higher priority. The call variables set in the first script are carried over into the second script and you can use these variables if you choose.

Change the call type in the script after the requery and create a path for calls that are required within the script.

## RONA for IPCC System PG

Redirection on No Answer calls update Peripheral tables (Peripheral\_Real\_Time and Peripheral\_Interval) differently in Unified CCE environments than in Unified CCE deployments with IPCC System PG.

Consider this example:

An incoming ACD call is sent to an agent, but the agent does not answer it. The RONA call redirects to an IVR (queued to a skill group), and is answered later by another agent.

In a Unified CCE deployment that does not use the IPCC System PG (with or without Unified CVP support), the CallsOffered fields (CallsOffered and CallsOfferedToday in Peripheral\_Interval and Peripheral\_Real\_Time) are updated three times:

- When the call first arrives, the Peripheral CallsOffered metrics for the CallManager peripheral are incremented.
- When the call is sent to the IVR, the metrics for the IVR peripheral are incremented.

In Unified CCE with the IPCC System PG deployments, this metric is updated only when the call first arrives.

This feature is implemented differently depending on whether you install Unified IP-IVR or Unified CVP as the VRU for your system.

## RONA metric reports

For Unified ICM, Redirection on No Answer metrics are reported directly from the ACD.

### Related Topics

[Unified ICM/CC Report Templates](#)

## RONA configuration

For Unified ICM, RONA is configured on the ACD and is not supported for the ARS PG.

For Unified CCE, RONA is configured on the Agent Desk Settings List.

## RONA call configuration with IP IVR

If you are installing Unified IP-IVR as the VRU, the Redirection on No Answer time and dialed number settings are configured in Agent Desk Settings List in Configuration Manager.

**Figure 15: RONA Setting in Configuration Manager**

The screenshot shows a configuration window titled 'Attributes'. It contains four settings:

- Name:** BXB\_01 (with a required field asterisk)
- Ring no answer time:** 10 seconds (range 1 - 120)
- Ring no answer dialed number:** SCHOLZ02.111 (with a dropdown arrow)
- Logout non-activity time:** 500 seconds (range 10 - 7200)

## RONA call configuration with Unified CVP

If you are implementing Redirection on No Answer and have deployed Unified CVP as the VRU, the Redirection on No Answer feature is configured in Agent Desk Settings in Configuration Manager and in Unified CVP.

- Configure Agent Desk Settings Ring no answer time in Configuration Manager. This time determines when the agent is made Not Ready so that additional calls are not assigned to the agent.
- Configure the Unified CVP Ring No Answer timeout in the Unified CVP Voice Browser Administration application. This timeout will be used to requery the call if the call is not answered.

Configure Unified CVP Ring NoAnswer timeout to be approximately 2 seconds more (longer) than the Ring no answer time configured in Agent Desk Settings.

The Unified CVP Ring No Answer timeout should also be less than 30 seconds because the Central Controller waits up to 30 seconds for a response to arrive from Unified CVP. If the response is not received within 30 seconds, the call fails.





## CHAPTER 11

# Call types and services

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This chapter provides information about call types and services.

- [Call type and service type reports, page 83](#)
- [Call types, page 84](#)
- [Call Type reporting, page 87](#)
- [Call type configuration, page 92](#)
- [Services, page 92](#)
- [Service and Service Member configuration, page 94](#)

## Call type and service type reports

Key statistics provided by service and call type reports include:

- Average Speed of Answer (ASA)
- Number of calls received, handled, and abandoned
- How long callers waited in queue
- Number of calls queued for an available agent
- Whether Service Level objectives are being met
- Whether the caller had to be transferred
- Number of callers who heard a busy signal
- Number of calls who encountered an error

Although skill group and agent reports provide many of these same metrics—such as ASA, Avg. Handle Time, abandons, redirects, and calls handled—the call type and service reports show these metrics in a format that gives a more complete picture of the customer experience and helps you review statistics organized by application.

## Call types

A call type is a category of incoming call. Based on the call type, the CallRouter selects the routing script that ultimately sends the call to an appropriate agent. Each call type has a schedule that determines which routing script or scripts are active for that call type at any time.

Call types are also the highest level reporting entity and are peripheral-independent.

There are two classes of call types: voice (phone calls) and non-voice (for example, email and text chat).

- Voice call types are categorized initially by the dialed number (DN) and, optionally, by the caller-entered digits (CED) and the calling line ID (CLID).
- Non-voice call types are categorized initially by the Script Type Selector and, optionally, Application String 1 and Application String 2.

Creating call types that correlate to the type of service the caller wants and changing call types during the script result in reporting statistics that reflect the customer's experience.



### Note

Configuring a separate call type for each type of call treatment that you offer can eliminate the need for most custom reporting.



### Note

- Call types cannot span ACDs and PGs. This means that if your system uses both Unified ICM/CC components and legacy ACDs, you must create separate call types for the ACDs and the Unified ICM/CC components.
- The software allows routing that can offer calls simultaneously to multiple skill groups. The `Call_Type_Skill_Group_Interval` table records details for call types associated with specific skill groups. Reports generated from this table show how scripts routed the calls, as well as the calls associated with a skill group that encountered errors, that abandoned, that were redirected on no answer, and so forth.

## Best practices for call types

Consider the call types you need to create to meet your reporting needs and configure a separate call type for each type of call treatment that you want to offer.

Based on the deployment model, scripting, queuing, and on whether or not calls are translation-routed, you can define call types to:

- Provide enterprise-wide routing statistics for the call center, such as the number of calls to be routed to different peripherals or the number of calls that encounter routing errors.
- Group calls to report on certain types of activity that occur within the contact center. For example, you might create separate call types for calls that redirect on no answer or calls that are transferred to another agent.
- Report on statistics for a self-service VRU application.

**Do you want to configure a separate call type associated with call transfers and conferences?**

Doing so enables you to direct the transfer to a different routing script.

**Do you plan to report on individual transactions within Network VRU Self-Service or Information Gathering applications?**

If so, you might configure a separate call type for each transaction.

**Do you want to separate Information Gathering VRU metrics from queue metrics?**

If so, you might configure a separate call type for queuing.

**Do you plan to use Outbound Option?**

If so, create a separate call type for Outbound Option calls. Outbound Option uses a routing script in addition to a physical call to reserve agents. The call type real-time and half-hour reports contain data that pertains only to reservation calls and do not include reporting information for any outbound calls.

**Do you want to configure a separate call type associated with RONA situations?**

This enables you to direct calls that Ring No Answer to a routing script designed for this situation and to report on this Redirection on No Answer call type to see how calls that redirect on no answer are eventually handled.

You can also handle this situation with requery. For more information, see [RONA call configuration with Unified CVP](#), on page 81.

**Do you want to configure a separate call type associated with the Supervisor and Emergency Assist script for each agent team?**

This enables you to direct the assistance request to the Supervisor and Emergency Assist routing script which can assign the request to the primary or secondary supervisor for that agent's team. You can use Call Type reports to view data for supervisor assistance calls.

**Do you want to determine the Service Level for call types?**

Service Level indicates how well you are meeting your goal for answering calls.

You can configure the Service Level setting individually for each call type or set a global Service Level for all call types.

**Do you want to configure abandoned short calls to filter out calls that abandon very quickly?**

If you want to use abandoned short calls, configure the call type Abandon Wait Time in Configuration Manager. Calls that abandon within the Abandon Wait Time are reported as short calls.

If you do not want to use abandoned short calls, leave the Abandon Wait Time field blank.

**Do you want to define “bucket intervals” for reporting on answered and abandoned calls for the call type (Unified CC)?**

These “bucket intervals” appear in call type reports that display the number of calls answered and abandoned for each interval and are useful for monitoring when calls are abandoning or being answered.

**Related Topics**

[Bucket intervals](#), on page 97

[Outbound Option](#), on page 119

[RONA configuration](#), on page 80

[Service levels](#), on page 101

[Short calls](#), on page 113

[Supervisor Assist and Emergency Assist reporting \(Unified CC\)](#), on page 71

[Transfers and conferencing, on page 123](#)

## Changing call types

Call type can be changed throughout the life of a call to direct the call to a new routing script or to gather report metrics for different legs or transactions.

Reasons for changing the call type within a routing script include the following:

- In a self-service network VRU application script, you might change the call type at specific points in the script to indicate that a transaction has been completed.

For example, if the customer is calling a bank and successfully checks an account balance using a Self-Service script, you might want to change the call type to indicate that the account balance transaction has completed and a new transaction has begun. In this case, you would create a call type for each transaction on which you want to report.

- You might change the call type when a call enters a queue at the end of an Information Gathering VRU application in order to separate Information Gathering and queuing metrics. In this case, you would create call types associated with the Information Gathering applications and call types associated with queuing.

The service level threshold timer at the call type starts as soon as the call enters the call type that has a service level defined. When the service level timer expires, the service level is applied to the current call type associated with the call.

If a call type is changed using the Requalify or Call Type nodes, then the service threshold timer is reset.

Service levels are defined only for call types associated with scripts that use the Queue To and LAA Select nodes.



### Note

If you use Unified CVP, the call type changes depending on the following factors:

- When you use a single CVP, the TCD record for each leg of the call is associated with the last call type.
- When you use multiple CVPs and VRUs, the controlling VRU (for example, CVP1) receives the updated call type in the last connect message. The call type of CVP2 is the same as the call type associated when the agent had received the call.
- When you use the Capture (CAP) micro-application, different TCD rows with multiple call types are populated.
- When a call is abandoned in a queue, the call type is not changed.

## Enterprise routing and enterprise reporting for calls (Unified ICM)

When Unified ICM receives a route request for a call, it first determines the call type, finds the script currently scheduled for that call type, and routes the call to the desired destination (for example, to a service, skill group, agent, or announcement).

The call type can be changed throughout the life of a call to direct the call to a new routing script and to gather report metrics for different legs or transactions.



For legacy ACDs where Unified ICM software is used for Enterprise Routing, consider the following to ensure that your reports contain correct and relevant metrics:

- Ensure all calls are routed by Unified ICM software.
- Deploy a Service Control VRU to provide treatment and to queue calls in the enterprise while waiting for an available agent in a skill group. Queue calls to skill groups in Unified ICM (Enterprise Queuing) for all call centers. Avoid using ACD queues (site queues).
- Use Translation Routes for routing calls to the legacy ACD. Always use translation routing when routing calls between ACDs.
- Once the call is routed and is terminated on the legacy ACD, have no treatment at the ACD.
- Avoid having agents transfer calls directly to other agent stations or agent IDs. Instead, use post routing capabilities to provide treatment and queuing for transferred calls.
- Avoid handling RONA situations on the ACD, where possible. Instead, use post-routing capabilities to have the RONA calls routed by Unified ICM.

### Related Topics

[Changing call types, on page 86](#)

[Translation routes, on page 132](#)

## Call Type reporting

The use of Call Type reports is based on the business need for your enterprise and is determined by how you plan to use the functionality provided by Unified CCE software.

Call Type reporting provides full customer experience in Unified CC, similar to Service reporting in Unified CCE.

Call Type reports can be used for the following purposes:

- Calls answered by agents
- Calls abandoned at the VRU
- Calls that abandon while en-route to an agent or while being offered to an agent's phone
- Short calls
- Calls that are given the busy, ring, default-routed or network-routed treatment
- Calls that go to another call type within a routing script using the Call Type or Requalify node
- Calls that abandon en-route to the VRU
- Calls that have a bad label
- Calls that re-route on no answer from the agent's phone
- Calls that terminate the script using the Label node to a non-monitored device, such as voice mail
- Cradle-to-grave reporting for call-handling statistics when calls are translation routed
- Reporting on calls grouped for the purposes of global call treatment
- Reporting on Enterprise Queuing statistics

- Providing enterprise-wide routing statistics for your call center, such as the number of calls routed to different peripherals and the number of calls that encountered routing errors
- Reporting on statistics for a self-service VRU , if a Network VRU is deployed
- Reporting on certain activities such as calls that are transferred, provided Call Types are configured for those activities

## Call Type reporting and Outbound Option campaigns

The call type is an Unified CC concept that maps a route point dialed number to a routing script. It is also a very useful reporting object for the enterprise to describe all calls that traversed a specific routing script. The call type mostly applies to inbound traffic in the call center because the Dialer does not use the routing script when placing outbound calls. However, Outbound Option does use routing scripts to reserve agents and to transfer calls to the IVR, so that it can provide some insight into how calls are being routed.

Since Outbound Option uses a routing script along with a physical call to reserve agents, the Call Type real-time and half-hour reports contain data for Outbound Option reservation calls. It is important to note that this call type data pertains only to reservation calls and does not include reporting information for any outbound calls. To eliminate any confusion regarding Call Type reporting, create a separate call type for Outbound Option routing scripts.

### Related Topics

[Outbound Option, on page 119](#)

## Call Type reporting in parent/child deployment

Call Type reports on the Unified ICME parent help to determine the following:

- Number of calls received by the call type to be routed to different peripherals (example: multiple Unified CCE children, or different ACDs)
- Number of calls routed to different peripherals (example: multiple children, or different ACDs)
- Number of calls that encountered routing errors

However, there are a limited number of scenarios where Call Type reports might be used to measure customer experience at the parent:

- If you are using translation routing at the parent, then certain Call Type reports might be useful in measuring customer experience associated with those translation routed calls.
- If you are using a network VRU at the parent for network queuing or network prompting, then the Call Type reports are useful to provide information on the calls handled by the VRU applications and also provide the queuing statistics. In a Contact Center Gateway deployment, if you are queuing the calls at the network, then use Call Type reports on the parent to report on the queuing statistics. The number of calls queued and the network queue time is not available at the child.

### Related Topics

[Network queuing and reporting, on page 191](#)

## How Calls Offered is calculated for call type

The completed state for CallsOffered at the Call Type is calculated using these fields from the Call\_Type\_Interval table:

- CallsHandled
- ErrorCount
- ICRDefaultRouted
- NetworkDefaultRouted
- ReturnBusy
- ReturnRing
- NetworkAnnouncement
- OverflowOut
- IncompleteCalls
- ShortCalls
- CallsRoutedNonAgent
- CallsRONA
- ReturnRelease
- AgentErrorCount
- TotalCallsAband

## How call errors affect call type reporting

The way call errors increment the database depends on the following conditions:

- Calls that abandon en-route to the VRU/CCE/IPCC scripts are calls that abandon in the network while they are being sent to the VRU. An example of this is if a call abandons while it is being sent to the VRU from a CTI Route point in Communications Manager. These calls increment the ErrorCount column in the Call\_Type tables.

If the caller abandons within the Abandon Wait Time set for the call type, calls that abandon en-route to the VRU might be counted as short calls, instead of as errors. See the next section for more information on abandoned short calls

If an on-premise VRU is used, then the probability of calls abandoning en-route to the VRU is very low.

- Calls that abandon en-route to agents are calls that encounter an error when the call is at the agent desktop. This call is counted as part of the AgentErrorCount in the Call\_Type tables.

The Calls Error field in call type reports is a calculated field that combines both error columns. For example, the Calls Error field in the Call Type Historical All Fields report is derived from `Call_Type_Interval.IncompleteCalls + Call_Type_Interval.AgentErrorCount`.

## How calls with a bad label affect call type reporting

A bad label refers to an incorrectly configured label or missing label. It is always good practice to define a default label, so that calls that do encounter an incorrectly configured label can at least go to the default label and get handled as well as get accounted for in the call type report.

Labels might be configured incorrectly in the following ways:

- The label specified in the script node might not exist on the routing client: In this case, label specified in the script node might not exist on the routing client.
- The label points to the wrong agent: In this case, the pre-call message is sent to one agent, but the actual call is sent to a different agent. This call is reported as an incomplete call.

If the node does not define a label, the call encounters error conditions and is reported as an error.

## How calls that experience Redirection on No Answer with IP IVR affect call type reporting

Redirection on No Answer calls are calls that redirect off the agent's phone because the ring time exceeds the Ring No Answer timer defined in the agent desktop settings. For Redirection on No Answer situations, you configure a separate call type and routing script to be used if agents do not answer ringing calls within the ring no answer time. In the Redirection on No Answer script, you queue the call at a higher priority so that the call does not fall to the bottom of the queue.

In a Unified CC, environment, Redirection on No Answer situations increment call type statistics as follows:

- For the initial call type, CallsOffered is incremented. When the call redirects, the CallsRONA field is incremented.
- For the Redirection on No Answer call type, CallsOffered is incremented as well as fields related to the completion of the call. For example, if the call is handled then the CallsHandled field is incremented.

Because CallsOffered is incremented twice for the call, use a different call type for Redirection on No Answer calls to ensure that the call does not peg the same call type twice.

In call type reports, these calls are grouped into the “Other” column. You can also view a count of Redirection on No Answer calls in agent and skill group reports.

## How calls that experience Redirection on No Answer with CVP affect call type reporting

The Redirection on No Answer feature, configured in Agent Desk Settings in the Configuration tool and in CVP, ensures that when an agent does not answer a call, the call is taken away from the agent after a specified number of seconds and re-assigned to another agent or queued. Redirection on No Answer is also used to change the agent state to Not Ready when a call is rerouted from the agent's phone. When the Ring No Answer time in the Agent Desk Settings expires, Unified CCE/CC software makes the agent unavailable for routing requests. When the Unified CVP Ring No Answer timeout expires, the call is re-queried for routing to a different skill group or agent. You configure the Unified CVP Ring No Answer timer to be approximately 2 seconds longer than the Agent Desk Settings Ring no answer time so that the agent is made Not Ready before the call is re-queried. If the agent is not made unavailable first, the script might reassign the call to the same agent.

**Note**

The Unified CVP Ring No Answer timeout must be less than 30 seconds because the Central Controller waits up to 30 seconds for a response from the Unified CVP. If the response is not received within 30 seconds, the call fails.

Because the Ring No Answer time and Unified CVP Ring No Answer timeout are several seconds apart, it is possible that the call will continue to ring on the agent's phone after the agent is made Not Ready. If the agent answers the phone in this brief interval, the context of the call will not be reported and reports will show that the agent went directly into Active state from Not Ready state.

You can configure the routing script to handle Redirection on No Answer situations in two ways: the script can change the call type when the calls is requeried, or the script can continue to use the same call type.

The manner in which you script for Redirection on No Answer affects the report data that you see, as follows:

- If you change the call type, CallsOffered, CallsRequeried, and OverflowOut is updated for the initial call type. CallsOffered and fields related to the completion of the call, such as CallsHandled, are incremented for the second call type.

Using two call types enables you to identify Redirection onNo Answer occurrences in call type reports. For example, if you create a specific call type for use in Redirection onNo Answer situations, then you can see whether calls are redirecting by monitoring the calls offered to that call type. You can also see whether the Flow Out field is incremented for other call types.

- If you do not change the call type, CallsOffered and fields related to the completion of the call, such as CallsHandled, are incremented. FlowOut is not incremented. You will not be able to tell without looking at agent or skill group reports whether calls are redirecting on no answer. (You could write a custom report to see values for CallsRequeried.)

**Note**

Because the Unified CVP application performs a requery to redirect the call to a different agent or skill group instead of branching to another script, the CallsRONA field is not incremented for the call type.

## How calls that terminate Label node and route to non-monitored devices affect reporting

The Label node is used to divert a call to voice mail or web attendant or some other device that is not monitored by Unified ICM/CC because of digits collected by the caller during a voice menu or due to some other conditions. These calls are counted as RoutedNonAgent and appear in the “Other” column of call type reports.

**Note**

Use a Unified ICM/CC routing scripting script, not a VRU script, to route calls to non-monitored devices. If you use the VRU script, calls are reported as abandoned at the call type.

## Call type reports

The following reports display call type data:

- Unified IC Call Type Abandon/Answer Distribution Historical
- Unified IC Call Type Historical All Fields

- Unified IC Call Type Real Time All Fields

### Related Topics

[Unified ICM/CC Report Templates](#)

## Call type configuration

### Configure a call type

#### Procedure

- Step 1** From the Configuration Manager, select **Tools > List Tools > Call Type List**.
- Step 2** Click **Retrieve**. Then select an existing call type, or click **Add** to define a new one.
- Step 3** Complete fields in the Attribute field as follows:

Option	Description
Name:	Enter a unique enterprise name for the call type.
Customer:	Select the Instance from the dropdown list.
Service Level Threshold:	To override the system-level threshold, check the Override box; then enter the number of seconds for the Service Level threshold for this call type.
Service Level Type:	Check the Override box. Then choose from the dropdown to specify how abandoned calls are to be handled in the service-level calculation.
Bucket Intervals:	Check the Override box. Then choose the Bucket Interval.
Description:	Enter a description for the call type.

Use a Unified ICM/CC routing script, not a VRU script, to route calls to non-monitored devices. If you use the VRU script, calls are reported as abandoned at the call type.

### Related Topics

[Configure short calls for call types, on page 115](#)

## Services

**For Unified ICM deployments**, a service refers to a particular type of processing required by the caller. Services are configured to map to an application on the peripheral that provides the service. For example, a Service on Unified ICM might map to an Application on Aspect or to a VDN on Avaya.

Every call routed to a peripheral must have an associated peripheral Service. The application on the peripheral provides the call treatment, and Service reports are used to measure the customer experience across peripheral services.

A single peripheral might have several services defined such as Sales, Technical Support, and Customer Accounts.

You can determine the service level for a service as well as how abandoned calls impact the service level.

**In an Unified CCE environment**, calls are routed through IVRs rather than services. Therefore most service reports are not applicable in an Unified CCE environment. However, for both a Unified ICM environment and a Unified CCE environment, use the historical IVR peripheral service reports and the historical IVR trunk group reports for measuring the performance of your IVRs.

## Service members

For Unified ICM, each Service has one or more skill groups whose members can provide the service. These skill groups are called service members. A skill group can be associated with (that is, can be a member of) more than one service.

Service and service members assist in tracking how scripts on an ACD are routing calls.

It is important to configure service members in Configuration Manager to accurately reflect their scripting in the ACD.

The system records calls that were offered to a service member, abandoned by that skill group, and reported against another skill group. (Call\_Type\_Skill\_Group.CallsReportedAgainstAnother).

## Enterprise Services (Unified ICM)

An Enterprise Service is a collection of services on different peripherals.

While an individual service is associated with a specific peripheral, an Enterprise Service can span several services from different peripherals in the contact center.

Creating and reporting on Enterprise Services gives contact center managers a consolidated measure of customer experience across similar services configured in different ACD peripherals distributed throughout the contact center.



### Note

Avoid queuing to multiple services on the same or on several peripherals. Instead, configure and queue to Enterprise Services.

### Related Topics

[Configure an Enterprise Service, on page 95](#)

## Service reports

**In Unified ICM**, a service is an ACD concept that identifies a particular type of processing that the caller requires and defines the call treatment. For example, in the contact center for a software company, callers having questions about installing software would be directed to the Technical Support service.

In a Unified ICM environment, calls are routed to services or skill groups at the ACD. All skill groups belong to specific services and, therefore, skill group data rolls up to the service.

Reports for services provide call treatment information for all of the skill groups assigned to those services, and service reports are useful to measure customer experience data for which call treatment is done on the ACD.

**In a Unified CC environment**, calls are routed through IVRs. Most Unified ICM service reports are therefore not applicable in a Unified CC environment.

The service reports that are relevant for both Unified ICM and for Unified CC are the Peripheral Service reports that display data pertaining to IVR services.

For Unified CC, use Service reports only to report on IVR status and activity. Use Call Type reports for the most complete view of the customer's experience and to ensure that your system is performing optimally.

## Service data reports

The following reports display service data.

**For Unified ICM environments**, there are two categories of service reports:

- Peripheral Services (Services)

This is a service that is tied to a specific peripheral (ACD). A single peripheral might have several services defined, such as Sales, Technical Support, and Customer Accounts.

- Enterprise Services

This is a collection of services from several peripherals across an enterprise.

Reports include:

- Unified Intelligence Center Enterprise Service Historical All Fields

**For Unified CC environments**, service reports include:

- Unified Intelligence Center Peripheral Service Real Time
- Unified Intelligence Center Peripheral Service Historical All Fields

# Service and Service Member configuration

## Configure Service and Service Member

To configure a Service and its associated routes, peripheral targets, and labels:

### Procedure

- 
- Step 1** From the Configuration Manager, select **Tools > Explorer Tools > Service Explorer**.
  - Step 2** Click **Retrieve**. Then select an existing Service, or click **Add** to define a new one.
  - Step 3** Complete the **Service** and **Advanced** tabs to define the properties of the selected service.
  - Step 4** Complete the **Service Member** tab to add and delete the Skill Groups as service members.



**Note** It is important to configure Service Members in Configuration Manager to accurately reflect their scripting in the ACD. If the configuration is not correct, certain service statistics will not be reflected correctly.

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## Configure an Enterprise Service

### Procedure

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- Step 1** From the Configuration Manager, select **Tools > List Tools > Enterprise Service List**.
  - Step 2** When the Enterprise Service List window appears, in the Select filter data box, select the filters you want and click **Retrieve**.  
This enables the **Add** button.
  - Step 3** Complete the **Attributes** tab.
-





# CHAPTER 12

## Bucket Intervals (Unified Intelligence Center)

This chapter provides information about Bucket Intervals.

- [Bucket intervals, page 97](#)

### Bucket intervals

Bucket Intervals allow you to track data for calls abandoned or answered within specific time increments (for example, between 0 and 8 seconds, or under 60 seconds).

Bucket Intervals are associated with the following:

- Call Types
- Skill Groups
- Precision Queues

They can be set for the system as a whole and for individual call types. Local settings override those set at the system level.



#### Note

Currently the global setting is available only for Call Types.

Service Level tells you what percentage of calls are being answered within a certain time, but does not tell you how closely to the Service Level calls are being answered or abandoned. Call type intervals provide additional insight into how long callers are waiting before their calls are answered or before they abandon.

For example, if your Service Level is two minutes, you might want to set up intervals for 30 seconds, one minute, 90 seconds, 120 seconds, 180 seconds, 210 seconds, and 240 seconds. Using these intervals, you can see whether calls are being answered in the thirty seconds after the Service Level Threshold of 180 seconds or if most are waiting a full minute longer to be answered.

The intervals also give you insight into how long callers are willing to wait before abandoning. Perhaps many callers do not abandon until two minutes past the Service Level. This might indicate that your Service Level goal can be modified.

To avoid reporting inconsistencies, modify Bucket Interval settings only at specific time boundaries (that is, end of day, week, or month). Ensure that no one is running reports for the intervals that you are changing when you modify the boundaries.

