Cisco Unified Intelligence Center Solution Reference Network Design (SRND)

8.0(1)

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Preface

Purpose

This document provides design considerations and guidelines for deploying network solutions that include the Cisco Unified Intelligence Center (Unified IC). The information in this document applies to Cisco Unified Intelligence Center 8.0(1), which is a major revision of Cisco Unified Intelligence Suite 7.5(x).

Audience

This design guide is intended for system architects, designers, engineers, and Cisco channel partners who want to apply best design practices for Unified IC. This document assumes that you are familiar with the Cisco Systems product with which you intend to integrate Unified IC.

Organization

This guide is organized as follows:

Chapter	Contents
Chapter 1 (page 5)	An overview of Unified IC, including a list of reporting features and a discussion of licensing, security, and throttling
Chapter 2 (page 11)	Unified IC architecture
Chapter 3 (page 19)	Deployment models for Unified IC, Unified CCE, and Unified CVP
Chapter 4 (page 29)	Bandwidth and Performance Recommendations

Chapter	Contents
Chapter 5 (page 31)	Best Practices

This document also has an index and a glossary.

Related Documentation

Sizing Calculator (http://tools.cisco.com/cucst/faces/login.jsp)

Cisco Unified Contact Center Enterprise Solution Reference Network Design (SRND) (http://www.cisco.com/en/US/products/sw/custcosw/ps1844/products_implementation_design_guides_list.html)

Cisco Unified Customer Voice Portal (CVP) Solution Reference Network Design (SRND) (http://www.cisco.com/en/US/products/sw/custcosw/ps1006/products_implementation_design_guides_list.html)

Cisco Unified Intelligence Center User Guides (http://www.cisco.com/en/US/products/ps9755/products_user_guide_list.html)

Hardware and System Software Specification (Bill of Materials) for the Cisco Unified Intelligence Center (http://www.cisco.com/en/US/products/ps9755/products_user_guide_list.html)

Troubleshooting tips for the Cisco Unified Intelligence Center (http://docwiki.cisco.com/wiki/Troubleshooting_Unified_Intelligence_Suite)

The Developers' Forum for the Cisco Unified Intelligence Center (http://wwwin-forums.cisco.com/forum.jspa?forumID=2711)

Cisco ACE 4700 Series Appliance Server Load-Balancing Configuration Guide (http://www.ciscosystems.com/en/US/docs/app_ntwk_services/data_center_app_services/ace_appliances/vA3_1_0/configuration/slb/guide/preface.html)

Conventions

This manual uses the following conventions:

Convention	Description
boldface font	Boldface font is used to indicate commands, such as user entries, keys, buttons, and folder and submenu names. For example: • Choose **Edit** > **Find**. • Click **Finish**.
italic font	Italic font is used to indicate the following:

Convention	Description
	• To introduce a new term. Example: A *skill group* is a collection of agents who share similar skills. • For emphasis. Example: *Do not* use the numerical naming convention. • A syntax value that the user must replace. Example: IF (*condition*, *true-value*, *false-value*) • A book title. Example: See the *Cisco CRS Installation Guide*.
`window font`	Window font, such as Courier, is used for the following: • Text as it appears in code or that the window displays. Example: **`<html><title>Cisco Systems,Inc. </title></html>`**
`< >`	Angle brackets are used to indicate the following: • For arguments where the context does not allow italic, such as ASCII output. • A character string that the user enters but that does not appear on the window such as a password.

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

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Chapter 1

Unified IC Overview

Cisco Unified Intelligence Center (Unified IC) is a comprehensive, end-to-end reporting solution, built using Web 2.0 frameworks. It is designed to make the task of creating reports and managing disparate data sources easier for the customer. The Unified IC reporting platform is intended to be a common tool with a consistent user interface that can access data across multiple Cisco Systems product families.

Unified IC can be installed as a standalone server or as a cluster of a maximum of eight server nodes. There is one mandatory publisher node (called the Controller) and up to seven subscriber nodes (called Members). The Controller node includes a Member; thus a deployment can consist of a Controller only.

Cisco Unified Intelligence Center (Unified IC) offers both a web-based Reporting application and an Administration interface. The reporting application (page 13) runs on the member(s). The administration application (page 12) runs on the Controller. See also Cluster Support (page 13).

Unified IC 8.0(1) reporting features include multi-user support, customized reports, security, multiple display formats, web accessibility, and Web 2.0-like mashup support to display data from multiple sources on a single dashboard. These features make Unified IC a valuable tool in the Information Technology arsenal of any organization and position it as a drop-in replacement or solution for most reporting requirements.

Release 8.0(1) contains built-in (stock) reports for Cisco Unified Contact Center Enterprise (Unified CCE) Release 8.0(1) and accepts the import of reports designed for use with the 8.0(1) release of Cisco Unified Customer Voice Portal (Unified CVP).

This chapter contains the following topics:

- Feature List, page 6
- Report/Database Compatibility , page 7
- Licensing, page 7
- Security, page 7
- Throttling, page 9

Feature List

This section includes a basic feature list for Unified IC reporting. Refer to the *User Guide for the Cisco Unified Intelligence Center Reporting Application* and the *Report Template Reference Guide For Cisco Unified Intelligence Center* for a comprehensive list of report templates and features and their use.

Reporting Capabilities	Web 2.0 based dashboard mashups Powerful grid presentations of reports with sorting and grouping Chart and Gauge presentations of reports Association of multiple report displays with the same report data definition Custom Filters Custom Thresholds to alert on the data Pre-installed stock report templates for Unified CCE data Importable report templates for Unified CVP data Ability to report data from JDBC compatible data sources. In Release 8.0(1), support is for Informix and SQL Server databases.
Report Management	Multi-user support Customized dashboards and custom reports Report scheduler Detailed security levels and support for LDAP / local database authentication Import and export of report XML files. Export of grid reports to Microsoft Excel
Report Infrastructure	Multiple language support Clustered deployment Management support through Simple Network Management Protocol (SNMP), Java Management Extensions (JMX), and Cisco Analysis Manager

Report/Database Compatibility

Cisco Unified Intelligence Center 8.0(1) stock Unified CCE reports and importable Unified CVP reports were qualified to extract report data from product database versions as follows:

- Unified CCE reports are present in the user interface after the Unified IC installation of a member node. These realtime and historical reports are populated by the Unified CCE 8.0(1) database.
- Unified CVP reports ship with the Unified CVP installation. Customers can import them into Unified IC, configure a data source for the Unified CVP 8.0(1) reporting database, and run reports populated by that database.