Unified CCE ships with a single System default Bucket Interval whose boundaries (increments) are: 8, 30, 60, 90, 120, 180, 300, 600, and 1200 (in seconds).

## Bucket Interval reports

The following reports display Bucket Interval data:

- Unified Intelligence Center: Call Type Abandon/Answer Distribution Historical
- Unified Intelligence Center: Call Type Historical All Fields Report
- Skill Group Abandon/Answer Distribution
- Precision Queue Abandon/Answer Distribution

### Related Topics

[Unified ICM/CC Report Templates](#)

## Define Bucket Intervals

Before you can assign a Bucket Interval (either as the new global default or to a particular Call Type) you must create its definition. To define a Bucket Interval:

### Procedure

- 
- Step 1** In the Configuration Manager, select **Tools > List Tools > Bucket Intervals List**.
  - Step 2** Click **Retrieve** and then click **Add**.
  - Step 3** In the **Add Name** field, enter a name for the interval.
  - Step 4** In the **Upper Bounds** fields, add up to nine successive increments to measure, in seconds.
  - Step 5** Click **Save**.
- 

## Set system Bucket Interval

To reset the default system-level Bucket Interval for your Unified CCE system:

### Procedure

- 
- Step 1** In the Configuration Manager, select **Tools > Miscellaneous Tools > System Information**. From the Bucket Intervals list, choose the interval you want to use.
  - Step 2** Click **Save**.
-

## Set Bucket Intervals for specific call types

To configure Bucket Intervals for specific Call Types, which override the global level setting:

### Procedure

---

- Step 1** In the Configuration Manager, select **Tools > List Tools > Call Type list**.
  - Step 2** Click **Retrieve**.
  - Step 3** Choose the call type whose Bucket Interval you want to set.
  - Step 4** From the Bucket Intervals list, choose the interval you want to use.
  - Step 5** Click **Save**.
- 

## Set Bucket Intervals for specific skill groups

To configure Bucket Intervals for specific skill groups:

### Procedure

---

- Step 1** In the Configuration Manager, select **Tools > Explorer Tools > Skill Group Explorer**.
  - Step 2** Click **Retrieve**.
  - Step 3** Select the skill group whose Bucket Interval you want to set.
  - Step 4** Go to the **Advanced** tab.
  - Step 5** From the Bucket Intervals list, choose the interval you want to use.
  - Step 6** Click **Save**.
- 

## Set Bucket Intervals for specific Precision Queues

To configure Bucket Intervals for specific Precision Queues:

### Procedure

---

- Step 1** Use the Precision Queue gadget to select the Precision Queues whose Bucket Interval you want to set.
  - Step 2** From the Bucket Intervals list, choose the interval you want to use.
  - Step 3** Click **Save**.
-





# CHAPTER 13

## Service levels

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This chapter provides information about service levels.

Service levels help you set and measure goals for answering calls. Service levels are configurable; you can define them in different ways, depending on the kind of information you want them to provide.

You can configure:

- Default system information service level threshold and type settings for all call types.
  - Specific service level threshold and type settings for an individual call type (to independently override the system information level settings for that call type).
  - Service level threshold and type settings for the Media Routing Domain (MRD).
  - Specific service level threshold and type settings for a peripheral that is associated with an MRD.
  - Specific service level threshold and type settings for a skill group that is associated with a peripheral.
  - Service level threshold and type settings for the Peripheral VRU (Aspect ACD only)
- 
- [About service levels, page 101](#)
  - [Service levels configuration, page 107](#)

## About service levels

All calls that have a *service level event* within a specified period are considered to be service level calls offered for that period. This designation differs from a call's offered value, which counts each call at the time it is first offered to the service.



### Note

Service level is not affected for calls that are neither answered nor abandoned within the service level time. For example, calls that encounter an error condition or are sent to non-monitored devices (using the label node) within the service level threshold do not affect the service level.

Two important configuration parameters contribute to the calculation of service level:

- Service level threshold - the number of seconds you set as a goal to treat a call. To calculate the service level for a period of time, Unified CCE software determines the number of calls that have had a service level event within that interval.
- Service level type - the manner in which calls that abandon affect the service level.

### Related Topics

[Service level threshold, on page 102](#)

[Service level type, on page 102](#)

## Service level threshold

The service level threshold is the number of seconds you set as a goal for connecting a call with an agent.

For example, your goal might be to answer 80% of calls within two minutes. In this case, you would set the service level threshold to 120 seconds. Reports show you the percentage of calls that are answered within that time threshold, enabling you to see whether you are meeting your goal.

A service level threshold of 0 seconds means that no service level event will be set for the call; it will not be treated as a service level call.

## Service level type

Service level type determines how calls that abandon before the service level threshold impact the service level calculation.

**Service level type is presented as three options** in the Configuration Manager: positively, negatively, or not at all.

- **Abandoned calls positively impact**

Some contact centers want abandoned calls to positively impact the service level. These contact centers consider a call abandoned within the service level threshold time a treated call. Abandoned calls are considered to positively impact the service level.

- **Abandoned calls negatively impact**

Other contact centers might consider only those calls answered within the service level threshold time as treated calls. For these contact centers, the service level is detrimentally affected by calls that abandon within the service level time. Abandoned calls negatively impact the service level.

- **Ignore abandoned calls**

Others might choose to exclude the abandoned calls from the service level calculation (abandoned calls ignored).

**The calculations for service level** are based on the service level type defined for the service level configuration. They are described in the following table.



**Table 22: Formulas for service level type**

Service level type	Formula used to determine service level
Ignore abandoned calls	For Call Type and service: $\text{ServiceLevelCalls} / (\text{ServiceLevelCallsOffered} - \text{ServiceLevelAband})$
Negative impact of abandoned calls	For Call Type and service: $\text{ServiceLevelCalls} / (\text{ServiceLevelCallsOffered})$
Positive impact of abandoned calls	For Call Type and service: $(\text{ServiceLevelCalls} + \text{ServiceLevelAband}) / (\text{ServiceLevelCallsOffered})$

For an example of how service level type is calculated, consider the following call counts:

- Answered within service level threshold ( $\text{ServiceLevelCalls}$ ) = 70 calls
- Abandoned within service level threshold ( $\text{ServiceLevelAband}$ ) = 10 calls
- Exceeded service level threshold ( $\text{ServiceLevelCallsOffered} - (\text{ServiceLevelCalls} + \text{ServiceLevelAband})$ ) = 20 calls
- Total service level events ( $\text{ServiceLevelCallsOffered}$ ) = 100 calls

For these call counts, the service level is calculated for each type as follows:

**Table 23: Calculations for service level**

For this service level type:	The service level calculation is:
Abandoned calls ignored	$70 / (100 - 10) = 77\%$
Abandoned calls negatively impact	$70 / 100 = 70\%$
Abandoned calls positively impact	$(70 + 10) / 100 = 80\%$

Leave the Abandon Wait Time field blank if you prefer to *not* track abandoned calls.

## Service level at call type

For measuring overall customer experience, the call type provides the most insight into overall call treatment and how callers are experiencing the system.

The service level threshold timer at the call type starts as soon as the call enters the call type that has a service level defined. When the service level timer expires, the service level is applied to the current call type associated with the call.

Only call types that are associated with scripts that use the Queue To and LAA Select nodes define service levels. If a call type is changed using the Requalify or Call Type nodes, then the service threshold timer is reset.

There are four *service level events* that can occur for the call type:

- The call is answered by an agent before the service level threshold expires. In this case, the ServiceLevelCallsOffered and ServiceLevelCalls database fields are incremented.
- The call abandons while in the VRU (prompt or queue) or at the agent's phone before the service level threshold expires. In this case, the ServiceLevelCallsOffered and ServiceLevelAband database fields are incremented.
- The call redirects on no answer before the service level threshold expires. In this case, the ServiceLevelCallsOffered and ServiceLevelRONA database field is incremented.
- The service level threshold timer expires. Example: the call reaches the service level threshold without being answered by an agent or abandoned. In this case, the ServiceLevelCallsOffered database field is incremented.

If calls encounter an error before the Service level threshold expires, the ServiceLevelError database field is incremented, but ServiceLevelOffered is not incremented. If the call encounters an error after the service level threshold expires, ServiceLevelOffered is incremented.

Unified CCE/Unified CCH gathers metrics for calls that RONA (if you are using IP IVR as the VRU) and for several types of errors at the call type. You could write a custom report to exclude these from call type service level.

To exclude calls that RONA:

- To exclude only calls that redirect on no answer before the service level threshold expires, adjust the ServiceLevelCallsOffered by excluding the ServiceLevelRONA calls. In this example, abandoned calls have a negative impact.

$$\text{ServiceLevel} = \text{ServiceLevelCalls} / (\text{ServiceLevelCallsoffered} - \text{ServiceLevelRONA})$$

- To exclude all calls that redirect on no answer irrespective of the service level threshold, adjust the ServiceLevelCallsOffered by excluding all RONA calls. In this example, abandoned calls have a negative impact.

$$\text{ServiceLevel} = \text{ServiceLevelCalls} / (\text{ServiceLevelCallsOffered} - \text{CallsRONA})$$

To exclude errors from your service level calculation:

- Adjust the ServiceLevelCallsOffered by excluding error calls.

$$\text{Adjusted SL Offered calls} = \text{SL Offered calls} - (\text{Total Error calls} - \text{ServiceLevelError})$$

In this example, abandoned calls have a negative impact.

$$\text{ServiceLevel} = \text{ServiceLevelCalls} / (\text{ServiceLevelCallsoffered} - (\text{AgentErrorCount} + \text{ErrorCount} - \text{ServiceLevelError}))$$

## Service level at skill group

At the skill group level, the service level metric is useful for monitoring agent and skill group performance. The service level threshold timer at the skill group starts as soon as the call is queued to a skill group.

You can use Precision Queues to enhance or replace skill groups. For more information about Precision Queues, see [Create Precision Queue](#).

**Note**

By default, the service level threshold for a skill group is set to the default value of that skill group's peripheral. You can manually select a skill group in Configuration Manager and change its setting from that of the peripheral to another value.

There are five service level events that can occur for the skill group:

- The call is answered by an agent before the service level threshold expires. In this case, the ServiceLevelsCallsOffered and ServiceLevelCalls database fields are incremented for the skill group that answered the call. If the call is queued to more than one skill group, then the ServiceLevelsCallsOffered and ServiceLevelCallsDequeued database fields are incremented for the other skill groups
- The call is dequeued from a skill group before the service level threshold expires. In this case ServiceLevelsCallsOffered and ServiceLevelCallsDequeued database fields are incremented. Calls may be dequeued using the Cancel Queue node, when they are de-queued from the skill group to be routed to a different skill group.
- The call abandons while in the VRU (queue) or at the agent's phone before the service level threshold expires. In this case, the ServiceLevelCallsOffered and ServiceLevelAband database fields are incremented.
- The call redirects on no answer before the service level threshold expires. In this case, the ServiceLevelCallsOffered database field is incremented.
- The service level threshold timer expires. Example: the call reaches the service level threshold without being answered by an agent or abandoned. In this case, the ServiceLevelCallsOffered database field is incremented.

Calls can queue to more than one skill group depending on your scripting, and service level metrics are updated for each skill group to which a single call queues.

It is important to understand how service levels are impacted in such cases.

- If a call is queued to more than one skill group and then the call is answered before the service level threshold expires, ServiceLevelsCallsOffered and ServiceLevelCalls database fields are incremented for the skill group that answered the call. For the other skill groups, ServiceLevelsCallsOffered and ServiceLevelCallsDequeued database fields are incremented.
- If a call is queued to more than one skill group and the call abandons in queue before the service level threshold expires, ServiceLevelsCallsOffered and ServiceLevelCallsAband database fields are incremented for *all the skill groups*. This result will have a negative or positive impact on service levels in all the skill groups depending on how you have decided to treat abandoned calls for service level calculations in your configuration for the individual skill groups.
- If a call is queued to more than one skill group and the call abandons in queue *after* the service level threshold expires, ServiceLevelsCallsOffered database field is incremented for *all the skill groups*. This result will adversely affect your service level.
- If a call is queued to more than one skill group and the call abandons after it was routed to a skill group (example: abandon while ringing at the agent) before the Service level threshold expires, ServiceLevelCallsOffered and ServiceLevelCallsAband database fields are incremented for the skill group that had the abandon, while other skill groups have ServiceLevelCallsOffered and ServiceLevelCallsDequeued database fields incremented.

Unified CCE/Unified CCH gathers metrics for calls that RONA (if you are using IP IVR as the VRU) and for several types of errors at the skill group. You could write a custom report to exclude these from skill group service level.

To exclude RONA calls:

- If you would like to exclude only calls that redirect on no answer before the Service level threshold expires, adjust the ServiceLevelCallsOffered by excluding the ServiceLevelRONA calls. In this example, abandoned calls have a negative impact.

$$\text{ServiceLevel} = \text{ServiceLevelCalls} / (\text{ServiceLevelCallsOffered} - \text{RouterCallsDequeued} - \text{ServiceLevelRONA})$$

- If you would like to exclude all calls that redirect on no answer irrespective of the service level threshold, adjust the ServiceLevelCallsOffered by excluding all RONA calls. In this example, abandoned calls have a negative impact.

$$\text{ServiceLevel} = \text{ServiceLevelCalls} / (\text{ServiceLevelCallsOffered} - \text{RouterCallsDequeued} - \text{CallsRONA})$$

If you want to remove errors from ServiceLevelCallsOffered, you can use this formula in a custom report:  $\text{ServiceLevelCallsOffered} - (\text{Errors} - \text{SLErrors})$ .

## Service level at peripheral VRU service (Unified ICM-Aspect only)



### Note

Service Level at the Peripheral VRU is configurable for the Aspect ACD only.

The service level threshold timer at the VRU service starts as soon as the call arrives at the VRU service.

There are three service level events that can occur for the peripheral VRU service:

- Call is routed to an agent before service level timer expires. In this case the ServiceLevelCallsOffered and ServiceLevelCalls database fields are incremented.
- Call abandons while in the VRU before service level timer expires. In this case the ServiceLevelAband and ServiceLevelCallsOffered database fields are incremented.
- Service level threshold timer expires. In this case the ServiceLevelCallsOffered database field is incremented.

The VRU Service does not detect abandons that happen at the peripheral agent service, so these calls will not be part of the service level for the VRU service. The VRU service does not detect when the call is physically answered by the agent; it only knows when the call is *routed* to the agent.

## Best practices for service levels

Consider these guidelines when configuring and scripting service level:

- Service level time begins as soon as the call enters a Call Type. Set up Call Type scripts specifically to collect queue and agent statistics such that service level time begins once a call is queued to a skill group. Define service levels only for Call Types that point to a script that includes a Queue to Skill Group node.
- Set up one Call Type to collect statistics before the queue (that is, the initial Call Type designated for the script via Call Type mapping).

- Set up other Call Types used specifically to collect queue and agent statistics.
- In your routing scripts, include the Requalify or Call Type nodes to submit the call to the Call Type used to collect queuing information.
- Skill group and service level metrics are updated for each skill group to which a single call queues. Service Levels could be adversely affected if calls abandon within or outside the service level threshold in such cases. Consider queuing to a single skill group if you include abandons in your Service Level calculations and do not want abandons to affect Service Levels adversely.

If you follow these guidelines, the first Call Type to which the call was initially mapped will gather statistics before the call is queued to the skill group. The script will then pass the call to the Call Type set up specifically to collect information after the call is queued to the skill group.

## Service level reports

The following reports display abandon statistics for call types and services:

- Unified Intelligence Center: Peripheral Service Historical All Fields Report
- Unified Intelligence Center: Peripheral Service Real Time All Fields Report

## Service levels configuration

Depending on the kind of information you want the service level to provide, set the service level using the corresponding configurable window in the Configuration Manager.

### Related Topics

[About service levels, on page 101](#)

## Configure system information service level for call types

Service levels are set at the System Information level for all call types. To view or change the default system-level settings for all Call Types:

### Procedure

- 
- Step 1** In the Configuration Manager, select **Tools > Miscellaneous Tools > System Information**.
  - Step 2** Specify a value for Service level threshold in seconds.  
The default is *20 seconds*.
  - Step 3** Select the service level type.  
The options are: *Abandoned Calls have Negative Impact*, *Abandoned Calls have Positive Impact*, and *Ignore Abandoned Calls*.  
The default is *Ignore Abandoned Calls*.
  - Step 4** Click **Save**.
-

## Configure service levels for specific call types

To configure service levels for specific Call Types, which override the System Information settings:

### Procedure

- 
- Step 1** In the Configuration Manager, select **Tools > List Tools > Call Type Lists**.
  - Step 2** Click **Retrieve**.
  - Step 3** Select the Call Type whose service level you want to set.
  - Step 4** For Service level threshold, check the box to the right of the field to override the default from the System Information (*20 seconds*).  
Specify a service level threshold value in seconds for this Call Type.
  - Step 5** For service level type, check the box to the right of the field to override the default.  
Select from *Ignore Abandoned Calls*, *Abandoned Calls have Negative Impact*, and *Abandoned Calls have Positive Impact*.
  - Step 6** Click **Save**.
- 

### Related Topics

[Service level at call type, on page 103](#)

## Service level relationships: MRD, peripheral, skill groups, and Precision Queues

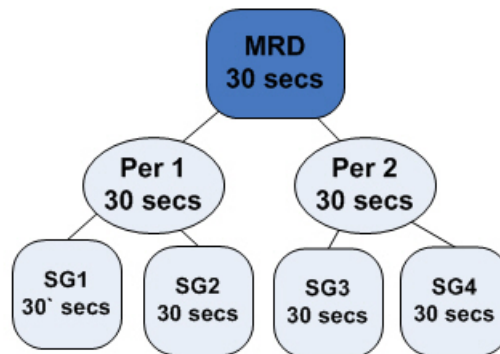
Service level setting for MRDs, peripherals, skill groups, and Precision Queues are hierarchical and are interpreted as follows:

- MRD — is the highest level. It is set in **Configuration Manager > Tools > List Tools > Media Routing Domain**.  
The default settings for the MRD are *Service level threshold = 30 seconds* and *Service level type = Ignore Abandoned Calls*. *Ignore Abandoned Calls* is the only value, and it is protected.
- Peripheral—is set in **Configuration Manager > Tools > List Tools > Service Level Threshold List**.  
The default settings for a peripheral are taken from its MRD. You can override them.
- Skill group—is set in **Configuration Manager > Explorer Tools > Skill Group Explorer > Advanced tab**.  
The default settings for skill group are taken from its peripheral. You can override them.
- Precision Queue—The service level for the Precision Queue is set in the Precision Queue gadget.

This example explains the configuration.

- 1 The MRD has two peripherals. Each peripheral has two skill groups. The service level threshold for the MRD is set to the default of 30 seconds. By default, the service level thresholds for both peripherals is 30 seconds, and the service level thresholds for all four skill groups is 30 seconds.

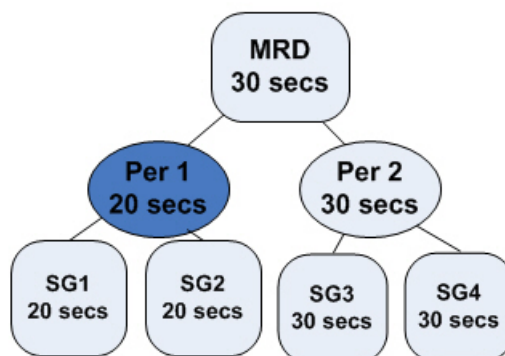
**Figure 16: MRD hierarchy example 1: Service level threshold at MRD**



- 2 If you change the service level threshold of Peripheral 1 to 20 seconds, the service level thresholds of skill groups 1 and 2 become 20 seconds.

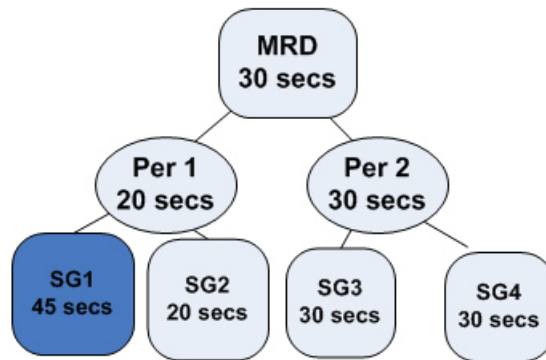
The service level thresholds of skill groups 3 and 4 remain at 30 seconds.

**Figure 17: MRD hierarchy example 2: Changing peripheral**



- 3 If you want the service level threshold of skill group 1 to be 45 seconds, you can independently configure skill group 1 to have a service level threshold of 45 seconds.

**Figure 18: MRD hierarchy example 3: Changing skill group**



## Configure service level for MRD

To configure the service level settings for the Media Routing Domain:

### Procedure

- 
- Step 1** In the Configuration Manager, select **Tools > List Tools > Media Routing Domain List**.
  - Step 2** Select the Routing Domain with the service level you want to modify.
  - Step 3** Click **Retrieve**.
  - Step 4** Select the MRD that has the service level you want to set.
  - Step 5** Specify a value in seconds for service level threshold. The default is 30 seconds.
  - Step 6** Service level type is protected and always shows *Ignore Abandoned Calls*.
  - Step 7** Click **Save**.
- 

## Configure service level for peripheral

To configure Service Level settings for a peripheral:



## Procedure

- 
- Step 1** In the Configuration Manager, select **Tools > List Tools > Service Level Threshold List**.
- Step 2** Click **Retrieve** to populate the list with the peripherals.
- Step 3** Select the peripheral that has the service level you want to modify.
- Step 4** Specify a value for service level threshold. The default is inherited from the MRD. Your options are to:
- Retain the default from the MRD.
  - Check the Override MRD default box to unprotect the value and enter a new value in seconds for the Peripheral Service level threshold.
- Step 5** For service level type, check the box to override the default. Select from the following:
- *Abandoned Calls have Negative Impact*
  - *Abandoned Calls have Positive Impact*
  - *Ignore Abandoned Calls*
- For a non-Unified CCE/Unified CCH peripheral and a voice media routing domain, select from *Abandoned Calls have Negative Impact*, *Abandoned Calls have Positive Impact*, and *Ignore Abandoned Calls*. For other MRDs, service level type is protected and always shows *Ignore Abandoned Calls*.
- Step 6** Click **Save**.
- 

## Configure service level for skill groups or precision queues

To configure service level settings for a skill group perform the following steps.

To configure service level settings for a Precision Queue, see [Create Precision Queue](#).

## Procedure

- 
- Step 1** In the Configuration Manager, select **Explorer Tools > Skill Group Explorer**.
- Step 2** Click **Retrieve**.
- Step 3** Select the skill group and click the **Advanced** tab.
- Step 4** Service level threshold defaults to that of the peripheral. Your options are to:
- Keep the service level threshold setting of the peripheral
  - Check the **Override Peripheral default** box to unprotect the value and enter a new value in seconds for the **Skill Group Service level threshold**
- Step 5** Service level type defaults to that of the peripheral. Your options are to:

- Keep the setting of the peripheral
- From the dropdown, change to: *Abandoned Calls have Negative Impact*, *Abandoned Calls have Positive Impact*, or *Ignore Abandoned Calls*

**Step 6** Click **Save**.

---

## Configure service level for Aspect VRU

To configure service level settings for an Aspect VRU:

### Procedure

---

**Step 1** In the Configuration Manager, select **Explorer Tools > PG Explorer**.

**Step 2** Click **Retrieve**.

**Step 3** Select and expand the PG.

**Step 4** Select the peripheral and click the **Peripheral** tab.

For all peripherals except Aspect, the **Peripheral Service Level Type** field is protected and shows *Calculated by Call Center*.

For Aspect, choose the type of calculation to be performed by default. You can override the default for each individual service.

---



## CHAPTER 14

# Short calls, abandoned calls, and overflow calls

This chapter provides information about short calls, abandoned calls, and overflow calls.

- [Short calls, page 113](#)
- [Abandoned calls, page 115](#)
- [Overflow, page 117](#)

## Short calls

A short call is a call that is either abandoned very quickly or answered and terminated very quickly. By defining what you believe to be a short call, you can filter out from reporting metrics those calls that did not stay in the system long enough to be considered and counted as events.

The Abandoned Call Wait timer, set at the peripheral, defines the threshold under which the abandoned call will not be counted. If the abandoned threshold is lower than the service level threshold, the call will not affect the service level. If call wait time is higher than this threshold, the call is counted as Offered.

The Answered Short Call threshold, also set at the peripheral, defines the time under which the call will not be counted as answered and will not impact agent performance.

If you plan to use short calls to filter out false abandons or to detect when calls are answered and terminated too quickly to be considered handled, consider the following:

- You can configure abandoned short calls globally for all call types.
- You can configure abandoned short calls for the peripheral. These calls are tracked for the services that are configured for that peripheral.
- You can choose not to count any abandoned calls as short calls regardless of how quickly they abandon.
- You can choose how abandoned calls affect the service level—negatively, positively, or not at all.
- You can configure answered short calls for agents and skill groups.
- You cannot configure answered short calls for call type.
- You can choose not to count any answered calls as short calls regardless of how quickly they terminate.

**Note**

The concept of short calls applies to the Voice media class only.

## Abandoned short calls

A call is considered abandoned if it abandons *after* the value set for the Abandon Call Wait time threshold. This is set globally.

If the call abandons *before* the Abandon Call Wait Time threshold, the call is reported as a short call.

Abandoned short calls affect reporting because they update the CallsOffered field but not the CallsAbandon field.

## Answered short calls

Answered short calls reflect when a caller hangs up quickly if no agent answers the phone.

Answered short calls are reported for skill groups and agent skill groups.

The short call timer starts when the agent answers the call, and the CallsAnswered metric is updated for these calls.

The ShortCalls fields within the Skill\_Group\_Interval and Agent\_Skill\_Group\_Interval tables are incremented if the Talk Time is less than the Answered short call threshold configured for the peripheral. The call is reported both as handled and as a short call.

If auto-answer is enabled for the agent, and if there are a high number of short calls within a certain interval, reporting on short calls can be used to determine which agents were not at their stations when a call was automatically answered. This conclusion assumes that the caller hangs up quickly when there is no agent on the phone.

## Short call reports

A number of All Fields Reports contain a Short Tasks column to enable you to track calls that are offered but are neither handled nor abandoned.

The following reports display operational information on short calls:

- Unified Intelligence Center Agent Historical All Fields Report
- Unified Intelligence Center Call Type Historical All Fields Report
- Unified Intelligence Center Agent Skill Group Historical All Fields
- Precision Queue Historical All fields

### Related Topics

[Unified ICM/CC Report Templates](#)

## Configure short calls for call types

For Call Types, you can configure Abandoned Short Calls only. Call Types do not allow support configuration for Answered Short Calls.

To configure Abandoned Short Calls for Call Types, complete the following steps:

### Procedure

- 
- Step 1** In the Configuration Manager, select **Tools > Miscellaneous Tools > System Information**.
  - Step 2** Set Abandoned Call Wait Time to a value, in seconds. This value indicates the length of calls to be considered abandoned. Calls abandoned before the Abandoned Call Wait Time are NOT considered abandoned. To not track abandoned calls, leave the field blank.
  - Step 3** Click **Save**.
- 

## Configure answered short calls for skill groups or Precision Queues

### Procedure

- 
- Step 1** In the Configuration Manager, select **Tools > Explorer Tools > PG Explorer**.
  - Step 2** Click **Retrieve** to retrieve the list of PGs.
  - Step 3** Under a PG, select the peripheral that you want to modify.
  - Step 4** Select the **Advanced** tab.
  - Step 5** Set **Answered Short Calls Threshold** to a value (in seconds).
  - Step 6** Click **Save**.  
Repeat steps 3 through 5 for additional PGs/peripherals, as desired.
- 

## Abandoned calls

A call is considered abandoned if the caller hangs up before being connected to an agent. This includes situations where the caller hangs up while queued and waiting at the VRU (CVP or IVR). A high number of abandoned calls might be an indication that callers are waiting in the queue for too long.

Service reports provide cumulative statistics for all abandoned calls. Call Type reports provide additional visibility on where calls are abandoning.



### Note

If a call abandons before the Abandon Call Wait Time threshold, it is considered a short call. For example, if you configure the abandoned call wait time for 10 seconds, and a caller disconnects at nine seconds, that call is a short call—it is not considered offered or abandoned.

## Related Topics

[Short calls, on page 113](#)

## How abandoned calls affect reporting

There are three types of abandon metrics: abandon at the VRU (prompt or self service), abandon in queue, and abandon at the agent.

Unified CCE/CC tracks the abandon counts for each of these abandon types separately. The time spent by these abandoned calls before abandoning is also tracked.

The value represented by the Aban column on the Call Type reports provides total abandon count for the call type, which includes calls that abandoned while at the VRU (prompting or self service), calls that abandon in queue, and calls that abandoned while ringing at the agent's phone or en route to the agent's phone. This value is derived from the TotalCallsAband database field.

Reports also provide average time spent by these abandoned calls in the Avg Aban Delay Time field. This field represents the average delay time of all abandoned calls that ended in this call type during the current interval. This value is derived from  $\text{Call\_Type\_Interval.CallDelayAbandTime} / \text{Call\_Type\_Interval.TotalCallsAband}$ .

To separate information gathering and queuing statistics, you can also determine the time spent by a call only in the call type where the call abandoned. This value is tracked in the CTDelayTotalAbanTime database field. It includes only the time spent in the call type where the call abandoned and not all call types.

Consider this example:

- A call spends 30 seconds in the information gathering call type, “Info\_Call\_Type”.
- The script then changes the call type to the queuing call type—say Queue\_Call\_Type—and the call is queued.
- After 15 seconds waiting in queue the call is abandoned.

In this case the total time spent by the call before abandoning will be 45 seconds. However, the time spent by the call in the “Queue\_Call\_Type” where the call abandoned will be 15 seconds. The call type statistics for the “Queue\_Call\_Type” will be updated as follows:

Queue\_Call\_Type

- CallDelayAbandTime = 45 seconds
- CTDelayTotalAbanTime = 15 seconds.



### Note

You could write custom reports to able to report on the different abandons and the time spent by these abandons. To determine the counts and the time associated with the abandoned calls, for calls in the script, or at the VRU (prompt or self service), subtract Agent Abandons and Queue Abandons from Total Abandons.

## How abandoned short calls affect reporting

A short call at the call type is a call that abandons within the call type's Abandon Wait Time threshold. By defining what you believe to be a short call, you can filter out those calls that you believe did not stay in the system long enough to be counted as a real call. You can define short calls for call types and services.



### Note

Short calls are configured globally for all call types.

The short call timer starts as soon as the route request is received for the call. The CallsOffered field is updated when the route request is received. If the call abandons within the Abandon Wait Time threshold, the ShortCalls field is updated, but the number of calls abandoned is not updated. Since the call type is the highest level reporting entity, calls that abandon at the VRU or at the agent's phone can also be considered short calls at the call type if they abandon within the call type's Abandon Wait Time threshold.

If you do not want to count any abandoned calls as short calls regardless of how quickly they abandon, you can disable abandoned short calls by leaving the Abandon Wait Time field for the call type blank.

## Abandoned call reports

The following reports display Abandon statistics for call types and services:

- Unified Intelligence Center: Enterprise Service Historical All Fields
- Unified Intelligence Center: Peripheral Service Historical All Fields

### Related Topics

[Unified ICM/CC Report Templates](#)

## Overflow

The software keeps counts of the number of calls moved out of each service or route (overflowed out) and moved into each service or route (overflowed in).

Overflow Out is incremented when the one of the following occurs:

- The call type associated with the current call is changed through use of a Call Type or Requalify node.
- The call is sent to a label using a label node.
- The call is redirected.

When a call is redirected, the PIM no longer can receive events for the call and has no way of referencing or tracking the call.

For example, the call might have been redirected to a non-Unified CCE monitored device and then returned to the switch with a different call ID.

The Unified CCE generates the termination call detail record with only the data originally tracked for the call. Calls marked as Redirected are counted as Overflow Out calls in the Unified CCE service and route tables.

- The call was not default-routed, and the label was not a ring, busy, or announcement label.

- The call hit a release node

In Unified CCE, to more accurately reflect call status, CallDisposition is set to 15 (Redirected) instead of 4 (Abandon Delay) in the following cases:

- When a call leaves a CTI route point to be sent to IVR.
- When the agent transfers call to another skill group, no agent is available, and the call is sent to IVR.

## Overflow reports

The following reports display operational information on Overflow Out situations:

- Unified Intelligence Center Call Type Historical /Call Type Daily All Fields
- Unified Intelligence Center Call Type Real Time
- Unified Intelligence Center Peripheral Service Real Time

### Related Topics

[Unified ICM/CC Report Templates](#)





# CHAPTER 15

## Outbound Option

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This chapter provides information about the Cisco Outbound Option application.

The Cisco Outbound Option application provides outbound dialing functionality along with the existing inbound capabilities of Cisco Unified Contact Center Enterprise. This application enables the contact center to dial customer contacts and direct contacted customers to agents or IVRs. The ability for agents to handle both inbound and outbound contacts offers a way to optimize contact center resources.

Outbound Option features include:

- Cisco Internet Protocol Contact Center (Unified CCE) compatible dialer
- Campaign management
- Inbound/outbound blending
- Predictive, Progressive, and Preview dialing modes
- Real-time and historical reports
- Personal callback
- Call Progress Analysis (CPA) for answering machine, fax/modem, and answering machine terminating tone detection
- Transfer to Interactive Voice Response (IVR)
- Sequential dialing
- Cisco IP Contact Center Agent re-skilling
- Abandoned and Retry call settings
- Campaign Prefix Digits for dialed numbers
- Outbound Option support on Cisco Unified Contact Center Hosted

Refer to the *Outbound Option Guide for Cisco Unified Contact Center Enterprise & Hosted* for details

- [Reports on Outbound Option campaign effectiveness, page 120](#)
- [Reports on agent performance for Outbound Option dialing campaign calls, page 120](#)
- [Campaign Query rule reporting, page 120](#)
- [Dialer reporting, page 122](#)

- [Import Rule reporting, page 122](#)

## Reports on Outbound Option campaign effectiveness

Use the templates in the Outbound Option reporting category to generate reports for campaigns, query rules used in those campaigns, Outbound Option record imports, and Outbound Option Dialer activity.

All Outbound Option reports are voice-only reports.

## Reports on agent performance for Outbound Option dialing campaign calls

Outbound Option, functionality that is automatically enabled at setup, provides automatic outbound dialing capability.

The Outbound Option Dialer, which places outbound calls to customers and connects these calls with agents, assigns and connects calls differently than regular Unified CCE routing. Report data for agents handling Outbound Option calls therefore differs from data for agents handling typical voice calls and multichannel tasks.

To interpret agent data for Outbound Option tasks, you need to understand how Outbound Option reserves agents, reports calls that are connected to agents, and handles calls dropped by customers before the calls are connected.

When the Outbound Dialer initiates a call to a customer, it reserves the agent assigned to handle the call by placing a reservation call to the agent and changing the agent's state to Hold. This reservation call is reported as a Direct In call to the agent.

For typical voice calls, the agent is placed into Reserved state when Unified CCE software reserves the agent to handle a call; the agent's state is reported as Reserved. For Outbound Option calls, reports show the agent in Hold state when reserved for a call and the time that agent spends reserved is reported as Hold Time.

When the customer answers the call, the Outbound Option Dialer transfers the call to an agent. The call is now reported as a Transfer In call to the agent. When the customer call is transferred to the agent, the reservation call is dropped by the Dialer and classified as Abandon on Hold.

For more information regarding Outbound Option termination call detail records, see the *Outbound Option Guide for Cisco Unified Contact Center Enterprise & Hosted*.

The abandoned call wait time, set in the Campaign Configuration screen, determines how calls are reported if the caller hangs up. Calls are counted in the Customer Abandon field in both Real Time and Historical campaign query templates only if the customer hangs up before the abandoned call wait time is reached.

### Related Topics

[Agent reporting for Outbound Option campaigns, on page 45](#)

[Skill group reporting for Outbound Option campaigns, on page 66](#)

## Campaign Query rule reporting

The Campaign Query rule reports are the most useful reports for measuring the effectiveness of a campaign and can also be used for agent and IVR campaigns.

These reports show you what is happening in each campaign, including the number of calls closed, number of customers contacted, average talk time, and average wrap-up time for each query in a campaign.

There are two categories of campaign query rule reports:

- One category of reports indicates the number of records closed, those in Pending state, and total records in the query rule's dialing list.

For example, the camqry20 report, Campaign Consolidated Half Hour Report, shows the overall view of how the system is running and can be used for troubleshooting reasons why agents are idle.

- A second category of reports provides different views into the call result activity. It breaks down call results into about a dozen categories.

For example, the camqry14/15 reports show the breakdown of attempts (in percentage) of each campaign for the selected time period.

The Query Rule Call Activity and Pending Record reports are available as campaign rollups for multiple query rules within a campaign.

There are also consolidated reports available, which blend campaign call activity reporting information with skill group performance reports to give a better overall view of the business activity. These reports provide a rough overview of agent activity, average time between calls, abandon rate, and so forth. Because these reports combine data from different reporting engines in a single report, there are a few caveats that are described in the reports themselves.

Observe the following guidelines when using the campaign reports:

- **Campaign Manager Restart**

- When the Campaign Manager restarts, there will be some data loss.
- Campaign Real Time reports capture call results since the last Campaign Manager restart only.
- Campaign Real Time reports describe how many records are left in the campaign dialing list.
- Campaign and Dialer Half Hour reports provide call result counts since the last Campaign Manager restart in the half hour that it restarts.
- Dialer utilization fields in the Dialer Half Hour report will be unaffected, although the Half Hour record might be missing if the Campaign Manager was inactive during the half-hour boundary. When the Dialer restarts only the Dialer Utilization fields will be affected; therefore, the Dialer Utilization will only capture port status since the Dialer restarted during that half hour. Some records might be left in an active state for a short period of time after the Dialer or Campaign Manager restarts, but the Campaign Manager has a mechanism to reclaim those records.

- **Transfer to IVR**

The campaign and query rule call activity reports display accurate call activity for calls that are not transferred to IVR. Calls transferred to IVR will simply be counted as being transferred to an IVR, but the Campaign and Query Rule Activity reports will not display what occurred after the call was sent to the IVR. If calls are queued and transferred back to an agent, they will be treated as new inbound calls in the reports.

## Related Topics

[Call Type reporting and Outbound Option campaigns, on page 88](#)  
[Campaign Query Rule](#)

## Dialer reporting

You can report on campaigns on a higher level using the Dialer templates. These reports provide information on how the ports are utilized during a campaign, which helps in determining whether the number of dialer ports effectively supports the number of agents and size of the campaign.

Each campaign is associated with a dialer. By reporting on a dialer, you can view the statistics that span all of the campaigns associated with the dialer. These reports show the number of customers dialed, the number of calls that were not answered, the number of calls that were abandoned, and detection of busy, voice, answering machine, and Standard Information Tones (SIT Tones).

### Related Topics

[Dialer and Dialer Port](#)

## Import Rule reporting

Outbound Option reports also enable you to view the success of record importation. Using the Import Rule templates, you can monitor whether records are being added successfully (good records) or are failing (bad records). Also, you can monitor how long it takes to import the records so that you can plan for future record importation.

The same import rule reports are used for Do Not Call and Contact List imports. The reports display an historical view of when imports were done, the number of records imported, and the number of records that were considered invalid due to length constraints or improper formatting.

For contact list imports, the reports also provide insight into the number of contacts that were assigned with the default time zone information for the campaign, as well as the number of contacts that were actually imported into the dialing list after the query rule and format validation was performed.

The following information is available in the Import Rule reports:

- Number of successful, unsuccessful, and total records imported by time range
- Current import status

### Related Topics

[Import Rule](#)



# CHAPTER 16

## Transfers and conferencing

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This chapter provides information about transfers and conferencing.

- [Reports on agent call transfers and conferences, page 123](#)
- [About transfers and conferences, page 127](#)
- [Configuration and scripting for transfers and conferences, page 129](#)

### Reports on agent call transfers and conferences

Voice calls can be transferred or conferenced. Non-voice tasks, such as email, chat, and Blended Collaboration tasks cannot be transferred and conferenced.

Transfer can be either blind or consultative and is supported only for agents within the ACD. A *blind transfer* is a transfer in which the agent transfers the call to another agent without first ensuring that another agent is available. A *consultative transfer* is a transfer in which an agent places the call on hold, calls the receiving agent to discuss the transfer, and then transfers the call to the agent. Consultative transfer is not supported when Unified CVP is used as the VRU.

It is best to discourage direct agent-to-agent transfers. Instead, use ACD numbers to transfer to a Skill Group and application service. This enables tracking of these calls and allows you to report on how calls were eventually handled. You can also post route calls to Unified ICM, which allows you to transfer calls to agents on other ACD sites and to be able to report on those calls.

#### Related Topics

- [About transfers and conferences, on page 127](#)
- [Configuration and scripting for transfers and conferences, on page 129](#)

### Transfers and conferences using ACD/Dialed Numbers (Unified ICM)

Transfers and conferences can be handled at the ACD, with ACD queuing, or through Unified ICM using ACD/Dialed Numbers, with Enterprise Queuing.

**For ACD and local queuing**, reporting statistics are accurate when the agent uses an ACD number and the script on the ACD queues and sends the call.

TransferOut or ConferenceOut is incremented for the source agent and TransferIn or ConferenceIn is incremented for the target agent.

**For Enterprise Queuing**, when the agent activates the transfer or conference button and selects a number to which to transfer or conference the call, the dialed number is sent to the CallRouter from the agent PG. This dialed number determines the Call Type, which in turn selects the transfer routing script. A Unified ICM script must include a Queue to Skill Group node that references the appropriate skill group based on the dialed number to which the call is to be queued.

If an agent is available in the selected skill group, a message is sent to the source agent PG, containing a label or dialable number. The PG transfers the call from the source agent phone to the target agent using the label returned from the Central Controller. For these types of transfers and conferences, TransferOut or ConferenceOut is incremented for the source agent and TransferIn or ConferenceIn is incremented for the target agent.

If no agents are available for a transfer in the selected skill group, the CallRouter sends the source agent's PG the label to forward the call to the VRU. For these types of transfers and conferences, TransferOut or ConferenceOut is incremented for the source agent. However, TransferIn or ConferenceIn is incremented for the target agent when the VRU routes the call to the target agent only in Unified CC with an IPCC System PG. This difference is also applicable when IPCC System PG with Unified CVP is used in Unified CC deployments.

## How database fields are affected by transfers and conferences

Transfers and conferences affect fields in the Agent\_Skill\_Group\_Interval database table.

The TransferIn field is incremented for the target agent if all of the following conditions are true:

- The call was transferred (blind or consultative) by an agent to a Unified ICM Call Type script or to an application script on the ACD that checks for agent availability.
- For blind transfers only, an agent within the same peripheral was available at the time that the transfer was initiated.

The ConferenceIn field is incremented for the target agent receiving the conference call if all of the following conditions are true:

- The call was conferenced by an agent to a Unified ICM Call Type script or to an application script on the ACD that checks for agent availability.
- An agent within the same peripheral was available at the time that the conference was initiated.

The TransferOut field is incremented for the agent initiating either a blind or consultative transfer when the initiating agent disconnects from the transfer.

The Conference Out field is incremented for the agent initiating a conference when the initiating agent disconnects from the conference.

The ConsultativeCalls field is incremented for the initiating agent when the consultative call disconnects and wrap-up is complete.

**Note**

- Consultative transfer is not supported for systems using Unified CVP as the VRU and therefore this field is never incremented if you are using Unified CVP.
- If you are using Unified CVP as the VRU, the transfer can be performed through a network transfer. If the network transfer is used, the TransferIn and TransferOut fields do not display data for these transfers.

## How types of calls are affected by transfers and conferences

The following table describes the fields that are incremented in the Agent\_Skill\_Group\_Interval database table when different types of calls are transferred and conferenced.

**Table 24: How types of calls are affected by transfers and conferences**

Type of call	How the call is affected
Outgoing internal	The InternalCall field is incremented for the source agent that initiates a transfer or conference operation if the target agent is on the same ACD as the source agent. This field is incremented after the call is disconnected.
Incoming direct/incoming internal	The InternalCallsRcvd field is incremented for the target agent who completes a transfer or conference if the agent dialed the target agent directly (that is, does not access a routing script). This field is incremented after the call is disconnected.
Outgoing external	The AgentOutCalls field is incremented for the source agent who completes a transfer or conference to an external destination. This field is incremented after the call is disconnected.
ACD calls	The CallsHandled field is incremented for the target agent if the call is sent to the agent via an ACD routing script. This field is incremented against the skill group to which the routing script queued the call. This field is incremented after the call disconnects and wrap-up is completed.

## How skill groups are affected by transfers and conferences

The skill group for which transfer and conference data is reported depends on how the original call was placed.

The transfer or conference is reported for the ACD-picked skill group if the original call is a direct call, placed to the agent's extension. For example, if an agent received a call directly to the agent's own extension and then transferred the call, the transfer is reported for the ACD-picked skill group of both the agent who initiated the transfer and agent who received the transfer.

The transfer or conference is reported for the skill group to which the call was routed if the original call was routed via an ACD routing script to a specific skill group. For example, if an agent in the Sales skill group received a Sales call and then transferred the call, the transfer out is reported for the Sales skill group. The transfer in is reported for the skill group of the agent who received the transfer.

The following scenarios further explain how database fields are incremented for different types of transfers and conferences.

#### Call scenario 1: Blind transfer of ACD calls—agent is not available

In this example, agent A is presented with an ACD call for skill group Y. Agent A selects skill group X via the ACD number (which accesses a script) and initiates and completes a blind transfer. The InternalCalls and TransferOut fields are then incremented for agent A against skill group Y.

After wrap-up is completed, the CallsHandled field is incremented for agent A against skill group Y. Since there are no agents available in skill group X, the call queues on the ACD. When agent B in skill group X becomes available, the ACD routes the call to agent B. Agent B answers the call and the call disconnects and wrap-up is complete.

**Table 25: Blind transfer of ACD calls—agent is not available**

Fields incremented for agent A against skill group Y	Fields incremented for agent B against skill group X
CallsHandled, InternalCall, TransferOut	CallsHandled, TransferIn

For agent A, the call is reported in the TasksHandled, Internal Out, and TransferOut report fields. For agent B, the call is reported in the Tasks Handled report fields.

#### Call scenario 2: Consultative transfer of an ACD call—agent available

In this example, agent A is presented with an ACD call for skill group Y. Agent A selects skill group X via the ACD number and initiates a transfer. The script on the ACD realizes that agent B is available and requests that agent A's PG initiate a transfer to agent B on behalf of agent A's phone. Agent B answers the transferred call. After consulting with agent B, agent A completes the transfer. The InternalCall and TransferOut fields are then incremented for agent A against the skill group Y. After wrap-up is completed, the CallsHandled field is incremented for agent A against skill group Y.

Agent B now talks to the caller. When the call disconnects and wrap-up is completed, CallsHandled and TransferIn are incremented for agent B against skill group X.

**Table 26: Consultative transfer of an ACD call—agent available**

Fields incremented for agent A against skill group Y	Fields incremented for agent B against skill group X
CallsHandled, InternalCall, TransferOut, Hold	CallsHandled, TransferIn

For agent A, the call is reported in Tasks Handled, Internal Out, Transfer Out, and Incoming Hold and/or All Hold report fields. For agent B, the call is reported in Tasks Handled and Transfer In report fields.

#### Call scenario 3: Consultative conference of a direct call

In this example, a direct call comes into agent A's ACD extension.

Agent A selects skill group X via the ACD number and initiates a conference. The script on the ACD realizes that agent B is available and requests that agent A's PG initiate a conference to agent B on behalf of agent A's phone. Agent B answers the conferenced call. After consulting with agent B, agent A completes the conference.



Agent A disconnects from the conference. The InternalCalls and ConferenceOut and InternalCallsRvcd fields are then incremented for agent A against the ACD-picked skill group.

Agent B or the caller disconnects. InternalCallsRvcd and Conference Out are incremented against the ACD-picked skill group for agent B.

**Table 27: Consultative conference of a direct call**

Fields incremented for agent A against ACD-picked skill group	Fields incremented for agent B against skill group X
InternalCallsRvcd, InternalCall, ConferenceOut, Hold	CallsHandled, ConferenceIn

For agent A, the call is reported in Tasks Handled, Internal Out, Conf Out, and All Hold (Internal Hold) in report fields. For agent B, the call is reported in Tasks Handled and Conf In report fields.

#### Call scenario 4: Consultative call

In this example, agent A is presented with an ACD call for skill group Y.

Agent A selects skill group X via the dialed number and initiates a consult. The script that uses the LAA Select node for skill group X realizes that agent B is available and requests that agent A's PG initiate a conference to agent B on behalf of agent A's phone. Agent B answers the consult call. After consulting with agent B, agent A activates the Reconnect button, which disconnects agent B and agent A resumes talking to the caller.

Agent A disconnects from the call. After wrap-up is completed, CallsHandled and Consultative Calls field are incremented for agent A against skill group Y.

**Table 28: Consultative call**

Fields incremented for agent A against skill group Y	Fields incremented for agent B against skill group X
CallsHandled, InternalCall, ConsultativeCall, Hold	CallsHandled

For agent A, the call is reported in Tasks Handled, Internal Out, Cons Out, and Incoming Hold and/or All Hold report fields. For agent B, the call is reported in Tasks Handled report fields.

## Agent transfer and conference reports

The following report displays agent transfer and conference data:

- Unified Intelligence Center: Agent Historical All Fields

#### Related Topics

[Unified ICM/CC Report Templates](#)

## About transfers and conferences

Unified CCE/CC supports transfers and conferences directly to agents and also to skill groups.

**For Unified CC**, if you are planning to allow agents to transfer and conference calls, follow these guidelines to obtain accurate and useful data from transfers and conferences:

- Configure the dialed numbers with associated route points for transfer and conference to agents and skill groups.
- Plan to create a separate script for transfers that use the dialed numbers you configured. In the initial script, change the call type such that when the call is transferred, it is directed to the transfer script. Having a separate script allows you to track data across call types and skill groups, instead of the agent's default skill group.

**For Unified CCE**, call transfers and conferencing can be accomplished in two ways.

- The agent can manually transfer the call to another agent or can conference in another agent by dialing that agent's extension directly on the ACD.
- The agent can use the ACD number to access a routing script on the ACD or can optionally post-route the call to Unified CCE.

The latter method is preferable, since Unified CCE will be able to track the transferred calls and how they are handled across the enterprise. This also provides the ability to transfer the call to another ACD site.

It is best to discourage direct agent-to-agent transfers, as one has to rely on the ACD for skill group and service assignment for the purposes of reporting. In situations where you are handling transfers and conferences on the ACD itself, use the ACD number to control how transfers are reported.




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**Note** Unified CCE will be unaware of a direct transfer if the agent extension is not configured.

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If you are planning to provide for transfers and conference calls using post-routing, follow these guidelines to obtain accurate and useful data:

- Configure the ACD number to post-route the call to Unified CCE.
- Consider creating separate scripts for transfer and conference scenarios if you are post-routing all transfers and conferences.
- Plan to create a separate script for transfers on Unified CCE that uses the dialed numbers you configured. Having a separate script on the ACD or on Unified CCE allows you to track data across all known skill groups.




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**Note** If you do not do this, the skill group affected by reporting statistics is unknown, and results are unpredictable.

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**Note** Refer to your *ACD Supplement Guide* for any restrictions that might affect the transfers and conferencing. For example, some ACDs do not support blind transfers.

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### Related Topics

[Reports on agent call transfers and conferences, on page 123](#)

## Configuration and scripting for transfers and conferences

Follow these guidelines when configuring and scripting for transfers and conferences to skill groups:

- Configure dialed numbers.
- Create new call types or identify existing call types and associate the call types with the Dialed Numbers.
- Create a routing script for transferring to skill groups that includes a Queue to Skill Group node. This script ensures that transferred and conferenced calls are queued to the correct skill group.
- Associate the call type with the routing script.





## CHAPTER 17

# Operational reporting

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This chapter provides information about operational reporting./

- [Configure application gateways, page 131](#)
- [Configure routes or routing clients, page 131](#)
- [Translation routes, page 132](#)
- [Trunks and trunk groups, page 132](#)

## Configure application gateways

An application gateway is an optional Unified CCE feature that allows Unified CCE to query host systems that are running other contact center applications and to base routing decisions on the results obtained from the query. You can pass data to the application and receive data in return, which you can then examine and use for routing decisions.

Before you can use these nodes in a script, you must first configure the gateways. The application gateway requires connection information to communicate with the external application. You perform this task using the Configuration Manager.

### Procedure

Within the Configuration Manager, select **Tools > List Tools > Application Gateway List**.

### Related Topics

[Application Gateway, Application Path, and Script Queue templates](#)

## Configure routes or routing clients

A route is a value that a routing script returns. This value maps to a service and specific target at a peripheral. It represents the destination for a call and the type of service to be offered to the caller.