Note: There is no support for Cisco Unified Expert Advisor Report Templates.

Licensing

Unified IC uses Flexlm licensing based on the MAC address of the controller node. The license is downloaded through the Administration console interface and is transmitted to all member nodes by replication. Any changes or updates to the license must be done on the controller node.

For cluster deployment, the license file specifies the maximum number of Unified IC servers that the cluster can support. Refer to the user documentation for the types of licenses available.

Security

The Unified IC application is accessed over HTTP by default, and users are required to log in to the web application to access it.

User authentication can be performed using either of the following:

- LDAP based authentication
- Application-specific authentication based on the local CUIC database

Once logged in, Security Administrator users can define access permissions for other users based on READ, EXECUTE, or WRITE rights for the objects they own. Role-based access policies are also enforced based on commonly-preformed user roles.

A single identity is used to access the Unified IC internal databases and the other data sources from which report data is extracted. Although each user has an individual login, the application does use multiple logins to access the internal / external) databases. A single, pre-configured login is used to access the databases irrespective of the login used.

Unified IC supports Unified CCE user integration, whereby Unified CCE supervisors can be imported into the Unified IC application, with specific, automatically-assigned roles.

Internal Firewall

The Unified IC nodes are shipped with inbuilt firewalls (IpTables based).

The following ports / protocols are opened by default:

- TCP ssh port 22
- TCP HTTP CUIC port 8081
- TCP HTTPS CUIC port 8442
- TCP HTTP OAMP port 8082
- TCP HTTPS OAMP port 8443
- TCP ports 1500 and 1501 for IDS access and replication (but not open to external access)
- ICMP ping requests
- All UDP (primarily used by SNMP)

Firewall Integration in a Wide Area Network

Data source servers that are deployed over WAN links are likely to encounter firewalls.

Firewall requirements for supported databases are as follows:

- **Microsoft SQL Server**

  Default instances of SQL Server listen on TCP port 1433. Named instances, however, dynamically assign an unused TCP port number the first time the instance is started. The named instance can also dynamically change its TCP port address on a later startup if the original TCP port number is being used by another application.

  Named instances should therefore be assigned a static port using the SQL Server Configuration Manager.

  Microsoft SQL Server uses UDP port 1434 to establish communication links from applications for its SQL server browser service. The firewall should also be configured to forward all requests for UDP port 1434 on the database server address. For further reference. please refer to this article on the MSDN **Configuring the Windows Firewall to Allow SQL Server Access** (http://msdn.microsoft.com/en-us/library/cc646023.aspx)SQL server firewall configuration guide.

- **IBM Informix IDS**

The Informix IDS server listens on a single incoming TCP port for incoming database connections, which is port 1504 by default.

This can be modified depending on the application and can be found in the services file (/etc/services on UNIX and %WINDIR%\system32\drivers\etc\services on Windows).

For example, in Release 8.0(1), the Unified CVP Reporting Server uses port 1526. This is the only port that must be opened on the forwarding firewall that guards access to an Informix IDS server.

More information can be found in the **IDS communication guides** (http://publib.boulder.ibm.com/infocenter/idshelp/v10/index.jsp?topic=/com.ibm.relnotes.doc/uc3E/idse_win_release_notes_10.0.html).

See Also

Local and Wide Area Network (page 16)

Throttling

The Unified IC throttling mechanism prevents servers from freezing or shutting down when they are pushed beyond their limits.

Note: This is not the same as ensuring good quality of service. If a Unified IC deployment is being overused, the level of service may degrade substantially before the throttling mechanism is activated.

Memory is the resource that is actively throttled by the Unified IC application. Processing report data accounts for the majority of memory consumption in Unified IC. For that reason, memory throttling is focused on controlling memory consumption due to reporting activity.

The *report row* is the basic unit used to measure the amount of reporting activity. Using report rows as the basic unit to measure reporting activity gives flexibility to users. A user can decide to run a few big reports or many small ones, and the throttling mechanism will be equally effective without requiring any tuning.

Report rows are counted only as they are loaded into memory, so no guesses are made as to report size. Test results using the row sizes of the installed stock reports quantified that 2 KB is a conservative estimate for the size of a report row. If each report row is 2KB in size, then 250,000 is the maximum number of report rows that a Unified IC server can allow into memory before the server encounters an Out-of-Memory error.

To enforce this limit, each Unified IC keeps a count of the number of report rows currently loaded into memory. That count is checked by all reporting operations to determine if additional report rows can be loaded into memory. If an operation cannot proceed because the number of concurrent rows in memory has reached the maximum value, the operation fails and an error is displayed to the user.

What happens if the limits are exceeded? Report rows are loaded into memory when the data is being fetched from the data source and when it is being prepared to be sent to the browsers.

Either of these operations can fail if the maximum number of concurrent report rows in memory is exceeded:.

- If a violation happens while Unified IC is reading data from a data source, the report execution aborts and the report marked as failed. This means that Unified IC does not take partial results – the system either reads all the data that a user requested or marks the report as failed and stores none of the data.
- If a violation occurs while Unified IC is in the process of preparing the HTTP response for a browser (HTML of a Grid, JSON string of a Gauge, XML of a Chart), the request to display the data is rejected and the user sees an error message that says the report cannot be rendered because the server is low on resources.

Note: The throttling mechanism should not be used for any sizing purposes. Always use the sizing calculator to determine your reporting sizing needs. Again, the throttling mechanism is designed to prevent the servers from crashing, not to ensure a good quality of service to the users.

Chapter 2

Architecture

Unified IC is a clustered, web-based reporting application that can extract and display data from external data sources using Structured Query language (SQL) statements. It supports external security (page 7) integration and SNMP-based management tools, which make it very easy to administer and deploy.

This chapter contains the following topics:

- Platform, page 11
- Browser Clients, page 11
- Cisco Unified Intelligence Center Administration , page 12
- Cisco Unified Intelligence Center Reporting, page 13
- Cluster Support, page 13
- Data Source Server, page 14
- Failover using Application Control Engine Load Balancing Module , page 16
- Local and Wide Area Network, page 16

Platform

Unified IC is supported as an appliance and is packaged with its complete environment, including its base platform—the Cisco Voice Operating System (VOS). VOS actively discourages user modifications or access to the underlying components except through supported administrative interfaces.

Browser Clients

The Unified IC application is designed to be accessed over Hypertext Transfer Protocol (HTTP), from web browser clients having JavaScript support. Once logged in, HTTP is used for all other pages.