Unified CCE converts the route to a label and sends the label to the routing client. The routing client then delivers the call to a specific trunk group and Dialed Number Identification Service (DNIS). The peripheral recognizes the trunk group and DNIS and delivers the call to the appropriate target.

A routing client is an entity that sends routing requests to Unified CCE software, seeking a destination (route) for a call. A routing client typically corresponds to a subsystem within an interexchange carrier or to a peripheral (ACD, VRU, PBX) that is performing Post-Routing.

To configure multiple routes, use the Configuration Manager's Route Bulk tool. To create individual routes, use the Configuration Manager's Explorer tool appropriate for the route target.

### Procedure

- 
- Step 1** To configure routing clients, from the Configuration Manager menu, select **Tools > Explorer Tools > NIC**.
- Step 2** Click the **Routing Client** tab.
- 

### Related Topics

[Route templates](#)

[Routing Client templates](#)

## Translation routes

Translation routes are used to transfer a call from one routing client to another and retain the details about call tracking, call data, and cradle-to-grave reporting. They form an intermediate destination that is allocated when a script sends a call from a source routing client to a destination. After the call reaches the destination, the translation route is available for reuse as the route is not busy for the entire duration of the call.

Consider whether you want to implement Translation Routing. Translation Routing allows you to:

- Do cradle-to-grave reporting
- Transfer call data between sites when using CTI
- Track calls between sites.
- Use Call Type reporting more effectively, as certain call type statistics are not available if you do not do translation routing

### Related Topics

[Translation Route Templates](#)

## Trunks and trunk groups

Every peripheral has one or more associated trunk groups, with each trunk group containing one or more physical trunks.

You configure trunks and trunk groups with the Configuration Manager.

**Note**

Not all ACDs support trunk configuration. If your ACD does, make sure the PG is accurately configured in Configuration Manager. For the ICM software to properly monitor ACD calls, all individual trunks and their corresponding trunk group assignments must be configured in the ICM database.

You can report on data such as the number of trunks in service, number of trunks idle, and the time during which all trunks in a trunk group were simultaneously busy (All Trunks Busy).

The following report contains operational information on trunk groups:

- Unified Intelligence Center IVR Ports Performance Historical Report

**Related Topics**

[Unified ICM/CC Report Templates](#)







# CHAPTER 18

## IVR/VRU Self-Service

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This chapter provides information about IVR/VRU self service.

- [About VRUs, page 135](#)
- [VRU application reporting, page 136](#)
- [Best practices for reporting on VRUs, page 143](#)

### About VRUs

A VRU, or voice response unit, also called an Interactive Voice Response Unit (IVR), is a telecommunications device that plays recorded announcements and responds to caller-entered touch-tone digits. A VRU can also be equipped with Automatic Speech Recognition (ASR) or Text-to-Speech (TTS) capabilities.

In Unified CCE terms, the VRU is a device that corresponds to a peripheral and is integrated by means of a PG. A typical configuration consists of a VRU and a PG (or two PG's if duplexed).

A **Network VRU** supports Unified CCE software's service control interface. A Unified CCE routing script can divert a call to a Network VRU and instruct the VRU to perform specific processing before Unified CCE software determines the final destination for the call. There are multiple Network VRU types, and they are explained in the *Scripting and Media Routing Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted*.

There are two VRUs supported by Unified ICM/CC: Cisco Customer Voice Portal (CVP) and Cisco IP-IVR. Because these VRUs support different features and behave differently, reporting data is affected by the type of IVR you have deployed in your system.

In Automatic Room Identification (ARI) deployments and Unified Contact Center deployments that use the IPCC System PG, both IP-IVR and Unified CVP are supported.

#### Uses for VRUs

Your enterprise might implement one or more types of VRU applications to provide initial call treatment and enterprise queuing.

These VRU applications can be used as follows:

- In **Self-Service** applications, the customer can obtain information through a series of VRU prompts, and the entire transaction occurs within the VRU. For example, if the customer calls a bank, the Self-Service

application might prompt the user for an account number and password and then provide abilities to check account balance, review recent payments, modify PIN numbers, and so forth.

- In **Information Gathering** applications, the VRU prompts the caller for certain information, such as which department the caller wants to reach, and then uses the information in the routing decision and might pass the information to the agent desktop.
- The VRU is also used to **enterprise-queue** calls while a customer waits for an available agent. During queuing, the VRU might be configured to play music on hold or perform a VRU application.

## VRU application reporting

You can use a VRU for a number of different purposes, including queuing, customer self-service, and information gathering.

### Impact of VRU type on report data

The types of VRU applications that you use in your enterprise determine what report data you should monitor.

For example:

- If your VRU performs queuing only, you might want to see how long callers waited in queue and the number of callers who abandoned while queued.
- If your VRU is used for Self-Service, you might want to see how many successful transactions occurred in the Self-Service application and whether the caller was transferred to an agent from the application.
- If you are using an Information Gathering application, you might want to see how many callers opted out of the digit collection to be transferred directly to an agent.

### Impact of PG setup choices on report data

When you select a VRU on the Peripheral Gateway Properties page during PG Setup, certain VRU Reporting options affect the data available for reporting:

- **Event Feed**

If you select this option, the VRU PG does not generate real-time trunk and service data update and does not write Termination Call Detail records for each Service Control Interface (SCI) dialogue. The VRU PG still generates real-time peripheral data update.

- **Service Control**

This option is selected by default. This option allows the VRU PG to generate real-time peripheral, trunk and service data updates, and write one or more Termination Call Detail records for each SCI dialogue.

Selecting this option also enables the **Queue Reporting check box**. If this box is unchecked, the only events generated for SCI dialogues are Delivered and Cleared and the only call statistic calculated is total call time. If this box is checked, the PG will also generate Queue events. Calculated call statistics will then include queue times and abandons in queue, as well as total call time.

The Service Control option with Queue Reporting checked generates the most data.

**Figure 19: VRU reporting options**

See also the chapter on VRUs in the *Scripting and Media Routing Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted*.

## Self-Service, Information Gathering, and Queuing VRU applications

Information gathering VRU applications are used to decide what skill group to queue the call to by walking the caller through a series of voice prompts. The Caller Entered Digits (CED) are passed back from the VRU to be used within the routing script, to decide the optimal skill group to answer the call.

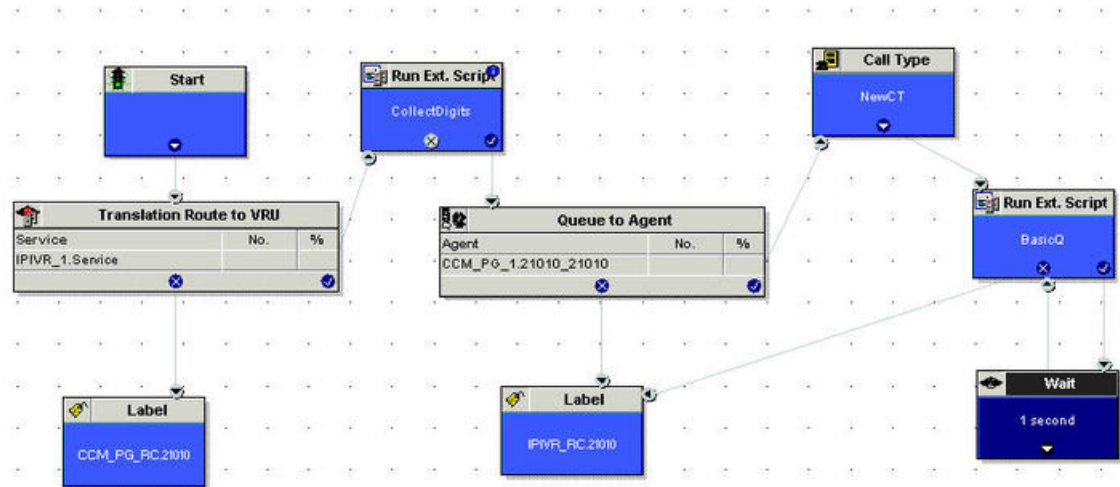
You must be able to determine the following from an IVR service used for information gathering:

- How many calls traversed the application
- How long each call remained in the information gathering application
- How many calls disconnected before being routed to an agent
- How many calls were eventually routed to agents

Several applications can reside on the same VRU PG. Self-Service and queuing can reside on the same VRU PG, and Information Gathering and queuing can reside on the same VRU PG. This means that all of the applications on that PG belong to the same VRU service.

The VRU service cannot be changed once the call is sent to the VRU. However, the Call Type can be changed with the Requalify or Call Type node. In the following script, the Call Type is changed via the Call Type node once it has been queued to separate Information Gathering (CollectDigits) and queuing.

**Figure 20: Sample routing script for Information Gathering queuing**



Although a service level can be defined for both Call Types, it is better to define a service level for the Call Type that has the Queue to Skill Group node in it.

Calls that disconnect while in the Self-Service or Information Gathering application are considered abandoned calls since both Service Control and Queue reporting must be turned on for VRU Queuing applications. However, you can extract queuing metrics from information-gathering metrics by defining a separate Call Type for each, and then changing the Call Type in the routing script.



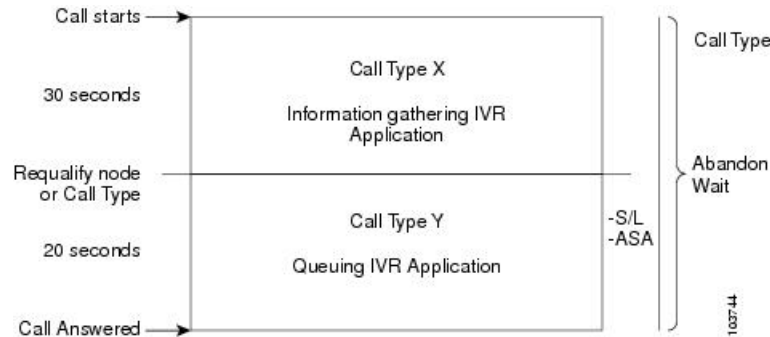
**Note**

If the VRU performing Self-Service does not also provide queuing, you can enable Service Control reporting and disable the Queue reporting checkbox. If the caller opts to speak to an agent, then the Self-Service VRU transfers the call to the IP-IVR or CVP that performs queuing, and the call does not appear abandoned from the Self-Service application. This means that the call is considered answered when received by the VRU, not offered. When the call ends, it is counted as handled. If you implement this configuration, reports show the number of calls that were answered and terminated, and time spent on terminated calls.

The following illustration shows how a call moves from the Information Gathering application to the queuing applications.

In this example, 20 seconds will be used to calculate ASA and decide the service level instead of 50 seconds (30 + 20 seconds).

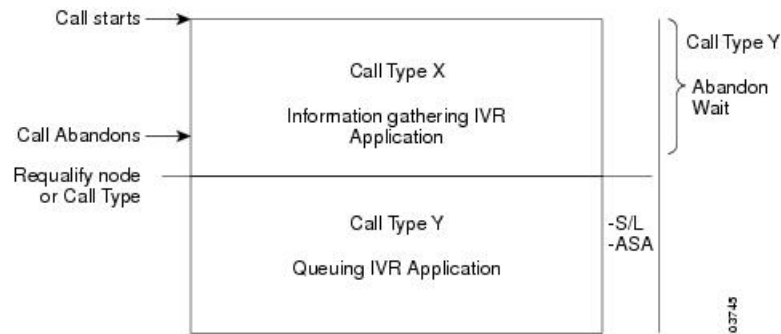
**Figure 21: Call Type data for calls that abandon after Call Type is changed**



**Note**

If the call abandons before being requalified to the Call Type that handles queuing, the Call Abandon Wait time is not reset. Therefore, the Abandon Wait time for the information gathering Call Type starts when the call enters the first Call Type, and ends when the call abandons, as illustrated below:

**Figure 22: Call Type for calls that abandon before Call Type is changed**



The following table illustrates how some basic metrics are defined at the Call Type and the IVR Service.

**Table 29: Self-service and information gathering application metrics**

Report metric	Call type	VRU service	Skill group
Abandon Wait Time	Starts when a call first enters a Call Type and ends when it abandons.	Starts when the call enters the service.	Not Applicable
Average Speed of Answer (ASA)	Starts at the first Queue to Skill Group node in the routing script.	Starts at the first Queue to Skill Group node in the routing script.	Starts at the first Queue to Skill Group node in the routing script.

Report metric	Call type	VRU service	Skill group
Service Level	Starts as soon as the call enters the Call Type that has the service level defined.	Starts when the call enters the service.	Not Applicable

### Related Topics

[Impact of PG setup choices on report data, on page 136](#)

## Monitoring Self-Service and Information Gathering application progress

You might determine the effectiveness of a Self-Service application in several ways:

- Monitoring the effectiveness of the application as a whole. For example, you might only want to monitor whether a customer's need was satisfied through the VRU application and that the caller did not need to be transferred to an agent.
- Monitoring the effectiveness of individual transactions within the application. For example, in a banking application a customer might have the ability to perform multiple transactions, such as account lookup, obtaining balance information, and learning about recent payments. You might want to see which of these transactions was used and whether the caller successfully completed the transaction.
- Monitoring failure cases in which a system error, such as a failed database lookup, caused the caller to be transferred by an agent instead of continuing through the VRU application.

Similarly, you might determine the effectiveness of an Information Gathering application in several ways:

- Monitoring whether the caller used the system prompts to be routed to an appropriate resource or used a failout path, such as pressing "0", to be routed directly to an agent.
- Monitoring failure cases in which system errors, such as a failed database lookup, caused the caller to be transferred to an agent instead of continuing through the digit collection prompts for more appropriate routing.

## VRUProgress variable

VRU applications are unique among call center applications in that the reports need to describe events that are application-specific, using application-specific terminology. Such reports vary widely from one customer to another and from one VRU application to another. Some customers only need to know how many VRU calls were satisfactorily handled by their VRU applications; others would like to track the usage and success rates of specific transactions within their VRU applications. Still others are interested in the actual series of activities performed by a specific caller and even the content of data collected or delivered.

The definition of a successfully handled call varies as well. In some cases a single transaction constitutes success. In others, each individual transaction has its own success criteria, and there might be several gradations of success. For example, some customers want to differentiate between calls in which no transactions were completed before transferring to an agent and calls in which one or more transactions were completed before transferring to an agent.

The system provides tools that customers can use as needed to meet these requirements

- The VRUProgress variable in the CallRouter call object
- Seven VRUProgress rollup buckets in the Call\_Type\_Interval table
- Reporting templates for reporting on Call\_Type\_Interval VRUProgress statistics
- A VRUProgress field in the Route\_Call\_Detail table

The following table describes the VRUProgress variables that you can use in your VRU script applications and how they map to report columns.

These VRUProgress variables map to columns that appear in VRU Activity reports, enabling you to see how many calls were counted for each variable per Call Type. You can use this data to modify applications if needed. For example, if you see that many callers are experiencing error conditions that cause a forced transfer you could correct the function of that node. If you see that many callers are opting to be transferred to an agent before being handled by the application, you might want to add functionality to the application.

**Table 30: VRUProgress variable**

Variable Setting in Script	Show in Reports as	Description
0	Not a VRU call—does not appear in reports	Indicates that this call is not a VRU call. It is the default value.
1	VRU Unhandled	Indicates that the caller's needs have not been met at this point in the application.
2	VRU Handled	Indicates that the caller's needs have been met by this point in the application. For example, the caller successfully received an account balance.
3	VRU Assisted	Indicates that this call was transferred to an agent after the caller's needs were met with the application. For example, the caller successfully received account information and then requested to speak to an agent for a different reason or for additional information not available through automatic means.
4	VRU Opt Out Unhandled	Indicates that the call was transferred to an agent at the caller's request before the caller's needs were met by the application. For example, the caller pressed “0” to be transferred to an agent before performing automated transactions or while in the process of completing a transaction.
5	VRU Scripted Transfer	Indicates that the call was transferred to an agent as part of the application design. For example, after the caller checked an account balance the application transferred the caller to agent to discuss new account options. Another example is that after a caller entered digits to request a particular type of service the call was transferred to an available agent to handle the request.

Variable Setting in Script	Show in Reports as	Description
6	VRU Forced Transfer	Indicates that the caller was transferred to an agent because of a system error. For example, a failure at a particular node in the application could lead to the call being transferred to the agent.
7	VRU Other	Indicates that the call disposition does not match any of the other VRUProgress variables.

You can use the VRUProgress variable to indicate the final VRU status at the end of the transaction or to indicate changes in VRU status through the different transactions in the application.

**Note**

While you can change the VRUProgress variable throughout the application, only the final status is reported for the Call Type. The value of the VRUProgress variable is written to the database when the routing script terminates. You can report on the VRU status of the application as a whole using the Call Type VRU Activity reports by monitoring statistics for the Call Type associated with the script.

**Note**

While you can change the VRUProgress variable throughout the application, only the final status is reported for the Call Type. The value of the VRUProgress variable is written to the database when the routing script terminates. You can report on the VRU status of the application as a whole using the Call Type VRU Activity reports by monitoring statistics for the Call Type associated with the script.

If you want to report on individual transactions within the application, change the VRUProgress variable and then the Call Type at the end of each transaction. You should have a different Call Type for each transaction with a related VRUProgress variable. This action ensures that the value of the VRUProgress variable is captured for that particular transaction, not just at the end of the routing script. The value is written to the database for the Call Type associated with that transaction when the Call Types changes. You can report on individual transactions using the Call Type VRU Progress reports by monitoring statistics for the Call Types associated with those transactions.

## Capturing script application data (Unified CVP only)

If you have deployed Unified CVP as the VRU in your enterprise system, you can use two advanced features to gather additional details about a calls' progress through Self-Service and Information Gathering applications: the capture microapplication and the metadata Exchange Carrier Code (ECC) variable. The details provided by these microapplications can be used only in custom reports; standard reports do not provide this information.

The Capture microapplication enables you to cause a Termination\_Call\_Detail (TCD) record to be written at any point in the script. This record includes information such as the current call variables, CallRouter call keys, date and time, caller entered digits, and metadata ECC variables.

The metadata ECC variable microapplication captures high-level details about a call's progress through a script, including whether the caller is using voice or digit dialing, percent confidence for Automatic Speech Recognition, number of attempts a user made before entering a prompt successfully, number of timeouts, number of invalid entries, microapplication duration, and the routing script used. This information is written



to TCD records. If you plan to use the metadata ECC variable, you must configure the ECC variables in Configuration Manager.

Using the VRUProgress variable, the Capture microapplication, and the metadata ECC variable microapplication together in a script provides you with the ability to monitor details about the transactions performed by the caller and the VRU application's interface to the caller. For example, you could use the Capture microapplication to create a TCD each time the VRUProgress variable changes in the script. The TCD is written for that particular point in the application, which includes the information gathered by the metadata ECC variable. A custom report could show how many callers experienced timeouts at different points in the application, how many attempts callers made before successfully completing a transaction, and how long it took a caller to complete each transaction. This data could indicate problems with the VRU application. You could also run a custom report on an individual call to see how a particular caller used the application and whether they encountered difficulties.

## Reports that show VRU metrics

This report shows metrics for VRU applications:

- Unified Intelligence Center IVR Ports Performance Historical Report

### Related Topics

[Unified ICM/CC Report Templates](#)

## Best practices for reporting on VRUs

Follow these guidelines when configuring Self-Service applications, Information Gathering applications, and queue applications:

- If you have Self-Service or Information Gathering IVR applications and want to separate self-service and digit collection metrics from queuing metrics, plan to change the call type in the routing script before the call is queued. This action ensures that you can report on both the self-service/digit collection section of the call and the queuing section of the call using Call Type reports.
- Plan to enable Service Control and Queue Reporting at the VRU peripheral if you want to report on VRU applications, services, queuing, and trunk groups.
- Determine the Service Level for the VRU peripheral.

If the peripheral type is not Aspect, the Service Level defaults to Calculated by Call Center.

If the peripheral type is Aspect, choose the type of calculation to be performed by default. You can override the default for each individual service.

- Use the VRUProgress variable in the Set node of the routing script to indicate the status of the call at different points in the routing script. You can set the status to VRU unhandled, VRU handled, VRU assisted, VRU opt out unhandled, VRU script handled, or VRU forced transfer.

For each transaction in the VRU Self-Service or Information Gathering application for which you plan to change the VRUProgress variable, create a separate call type. In the script, change the call type when a call reaches the end of a transaction and then change the VRUProgress variable. This action enables you to report on each transaction separately using the Call Type VRU Activity reports.

- Optionally, if you are using Unified CVP as your VRU and want to perform advanced custom reporting on VRU application details, configure the following:

- The Capture microapplication, which you can include in a script to trigger the creation of a TCD record at any point in a routing script. Configure the Capture microapplication as a VRU script; execute the application using the RunExternalScript node. You must name the script “CAP” or “CAP, xxx”, where xxx is any string that makes the script name unique. (For example, CAP, bankingApplication).
  - The Metadata ECC variable microapplication, which collects high-level details about the script application. Configure an ECC variable in the Expanded Call Center Variables configuration tool. The variable length should normally be 62 bytes but can be as low as 21 bytes to save space.
  - Use these microapplications in your scripts to trigger TCD creation at points in the script for which you want to capture data, such as when a transaction completes. Using the metadata ECC variable microapplication in conjunction with the Capture microapplication enables you to capture additional details about the performance of the script and the customer's experience for each point in the script for which a TCD record is created.
- There might be cases when a call is not queued, but instead sent to the agent directly (via the LAA Select node) from the VRU. Ensure the VRU PG is configured correctly to ensure that such a call is considered answered at the VRU service rather than abandoned.

To do this, set the configuration parameter to /ASSUME\_ANSWERED.

- If you are using IP-IVR as the VRU, set the Configuration parameter in the VRU PG record to /ASSUME\_ANSWERED to ensure that calls sent from the VRU to an agent without being queued are reported as Answered.

With this parameter, calls are counted as successfully connected as soon as the Connect message is sent to the VRU. This prevents calls from being counted as abandoned when a VRU fails to send an Event Report / Answered message in response to a Connect message.

- Configure services with peripheral IDs that match the information sent from the VRU.

The peripheral ID that you enter depends on whether you are using IP-IVR or Unified CVP as the VRU.

- If you are using IP-IVR, you configure a service with a peripheral ID that matches the ID you entered in Application Administration as the post-routing ID. Remember the post routing ID that you configure for use when creating services.
- If you are using Unified CVP, the peripheral ID that you enter depends on the VRU type.

If Unified CVP is a routing client that handles new calls (VRU type 5), the peripheral service ID should be 1.

If Unified CVP receives pre-routed calls (for example, VRU types 2, 3, 7, or 8), the peripheral service ID should be 2.



## PART III

# Special reporting environments

- [Reporting in a multichannel environment, page 147](#)
- [Reporting in Contact Center Gateway \(parent/child\) deployment, page 153](#)





# CHAPTER 19

## Reporting in a multichannel environment

This chapter provides information about reporting in a multichannel environment.

The ability to support online channels such as email, web collaboration, and web chat are a major part of customer interaction. Unified ICM reporting provides data on task and agent activity for multichannel options, including Cisco Unified E-Mail Interaction Manager (Unified EIM) and Cisco Unified Web Interaction Manager (Unified WIM), *if they are deployed in your Unified ICM system*.

To interpret report data correctly, you need to understand how Media Routing Domains (MRDs) and media classes are used, how agent availability and routability is determined, and the differences in report data for voice tasks and non-voice tasks.

- [Multichannel options, page 147](#)
- [Media classes and Media Routing Domain, page 148](#)
- [Multichannel reporting data, page 149](#)
- [Report templates for multichannel applications, page 150](#)

### Multichannel options

When Unified EIM and Unified WIM tools are included in a Unified ICM system, agents can be configured to handle email messages and online chat sessions *in addition to* voice calls.

**Unified EIM** enables organizations to intelligently route and process inbound emails, webform inquiries, faxes, and letters.

**Unified WIM** provides agents with a comprehensive set of tools for serving customers in real time. It enables call center agents to provide immediate personalized service to customers through text chat messaging and page-push abilities. Agents can also use Unified WIM to assist customers while on the phone, by navigating through web pages that the customer is currently browsing.

When present in the system, these multichannel options send the incoming task request to Unified ICM software for agent or skill group selection through the Media Response PG (MRPG) (which is used for routing) and an Agent PG (which sends agent status and activity to the Central Controller and places the selected agent into session with the task).

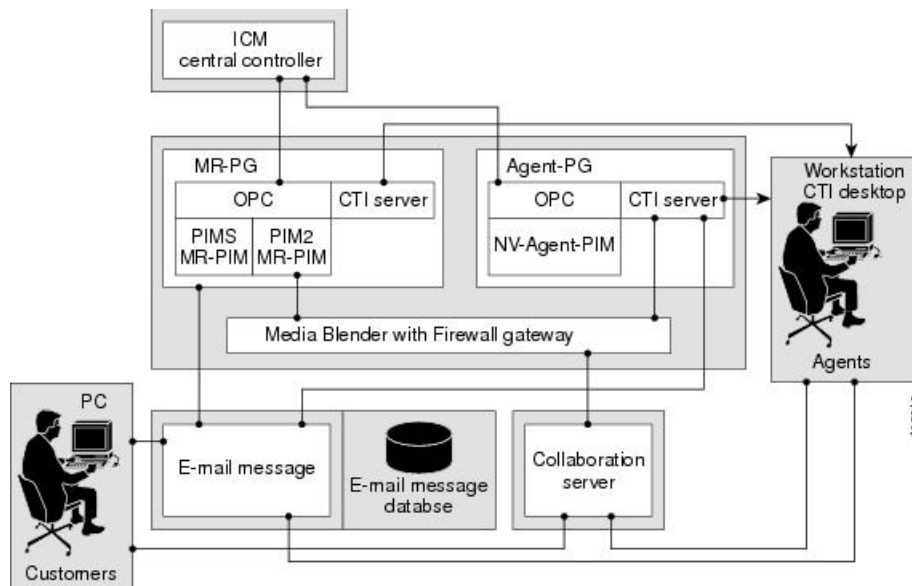
This is the flow of events when Unified EIM and Unified WIM receive a request:

- The multichannel option sends the task information to the Central Controller for routing purposes.

- The Central Controller returns an agent and skill group.
- The multichannel option pushes the task to the agent.
- If no agent is available, the task queues logically at the Unified WIM or in the queue of the Unified WIM until the agent becomes available. Because the task does not involve voice, physical queuing is not needed.

This architecture is illustrated in the following diagram.

**Figure 23: Multichannel options**



## Media classes and Media Routing Domain

A media class represents a combination, or a single instance, of media that are to be treated as a single concept for routing by Unified ICM software.

Media classes include:

- Voice, which includes incoming and outgoing phone calls. Voice also includes Web Callback and Delayed Callback through the Unified WIM.
- Chat, through Unified WIM
- Blended Collaboration, through Unified WIM
- Email, through Unified EIM

If your system is designed to handle voice-calls only, you have the Voice media class only.

A Media Routing Domain (MRD) is a collection of skill groups and services that are associated with a common media class. Unified ICM uses MRDs to organize how requests for different media are routed.

Each skill group is assigned to a MRD. Unified ICM software uses MRDs to route a task to an agent who is associated with a skill group and a particular medium.

Each MRD belongs to a media class.

You can report on activity for all of the MRDs that you have configured in your system.

When configuring your system, you first configure MRDs in Configuration Manager and then enable the appropriate MRDs on the Unified EIM and Unified WIM applications. MRDs have unique IDs across the enterprise.

The Voice MRD is created by default for all deployments.

## Multichannel reporting data

Unified ICM databases store information about agent activity and tasks routed by Unified ICM, including tasks that are submitted by Unified EIM or Unified WIM. Reports contain a Media field, when appropriate, to identify the MRD of each task included in the report.

The following table describes major differences between voice and non-voice tasks in reports. Non-voice tasks include chat, email, and Blended Collaboration.

**Table 31: Report data for multichannel options**

Type of Data	Data for Voice Tasks	Data for Non-Voice Tasks
Task direction	<p>Task direction can be both incoming (agent receives call) and outgoing (agent places call).</p> <p><b>Note</b> Calls placed by Outbound Option appear as incoming calls because of the manner in which the Outbound Option Dialer places calls between agents and customers.</p>	<p>Task direction is always incoming, and values of report fields pertaining to outgoing non-voice tasks are set to null.</p>
Session ownership changes	<p>The ownership of a voice task can change through the life of the call. Agents can transfer the call or conference in another agent.</p>	<p>Non-voice tasks do not change session ownership. These tasks cannot be transferred or conferenced and supervisors cannot barge into or intercept the task.</p> <p><b>Note</b> While it is possible for a Unified WIM agent to allow another agent to join a session and then drop the session, leaving the second agent and the caller in session together, this is not the same as a voice call transfer. Unified ICM software interprets this scenario as two different sessions, one for the original agent and one for the second agent. Also, while Unified EIM agents can forward messages to other agents, this is not the same as a voice call transfer. Unified ICM interprets message forwarding as two different sessions, one for the original agent and one for the receiving agent.</p>

Type of Data	Data for Voice Tasks	Data for Non-Voice Tasks
Short calls	Voice calls are considered to be short calls if they disconnect within the time boundaries defined in the Agent Desk Settings for short tasks.	Unified EIM and Unified WIM do not enable administrators to configure a short task time boundary. Therefore, non-voice tasks are not reported as short tasks, even if they disconnect within the short task time defined in Agent Desk Settings. Values of report fields pertaining to short calls are set to zero.
Multiple tasks	<p>Agents can handle one voice task at a time. Agents can handle a voice task and an email task simultaneously.</p> <p>Email is an interruptible MRD and agents handling email tasks can be interrupted with a voice call. Reports show the agent as Active for both the email and voice task.</p>	<p>Agents might be configured to handle multiple non-voice tasks, such as chat, at the same time. If an agent is engaged in several non-voice tasks, the reports contain data for each of the tasks.</p> <p>These tasks might be from multiple skill groups. For instance, because email is an interruptible MRD, an agent can be working on an email task while also working on a task or call in any other medium.</p> <p><b>Note</b> Task duration fields are also affected in reporting. For instance, the half-hour duration fields might have a value greater than 30 minutes for non-voice tasks.</p> <p><b>Note</b> Task duration fields are also affected in reporting. For instance, the half-hour duration fields might have a value greater than 30 minutes for non-voice tasks.</p>
Service Level	You determine which Service Level type you want to use for voice tasks and this setting affects the reporting data.	The Service Level for non-voice tasks is always set to “ignore abandoned calls”. The Service Level setting affects the Service Level data in reports for non-voice tasks.

## Report templates for multichannel applications

Although Unified ICM reporting applications offer templates that report on multichannel skill groups, agents, and tasks, reports generated from these templates do not contain details regarding specific events that transpire during a Unified EIM or Unified WIM task.

For example, Unified ICM report templates show that an agent handled a chat task, but do not provide the text of a sent chat message. Similarly, these reports show that an agent is currently Active on an email task, but do not show the number of emails received by an agent.

Multichannel applications have separate reporting tools, available through the applications, that provide application-specific details about the sessions.

These are some of the reports that contain operational information on activity in the Media Routing Domain:

- Unified Intelligence Center Agent Real Time All Fields
- Unified Intelligence Center Agent Historical All Fields



## Related Topics

[Unified ICM/CC Report Templates](#)





## CHAPTER 20

# Reporting in Contact Center Gateway (parent/child) deployment

This chapter describes reporting in a Contact Center Gateway deployment—a deployment in which a Unified CCE system functions as an ACD “child” with respect to a Unified ICME “parent”. It explains the relationship between the parent and child and the data that are transmitted from the child to the parent.



### Note

- For details on the Contact Center Gateway deployment, including installation and configuration, refer to the *Cisco Contact Center Gateway Deployment Guide*.
- Notes indicate those functions that require both the parent and the child to be at Release 8.0.



### Note

**Multiline:** Multiline reporting should not be compared between IPCC and ACMI (parent) as the feature is specific to Call Manager peripherals and not applicable for TDM (parent) peripherals.

In this deployment, the parent is the Unified ICME. Although the child can be a Unified CCE or Unified CCX system, this section assumes that the child is a Unified CCE system.



### Note

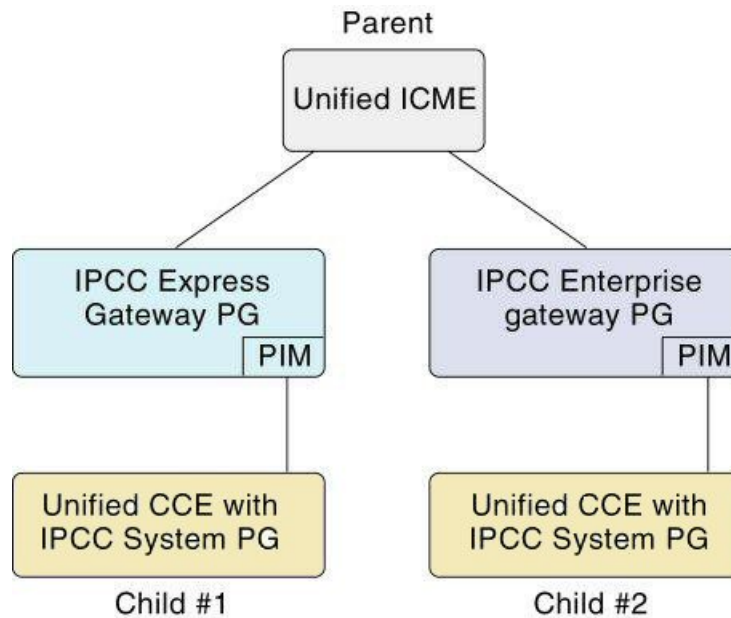
For information about reporting with a Unified CCX child and a Unified ICME parent, see the [Cisco Unified Contact Center Express documentation](#).

The relationship between parent and child is as follows:

- **Parent.** The parent is the system that serves as the network or enterprise routing point. The parent uses the Gateway PG to communicate to the CTI server on the child.
  - The parent knows the child as an Automatic Call Distributor (ACD), similar to any other ACD in the enterprise.
  - The parent can have more than one child and can route between children.
  - The child can receive calls routed from the parent but is not aware of any other peripherals attached to the parent.

- **Child.** The child is the system that is set up to function as an ACD. The child uses the IPCC System PG to communicate with the parent.
- **The System PG.** The child uses the IPCC System PG to communicate through the CTI layer interface to the parent. The IPCC System PG combines the VRU peripheral(s) and the Unified CM peripheral so that all events appear to come from a single peripheral and to have a single PeripheralCallKey. This allows ACD-like ingress to agent continuity in the call flow with a single call ID.

**Figure 24: Parent/child deployment**



The addition of the Cisco Contact Center Gateway PGs does not affect the reports on the ACD level; parent reports can be run and accurately reflect the state of their respective systems.

However, the data that the child system feeds to the parent through Cisco Contact Center Gateway PGs do not always correlate, and are not always intended to correlate, on both systems. This situation affects the reports on the enterprise level. In some instances, discrepancies are due to timing; in others, they occur because the Cisco Contact Center Gateway does not populate certain database fields.

- [Parent/child reporting, page 154](#)
- [Call Types on child maps to Services on parent, page 161](#)

## Parent/child reporting

This section provides information to help you understand the differences between reporting on the parent and reporting on the child.

As a best practice, whenever possible, *report at the source*; that is, at the call site where the activity is happening and where the data is generated. Use site (child) reporting for ACD activities such as agent-level reporting. Use parent reporting for cross-site, enterprise level reporting.

Things to keep in mind:

- **Agent Level Reporting.** To scale the parent optimally across the enterprise, disable agent-level reporting at the parent. Agent-level reporting is always enabled at the child.

Agent level reporting can be enabled at the parent but increases the load on the PG and the Central Controller and limits the total number of agents in Unified ICME to around 8,000 for all PGs.

- **Call Types.** Call Types at the child are mapped to Services at the parent. Do not have call types that span peripherals at a child site that has more than a single System PG. Doing so causes service counts on the parent to be different than Call Type reports on the child. Use unique call types per system PG where possible.
- **Configuration** is simplified by autoconfiguration.
- **Enterprise Queue Time.** The EnterpriseQueueTime field in the child Termination\_Call\_Detail table reflects the duration for which a call was queued at the parent. This field is not available to child scripts and is not used in any other calculation at the child or in any of the standard reports. However, users who look at this field in the database have a better sense for the Customer Experience as to queue time.




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**Note** Both Parent and Child must be at Release 8.0.

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- **Multichannel.** The reporting data collected is voice only (no enterprise-wide multichannel). Both the parent and the child can use multichannel independently. The parent and child cannot use each other's resources.
- **Network consultative transfer** is not possible in a parent/child deployment.
- **Outbound.** There is no enterprise-wide Outbound Option reporting in a parent/child environment. Both the parent and the child can use Outbound Option independently. The parent and child cannot use each other's resources.
- **Scripting** is consistent with traditional PGs, not Unified CCE. Scripts use Longest Available Agent (LAA) and Minimum Expected Delay (MED) and target services and skill groups, not agents.
- **RONA and RNA.** Redirect on No Answer (RONA) is defined and Ring No Answer (RNA) is handled at the ACD level (at the child).
  - RNA is defined as Ring No Answer handled by Unified CVP, generally at the parent or enterprise level and allows enterprise-wide consideration when a ring no answer event occurs. RNA is possible only when queuing is done with Unified CVP at the parent.
  - RONA allows consideration of resources only at the site (unless the call is post-routed to the parent, in which case the parent is unaware of the ring no answer condition).
  - As a best practice, do not use both child RONA and parent RNA. Pick one or the other and be consistent. RNA is preferable when Unified CVP is the enterprise routing platform.
- **RNA handling when a call is redirected.** If a call is queued at the parent Unified CVP and translation-routed to the child and is later pulled back by the parent CVP and sent to another child or to the same child, when the original child requeries the call, then the parent sends RNA information to the original child as a TCD record that shows the appropriate disposition (Redirected) and not the disposition of Abandoned.




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**Note** Both Parent and Child must be at Release 8.0.

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- **Routing**

- Avoid sending calls from one child to another without parent involvement. Cradle-to-grave tracking is lost if you do this.
- Do not bounce calls. That is, do not queue the call locally at the child and periodically post-route the call to the parent to check if another resource is available. Leave the call queued at the parent or at the child.
- Use translation routes to all children. This allows parent-to-child call data exchange and cradle-to-grave reporting.
- All normal ACD functionality is supported: pre-routing, re-routing with translation routing, and post-routing. Third-party call control on the parent is the exception.
- Routing to the child is to peripheral targets (skill groups, service), as for all legacy PGs.
- The child can send remote route requests to the parent for post routes and translation routes, provided that Permit Application Routing is checked on the Dialed Number. Remote routing takes priority over local routing if the parent exists, is connected, and the PG registers for control. This prioritizing allows backup local scripts to take over if the parent is unavailable.

- **Queuing**

- If queuing is done at the parent, the child call center does not have access to the queue time for some calculations such as Average Handle Time (AHT).
- CTI clients connect to the child's CTI and do not see calls queued by the parent; for example, with Unified CVP.

- **Supervisors and supervisory activity and statistics** are not reported at the parent. The parent is aware of the activities but does not know the reason for them; for example, an intercept is seen as a transfer.
- **Third-party call control.** There is no third-party call control through CTI. Agent desktops are connected to the child only.
- **Unified CVP** at the child is supported but is discouraged, as no queuing statistics are reported, since Unified CVP is on a peripheral other than the System PG.
- **Variables.** Full variable passing is done between parent and child. You can send/receive call variables 1–10 and ECC variables. Filtering is available to control data passing in each direction if necessary.
- **VRU call events** are not reported at the parent and do not appear in parent reports.

### Related Topics

[Call Types on child maps to Services on parent, on page 161](#)

[Autoconfiguration from child to parent, on page 159](#)

## Differences between Unified ICME parent and Unified CCE child reporting

If you compare data at the parent with data at the child over intervals, you are likely to find differences. This section lists some reasons why data collected and presented in reports run at the parent can differ from data collected and presented in reports run at the child:

- **Differences due to transmission delays** can cause variations between reporting data seen on reports run at the parent and at the child. All times computed on the parent, such as various state transitions, are based upon event arrival time in the parent, not on their actual event occurrence on the child.
- **Differences based on Central Controller Time or ACD Time.** Prior to this release, call type data was written to Call Type tables on Central Controller time. Other data (service, skill group, agent) was written to the respective tables based on Peripheral time.

You can configure reporting intervals on either Central Controller time or on ACD (Peripheral) Time.

To continue with existing parent/child behavior, select ACD (Peripheral) Time. With this selection, Call Type/Skill Group data at the parent might not be consistent with itself. However, Skill Group counts at the parent and the child should match.

If your selection is Central Controller time, then the Call\_Type/Skill\_Group data at the parent should match. However, Skill Group counts at the parent and at the child might not match as they might no longer be synchronized.




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**Note** Both parent and child must be at Release 8.0.

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- **Differences in supported concepts at the parent and child** can cause variations. Certain concepts are supported only at the parent or only at the child. Therefore, certain agent performance and customer experience statistics might only be available at the parent or at the child. For example, Skill Group Service Levels are supported on the child but not the parent.
- **Differences in implementation of similar concepts in the parent and child.** For example, to measure the Service Level experienced by incoming callers, reporting users at the parent would use Service Level statistics on Service Reports, while reporting users at the child would use Service Level statistics on Call Type Reports.
- **Differences in configuration of parent and child systems.** Although autoconfiguration minimizes this issue, discrepancies between child and parent configurations can lead to reporting differences.

The following are some examples:

- **Short Calls:**

*Abandoned Short Calls:* For call types and services, you configure only abandoned short calls. Answered short calls are not reported for call types and services. On the parent, if the “Abandon Wait Time threshold” for services is not configured to be the same as the Aban Wait Time threshold in the global settings for Call Types on the child system, discrepancies can arise between abandon counts on the two systems. A call might be considered as abandoned on the parent and as a Short Call on the child and vice versa.

*Answered Short Calls:* Answered short calls can also cause a difference in reporting. Answered short calls apply to the skill group and the agent skill group database tables. The short call timer starts when the agent answers the call. CallsAnswered is updated for these calls. However, the ShortCalls fields within the skill group and agent skill group tables are also incremented. It is important to ensure that the “Answered Short Call threshold” configured on the Contact Center Gateway Peripheral on the parent matches the “Answered Short Call threshold” configured on the IPCC System peripheral configured on the child.

- **Agent Reporting:** If you decide to use the parent system to report on agents, consider the following configurations.

Ensure that the Agent reporting is enabled on the Contact Center Gateway peripheral on the parent and identify the Administration & Data Server on the Agent Distribution list when configuring the IPCC Enterprise Gateway peripheral. If these configurations are not done, then reporting on the parent system does not show any agent data.

If you plan to use **Agent Team** reports, configure Agent Teams and the Agent Team Members on the parent to match those on the child systems.

If you plan to report on **Not Ready reason codes** on the parent system, configure the following on parent:

- 1 Configure the Not Ready reason codes by entering numeric and text values for each reason code. For example, if you want Not Ready reason code 1 to equal “Break”, enter “1” for the Reason Code and “Break” for Reason Code Text. These codes need to match and must be identical as configured on the child system.
- 2 Ensure that agent event detail is enabled on the IPCC Enterprise Gateway PG that is configured to talk to the IPCC System PG on the child.

- **Mapping of Call Types and Services:** The Call Types on the child are autoconfigured as Services on the parent. However Call Types are not specific to peripherals, whereas, Services are.

If you have a child that has two or more IPCC System PGs, ensure that you have not configured call types that span these two peripherals. If you configure a Call Type that spans peripherals on the child, these are configured as two services on the parent system, one for each peripheral. Hence, a single call type on the child maps to two different Services (on two different peripherals) on the parent, resulting in reporting differences.

### Related Topics

[Interval configuration, on page 8](#)

[Differences between Unified ICME parent and Unified CCE child reporting, on page 156](#)

## Reporting applications in a parent/child environment

Unified IC provides real-time and historical reports for agents, skill groups, services, and call types. These reports can be used to manage agents, measure customer experience, and monitor call center operations.

- To run enterprise-wide reports at the *parent*, always select the ICM Templates check box in each report category. Leave the IPCC Templates check box unchecked.
- To run reports at the *parent* to measure customer experience, use “ICM Templates” in the Services category.
- To run reports at the *child* to measure customer experience, use “IPCC Templates” in the Call Type category.

Unified IC does not distinguish between ICM Templates and IPCC Templates.

## Parent/child deployment models

The following table provides a brief outline of reporting on the parent and child systems for two common parent/child deployment models.



**Table 32: Reporting options, IPCC enterprise gateway deployment model**

Deployment Model	Parent Reporting	Child Reporting	Caveats
One parent with one or more children, each with an IPCC System PG  <b>Note</b> The parent treats each child as a separate ACD.	The parent has its own reporting components: an Historical Data Server, an Administrative & Data Server, and a Unified IC reporting application  Unified IC does not distinguish between ICM and CCE (IPCC) templates.	Each child system has its own individual reporting components: an Historical Data Server, an Administrative & Data Server, and a Unified IC reporting application.  Unified IC does not distinguish between ICM and CCE (IPCC) templates.	The Agent and Skill Group reports on the parent do not reflect reporting statistics for the Outbound Option dialer and Multimedia (email, chat and Blended Collaboration) tasks that are handled by agents in the child.  Reports do not reflect Outbound Dialer Campaign or Dialer statistics that are reported on the child.
Multiple parents connected to a single child system through individual IPCC System PGs; for example, multiple Outsourcers sending calls from their parent to a single child (Provider).	Each parent has its own reporting components. For example, each Outsourcer has its own individual parent with its own Unified IC reporting application.  Each parent can see only reporting information that is associated with its own IPCC Enterprise Gateway PG.	The receiving child (Unified CCE) system has an Historical Data Server, an Administrative & Data Server, and a Unified IC reporting application and provides reporting on agent performance and customer experience on calls routed to the Unified CCE child from multiple Unified ICME parents.	In this deployment the child Unified CCE System has two peripherals (IPCC System PGs) each talking to different Unified ICME parents.  <b>Note</b> The child must not set up call types that span the two peripherals.

## Autoconfiguration from child to parent

The PG supports autoconfiguration of basic configuration data from the child to populate tables on the parent. Autoconfiguration is enabled by default in the Peripheral tab of the PG Explorer and takes effect when the PG is started.

Once initial autoconfiguration is complete and configuration rules are updated, additional changes on the child are sent up to, and are applied dynamically to, the parent. During subsequent connections, configuration keys are checked so that only changes are updated.

When records are deleted on the child, they are marked as “deletable” on the parent but are not actually deleted.

Do not confuse Cisco Contact Center Gateway peripheral autoconfiguration with agent autoconfiguration.

- Peripheral autoconfiguration is a check box on the main Peripheral tab. It is greyed out for all but the gateway PGs.
- Agent autoconfiguration is a check box option available on the Advanced tab in the PG Explorer.

You must ensure that Agent autoconfiguration is *disabled* so that the IPCC Enterprise Gateway PG can function properly using Peripheral auto-configuration.

**Note**

With autoconfiguration on, you cannot alter any of the active configuration on the parent.

These are the tables on the parent that receive configuration data from the child:

**1 Agent/Person****2 Skill Group****Note**

Default skill groups on the child, which are non-viewable, are created as real skill groups on the parent. Activity done in the default skill group on the child shows up in these real skill groups on the parent.

**3 Service** (*Call Types* on the child are configured as *Services* on the parent.)**4 Peripheral Monitor**

If *any* error occurs during autoconfiguration, the keys on the parent are not updated. The Unified CCE PIM continues to upload the entire child configuration to compare it every time it is started until no configuration errors are encountered.

Autoconfiguration does not provide complete configuration for Unified ICME software. You must configure some elements manually at the parent, such as:

- Dialed numbers
- Scripts
- Peripheral targets
- Routes
- Device targets
- Agent desk settings
- Agent teams
- Supervisors
- Service members

To configure service members for any given service, examine the script for a call type on the child and note to what skill groups the script offers the call. On the Unified CCE parent, make these skill groups service members of that Service.

**Naming conventions for mapping on the parent**

*Mapping* is the method that Contact Center Gateway uses to manage data that the child system delivers to a parent system during the autoconfiguration process.

Unified ICME uses naming conventions to assist users in tracking data mapping between parent and child systems.

As a best practice, limit the number of characters in the names of agents, skill groups, and call types on the child system. When these names are passed to the parent during autoconfiguration, the software configures the name as (Parent)Peripheral.EnterpriseName + "." + (Child)Skill\_Group.PeripheralName. If the configured name exceeds 32 characters, it is automatically truncated, and the *name* of the skill group, agent,

or call type on the child is replaced with a *number* on the parent. This means that you cannot find the name in reports run on the Unified ICME system.

The following list provides the mapping naming convention syntax descriptions for each data entity and uses the example of a Peripheral.EnterpriseName value of CCE1:

- **Skill Group**

Default syntax (under 32 characters): (Parent)Peripheral.EnterpriseName+"."+(Child)Skill\_Group.PeripheralName

Example: CCE1.Sales

Fallback syntax (over 32 characters): (Parent)Peripheral.EnterpriseName+"."+(Child)Skill\_Group.PeripheralNumber

Example: CCE1.5001

- **Service**

Default syntax: (Parent)Peripheral.EnterpriseName+"."+(Child)Call\_Type.Name

Example: CCE1.TECH\_SUPPORT\_CT

Fallback syntax: (Parent)Peripheral.EnterpriseName+"."+(Child)Call\_Type.CallTypeID

Example: CCE1.5009

- **Agent**

Default syntax: (Parent)Peripheral.EnterpriseName+"."+(Child)Agent.LastName + "."+(Child)Agent.FirstName

Example: CCE1.Smith.Jane



**Note**

Duplicates are avoided by a suffixed numeral. If a child has two agents with identical names, differentiated enterprise names are generated. (Example: CCE1.Jones.John and CCE1.Jones.John.1)

Fallback syntax: (Parent)Peripheral.EnterpriseName+"."+(Child)Agent.PeripheralNumber

Example: CCE1.5011

## Call Types on child maps to Services on parent

Most data entities on a child map to corresponding entities on the parent and are mapped by their corresponding peripheral fields. However, there is one important exception: for reporting purposes, *Call Types* on the child map to *Services* on the parent. That is, when autoconfiguration occurs, data from the *Call Type tables* on the child populate the *Service tables* on the parent.



**Note**

The parent continues to process the Call Type data it owns using the “traditional” method, that is, by populating the Call Type tables with Call Types configured on the parent.

## Call Type and Service differences for parent and child

On both the parent and the child, Call Type is the first-level category by which data is determined about the contact and a script is associated with the Call Type. On the child, when a contact of a certain Call Type is received, the associated script runs to determine the appropriate Skill Group to route the call to. However, on the parent, when a contact of a certain Call Type is received, the associated script runs to determine the appropriate Service to which to route the call.

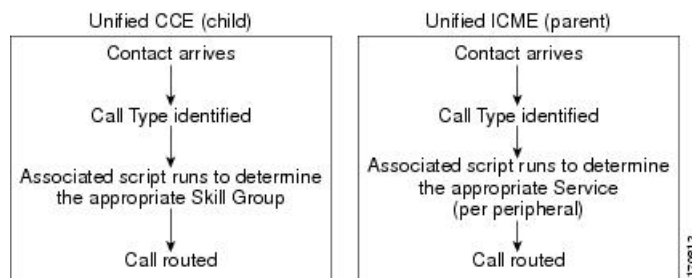


**Note** This diagram does not show translation routing.



**Note** This diagram does not show translation routing.

**Figure 25: Child skill group/parent service**



## Similar data concepts in child Call Type and parent Service database tables

This section describes the relationship between customer experience data available at the parent and at the child.

At the child, service level data is collected and presented in Call Type and Skill Group database tables and reports.

At the parent, service level data is collected and reported only in Service database tables and reports.

In addition to these differences, in a Unified CCE *child*, you can also use scripting to change call types in order to capture certain statistics. In such scripts, when a call changes call types, the old call type Service Level timer stops and the Service Level timer associated with the new call type starts. However, the Service Level timer for Services on the Unified ICME *parent* is not stopped and reset.



- Note**
- Due to this timing issue, do not compare ServiceLevel field values in Call\_Type\_Interval/Real\_Time tables on the child with the ServiceLevel field values in Service\_Interval/Real\_Time tables at the parent.
  - “Similar concept” in this discussion means “closest in meaning”; it does not imply an absolute match.

The data collected and presented in Service database tables and Services reports at the parent is expected to vary from data collected and presented on Call Type database tables and Call Type reports on the child.

Although the two data sets are not expected to be an exact match, in some cases, the customer can look at a specific data field in the Services table at the parent and see a corresponding data field in Call Type table in the child that is similar in meaning.