The Internet Explorer and Mozilla Firefox clients are supported in this release. For version information, refer to the **Cisco Unified Intelligence Center Bill of Materials** (http://www.cisco.com/en/US/products/ps9755/products_user_guide_list.html)

Cisco Unified Intelligence Center Administration

The Cisco Unified Intelligence Center Administration Console server is the administrative and management component for Unified IC and provides Operations Administration Maintenance Provisioning (OAMP) functions. The Administration Console is the primary interface for configuring Unified IC specific application settings for a cluster, as well as provisioning devices in a cluster. The Administration Console works in conjunction with the other VOS web applications to manage a Unified IC VOS device.

Administration is a mandatory component and is deployed and accessible only on the primary (controller) node in the cluster. If you install a single (standalone) node only, that node is the controller has both the Administration and the Reporting applications.

The Administration Console is a web based application and requires System Application User or Super User login through HTTP.

Use the Administration console to:

- Configure reporting nodes in the cluster
- Manage licensing
- Download the Real Time Monitoring Tool (RTMT)
- Configure super users and policies
- Configure security related settings such as LDAP configuration
- Manage serviceability settings such as trace levels and log file size, which can be used for troubleshooting and debugging
- Configure SMTP
- Manage start / stop the Unified IC web reporting application on other nodes in the cluster
- Synchronize (integrate) Unified CCE users

The Administration application uses the Web Services Manager (WSM) server process to interface with the Unified IC reporting application.

Note:

- Platform management applications for managing system-level functions such as network options, certificates, upgrades, and SNMP and Alert settings are not handled by the Unified IC Administration application.

- Three Cisco Unified Communications Manager (Unified CM) tools (Cisco Unified OS Administration, Cisco Unified Serviceability, and Disaster Recovery System) are accessible from any node. Refer to the **Administration Console User Guide for Cisco Unified Intelligence Center** (http://www.cisco.com/en/US/products/ps9755/products_user_guide_list.html) for details on these platform management applications.

Cisco Unified Intelligence Center Reporting

The reporting node contains the core of the Cisco Unified Intelligence Center and contains all the features required for reporting. A single reporting node can be deployed standalone in a Controller node or in a cluster of a Controller node and up to seven reporting "Member" nodes.

The following software components are deployed in the reporting node:

- Firewall
- Web Server (Tomcat 6.0) that runs the Unified IC application
- JAVA services and JSP pages that translate the web requests into HTML
- CUIC Database (Informix) with replication support within the cluster
- The Administration (OAMP) application (when the reporting node is also the only node of the cluster).

Cluster Support

When the number of concurrent logins and reporting needs exceed the capacity of a single (controller) server, Unified IC can be deployed in a clustered mode. In this mode, multiple member (reporting) nodes present a unified application to the user and allow a consistent, shared configuration across the controller and all member nodes.

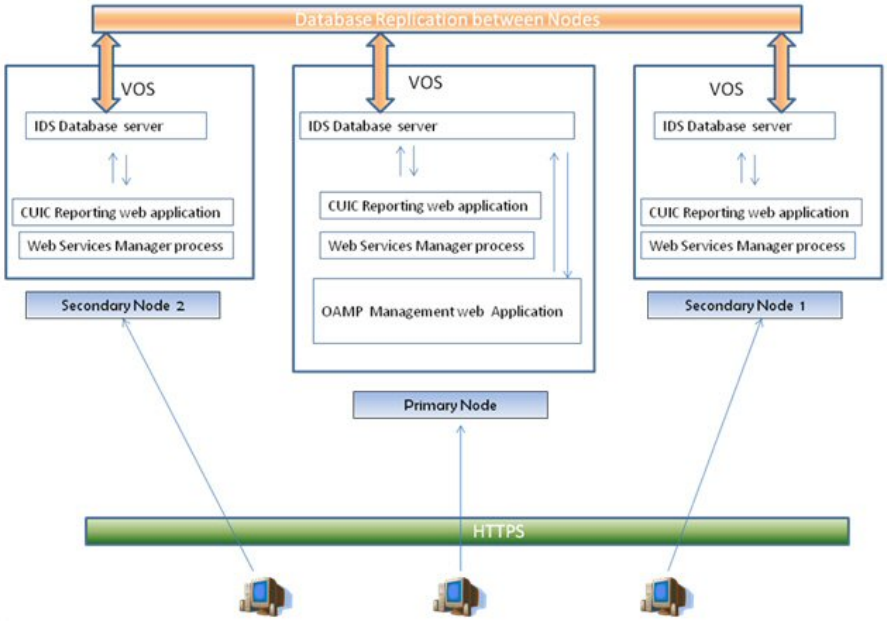
Multiple nodes bring better scalability to the reporting infrastructure than would be possible using a single, vertically-scaled reporting server. Cluster support also presents an opportunity to scale the solution gradually, depending on the needs of the deployment.

Clustering in Unified IC is made possible by the IBM Informix CUIC database, which serves as the backend data store for the Unified IC reporting application.

Enterprise Replication database replication connects and synchronizes the multiple nodes participating in a cluster. Administrative changes, configuration updates, and so forth are communicated throughout the cluster, and all users are presented with a common interface of object, irrespective of the node used to serve their requests and actions.

In addition, nodes communicate with each other directly via IP multicast, which happens independently of database replication.

Figure 1: Database Replication



Database Replication in the Cluster

The Cisco Unified Voice Operating System (VOS) installs Informix as part of the base platform installation. Installation-specific scripts create the Unified IC application database (CUIC) on each reporting node and set up the enterprise replication among participating nodes.

The CUIC database is the main data store for the Unified IC reporting web application. It holds configuration information relating to users, reports, user access rights for each node in the cluster.

Unified IC uses the update-anywhere enterprise replication model based on a topology of Fully Connected Database servers. Each database server has connection to all other database servers. Data can be transferred from any machine to all others. Data is replicated immediately, as soon as changes are made. Changes that are apparent in the User Interface (such as the addition or deletion of a dashboard or a change to a report definition) are evident across all devices when the page is refreshed, provided that all devices in the cluster have all the required network connections and CPU power to do the processing.

An automated daily purge that runs every day at midnight takes care of database maintenance activities. The purge schedule can be controlled or changed through the command line interface. Purge is the only local database maintenance apart from the backup that is required for the local CUIC database(s).