**Note**

- Data fields that are not listed in these tables either cannot be mapped (that is, although they might be populated on a parent system, they have no corresponding value on the child system) or are not available (that is, they are null or zero on the parent.)
- There are no corresponding fields or tables in the child for the parent Service\_Five\_Minute table.

**Table 33: Service and Call Type data mapping**

Parent: Service_Interval	Child: Call_Type_Interval	Comments
AnswerWaitTime	AnswerWaitTime	
AvgDelayQ	AvgRouterDelayQ	Network queuing data is not available at the child level.
CallsAnswered	CallsAnswered	
CallsHandled	CallsHandled	
CallsOffered	CallsOffered	
DelayQAbandTime	DelayQAbandTimeHalf	See Note 1.
HandleTime	HandleTimeHalf	
HoldTime	HoldTimeToHalf	
OverflowOut	OverflowOutHalf	
SkillTargetID	No direct map	The PeripheralNumber of this service in the Service table maps to the CallTypeID in the child table.
TalkTime	TalkTimeHalf	
TimeZone	TimeZone	

**Note 1:** Any condition on the child causing the call to terminate while in queue is documented in this field in the database schema. (The child Call Type reports have more granularity with regard to “error” calls.)

**Table 34: Service\_Real\_Time data mapping**

<b>Parent: Service_Real_Time</b>	<b>Child: Call_Type_Real_Time</b>	<b>Comments</b>
AnswerWaitTimeHalf	AnswerWaitTimeHalf	
AnswerWaitTimeTo5	AnswerWaitTimeTo5	
AnswerWaitTimeToday	AnswerWaitTimeToday	
AvgDelayQATo5	AvgRouterDelayQTo5	See Note 1.
AvgDelayQNow	AvgRouterDelayQNow	
CallsAbandQHalf	RouterCallsAbandQToHalf	See Note 1.
CallsAbandQTo5	RouterCallsAbandQTo5	See Note 1.
CallsAbandQToday	RouterCallsAbandQToday	See Note 1.
CallsAnsweredHalf	CallsAnsweredHalf	
CallsAnsweredTo5	CallsAnsweredTo5	
CallsAnsweredToday	CallsAnsweredToday	
CallsHandledHalf	CallsHandledHalf	
CallsHandledTo5	CallshandledTo5	
CallsHandledToday	CallsHandledToday	
CallsOfferedHalf	CallsOfferedHalf	
CallsOfferedTo5	CallsOfferedTo5	
CallsOfferedToday	CallsOfferedToday	
DelayQAbandTimeTo5	DelayQAbandTimeTo5	See Note 1.
HandleTimeHalf	HandleTimeHalf	
HandleTimeTo5	HandleTimeTo5	
HandleTimeToday	HandleTimeToday	
HoldTimeHalf	HoldTimeHalf	
HoldTimeTo5	HoldTimeTo5	
HoldTimeToday	HoldTimeToday	

Parent: Service_Real_Time	Child: Call_Type_Real_Time	Comments
RedirectNoAnsCallsHalf	CallsRONAHalf	
RedirectNoAnsCallsTo5	CallsRONATo5	
RedirectNoAnsCallsToday	CallsRONAToday	
TalkTimeHalf	TalkTimeHalf	
TalkTimeTo5	TalkTimeTo5	
TalkTimeToday	TalkTimeToday	

**Note 1:** Any condition on the child causing the call to terminate while in queue is documented in this field in the database schema. (The child Call Type reports have more granularity with regard to “error” calls.)

### Related Topics

[Differences between Unified ICME parent and Unified CCE child reporting, on page 156](#)

### Mapping data between child and parent

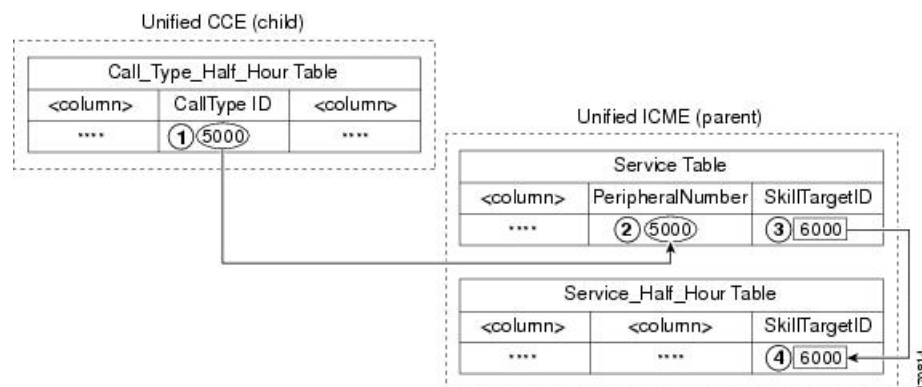
When the child maps a Call Type to a parent Service, the following attributes are passed from the Call\_Type table to the Service table:

- The CallTypeID in the Call\_Type table on the child system maps to the PeripheralNumber in the Service table on the parent.
- The EnterpriseName in the Call\_Type table on the child maps to the PeripheralName in the Service table on the parent.

You can use this mapping process to locate the corresponding Service records on the parent for a call type record on the child.

The figure that follows shows an example of data mapping.

**Figure 26: Data mapping between Unified CCE child and Unified ICME parent**



In the figure:

- 1 On the child, the record in the Call\_Type\_Interval table you are interested in has a CallTypeID value of 5000.
- 2 On the parent, you would search the Service table for a Service with a PeripheralNumber field that matches the CallTypeID on the child (5000).
- 3 The SkillTargetID for that Service is 6000.
- 4 Using the SkillTargetID value (6000), look up the corresponding record in any of the Service Tables (for example, Service\_Interval, Service\_Real\_Time).





## PART **IV**

# Reporting implications of data loss and component failover

- [Data loss and component failover, page 169](#)





## CHAPTER 21

# Data loss and component failover

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This chapter provides information about data loss and component failover.

Unified CCE uses sophisticated techniques in gathering and storing data. Due to the complexity of the system, the amount of data being gathered, the diversity of devices and peripherals, and the complex processes involved, it is possible that historical reports might present inconsistent data.

Although these reporting inconsistencies are confusing, most can be traced to temporary effects caused by time lags between the processes involved and nature of the data itself.

This chapter identifies and explains common conditions that lead to temporary and permanent inconsistencies in historical data. It discusses the potential effect of system failover on data that appears in reports and offers guidance on how to guard against data loss.

- [Data flow from Logger to Historical Data Server, page 169](#)
- [Methods to prevent data loss from Logger and HDS failure, page 171](#)
- [Data loss from PIM failure, page 173](#)
- [Other possible points of failover, page 174](#)

## Data flow from Logger to Historical Data Server

Assuming a full-duplex, fault-tolerant implementation, data is sent from CallRouter A to Logger A and from CallRouter B to Logger B.

The Logger Central Database forwards (replicates) historical data to corresponding historical tables on the Historical Database Server in summary intervals. These data populate the historical interval and daily reports.

Two Administration & Data Servers are typically set up as HDS machines. A similar fault-tolerant strategy applies to the HDS—when the primary HDS fails, the Administration Client automatically switches over to use the backup HDS.

Each Historical Data Server (HDS) is connected to a single Logger.

## Recovery and replication

### Recovery keys

The recovery key is the base key for all historical data tables. This key is always incremented by 1 before a new record is inserted into any historical table.

In a duplex configuration, the Logger that finishes initializing first is designated the primary Logger (although both the Loggers are always active and working in parallel). The recovery key is always initialized by the primary Logger. The recovery key is based on the current GMT date and time and always has a value greater than any previous value generated. This helps the recovery process to keep the Loggers in sync.

The replication process may have a latency of about one to five minutes because the Logger replicates data table-by-table on the HDS.

### Temporary tables

Each historical table on the Logger Central Database has two corresponding temporary tables that act as buffers to incoming historical data. As they have minimal indexes, the temporary tables speed up the process of inserting data into the corresponding actual table in the Logger Central Database.

### Recovery process

As the incoming historical data is written to the corresponding temporary tables by the Logger, the Recovery process reads the data from the temporary tables and performs a bulk insert operation of up to 2000 records into the actual historical tables.

In a duplex configuration, the recovery process keeps the historical data on the two Loggers in sync, using the recovery keys. The historical data between the Loggers is synced directly using actual tables; temporary tables are not used by the recovery process.

### Replication

The Replication process is responsible for replicating data that has been committed to the Logger Central database to the HDS database.



#### Note

The Replication mechanism consists of two processes: the Replication Server Process that runs on the Logger and the Replication Client Process that runs on the Distributor on which HDS has also been installed.

The Replication Client sends a request to the Replication Server requesting historical data that have associated Recovery Keys higher than those currently on corresponding historical tables. The Replication server sends the requested data back as a set of 2000 records each time.

The Replication server reads the historical data from the actual tables on the Logger and sends it to the Replication Client, which writes the historical data to the actual corresponding tables in the HDS database. Temporary tables are not used to replicate the data from the Logger to the HDS.

## Possible points of delay or inconsistency

If the Logger connected to the HDS goes offline, the HDS does not connect to a different Logger. For example, if the HDS is connected to Logger B and Logger B fails, the HDS does not connect to Logger A. When Logger

B comes back up, it recovers data from Logger A and begins to receive current historical information. Once the Logger has recovered all of the data from Logger A, it begins to replicate this data to the HDS.

If reports are run from this HDS for recent intervals while the Logger is offline or while the Logger is in the process of recovering or replicating data, you might not see data for those intervals in reports. This situation is temporary, and you will see the data once the replication process for the tables used by the reports is complete. If you are using a fault-tolerant system with two HDS Administration & Data Servers, you can run reports using the backup HDS while the primary HDS is not receiving data.

If the HDS goes offline and you are using a fault-tolerant system with two HDS Administration & Data Servers, you can run reports using the backup HDS. When the HDS comes back up, it recovers data from the last HDS data backup and also replicates data from the Logger for the most recent data not available in the backup.

The recovery data replication is faster than regular Logger-HDS data replication. Once the HDS has recovered to its typical Logger-HDS latency of one to five minutes, data replication proceeds as usual.

If you are not using a fault-tolerant system, you will not see data in historical reports until the HDS is restored. You might also notice missing data as the replication process is in progress. This situation is temporary and you will see the data once the replication process for the tables utilized by the reports is complete.

## Methods to prevent data loss from Logger and HDS failure

Data loss manifests as *data holes*, which are one or more missing records in an historical database table.

There are two types of data loss: temporary and permanent:

- A temporary data hole can happen during the Logger recovery process. For example, Logger A goes down, then comes back up and contacts Logger B to synchronize and recover historical data that was written while it was down.

While this recovery process is going on, the reporting database on Logger A may have temporary data holes, which will be filled when the recovery process completes.

- A permanent data hole can happen during an Emergency Purge. For example, there can be permanent data loss if an emergency purge deletes records on one Logger that have not been sent to the other Logger or to the HDS.

It is possible to monitor and tune Unified CCE to minimize the occurrence of data loss.

### Fault tolerance

One way to protect your system is to follow Best Practices for duplexed Unified CCE fault tolerance, as presented in the *Administration Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted*.

### Data retention and backups

Another way to safeguard against loss is to configure the amount of time that data is stored on the Logger Central Database and in the HDS in relation to the schedule for HDS backups.

The Central database stores data for less time than the HDS. For example, you might store two weeks of data on the Logger and a year of data on the HDS.

When the HDS recovers after going offline, it retrieves all of the data on the Logger for the interval for which data is missing from the backup. You must manually restore the rest of the data from the last HDS backup.

The amount of data retained on the Logger should cover, at a minimum, the time period between HDS backups. For example, if the Logger stores data for two weeks, then you need to back up at least every other week to ensure that you can recover all historical data.

### CPU utilization

It is possible that the process on one of the Loggers is slow because of space issues or an overload of the SQL Server. In this situation, the data on the Logger with the slower SQL Server will lag in persistence of the historical data with respect to the other Logger. This causes the HDS on the corresponding side to lag as well.

As a consequence, if both sides have an HDS set up and the same reports are run from both HDSs, the reports might differ. This is usually a temporary inconsistency, since the condition that causes the SQL server process to slow might be remedied. Autogrowing of the database and load conditions often remediate. The Loggers and the HDSs eventually catch up and are in sync. Running the reports later will result in consistent reports.

However, if the database server runs out of disk space, the situation is quite serious and might cause data to be out of sync for a longer duration until the problem is remedied. A permanent loss of data can occur when data is purged from the peer Logger and never replicated on the slower side.

### Scheduled purge and retention settings on loggers

The goal of the scheduled purge is to free up database space by purging the oldest data.

There are several reasons for data loss during a scheduled purge:

- **Retention settings on Loggers**

Data inconsistencies and permanent data loss can occur if the number of days to retain the data differs on the Loggers.

Assume that Logger A is set to retain 7 days' worth of data, while Logger B is set to retain 15 days worth of data.

If Logger B is down for 6 days, a temporary data discrepancy exists when it is brought back up, until the Recovery process synchronized the data from Logger A. However, if Logger B is down for 10 days, when it comes back up, it can synchronize only the last 7 days worth of data, based on Logger A's retention setting. Three days are lost permanently from Logger B.



**Note**

The data might be lost from the system permanently, if the historical data was copied to the HDS database associated with Logger A. Although this situation appears as a discrepancy in the reports that are run from HDS servers that connect to side B, the system is functioning in a predictable manner. It can be considered as an issue of perception.

To avoid this situation, make sure that the retention settings are the same on both Loggers.

- **Scheduled purge and Peripheral Gateway failure**

If multiple Peripheral Gateways (PGs) are configured, and if one of the PGs goes down for a brief period, it is possible to lose historical data permanently.

Assume that there are three PGs in the system and that one goes down for a day and then comes back online. When that PG comes back online, it sends historical data for activity that occurred prior to it going offline.

If the scheduled purge mechanism activates and determines that the oldest one hour of data needs to be purged, it is possible that the purge will delete data that was sent by the PG after it came online but before it was replicated to the HDS.

Permanent data loss can occur if the HDS is down and the scheduled purge on the Logger deletes data that has not yet been replicated to the HDS.

### Emergency purge

The emergency purge mechanism is triggered when the Logger Central Database becomes full or reaches a configured threshold size. Its objective is to free up space by purging data from the historical tables so that the database has more free space than the allowed minimum.

The emergency purge goes through each historical table in a predefined order one at a time and purges one hour's worth of data from the table. As data is purged from each historical table, a check is made to verify if the free space is more than the minimum threshold value. Once adequate space has been recovered, the emergency purge procedure stops. Otherwise, it continues through to the next historical table and keeps looping as necessary.

Permanent loss of historical data can occur if the emergency purge removes historical data that has not yet made it to an HDS and has also not been replicated to the peer Logger that is “down” or in the recovery process.

Database used percentage is displayed as a normal status message in the replication process every few minutes. You can occasionally monitor this value to make sure that it does not grow too often or too fast. Emergency purge occurs when the percentage used is greater than the configured value (usually 90%).

## Data loss from PIM failure

The Peripheral Interface Manager (PIM) is the process on the Peripheral Gateway responsible for the actual connection to the peripheral and for normalizing the CTI interface on behalf of Unified CCE.

If a PIM fails, if the link between the PIM and the ACD goes down, or if the ACD goes down, then all of the reporting data that has been gathered for the peripheral associated with the PIM is deleted.

The state of all agents on that peripheral is set to *logged out* and is reported as such to the CallRouter.

The CallRouter has no way of determining what was going on at the ACD while the PIM was out of contact with the ACD. When the PIM reconnects to the ACD, the ACDS does not send the PIM sufficient information to allow the recording of accurate historical reporting data for the interval(s) in which the disconnect took place.



#### Note

When the PIM reconnects to the ACD, most ACDs do pass information to the PIM about each agent's state and duration in that state. While this is not enough to allow accurate historical reporting data to be recorded, it is enough to allow the CallRouter to make accurate call routing decisions.

When the PG is duplexed, either the Side A or Side B PIM is active for each peripheral. If one side loses connection, the other comes up and activates.

## Other possible points of failover

### Peripheral Gateway / CTI Manager service failover

If the agent's PG shuts down or the CTI Manager service shuts down, the agent is momentarily logged out. The agent might be logged in again automatically once the backup PG or CTI Manager comes into service. The agent Media Logout Status reports for the agent, agent skill group, agent team, and agent peripheral show a logout reason code of 50002.

**Table 35: Agent State before and after Peripheral Gateway/CTI Manager Service failover**

Agent State at Fail-Over	Agent State after Fail-over
Available	Available
Not Ready	Not Ready
Wrap-up	Available, if in Available state before the call. Otherwise, the agent reverts to Not Ready.

### Agent desktop / CTI OS Server failover

If the agent desktop (CTI OS desktop or Cisco Agent Desktop) shuts down or loses communication with CTI OS Server, or if CTI OS Server shuts down, the agent is logged out of all MRDs supported by the peripheral that has lost communication with Unified CCE software.

The agent is logged in again automatically when one of the following occurs:

- The agent desktop comes back up or resumes communication with CTI OS Server
- The agent is connected to the backup CTI OS server

The agent Media Logout Status reports for the agent, agent skill group, agent team, and agent peripheral show a logout reason code of 50002.

The state to which the agent reverts after failover depends on the agent's state when the failover occurred, as described in the following table.

**Table 36: Agent State before and after Agent Desktop/CTI OS Server failover**

Agent state at failover	Agent state after failover
Available	Available
Not Ready	Not Ready
Reserved	Available



Agent state at failover	Agent state after failover
Wrap-up	Available, if in Available state before the call. Otherwise, the agent reverts to Not Ready.

## Application Instance / MR PG failover

If the connection between the Application Instance and MR PG shuts down or either component shuts down, the Central Controller discards all pending NEW\_TASK requests received from the application.

The Application Instance waits for the connection to be restored and continues to send messages regarding existing tasks and new tasks assigned by the Application Instance to the Agent PG CTI server. When the connection, MR PIM, or Application Instance is restored, the Application Instance resends any pending NEW\_TASK requests for which it has not received a response from the Central Controller. The tasks that are assigned to the agent by the Application Instance while the connection is down and completed before the connection is restored do not appear in reports.



### Note

If the Application Instance shuts down, this situation also affects Agent PG CTI server connections.

If the connection between the MR PIM and the Central Controller shuts down or the Central Controller shuts down, the MR PIM sends a ROUTING\_DISABLED message to the Application Instance that causes the Application Instance to stop sending routing requests to the Central Controller.

Any request sent while the connection is down is rejected with a NEW\_TASK\_FAILURE message. The Application Instance continues to send messages regarding existing tasks and new tasks assigned by the Application Instance to the Agent PG CTI server.

When the connection or Central Controller is restored, the MR PIM sends the Application Instance a ROUTING\_ENABLED message that causes the Application Instance to start sending routing requests to the Central Controller again. The tasks that are assigned to the agent by the Application Instance while the connection is down and completed before the connection is restored do not appear in reports. If the connection between the Central Controller and the MR PG fails, the CallRouter deletes all pending new tasks. When the connection is restored, the application connected to MR PG will resubmit all the tasks.



### Note

If the Central Controller shuts down, this situation also affects the Application Instance/Agent PG CTI server interface.

## Application Instance / Agent PG CTI server / PIM failover

If the connection between the Application Instance and Agent PG CTI server shuts down or either component shuts down, agents stay logged in. Tasks remain for a time, based on the task life attribute of the MRD. If the task life expires while the connection is down, tasks are terminated with the disposition code of 42 (DBCD\_APPLICATION\_PATH\_WENT\_DOWN).

**Note**

For the email MRD, agents are not logged out automatically when the Agent PG CTI server or connection to CTI server shuts down. Instead the email Manager continues to record agent state and assign tasks to agents. When the connection is restored, the email Manager sends the updated agent state information on the peripherals serviced by the Agent PG CTI server to the CTI server, which sends the information to Unified CCE software. The software attempts to recreate historical data and corrects current agent state. If the connection or Agent PG CTI server is down for more than the time limit configured for the MRD, reporting on tasks might be ended prematurely and restarted with the connection is reestablished

The application instance can assign tasks to agents while the connection or CTI server is down and, if the connection to the MR PG is up, can continue to send routing requests to the central controller and receive routing instructions. However, no reporting data is stored for the tasks while the connection is down. Also, any tasks that are assigned and completed while the connection or CTI server is down do not appear in reports. If the connection between the Agent PG CTI server and the CallRouter shuts down or if the CallRouter shuts down, the application instance continues to send messages to the CTI server and agent activity is tracked. However, this information is not sent to the CallRouter until the connection or the CallRouter is restored, at which time the cached reporting information is sent to the central controller.

**Note**

If the Central Controller shuts down, this situation also affects the Application Instance/MR PG interface.

If the PIM shuts down, voice media routing is unavailable for agents associated with the PIM. However, the Central Controller can continue to assign non-voice tasks to agents associated with the PIM, and the CTI server can continue to process messages and requests about agents associated with the PIM for non-voice MRDs. When the connection is restored, voice media routing is available again.



## PART **V**

# Peripheral Gateway processes

- [Peripheral Gateway processes, page 179](#)





## CHAPTER 22

# Peripheral Gateway processes

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This chapter provides information about Peripheral Gateway processes.

- [Overview, page 179](#)
- [Peripheral Interface Manager, page 179](#)
- [Message Delivery Service, page 180](#)
- [Open Peripheral Controller, page 180](#)
- [PG Agent, page 180](#)
- [Computer Supported Telephony Application message example, page 180](#)
- [Two models of reporting \(Unified ICM\), page 182](#)

## Overview

Four processes on the Peripheral Gateway are critical to reporting: the Peripheral Interface Manager (PIM), the Message Delivery System (MDS), the Open Peripheral Controller (OPC), and the Peripheral Gateway Agent process (PG Agent).

## Peripheral Interface Manager

The Peripheral Interface Manager (PIM) manages communication between the PG and the peripherals themselves (ACDs, IVRs). The PIM's main function is to convert peripheral-specific events and requests to an Unified CCE-compatible peripheral data stream.

The PIM supplies the Open Peripheral Controller (OPC) with Computer-Supported Telephony Application (CSTA) call event reporting messages. These messages form the basis of real-time monitoring and historical reporting. The OPC process receives the CSTA messages from the PIM and uses them to construct the actual real-time and historical routing and reporting data.

## Message Delivery Service

The Message Delivery Service (MDS) manages all data flow between Unified CCE processes within the PG. The MDS notifies connected processes of errors detected during a data flow request. In addition, it plays a key role in keeping duplexed components (such as Loggers) synchronized.

## Open Peripheral Controller

The Open Peripheral Controller (OPC) is the process that takes real-time data and events from the PIM and presents these data to the CallRouter. The OPC process forms the database objects the CallRouter needs to route calls and to monitor real-time activity on the peripheral. These include call objects, agent objects, Service objects, Peripheral device objects, routing objects, and skill groups.

To interface with the PIM, OPC uses the *OPC Interface*. The OPC Interface provides a standard communication interface between OPC and the various types of PIMs.

The OPC process outputs the data it receives from the PIM in the form of OPC Interface (OPCI) messages, which OPC uses to track the state transition of monitored calls and agents. The OPCI messages are based on European Computer Manufacturers Association (ECMA) Standard Protocol for Computer-Supported Telephony Application (CSTA). They also include additional components and interfaces to support real time data feeds or other call control interfaces needed for an ACD.

### Open Peripheral Interface data elements

To interface with the Central Controller Agent, OPC uses the Open Peripheral Interface (OPI).

The OPI defines the objects that control the flow of OPCI messages from OPC to the CallRouter. Each table in the Central Database has a set of fields that the CallRouter uses to make its routing decisions. OPI defines tags for each of those fields.

As elements change based on events and updates from the ACD, OPC informs the CallRouter of the changed values based on table type, tag, and value. OPC sends to the Router only those data elements that have changed in value. Types of OPI data elements reported to the CallRouter are Now, Half, and Today.

#### Related Topics

[Real time data collection, on page 5](#)

## PG Agent

The PG Agent process is responsible for controlling the flow of OPI messages from OPC to the CallRouter. It manages all message traffic between the Peripheral Gateway and the Agent Process on the CallRouter, which is called the Central Controller Agent (CC Agent). The protocol used between the two agent processes is the Device Management Protocol (DMP).

## Computer Supported Telephony Application message example

To illustrate how Computer Supported Telephony Application (CSTA) messages from the PIM are translated into OPI data elements, it might help to examine one CSTA message: `CSTAEstablished`.

Several OPC state transitions occur when OPC receives this message. The CSTAEstablished event indicates that a call has been answered by a device (that is, an agent, trunk, or voice port).

When OPC receives this event, the following OPC state transitions take place:

- **If the call was Queued**, several database elements and call objects are changed:
  - The count for CallsQNow is reduced by one (–1).  
CallsQNow is a database element for services and routes that tracks the number of calls currently in queue at the peripheral.
  - The call object used to track the CallsQNow and CallQNowTime data elements is removed from the Call Queued object for the service and route associated with the call.  
CallsQNowTime is a database element that records the time in seconds that all calls currently in queue to the service or route have spent in the queue.
  - The CallsLeftQTo5 data element for the service and/or route associated with the call is increased by one (+1).  
CallsLeftQ is a database element that provides the total number of calls to the service or route that were removed from queue during the current five-minute interval. CallsLeftQ is also used to calculate expected delay.
  - LocalQTime is written in the Termination\_Call\_Detail table.  
LocalQTime is the time in seconds that the call was in the local queue at the peripheral. The Termination\_Call\_Detail record contains information about how each call was handled at a peripheral. It is generated for each call that arrives at a peripheral (provided the proper monitoring is enabled for the peripheral).
- **If there is a Call Alert event**, the amount of time the call spent ringing is added to the Call object for RingTime in the Termination\_Call\_Detail record.  
RingTime is the number of seconds that the call spent ringing at the agent's teleset before being answered.
- **If the answering device is an agent**, the following data elements and call objects are changed:
  - The AgentsTalking data element for the service and/or route associated with the call is increased by one (+1).  
AgentsTalking is a service and route database element that provides a count of the number of service agents currently in one of several talking states.
  - The call is associated with the agent and the agent is placed in the TalkingIn state on behalf of the call. This increases by one (+1) the count for TalkingIn for the skill group associated with the call the agent is handling.  
TalkingIn is a database element for skill groups that provides a count for the number of agents in the skill group currently talking on inbound calls.
  - The parameters used to calculate the database element AvgSpeedAnswer are modified.  
AvgSpeedAnswer is a service and route data element. It provides the average AnswerWaitTime for all calls to the service or route (that is, the average time that all calls to the service or route had to wait before being answered). The calculation for AvgSpeedAnswer is  $\text{AnswerWaitTime} / \text{CallsAnswered}$ .
  - The CallsAnsweredHalf (in the real-time database tables) and CallAnsweredTo5 (in the five-minute tables), are increased by one (+1).

- The AnswerWaitTime for the call is added and written to the database.

AnswerWaitTime is the elapsed time from when the call was offered at the peripheral to when it was answered. It includes any RingTime, LocalQTime, and DelayTime (all from the Termination\_Call\_Detail records) associated with calls.

- RingTime, LocalQTime, and DelayTime are added to AnswerWaitTimeTo5.
- TalkTime for the call begins to be monitored.

TalkTime is a service completed call time data element. It is populated with TalkTime and HoldTime from the Termination\_Call\_Detail record for the call. The value is not updated in the database until any after-call work associated with the call is completed.

## Two models of reporting (Unified ICM)

The PIM is responsible for general monitoring functions that include accessing data on the peripheral regarding agent groups, service, routes, trunk groups, and agents.

The level of data provided by the PIM is determined by the types of CTI links available on the peripheral. The PIM can retrieve ACD statistics by using an event-based CTI feed, an aggregate data CTI feed, or both. In general, an event-based CTI feed provides more data and capabilities than an aggregate data CTI feed.

### Event-based reporting

An event-based PIM (for example, the Aspect Event Link PIM) connects to a CTI link that provides call events and agent state events.

Event-based PIMs base their data on agent and call state transitions reported from the ACD. These PIMs convert CTI events received from the switch to CSTA-based OPC API messages, which can then be forwarded to OPC. The OPC constructs the routing and monitoring data from these events.

### Aggregate-based reporting

Some aggregate-data PIMs connect to CTI links that provide aggregate skill group, service, and route statistics. The aggregate-data PIM works by polling the ACD for certain data supported over the switch vendor's CTI link. The aggregate PIM reports to OPC those data components that are required to build the OPI data elements.

When the PIM detects a change, it updates OPC, which informs the CallRouter of the changed values. ACD-specific data is supported by a passed-through API defined in the OPC interface. OPC sends the data to the CallRouter to be stored in the Central Database. Pass-through data requires that the database define the table format of the records.





## PART VI

### Routing and queuing

- [Routing and queuing, page 185](#)
- [Network queuing and reporting, page 191](#)
- [Routing in various Unified ICM deployments, page 197](#)





## CHAPTER 23

# Routing and queuing

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This chapter presents basic routing concepts. It also explains the two types of queuing models for reporting and how they affect reporting metrics.

- [Routing, page 185](#)
- [Queuing, page 187](#)
- [Precision Queues, page 190](#)

## Routing

When Unified CCE software receives a routing request, it determines the appropriate destination for the call by executing routing scripts.

These scripts use real-time information about activity at the contact centers to find the destination best able to handle the call. You can monitor how the system is handling calls and can make changes to the scripts when needed, using the Script Editor.

A destination (called a *routing target*) can be a network target such as an announcement or a ring, or a skill target such as an agent, a skill group, or a service. Once these targets are defined in the Configuration Manager, they can be specified in the routing script.

## Pre-routing

Pre-routing is a routing decision that is executed before the call terminates at the call center. With pre-routing, the Network Interface Controller (NIC) receives the route request from the IntereXchange Carrier (IXC) and passes the call information along to Unified CCE software.

Unified CCE bases pre-routing decisions on real-time data gathered by the PGs at the call center sites. Unified CCE then runs the appropriate script that defines how the call is to be routed.

A pre-routing request therefore determines the initial destination for a call.

## Post-routing

Post-routing is a routing decision made after the call has initially been processed at a VRU or call center. Post-routing enables Unified ICM to process calls when an ACD, VRU, or PBX generates a route request via the PG.

Unified ICM executes scripts to process the route request and return the destination address. This directs the ACD/PBX to send the call to an agent, skill group, service or Call Type in the same call center or at a different call center. In making a post-routing decision, Unified ICM software can use all the same information and scripts used in pre-routing.

A post-routing is sent by the peripheral to refine the original route or redirect the call.



### Note

Your *ACD Supplement Guide* describes the features of Unified ICM post-routing available with the ACD, as well as any considerations you should be aware of when using post-routing or Translation Routing on the PG.

## Translation routing

Translation routing is the term used when additional information is sent along with a call.

This type of routing is necessary because the carrier can deliver *voice*, but has no way to deliver *data* to the peripheral.

Unified CCE software works with the PG to deliver the call to the final destination on the peripheral and to ensure that the appropriate information collected for the call is also delivered to the agent's desktop.

Once the data is delivered to the peripheral, the PG receives back information about which agent the call will be sent to.

You define Translation Routes with the Configuration Manager, using the Translation Route Wizard.



### Note

Refer to your *ACD Supplement Guide* to see if your ACD supports translation routing and for any considerations you should be aware of when using translation routing on the PG.

Translation routing is always used when a call moves from one peripheral to another. A call can also be translation routed from the network.

- The term ICM TranslationRoute is used when calls are translation routed to a peripheral that is an ACD.
- The term TranslationRouteToVRU is used when calls are translation routed to a peripheral that is a VRU.

Translation routing plays a significant role in the accuracy of reporting and allows for cradle-to-grave call tracking and reporting. Some reporting metrics gathered for Call Types and skill groups are applicable only if calls are translation routed.

## Skills-based routing

Skills-based routing is a routing decision whereby a call is routed to the skill group that has agents with the appropriate expertise.

## Queuing

Queued calls are calls that are being held until an agent is available.

Unified CCE software calculates a number of call center metrics based on the time spent in queues.

It is important to understand the two models of queuing and how queuing affects reporting metrics.

### ACD queuing

ACD queues are used to queue calls on a targeted ACD and are *controlled by the ACD*.

Unified ICM might route a call to the ACD, based on knowledge gathered by the PGs that a certain skill group or service at that ACD is best suited to answer the call.

Once the call arrives at the ACD, if an agent is not available, the ACD queues the call to the skill group. Optionally a call can be queued to a skill group on the ACD during agent transfers or resulting from a call treatment provided on the ACD.

### Enterprise queuing

Enterprise queues are *controlled by Unified ICM* using the Service Control Interface (SCI), irrespective of the telephony platform chosen to queue the call.

In this model, calls are held at a “network-level” VRU that has an enterprise view of available agents, based on the skill groups and services configured for the peripheral.

The following telephony platforms are supported for Enterprise queuing:

- Cisco Voice Portal and Cisco IP-IVR, when connected to Unified ICM by a VRU PG
- A third-party VRU that supports service control and is connected to Unified ICM by a VRU PG
- A VRU at the TDM Network that supports service control and is connected to Unified ICM by a NIC
- For deployments where Unified ICM provides integration to an ACD for agent level routing using the ARS PG, the ACD itself is used as the telephony platform that queues the call as directed by the ICM.

Enterprise queues are an efficient way of routing a call in your enterprise network and are also a cost-effective way to save on toll charges before terminating a call on the ACD.

### How calls offered and calls queued are incremented

The Skill\_Group\_Real\_Time database tracks calls offered and calls queued in separate fields.

Therefore, there is no double counting of calls queued and offered at the ACD and calls queued and offered at the network.

### Effect of enterprise queues on reporting

The use of enterprise queues affects Call Type, Skill Group, and Service reporting.

The reporting metrics that are affected include queued metrics, answered metrics, service level metrics, and abandoned metrics.

The reporting of these metrics is also affected by whether or not the call was routed when sent to an ACD. For more information, see, [Routing](#).



#### Note

- Some reporting metrics for skill groups and call types are applicable only if calls are translation routed.
- Translation routing plays a significant role in the accuracy of reporting. Some reporting metrics gathered for Call Types and skill groups are applicable only if calls are translation routed. Calls can be translation routed either to a VRU Peripheral or to an ACD.
- Translation routing is primarily applicable when Unified ICM software is used for Enterprise Routing to traditional ACDs. This includes deployments connected to legacy ACDs using any supported TDM PG such as Aspect PG and deployments connected to Cisco Unified System Contact Center using IPCC Gateway PG. Translation Routing enables Unified ICM for cradle to grave reporting.
- For deployments where Unified ICM provides integrations to an ACD for Enterprise Routing, the following is true:
  - Unified ICM system reports on ACD queue metrics.
  - When Unified ICM software is used to provide initial call treatment and/or enterprise queuing, Unified ICM software reports on enterprise queue metrics. However, once the call is routed to an ACD the ACD may queue the call. In this case, Unified ICM software reports on both enterprise queue and ACD queue metrics.
  - Unified ICM system uses a Service Control VRU as the telephony platform for enterprise queuing.
- Reporting is the same whether Unified ICM script uses a Send To VRU node or a Translation Route To VRU node.

### Call Type metrics

#### When a call is translation-routed:

- The *AnswerWaitTime*, *ASA*, and *Service Level* include both the time spent in the Enterprise queue and the time spent in the ACD queue.  
 The measurement of AnswerWaitTime for a call begins when the call is queued. The measurement of Service Level begins when the call arrives at the routing script or when its Call Type is changed.  
 This method of measurement means that if self-service is performed on a call before the call is queued to an agent, the routing script must be set up to change the Call Type when self-service is completed. Otherwise, the time spent in self-service will negatively impact the Service Level.
- *Abandoned* statistics are classified in three ways:
  - Calls that abandoned while ringing at the agent desktop.
  - Calls that abandoned in an Enterprise queue while waiting for an available agent.
  - Total number of calls that abandoned. This number includes calls that abandoned in a VRU (prompting), calls abandoned in both Enterprise queue and ACD queue, and calls that abandoned at the agent.

**Note**

Although the total abandons includes calls that abandoned at the ACD, there is no separate count for only those calls that abandoned at the ACD.

**When a call is not translation-routed:**

- The Call Type *Abandoned* metrics allow you to determine the number of calls that abandoned in an enterprise queue while waiting for an available agent and the number of calls that abandoned while in self-service.

However, they do not allow you to determine the number of calls that were abandoned after they left the VRU and before an agent answered them.

- The Call Type *Answered* metrics will always be zero and are not applicable.
- The Call Type *Service Level* metrics are not applicable.

**Skill Group metrics****When a call is translation-routed:**

- The Skill Group *Answered* metrics include only time spent in the ACD queue.

**When a call is not translation-routed:**

- The Skill Group *Queued* metrics are applicable.
- The Skill Group *Abandoned* metrics allow you to determine the number of calls that abandoned in an enterprise queue while waiting for an available agent, but they do not allow you to determine the number of calls that abandoned after they left the VRU and before an agent answered them. The ACD report shows calls that abandoned after they arrived at the ACD.
- The Skill Group *Answered* metrics do not include any time spent in the enterprise queue and therefore are not applicable.

**Note**

None of the skill group metrics include time spent in self-service, or calls that ended during self-service. A call is not associated with a skill group until it is queued, and a call is queued after self-service is complete.

**Service metrics**

If a Service Control VRU is used for VRU application, the Service metrics can be used to provide performance measures for the VRU service. The type of VRU and configuration determines the information and usefulness of the metrics reported for the VRU service.

The metrics reported for Unified ICM Services defined for the ACD peripherals do not include any time spent in the enterprise queue. Hence the service metrics are not useful when using an enterprise queue.

## Precision Queues

Precision Routing is a feature available with Cisco Unified Contact Center Enterprise (Unified CCE), Release 9.0. Precision Routing enhances and can replace traditional routing. Traditional routing looks at all of the skills to which an agent belongs and defines the hierarchy of skills to map business needs. However, traditional routing is restricted by its single dimensional nature. Precision Routing provides multidimensional routing with simple configuration, scripting, and reporting. Agents are represented through multiple attributes with proficiencies so that the capabilities of each agent are accurately exposed, bringing more value to the business.

You can use a combination of attributes to create multidimensional precision queues. Using Unified CCE scripting, you can dynamically map the precision queues to direct a call to the agent that best matches the precise needs of the caller.

For more information about Precision Queues, see [Create Precision Queue](#).

**Note**

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Precision Routing is supported only on Unified CCE Communications Manager PG.

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**Note**

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Precision Routing is only supported by inbound Unified CCE agents.

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# CHAPTER 24

## Network queuing and reporting

This chapter provides information about network queuing and reporting .

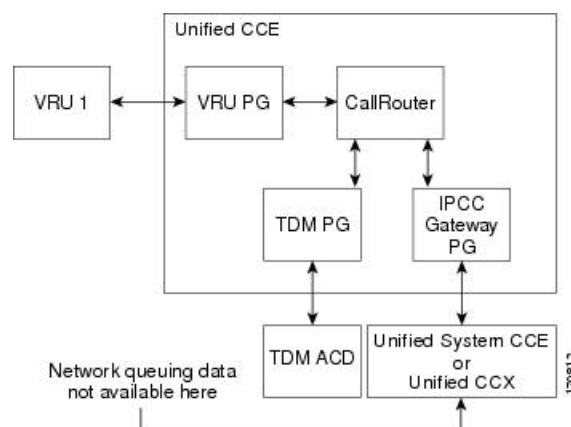
- [Network queuing and reporting, page 191](#)
- [Network VRU and call type metrics, page 192](#)
- [Network VRU and Skill group metrics, page 194](#)

## Network queuing and reporting

The existence of a network VRU in a Unified CCE deployment affects Unified CCE Call Type and Skill Group reporting.

*How* a call is sent to the VRU does not affect reporting; that is, it does not matter if the Unified CCE script used a Send To VRU node or a Translation Route To VRU node.

**Figure 27: Network VRU in a Gateway Deployment**



This chapter explains the Call Type metrics and Skill Group metrics and uses following the terms:

*ICM-TR* denotes a Unified ICME system in which all calls *are translation routed* when sent to an ACD.

*ICM-Not-TR* denotes a Unified ICME system in which some or all calls *are not translation routed* when sent to an ACD.

The Call Type and Skill Group reporting metrics that are affected by the existence of a network VRU include *queued* metrics, *at VRU* metrics, *answered* metrics, *service level* metrics, and *abandoned* metrics.

## Network VRU and call type metrics

All of the Call Type metrics apply to both Unified CCE and Unified ICME. In Unified ICME systems, Answer Wait Time, ASA, and Service Level include both the time spent in the network queue and the time spent in the ACD queue.

The measurement of Answer Wait Time for a call begins when the call is *queued*. The measurement of Service Level begins when the call *arrives* at the routing script, or when its call type is *changed*. This means that if self-service is performed on a call before the call is queued to an agent, the routing script must be set up to change the call type of the call when self-service is completed. Otherwise, the time spent in self-service negatively impacts the Service Level.

With regard to ICM-Not-TR systems, the Call Type abandoned metrics allow you to determine the number of calls that abandoned while queued in the CallRouter, but they do not allow you to determine the number of calls that abandoned while in self service, nor the number of calls that were abandoned after they leave the VRU and before an agent answers them. The Call Type answered metrics are always zero. The Call Type Service Level metrics are meaningless and can be ignored.

The following table shows the fields in the Call\_Type\_Real\_Time table that affect reporting metrics by metric category:

**Table 37: Call\_Type\_Real\_Time table and reporting metrics**

Queued Metrics	At VRU Metrics/ Answered Metrics	Service Level Metrics	Abandoned Metrics
AvgRouterDelayQHalf	<b>At VRU :</b>	ServiceLevelAbandHalf	CallDelayAbandTimeHalf
AvgRouterDelayQNow	CallsAtVRUNow	ServiceLevelAbandTo5	CallDelayAbandTimeTo5
AvgRouterDelayQTo5	<b>Answered:</b>	ServiceLevelAbandToday	CallDelayAbandTimeToday
AvgRouterDelayQToday	AnsweredWaitTimeHalf	ServiceLevelCallsHalf	CTDelayAbandTimeHalf
CallsLeftQTo5	AnswerWaitTimeTo5	ServiceLevelCallsTo5	CTDelayAbandTimeTo5
CallsAtVRUNow	AnswerWaitTimeToday	ServiceLevelCallsToday	CTDelayAbandTimeToday
RouterCallsQNow	CallsAnsweredHalf	ServiceLevelCallsOfferedHalf	DelayAgentAbandTimeHalf
RouterCallsQNowTime	CallsAnsweredTo5	ServiceLevelCallsOfferedTo5	DelayAgentAbandTimeTo55
RouterLongestCallQ	CallsAnsweredToday	ServiceLevelCallsOfferedToday	DelayAgentAbandTimeToday
RouterQueueCallsHalf	CallsAtAgentNow	ServiceLevelHalf	DelayQAbandTimeHalf
RouterQueueCallsTo5		ServiceLevelTo5	DelayQAbandTimeTo5
RouterQueueCallsToday		ServiceLevelToday	DelayQAbandTimeToday
RouterQueueWaitTimeHalf			RouterCallsAbandQHalf
RouterQueueWaitTimeTo5			RouterCallsAbandQTo5
RouterQueueWaitTimeToday			RouterCallsAbandQToday
ServiceLevelCallsQHeld			RouterCallsAbandToAgentHalf
			RouterCallsAbandToAgentTo5
			RouterCallsAbandToAgentToday
			TotalCallsAbandHalf
			TotalCallsAbandTo5
			TotalCallsAbandToday

The following table shows the fields (by metric category) in the Call\_Type\_Interval table that affect reporting metrics:

**Table 38: Call\_Type\_Interval table and reporting metrics**

Queued Metrics	At VRU Metrics/ Answered Metrics	Service Level Metrics	Abandoned Metrics
AvgRouterDelayQ CallsQHandled RouterQueueCalls RouterQueueCallType Limit RouterQueueGlobalLimit RouterQueueWaitTime	<b>At VRU :</b> CTVRUTime VRUTime <b>Answered:</b> AnsInterval1 - AnsInterval10 AnswerWaitTime CallsAnswered	ServiceLevelAband ServiceLevelCalls ServiceLevelCallsOffered ServiceLevel	AbandInterval1 - AbandInterval10 CallDelayAbandTime CTDelayAbandTime DelayAgentAbandTime DelayQAbandTime RouterCallsAbandQ RouterCallsAbandToAgent TotalCallsAband

For additional information on the Call\_Type\_Real\_Time and Call\_Type\_Interval table fields, see the *Database Schema Handbook for Cisco Unified ICM/Contact Center Enterprise & Hosted*.

## Network VRU and Skill group metrics

The Answer Wait Time and ASA metrics do not include the time spent in the network queue, while the Service Level metrics do.

The Skill Group abandoned metrics allow you to determine the number of calls that abandoned while queued to the CallRouter, but they do not allow you to determine the number of calls that abandoned after they left the VRU and before an agent answered them. The Skill Group answered metrics are always zero. The Skill Group Service Level metrics are meaningless and can be ignored.



### Note

None of the Skill Group metrics include time spent in self-service or calls that ended during self-service because a call is not associated with a skill group until it is queued, and a call is queued after self-service is complete.

The following table shows the fields (by metric category) in the Skill\_Group\_Real\_Time table that affect reporting metrics:

**Table 39: Skill\_Group\_Real\_Time table and reporting metrics**

Queued Metrics	At VRU Metrics/ Answered Metrics	Service Level Metrics	Abandoned Metrics
CallsQueuedNow LongestCallQ RouterCallsQNow RouterLongestCallInQ	<b>At VRU:</b>  None.  <b>Answered:</b> AnswerWaitTimeTo5 CallsAnsweredTo5	ServiceLevelTo5 ServiceLevelCallsTo5 ServiceLevelCallsAbandTo5 ServiceLevelCallsDequeuedTo5 ServiceLevelRonaTo5 ServiceLevelCallsOfferedTo5	RouterCallsAbandQTo5 RouterCallsAbandToAgentTo5

The following table shows the fields (by metric category) in the Skill\_Group\_Interval table that affect reporting metrics:

**Table 40: Skill\_Group\_Interval table and reporting metrics**

Queued Metrics	At VRU Metrics/ Answered Metrics	Service Level Metrics	Abandoned Metrics
CallsQueued RouterQueueCalls	<b>At VRU:</b>  None.  <b>Answered:</b> AnswerWaitTime CallsAnswered	ServiceLevel ServiceLevelCalls ServiceLevelCallsAband ServiceLevelCallsDequeued ServiceLevelError	AbandonRingCalls AbandonRingTime RouterCallsAbandQ RouterCallsAbandToAgent

For additional information about the Skill\_Group\_Real\_Time and Skill\_Group\_Interval table fields, see the *Database Schema Handbook for Cisco Unified ICM/Contact Center Enterprise & Hosted*.





## CHAPTER 25

# Routing in various Unified ICM deployments

This chapter provides information about routing in various Unified ICM deployments.

- [Different Unified ICM deployments, page 197](#)
- [Deployments with Enterprise routing, page 197](#)
- [Deployments with agent-level routing, page 204](#)
- [Deployments with hybrid routing, page 209](#)

## Different Unified ICM deployments

Unified ICM reports help to monitor operational effectiveness, customer experience and contact center agent performance across your enterprise.

In order to effectively run your call center using the data provided by enterprise reports, it is important to understand the different Unified ICM Enterprise deployments.

The Peripheral Gateway component in a Unified ICM system is used to interface with peripherals at the different call centers in your enterprise.

The capabilities provided by the ICM software when connected by a traditional TDM PG to a legacy TDM ACD differ from the capabilities provided by a Gateway PG, an ARS PG, and a Unified CM PG.

Unified ICM can be deployed with different types of Peripheral Gateways to meet the call center needs in your enterprise.

## Deployments with Enterprise routing

In this deployment, Unified ICM is configured with PGs that can connect to legacy ACDs using any of the supported TDM PGs (Aspect, Avaya, and so forth) as well as the Unified CCE Gateway PGs.

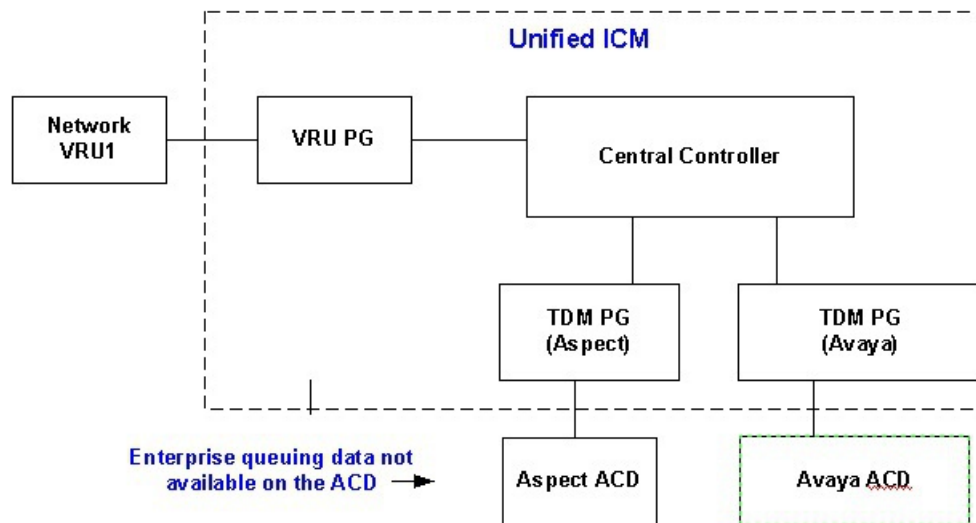
When Unified ICM is configured with these types of PGs, the call treatment and queuing (ACD queuing) is provided *by the ACD*. That is, it is the ACD that controls the queuing and chooses the agent required to handle the call.

Unified ICM software is primarily used for intelligent call routing to sites and consolidated reporting for these ACDs. Optionally Unified ICM software can be used to provide initial call treatment and/or enterprise queuing (Enterprise queue). In this case the call is routed to a site when an agent becomes available.

The ACD offers the call to agents based on skill definitions on the ACD. If an agent is not available, the ACD queues the call (in the ACD queue) and then directs the call when an agent becomes available.

This illustration shows a Unified ICM system connected to two PGs for legacy ACDs and to a network VRU.

**Figure 28: Deployments with Enterprise routing**



- When calls are routed to an ACD, call treatment is provided on the ACD and the ACD controls the queuing.
- Network VRU1 can be any Service Control VRU that can be used to provide initial call treatment and serve as the telephony platform for queuing calls across all call center ACDs. VRU1 can also be used for information gathering and self-service.

## Routing and scripting

In this deployment, Unified ICM software uses real-time reporting statistics gathered from the different peripherals (ACDs) to make routing decisions to route calls to the ACD at a site that is best suited to answer the call.

The following routing capabilities can be provided in this deployment.

- **Site-based Routing:** Unified ICM software, using ICM routing capabilities, can use real time reporting statistics gathered from the different peripherals (ACDs) to make routing decisions to route calls to the ACD at a site that is best suited to answer the call.

Site selection can be scripted using real time Service and Skill Group metrics provided by the PG.

Several metrics can be used to make the selection, such as Agent availability, CallsInProgress, and a Minimum Expected Delay (MED) calculation.



**Note**

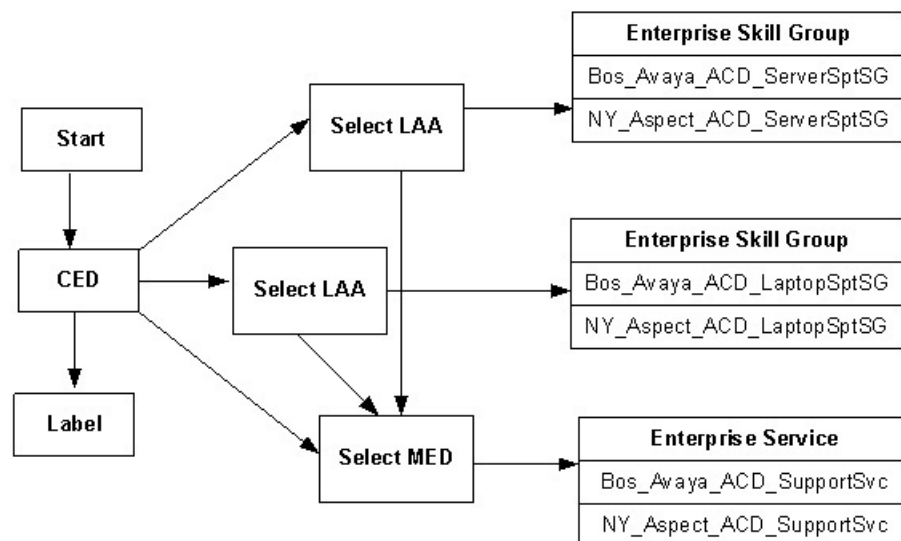
Unified ICM scripts provide a predefined MED (Minimum Expected Delay) calculation that can be used only with ICM Services.