Data Source Server

Data source servers are used by the Unified IC reporting component to extract data requests from the queries that are defined in the report definitions. Each data source server contains the

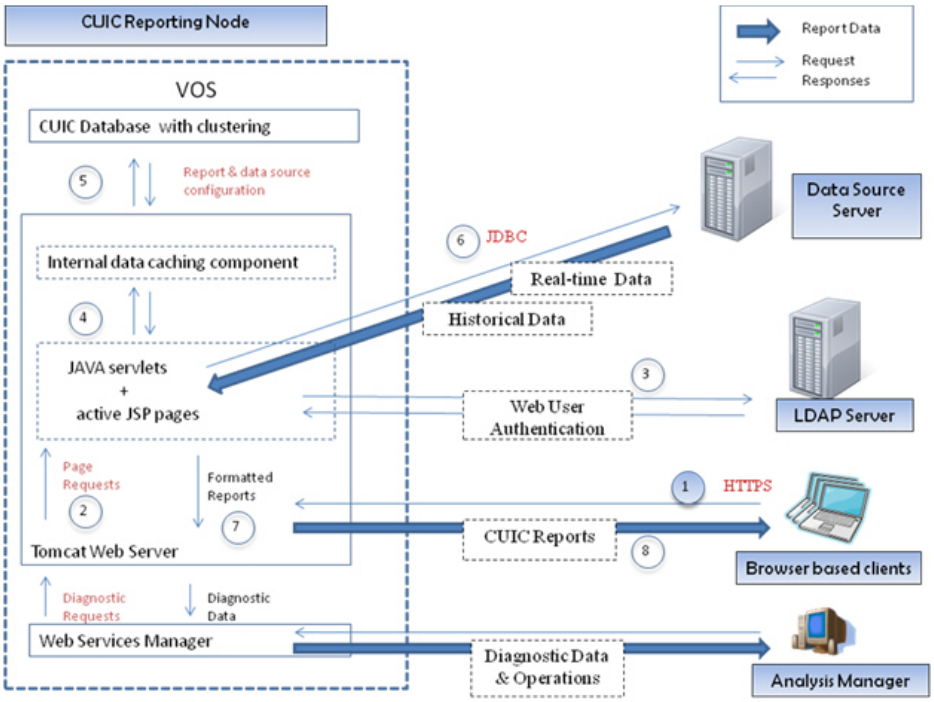
database and the schema that store the reporting data that populate the reports. For this release, a Unified IC data source server must be a valid JDBC compliant database. Unified IC is currently validated with SQL server 2005 and Informix 11.5 database versions.

Note: SQL Server Authentication must be set to *SQL Server and Windows Authentication mode*. This release does not support Windows Authentication to a SQL Server database.

These data source servers are supported for the stock Unified CCE reports and the importable Unified CVP reports

- Unified CCE AW-HDS, which is part of the Unified CCE 8.0(1) deployment (page 22)
- Unified CVP reporting server, used in Unified CVP deployments (page 26)

Figure 2: Unified IC Architecture

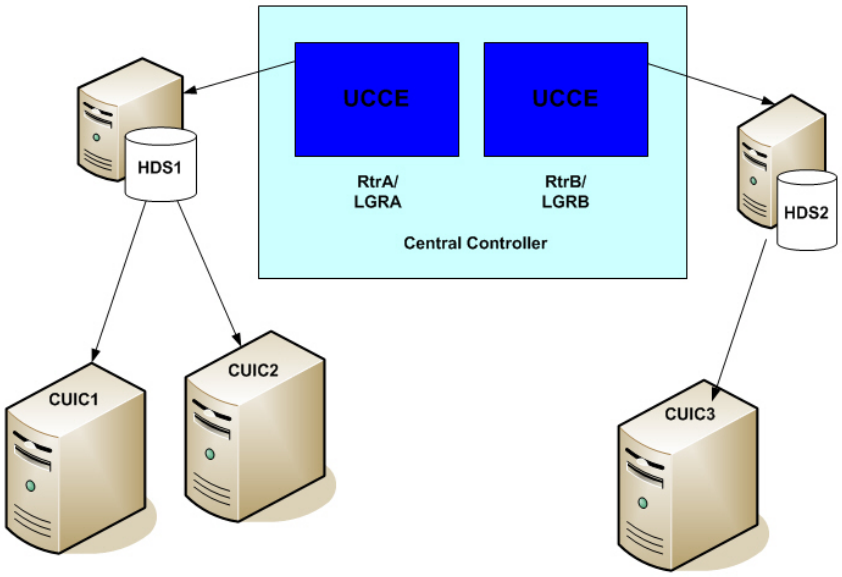


Mapping Nodes to Multiple Databases

The number of data sources that need to deployed for Unified IC depends on the number of concurrent reports to be supported and the number of concurrent logins. You can distribute the reporting load to several UCCE AW_HDS databases using the Command Line Interface and conventional name resolution. If there is a need to direct a specific member node to a database host other than the one in configured on the Data Sources interface, you can use the **`set cuic-properties host-to-ip`** command to resolve the data source name differently on each node.

Any given reporting member node can be directed to a specific UCCE database.

Figure 3: Nodes Mapped to Multiple Databases



Failover using Application Control Engine Load Balancing Module

The Cisco Application Control Engine (ACE) is a multifunction module for Cisco Catalyst 6500 Series Switches and Cisco 7600 Series Routers that can be used for maximizing availability, acceleration, and Server Load balancing. It has a native understanding of multiple protocols such as HTTP, which can be used for content-based traffic redirection, depending on various traffic predictors, source address / round robin / server load, and so forth.

ACE can be used by Unified IC to present a single URL to access the application and to perform server load balancing in the cluster, by redirecting the HTTP requests across the multiple nodes as required. When deployed along with ACE, the failure of a single node does not affect the application, and new requests are automatically routed to the remaining servers.

Coupled with database replication, which replicates the application state across the nodes, ACE presents an elegant failover solution for the overall application.

Local and Wide Area Network

Data Sources have been qualified over local area networks (LAN) and wide area networks (WAN).

Note: Distributing data source servers over a WAN can increase the report execution times, depending on the latencies and traffic conditions over the WAN.

Cluster nodes have been qualified over a LAN and are being tested over a WAN.

See Also

Firewall Integration in a Wide Area Network (page 8)

Chapter 3

Deployment Models

This chapter describes the deployment models for Cisco Unified Intelligence Center. Each model addresses scalability of the solution. The exact model that needs to be employed at different sites will depend upon on the number of clients to be supported and, to a lesser extent, on the amount of data being reported.

See Chapter 4 (page 29) for sizing calculations.

This chapter contains the following topics:

- Unified IC Deployment , page 19
- Cisco Unified Contact Center Enterprise Deployment, page 22
- Cisco Unified Customer Voice Portal Deployment, page 26

Unified IC Deployment

The deployment models supported by Unified IC Release 8.0(1) are

- Standard Deployment (page 19) - one or two servers;no Load Balancer
- Scaled Deployment (page 20) - up to eight servers, use of Load Balancer

Note: The differentiators between the two deployments are the number of servers and the use of the ACE Load Balancer.