- **Agent Level Routing:** Not Supported.

A typical script used to route calls in this deployment is illustrated and explained below.

- The script is associated with a Call Type. The example is shown for an enterprise that has two sites (Boston and New York), each running a call center.
- The call center at either site can provide call treatment to handle “Support” calls. “Support” is configured as a Service in Unified ICM.
- Both call centers have agents trained to handle calls for either “Laptop Support” or “Server Support”. These categories are configured as Skill Groups in Unified ICM. The relationship of the Service to Skill Groups is configured as Service Members in Unified ICM.
- The Boston call center has an Avaya ACD (peripheral) connected with an Avaya PG, and the New York call center has an Aspect ACD (peripheral) connected with the Aspect PG. Service and Skill Groups are configured for each peripheral in Unified ICM.

**Figure 29: Sample Script for Enterprise Routing**



The script illustrated above shows an example of pre-routing and ACD queuing, processed as follows:

- 1 The script is associated with a Call Type to route Support calls.
- 2 The script uses caller entered digits (CED) to determine the skill group (Laptop Support or Server Support) required to handle the call and/or the Service treatment (Support) required by the caller.

- 3 The script uses the LAA (longest available agent) node to look for an available agent across the enterprise who can handle the call.

Unified ICM software routes the call to the call center site that has an available agent. The ACD at that site picks an agent and assigns the call.

- 4 If an agent is not available, the script uses the MED (Minimum Expected Delay) node to select a site that can handle the call with minimum delay.

Once the site with the least expected wait time is selected, the call is routed to the ACD at that site.

After the call arrives on the ACD, call treatment is provided by the ACD. If an agent is available, the ACD assigns the call to that agent.

If an agent is not available, the ACD will queue the call to a skill group to wait for an available agent.

## Reporting considerations

This section is an overview of reporting categories to use to meet the reporting needs for your enterprise in this deployment.

Two key factors that affect reporting are:

- Are you using ACD queuing or Enterprise queuing?
- Are you using Translation Routing to route calls to the ACD?

The information is therefore presented based in the four scenarios described in this section.

### Scenario one: Calls are Queued on the ACD and are not Translation Routed

For Enterprise reporting, use the following report categories:

- Use Enterprise Service reports for an enterprise view of reporting statistics for the application.
- Use Enterprise Skill Group reports for enterprise view of reporting statistics routed to a particular skill group.

This table shows other report categories and the statistics they provide.

**Table 41: Calls are Queued on the ACD and are not Translation Routed**

Report Focus	Reporting Statistics Needed	Report Template	Key Statistics
Application	Before the call is routed to the ACD	Call Type	Number of calls routed Number of calls received Number of calls that encountered an error or received default treatment
	After the call is routed to the ACD, calls queued on the ACD	Peripheral Service Enterprise Service	Queue Statistics (ACD Queue) Abandons Service Level RONA
	After the call is answered by agent	Peripheral Service Enterprise Service	ASA Calls Handled Avg. Handle Time Transfers
Skill Group	For calls routed to skill groups and queued calls	Peripheral Skill Group Enterprise Skill Group	Queue Statistics (ACD Queue) Abandons RONA
	After the call is answered by agent	Peripheral Skill Group Enterprise Skill Group	ASA Calls Handled Avg. Handle Time Avg. Talk Time
	Agent Info	Peripheral Skill Group Enterprise Skill Group	FTEs and Percent Utilization
Agents	Agent Info	Agent	Agent's current state Duration in state Agents logged out Calls Handled Avg. Handle Time Avg. Talk Time

### Scenario two: Calls are Queued on the ACD and are Translation Routed

The report categories to use are the same as for [Scenario one: Calls are Queued on the ACD and are not Translation Routed](#), with the additional statistics available for Call Type (cradle-to-grave):

**Table 42: Calls are Queued on the ACD and are Translation Routed**

Report Focus	Reporting Statistics Needed	Report Template	Key Statistics
Application	After the call is routed to the ACD, calls queued on the ACD	Call Type	Abandons
	After the call is answered by agent	Call Type	ASA Calls Handled



**Note**

Call Types cannot report on *queued metrics* for calls queued on the ACD (ACD queue), such as the number of calls queued on the ACD.

### Scenario three: Calls are Enterprise Queued and are not Translation Routed

For Enterprise reporting, use the following report categories:

- Use Enterprise Service reports for an enterprise view of some reporting statistics for the application.
- Use Call Type and Enterprise Skill Group reports for an enterprise view of queued and abandon in queue statistics for the application and skill group respectively.
- Use Enterprise Skill Group reports for enterprise view of reporting statistics when routed to a particular skill group.

Skill Group and Agent reporting are the same as for [Scenario one: Calls are Queued on the ACD and are not Translation Routed](#).

This table shows other report categories and the statistics they provide.

**Table 43: Calls are Enterprise Queued and are not Translation Routed**

Report Focus	Reporting Statistics Needed	Report Template	Key Statistics
Application	Before the call is routed to the ACD, queued in the enterprise	Call Type	Number of calls routed Number of calls received Number of calls that encountered an error Enterprise Queue Statistics and Abandon in Enterprise Queue
	After the call is routed to ACD	Peripheral Service Enterprise Service	Abandons RONA
	After the call is answered by the agent	Peripheral Service Enterprise Service	Calls Handled Avg Handled Time Transfers

**Note**

Skill Groups report on Enterprise queue statistics.

**Related Topics**

[Effect of enterprise queues on reporting, on page 187](#)

**Scenario four: Calls are Enterprise Queued and are Translation Routed**

For Enterprise reporting, use the following report categories:

- Use Call Type reports for enterprise view of reporting statistics for the application.
- Use Call Type and Enterprise Skill Group reports for enterprise view of queued and abandon in queue statistics for the application and skill group respectively.
- Use Enterprise Skill Group reports for enterprise view of reporting statistics when routed to a particular skill group.

Skill Group and Agent reporting are the same as for [Scenario one: Calls are Queued on the ACD and are not Translation Routed](#).

This table shows other report categories and the statistics they provide.

**Table 44: Calls are Enterprise Queued and are Translation Routed**

Report Focus	Reporting Statistics Needed	Report Template	Key Statistics
Application	Before the call is routed to the ACD, queued in the enterprise	Call Type	Number of calls routed Number of calls received Number of calls that encountered an error Queue Statistics and Abandon in Queue
	After the call is routed to the ACD	Call Type	Abandons Service Level <b>Note</b> RONA calls are reported on services and are not available for Call Types.
	After the call is answered by agent	Call Type	Calls Handled Avg Handled Time ASA



**Note** Skill Groups report on Enterprise queue statistics.

#### Related Topics

[Effect of enterprise queues on reporting, on page 187](#)

## Deployments with agent-level routing

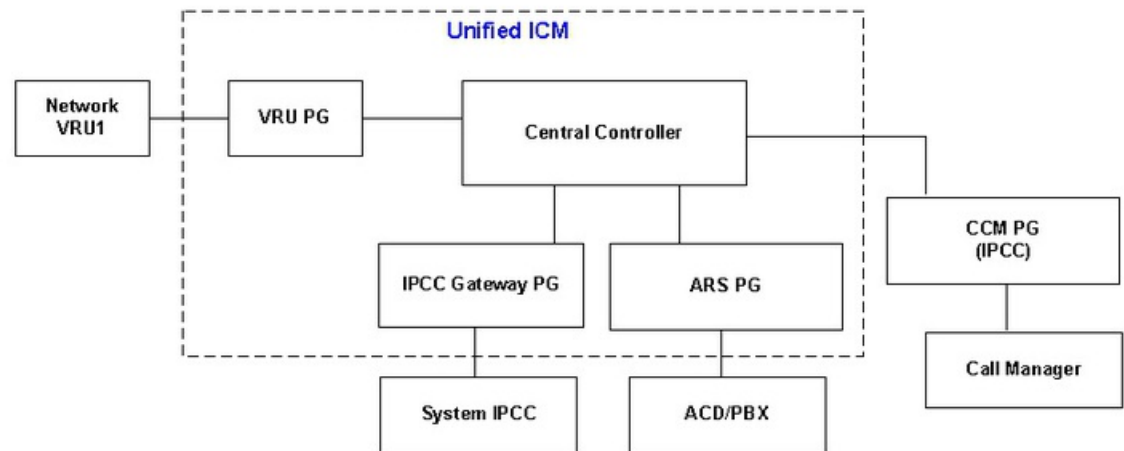
In this deployment, Unified ICM is configured with ARS PGs (Agent Routing Service Peripheral Gateways) to provide the Agent Routing Integration (ARI) to an ACD/PBX.

When Unified ICM is connected with this type of PG to an ACD/PBX, the call treatment and queuing (Enterprise queuing) is provided by *Unified ICM software*.

The call treatment is done through the use of Call Types and associated scripts. It is Unified ICM in this case that controls queuing and chooses the agent required to handle the call. Unified ICM software provides the ACD functionality and the ACD itself becomes a simple PBX that connects a call to an agent as directed by the CallRouter.

In the illustration below, Unified ICM is connected with two ACDs using ARS PGs. In this deployment Unified ICM software always controls the queuing; hence the enterprise queue statistics are affected. The ACD is used as the telephony platform to queue the calls.

**Figure 30: Deployments with agent-level routing**



The Network VRU1 can be any Service Control VRU that can be used to provide initial call treatment and serve as the telephony platform for queuing calls across all call center ACDs. VRU1 can also be used for information gathering and self-service. There might also be a premise-based VRU or a Virtual VRU at the ACD/PBX.

In that case, the premise-based VRU or Virtual VRU are also controlled by the Service Control Interface (SCI) of the Unified ICM SoftACD Gateway Interface (ISAGI) protocol so that Unified ICM retains control of the queuing.

For additional information on ARS PGs, see the *ARI Deployment Guide for Cisco Unified Intelligent Contact Management Enterprise & Hosted*.

## Routing and scripting

The following routing capabilities can be provided in this deployment:

- **Site-based Routing:** Unified ICM software, using Unified ICM routing capabilities, can use real-time reporting statistics gathered from the different peripherals (ACDs) to make routing decisions to route calls to the site that is best suited to answer the call.

Site selection can be scripted using real time Skill Group metrics provided only by the PG. Several metrics can be used to make the selection, such as Agent availability, CallsInProgress, CallsInQ, and Avg.HandleTime.



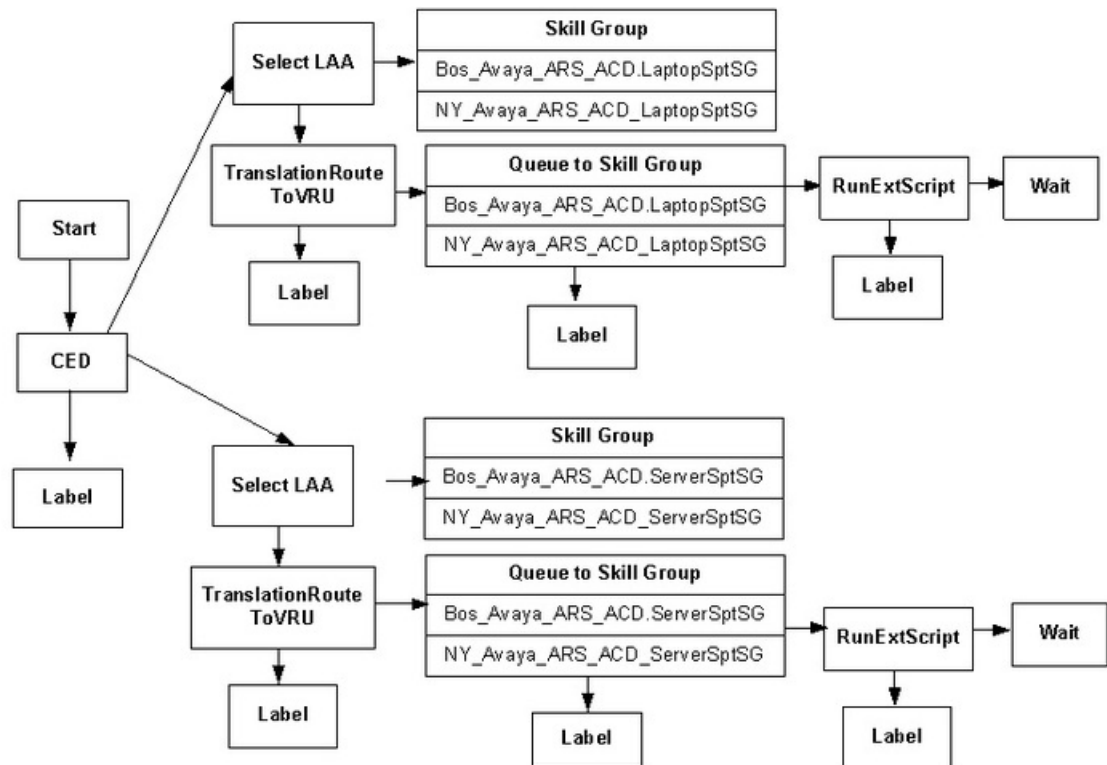
**Note** A custom formula using real-time skill group metrics in the ICM scripts is required to calculate the expected wait time for site selection.

- **Agent-level Routing:** Unified ICM software can route a call directly to an agent. It is also possible to queue a call for an agent, using the “Queue to Agent” node in the script. It is Unified ICM software that chooses the agent for handling the call.

A typical script used to route calls in this deployment is illustrated and explained below.

- The script is associated with a Call Type. The example shows an enterprise that has two sites—Boston and New York—each running a call center.
- The call center at each site can provide call treatment to handle “Support” calls. “Support” is configured as a Service in the ICM.
- The call center has agents that are skilled to handle calls for either “Laptop Support” or “Server Support”. These are configured as Skill Groups in the ICM.
- Both call centers have ARS PG connections to the Avaya ACD.

**Figure 31: Script example for agent-level routing**



The script above is used for the following:

- 1 The script is associated with a Call Type to route support calls. In this example, treatment for support calls is provided by Call type and the associated script.
- 2 The script uses Caller entered digits (CED) to determine the skill group (Laptop Support or Server Support) required to handle the call.
- 3 The script uses the LAA node to look for an available agent across the enterprise who can handle the call.



Once an available agent is found across the two call centers, Unified ICM selects the agent and provides instructions to the routing client to direct the call to the agent.

- 4 If an agent is not available, the script instructs Unified ICM software to translation route the call to the VRU and queue the call.
- 5 When an agent becomes available, Unified ICM selects the agent and provides instructions to the routing client (VRU) to direct the call to the agent.

## Reporting considerations for agent-level routing deployments

In this deployment, all queued calls are controlled by Unified ICM (Enterprise queue) and all calls are translation routed.

The table below defines the report categories to use to meet the reporting needs for your enterprise.

### Enterprise reporting

- Use Call Type reports for an enterprise view of reporting statistics for the application, including queue statistics.
- Use Enterprise Skill Group reports for an enterprise view of reporting statistics when calls are routed to a particular skill group, including queue statistics.

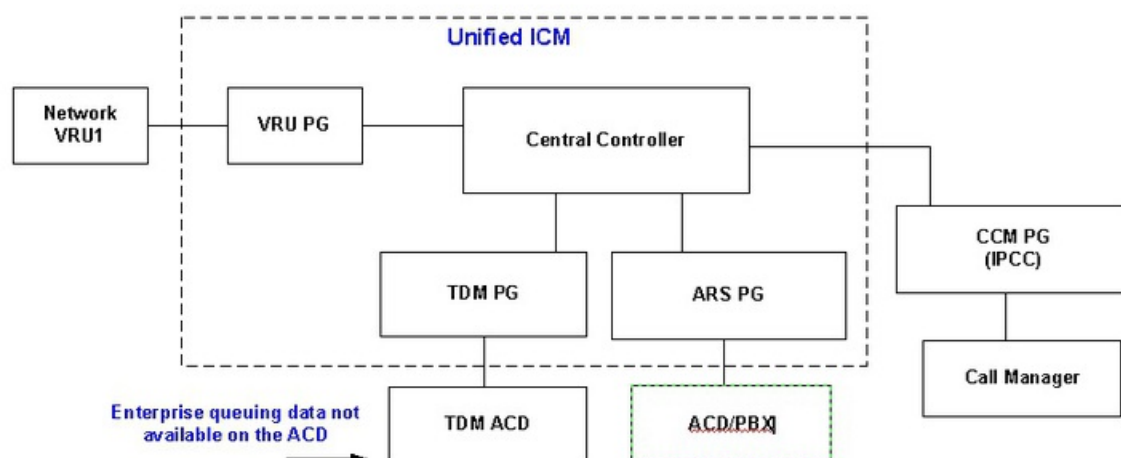
Report focus	Reporting Statistics Needed	Report Template	Key Statistics
Application	Before call is routed to an agent	Call Type	Number of calls routed. Number of calls received. Number of calls that encountered an error. Queue Statistics and Abandons.
	After call is routed to an agent	Call Type	Abandons Service Level Redirection on No Answer (RONA)
	After call is answered by an agent	Call Type	ASA Calls Handled Transfers

Report focus	Reporting Statistics Needed	Report Template	Key Statistics
Skill Group	Calls routed to a skill group Queued calls	Peripheral Skill Group & Enterprise Skill Group	Queue Statistics Abandons RONA Service Levels
	After call is answered by an agent	Peripheral Skill Group & Enterprise Skill Group	ASA Calls Handled Avg.TalkTime Avg.HandleTime
	Agent Info	Peripheral Skill Group & Enterprise Skill Group	Full Time Equivalent Agents (FTE) Percent Utilization.
Agents	Agent Info	Agent by individual, team, peripheral or skill group	Agent's current state Duration in a state Agents logged out Calls Handled Avg.Talk Time Avg.Handle Time

## Deployments with hybrid routing

In this deployment, Unified ICM includes both TDM PGs for Enterprise Routing to legacy ACDs as well as Cisco Call Manager PGs and ARS PGs (Agent Routing Service Peripheral Gateways) to provide the Agent Routing Integration (ARI) to an ACD/PBX such as Avaya.

**Figure 32: Deployments with hybrid routing**



## Routing and scripting

The manner in which you configure and script your Unified ICM system in this deployment greatly affects the accuracy and usefulness of your reporting metrics. This section assumes that calls are shared and routed across call centers for the application and are managed the same way.

Follow these guidelines for configuring and scripting Unified ICM to ensure that your reports display correct and relevant metrics for your “hybrid” contact center implementation.

### Guidelines:

- 1 Ensure all calls are routed by Unified ICM software.
- 2 Deploy a Service Control VRU to provide treatment and to queue calls in the enterprise while waiting for an available agent in a skill group.  
In other words, queue calls to skill groups in Unified ICM (Enterprise queuing) for all call centers. Avoid using ACD queues.
- 3 For legacy ACDs where Unified ICM software is used for Enterprise Routing, consider the following:
  - Ensure all calls are routed by Unified ICM software.
  - Use Translation Routes for routing calls to the legacy ACD. Always use translation routing when routing calls between ACDs.
  - Once the call is routed by Unified ICM and is terminated on the legacy ACD, make sure no treatment occurs at the ACD.

- Avoid having agents transfer calls directly to other agent stations or agent IDs. Instead, use post routing capabilities to have Unified ICM provide treatment and queuing for transferred calls.
- Avoid handling Redirection on No Answer (RONA) situations on the ACD. Instead use post routing capabilities to have the RONA calls routed by Unified ICM.

4 Plan for Call Type Reporting. To execute this type of reporting:

- Configure a separate call type for each type of treatment offered. For example: Create a separate call type for treating Support calls and Sales calls across all ACDs in your call centers.
- If you want to separate Information Gathering VRU metrics from queue metrics, configure a separate call type for queuing.
- Configure a separate call type associated with Redirection on No Answer situations. This enables you to direct calls that Ring No Answer to a routing script designed for this situation. This also enables you to use Call Type reports to report on this Redirection on No Answer and to see how calls that redirect on no answer are eventually handled.
- Configure a separate call type associated with call transfers. This enables you to direct the transfer to a different routing script.

5 Create a custom formula using skill group metrics for site selection based on expected delay. This is required as the predefined MED (Minimum Expected Delay) calculation provided by Unified ICM scripts is not applicable for Agent Level Routing configurations.

6 Configure Enterprise Skill Groups for Enterprise Skill Group reporting. Avoid grouping skill groups from the same peripheral into an Enterprise Skill Group.

A typical ICM script used to route calls in this deployment is shown below.

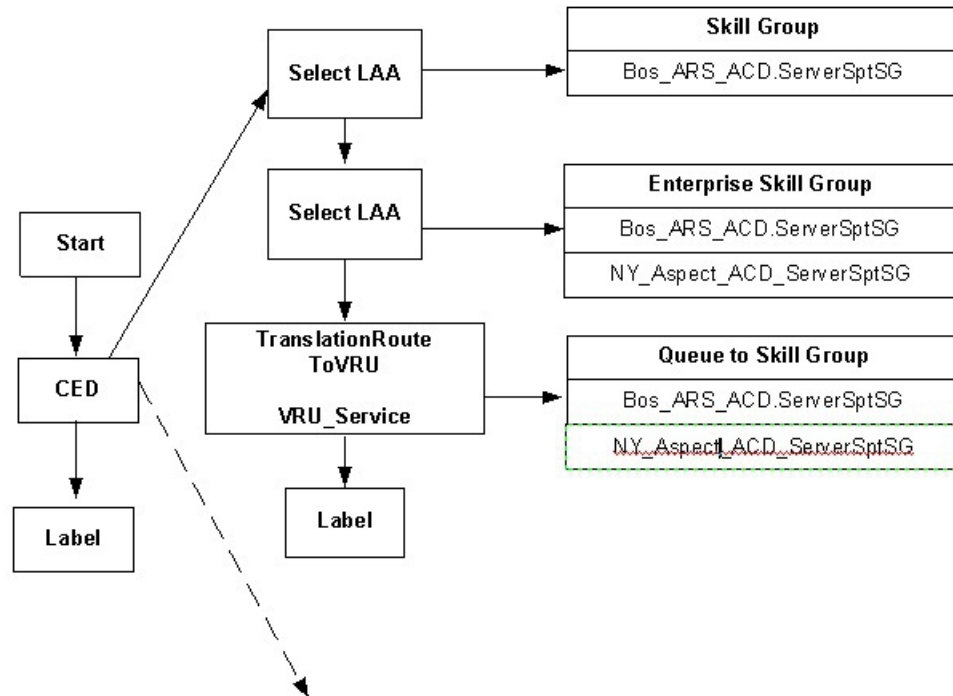
In this example:

- The enterprise has two sites (Boston and New York), each running a call center.
- A Call Type is defined that is associated with the routing script. This Call Type is used to define the treatment provided by the call centers.
- The call treatment to handle “Support” calls is provided by Unified ICM software through the call type and script association.
- The call center at each site has agents who are skilled to handle calls for either “Laptop Support” or “Server Support”. These categories are configured as Skill Groups in the ICM.

The Boston call center has an Avaya ACD (peripheral) connected with an ARS PG. The New York call center has an Aspect ACD (peripheral) connected with an ACD PG.

- Skill Groups are configured for each peripheral in the ICM.

**Figure 33: Sample script for hybrid routing**



The script above is used for the following:

- 1 The script is associated with a Call Type to route support calls. The call type is used to define the treatment provided by the call centers.
- 2 The script uses Caller entered digits (CED) to determine the skill group (Laptop Support or Server Support) required to handle the call.
- 3 The script uses the LAA (longest available agent) node to look for an available agent at a particular call center. In this case the call may have arrived at the Boston call center, and you prefer to look for an available agent from that call center first.
- 4 If an agent is not available, the script uses the LAA (longest available agent) node to look for an available agent across the enterprise.
- 5 If an agent is not available, the script instructs the ICM software to translation route the call to the VRU and queue the call (Enterprise queuing).
- 6 Depending on the call center where there is an available agent, the ICM software does the following:
  - If an agent is available at the New York call center, the call routes to the Aspect ACD. The ACD at the site then picks an agent and assigns the call.
  - If an agent is available at the Boston (ARS) call center, Unified ICM software selects the agent and provides instructions to the routing client (VRU) to direct the call to the agent.

## Reporting considerations for hybrid routing deployments

In order to get accurate and useful reporting metrics in this type of deployment, it is important to consider several factors that affect reporting. For more information, see [Reporting considerations](#), and [Reporting considerations for agent-level routing deployments](#).

Some of these factors include:

- Two reporting models used to provide reporting statistics for the application: Services are used for Enterprise Routing and Call Types for Agent Level Routing.
- The use of a Service Control VRU in your deployment to provide initial call treatment and enterprise queuing when sharing queues (skill groups) across call centers. This entails queuing calls to skill groups waiting for an available agent across your enterprise.
- The reporting on **queuing** statistics—ACD queues and Enterprise queues.
- The use of the Translation Routing mechanism to route calls to legacy ACDs for enterprise routing. This allows for call types to be used to provide reporting statistics for the application (Cradle to Grave). Translation Routing is implicit with Agent Level Routing.
- Routing scripts set up for your call center operations.

The table below defines the report categories to use to meet the reporting needs for your enterprise.

### Enterprise Reporting

- Use Call Type reports for an enterprise view of reporting statistics for the application, including queue statistics.
- Use Enterprise Skill Group reports for an enterprise view of reporting statistics when calls are routed to a particular skill group, including queue statistics.

Report focus	Reporting Statistics Needed	Report Template	Key Statistics
Application	Before call is routed to an agent	Call Type	Number of calls routed. Number of calls received. Number of calls that encountered an error. Queue Statistics and Abandons.
	After call is routed to an agent	Call Type	Abandons Service Level Redirection on No Answer (RONA)
	After call is answered by an agent	Call Type	ASA Calls Handled Transfers

Report focus	Reporting Statistics Needed	Report Template	Key Statistics
Skill Group	Calls routed to a skill group Queued calls	Peripheral Skill Group & Enterprise Skill Group	Queue Statistics Abandons RONA Service Levels
	After call is answered by an agent	Peripheral Skill Group & Enterprise Skill Group	ASA Calls Handled Avg.TalkTime Avg.HandleTime
	Agent Info	Peripheral Skill Group & Enterprise Skill Group	Full Time Equivalent Agents (FTE) Percent Utilization.
Agents	Agent Info	Agent by individual, team, peripheral or skill group	Agent's current state Duration in a state Agents logged out Calls Handled Avg.Talk Time Avg.Handle Time

For additional information on reporting in a hybrid environment, see the *ARI Deployment Guide for Cisco Unified Intelligent Contact Management Enterprise & Hosted*.







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