Unified IC Standard Deployment Model

The standard model includes the following components:

- One or two Unified IC reporting (member) nodes in a cluster

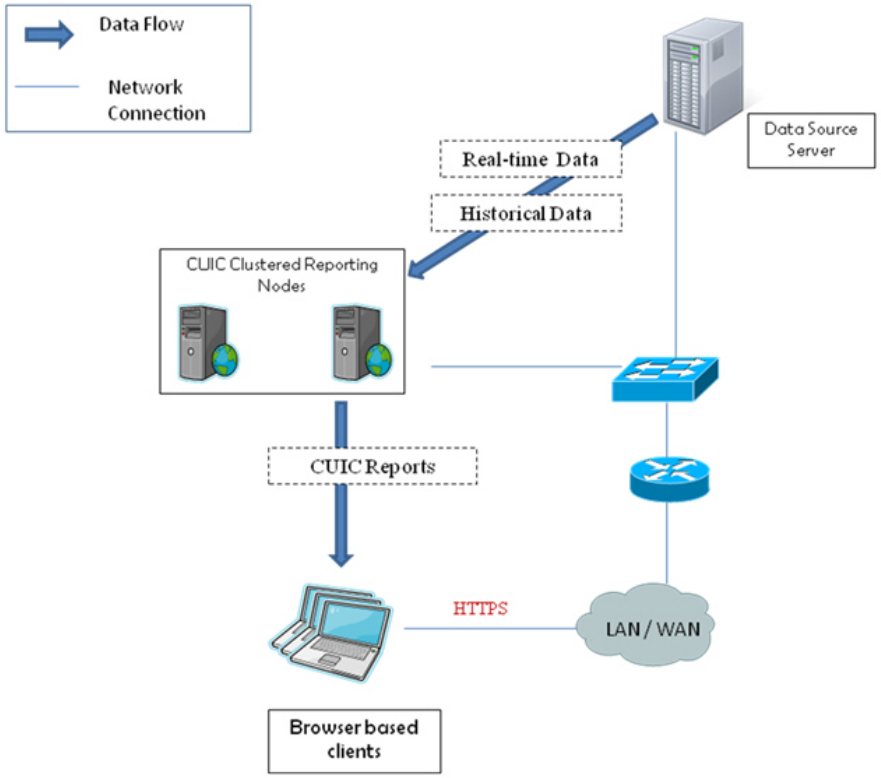
- Realtime and historical Unified CCE data source(s)
- Optionally, other data sources

This deployment model consists of a Unified IC cluster that communicates directly with the database running on the data source server. Data for all reports — both realtime and historical — are fetched when required, based on report requests issued by web clients. If data must be obtained from multiple servers, reports can be redirected to the corresponding data sources.

Data flow:

- The web client makes an HTTP request for a Unified IC page / report
- The web request is handled by the web server on the Unified IC reporting node
- When a report is requested, the data is pulled from the data source server, which supplies the actual data for both historical and realtime reports

Figure 4: Unified IC Standard Deployment



Unified IC Scaled Deployment Model

The scaled model includes the following components:

- Multiple (maximum of 8) Unified IC reporting nodes deployed in a cluster

- Multiple data source servers
- A Cisco switch / router capable of deploying ACE module
- Single ACE Load balancer Module

In this model, the multiple Unified IC reporting nodes are deployed across an ACE load balancer module. This allows clients to use the same URL to access the application. The ACE module performs Load Balancing by distributing user sessions among multiple member nodes in the Unified IC cluster that are available at the beginning of the session. The nodes are synchronized through database replication.

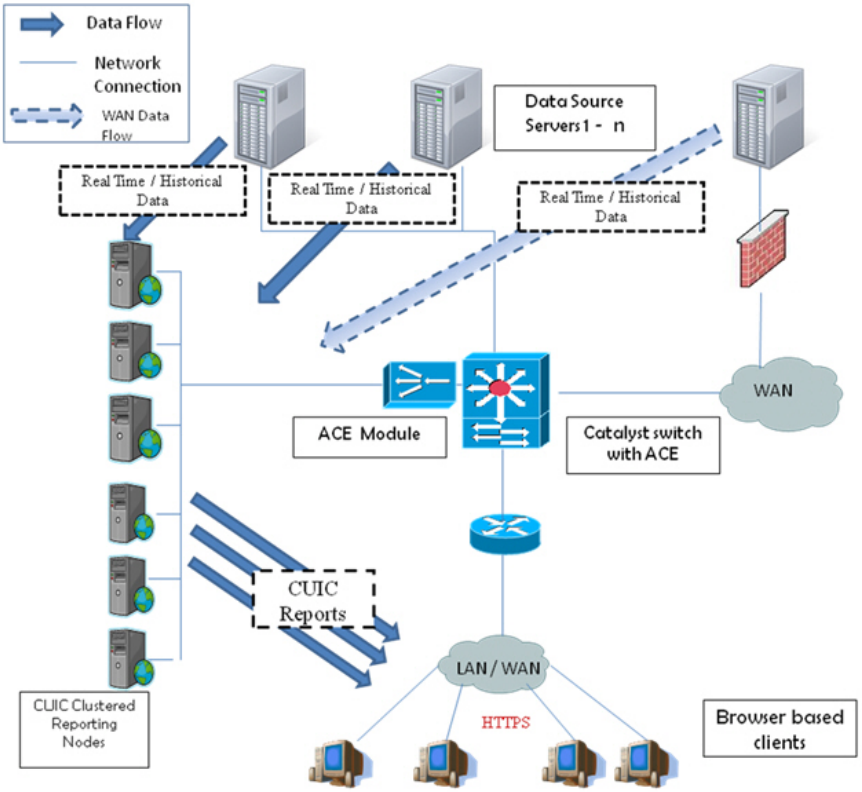
If a single data source server is insufficient to server all the reporting data requests from multiple clients, multiple data source servers can be used to spread the report load. The server load factor numbers (present in the bandwidth and sizing section) determine the number of data source servers, depending on the number of simultaneous real clients running the Unified IC reports.

Firefox is the client of choice for administrators in scaled deployments, due to the large amount of data that will be displayed, which render faster on the Firefox browser.

Data flow:

- The web client makes an HTTP request for a Unified IC page / report using the virtual server configured on the ACE module.
- The ACE load balancer determines which available working member (reporting) node is to handle the request and redirects it to that node. ACE continues to redirect subsequent http requests from the browser session to the same node (sticky mode).
- The web request is handled by the Unified IC reporting node.
- When a report is requested, the reporting data is pulled from the database on the associated data source, whose connection parameters are resolved by the reporting node.

Figure 5: Unified IC Scaled Deployment



Cisco Unified Contact Center Enterprise Deployment

Cisco Unified Contact Center Enterprise (Unified CCE) is an integral component of the Cisco Unified Communications system and delivers a comprehensive solution that provides intelligent routing and logging functionality and call treatment. Unified CCE uses a synchronized, lock and step message-based routing functionality to keep configuration and reporting data up to date. This data is maintained in databases in the Administration & Data Server, formerly called the Distributor Admin Workstation (AW).

Unified CCE Parent-Child Deployment: Unified IC does not directly support consolidated reporting of data across parent/child sites. Run reports on overall statistics from the parent site. Run agent-specific reports at the child. Create data sources at the parent and separate data sources that connect to the child.

Unified CCE Hosted Deployment: In this release, Unified IC was not qualified by Cisco Quality Assurance in a Hosted environment.

Administration & Data Server as Unified IC Data Source

The Administration & Data Server holds the database used as the Unified IC data source for Unified IC stock reports. Unified CCE can support multiple Administration & Data Servers.

Unified CCE Release 8.0(1) introduces a new set of options based on deployment size.

- For small or medium deployments, select **Administration Server, Historical Data Server, and Detail Data Server (AW-HDS-DDS)**. This is the selection for Unified IC data feed.
- For large deployments, select **Administration Server and Historical Data Server (AW-HDS)**.

These selections are documented in the **Cisco Unified Contact Center Enterprise Solution Reference Network Design (SRND)** (http://www.cisco.com/en/US/products/sw/custcosw/ps1844/products_implementation_design_guides_list.html).

Note: Cisco Unified Intelligence Center uses AW/HDS as a data source for standard historical reports and AW/HDS or AW as a data source for standard real-time reports. For use of DDS for custom reporting, please see the recommendations for call detail reporting in the **Reporting Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted, Release 8.0(1)** (http://www.cisco.com/en/US/products/ps9755/products_user_guide_list.html).

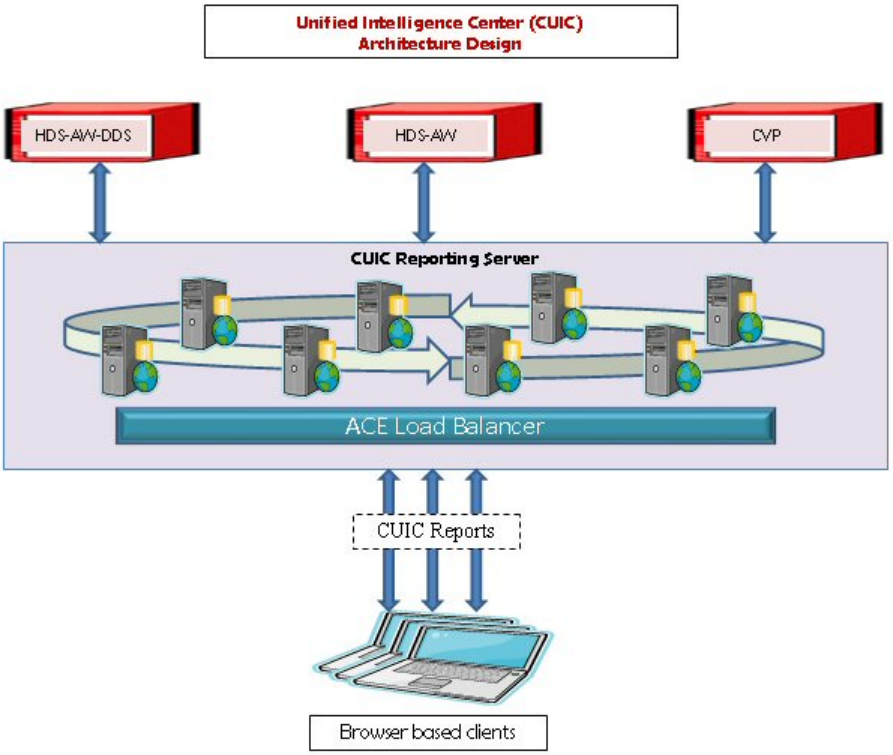
In all cases, the database on the Administration & Data Server and the views inside it are used as the tables for the data source queries run from Unified IC. This makes it unnecessary to maintain additional database network connections to multiple databases from the Unified IC, and all the data pertaining to the Unified CCE can be referenced by single data source.

The Unified IC installation adds two data sources to the reporting (member) nodes:

- The UCCE Historical data source, which support the Unified ICM/CC stocks historical reports and UCCE User Integration.
- The UCCE Realtime data source – This data source is added by default to support the Unified ICM/CC stock realtime reports.

Depending on your environment, the UCCE Historical and UCCE Realtime data sources can point to the same Administration & Data Server.

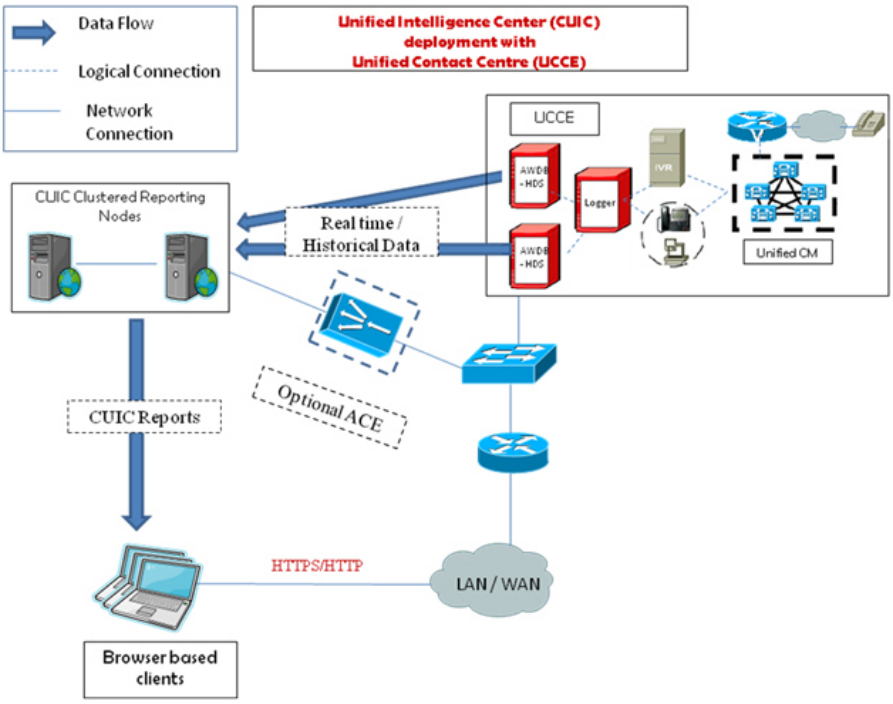
Figure 6: Unified IC and HDS-AW



Network Design - Unified IC Standard Deployment with Unified CCE

The Unified IC deployment with Unified CCE utilizes the AW-HDS as its data source server. It is possible to connect to multiple AW-HDS databases to handle the load from multiple Unified IC reporting nodes. Other data sources such as the CVP Reporting Server can be used along with the Unified CCE AW-HDS as data source servers. The ACE load balancer, an optional component, provides load balancing for report queries across the multiple reporting nodes and servers as a single point of access to the cluster.

Figure 7: Unified IC Deployed with Unified CCE



Unified CCE deployments with a distributed AW-HDS can be used a data source for Unified IC reports. However local area network AW-HDS access ensures better throughput in data extracted and ensures faster response times for reports, especially realtime reports with repeated refresh intervals.

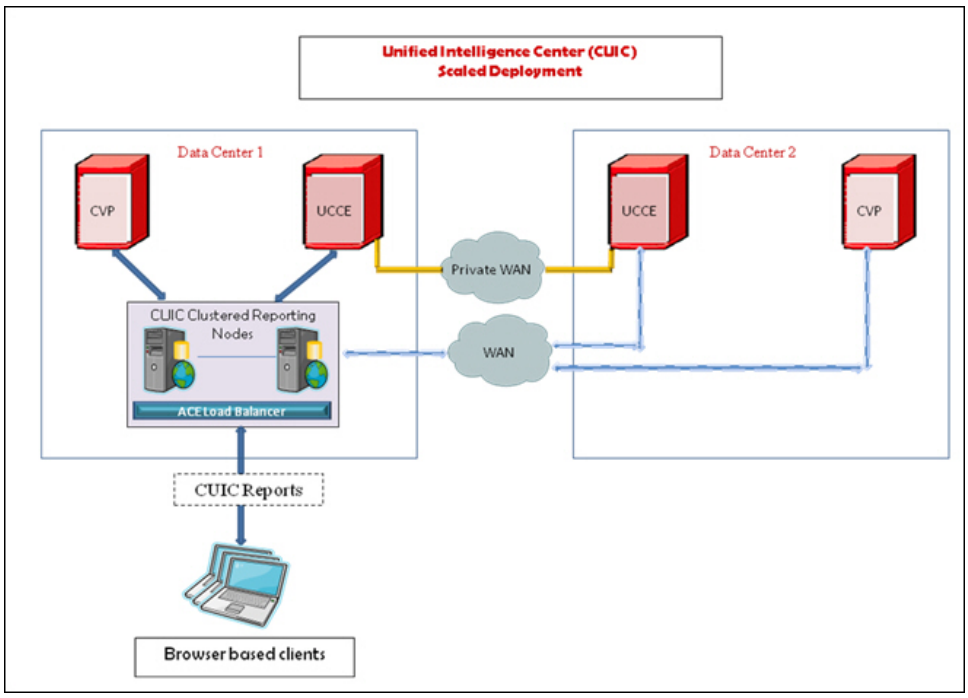
The exact response times and latencies can looked up in the performance section (page 29) of this document.

Network Design - Unified IC Scaled Deployment with Unified CCE

Unified IC can be deployed as the reporting solution with Unified CCE deployments that scale over WAN networks. In these deployments, Unified IC is deployed locally with one section / data center of the scaled Unified CCE deployment and can access the local AW-HDS over the Local Area Network (LAN) as well as the remote AW-HDS which is deployed along with the remote section of the Unified CCE over the Wide Area Network (WAN).

Other data sources such as Unified CVP can be deployed along with Unified CCE. Firewall considerations when deploying over WAN are applicable to the data source servers and appropriate ports as described in the Firewall Integration (page 8) notes should be opened, depending on the remote database configuration.

Figure 8: Unified IC Scaled Deployment with Unified CCE



Cisco Unified Customer Voice Portal Deployment

Cisco Unified Customer Voice Portal is a VoiceXML-based solution that provides Interactive Voice Response (IVR) and IP switching functionality on Voice over IP (VoIP) networks. It can be deployed in a standalone mode or integrated as part of Unified Contact Center Enterprise (Unified CCE) solution.

Unified CVP Reporting Server as Unified IC Data Source

The Unified CVP Reporting Server component of Unified CVP is used as the data source in a Unified IC deployment that imports reports for the Unified CVP platform.

The Unified CVP Reporting component provides the basic reporting capabilities in a Unified CVP environment. This reporting server is a Windows 2003 server that hosts an IBM Informix Dynamic Server (IDS) database management system. It contains a published schema, which customers can use to create custom reports.

Network Design - Unified IC deployment with Unified CVP

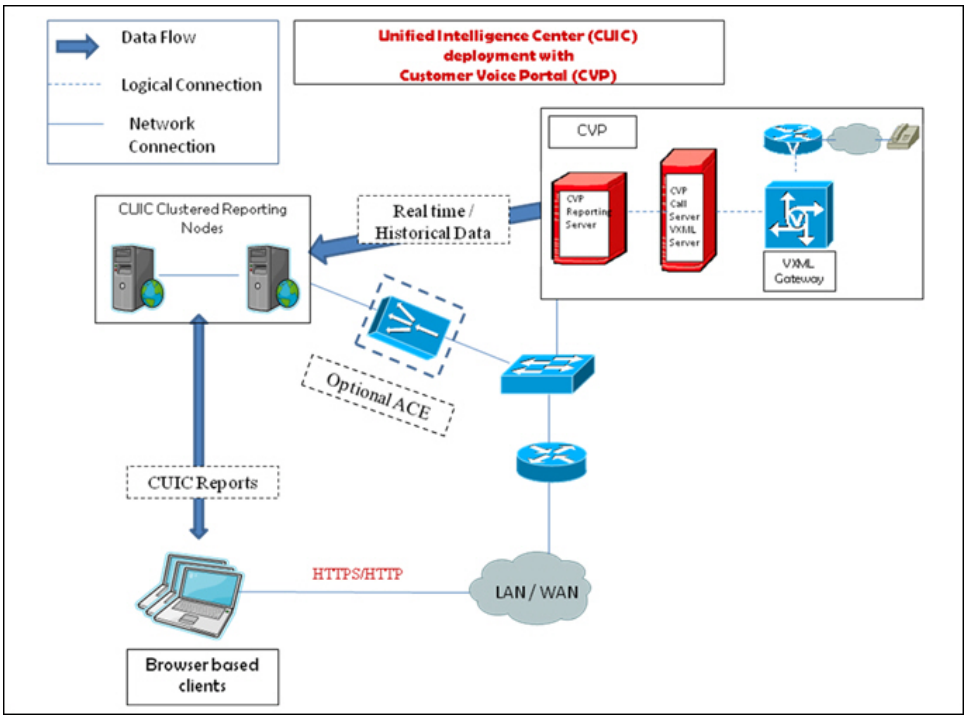
The Unified CVP Reporting Server receives reporting data from the IVR Service, the SIP Service (if used), and the Unified CVP VXML Servers. The Reporting Server depends on the Call Server to receive call records.

For standalone Unified CVP VXML Server deployments, one Call Server is needed per Reporting Server. The Reporting Server must also be local to the Call Server(s) and Unified CVP VXML

Server(s) that it is servicing. Deploying the Reporting Server at a remote location across the WAN is not supported by Unified CVP.

The Unified CVP deployment model shown in the diagram below is a not a strict requirement for Unified IC. Unified IC is independent of the components connected to the data source server it uses to fetch its data. Therefore the exact Unified CVP deployment can vary depending on the customer installation and on the required number of Reporting Servers available for the Unified IC reporting nodes to connect to.

Figure 9: Unified IC Deployed with Unified CVP



Chapter 4

Bandwidth and Performance Recommendations

This chapter qualified the performance levels that can be expected from a single Unified IC node with respect to bandwidth requirements and user level responsiveness from the reporting application. The assumption is that Unified IC users are working from a standard desktop system with sufficient memory and disk space as recommended by Microsoft to support Internet Explorer 7 or above.

This chapter contains the following topics:

- Definition of Sizing Parameters , page 29
- Measured Bandwidth, page 30
- Bandwidth Requirement, page 30

Definition of Sizing Parameters

The following parameters combined have an effect on the responsiveness and performance of the Cisco Unified Intelligence Center at desktop. Descriptions of these items are:

- Realtime reports: Simultaneous realtime reports run by a single user.
- Refresh rate/realtime: Frequency that report data are refreshed for a realtime report. Note that this can be set per report and the default setting is 30 seconds.
- #Cells per report: The number of columns that are retrieved and displayed in a report.
- #Historical report : Number of Historical reports run by a single user / hour.
- Refresh rate/historical: The frequency that report data are refreshed on a historical report. Note that this can be set per report.
- #Rows / report: Total number of rows on a single report.
- Charts / dashboard: Number of charts (pie, bar, line) in use concurrently on a single dashboard.

- Gauges / dashboard: Number of gauges (speedometer, thermometer) in use concurrently on a single dashboard.

Measured Bandwidth

Unified IC bandwidth calculations were performed on a local area network with a local AWDB database and client machine running the reports. The bandwidth figures are derived from observations on the network statistics of the Unified IC node and the AWDB HDS box serving the report data. Load Figures from the test setup are as follows:

Two hundred Unified IC Users, each running:

- Four realtime reports with 50 rows per report, with 10 fields each, refreshed every 15 seconds
- Two historical Reports with 2000 rows, with 10 fields each, refreshed every 30 minutes

Note: It is possible to derive the bandwidth requirements for different test setups from the **Sizing Calculator** (http://tools.cisco.com/cucst/faces/login.jsp).

Bandwidth Requirement

The observed bandwidth for this test setup was 12657 kbps overall, and the individual network segment bandwidths are:

- Unified IC <– –> AWDB bandwidth = 2,661 kbps
- Unified IC <– –> Browser based Reporting Client bandwidth = 9,996 kbps

The exact bandwidth requirement will differ based on the sizing parameters used, such as the number of rows, the refresh frequency, and the number of columns present in each report.

The formulas that can be used to derive the exact bandwidth required based on these parameters are as follows:

- Formula to calculate Unified IC Network Bandwidth is 0.37 * cells/sec + 352
- Formula to calculate bandwidth from Unified IC to AW/HDS is: 0.05 * cells/sec + 1105
- Formula to calculate bandwidth from Report Client to Unified IC is 0.31 * cells/sec + 352

Please use these formulas to determine the exact bandwidth figures and the number of reporting nodes required for the required client setup.

Chapter 5

Best Practices

The following are a brief collection of recommendations or best pacticies, which if followed while deploying Unified IC will provide the best optimal operation of the application.

This chapter contains the following topics:

- Centralized Ownership and Administration, page 31
- Dashboard Design, page 31
- Refresh Rate, page 31
- Report Design, page 32
- Reporting Client, page 32
- Scheduled Reports, page 32

Centralized Ownership and Administration

The administration and design of Unified IC is best left to a centralized team who are responsible for ensuring proper report and dashboard design, as well as managing ongoing system utilization.

Dashboard Design

Create targeted dashboards for users and eliminate elements that are not required for those users. Focus dashboard design on just what people need.

Refresh Rate

When possible, increase the time between the refresh (increase the refresh rate) to reduce access to the database. By default, realtime reports are set to refresh every 15 seconds, and historical reports are set to refresh every 15 minutes, but each custom report definition can be set to a unique refresh rate.

Report Design

Use a lab or non-production system for report development and testing prior to deployment. The finished reports can be imported into the production server following testing in the lab environment.

Build reports with historical summary skill group or call type data rather than with individual agent or call records to optimize database queries. There will be fewer records to report on in the summarized forms, which results in improved performance

For example, whenever possible, use Agent Team reports in Unified CCE deployments instead of Agent reports, if the former will suffice.

Reporting Client

Mozilla Firefox is the preferred client of choice for administrators in scaled deployments, due to the large amount of data that is displayed. Unified IC pages render faster on the Firefox platform.

Scheduled Reports

Identify the reports that are run daily and shared among various users and use the scheduling function in Intelligence Center to send email or update dashboards with this data.

For example: if all managers in a call center require the same Daily Skill Group and Call Type Reports, schedule those reports for email delivery or to update a common dashboard.

Evaluate any reports that require more than 30 seconds to render to determine if the report can be optimized or scheduled for a time of lower system utilization, especially if they access a large amount of data.

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