



**PureConnect®**

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# PureConnect Reporting

## Technical Reference

### Abstract

This technical reference describes the PureConnect reporting process, including advanced reporting features.

For the latest version of this document, see the PureConnect Documentation Library at: <http://help.genesys.com/cic>.

For copyright and trademark information, see [https://help.genesys.com/cic/desktop/copyright\\_and\\_trademark\\_information.htm](https://help.genesys.com/cic/desktop/copyright_and_trademark_information.htm).

# Table of Contents

Table of Contents	2
Interaction Reporting in CIC	5
Interaction Reporter	5
Report Manager in Interaction Administrator	5
Interaction Report Assistant in IC Business Manager	5
Where to find Interaction Reporting information	6
IC Business Manager Getting Started Help	6
Interaction Reporter Help	6
Report Management Help	6
Interaction Report Assistant Help	6
PureConnect Customer Care Self Help	6
PureConnect Data Dictionary	6
Sample Reports for Interaction Reporter	6
PureConnect Licensing Technical Reference	7
CIC Installation and Configuration Guide	7
Interaction Administrator Help	7
Overview of the CIC Reporting Process	8
PMQ Logging	8
Report Logging Process Summary	8
CIC Server Parameters	8
Report Log Purging for Large Databases	8
Using CIC Server Parameters with a Report Log	9
Custom Logging	9
Logs	9
Log Details	9
Interaction Administrator	11
Overview of Crystal Report Templates in CIC	12
Customization Requirements for Crystal Reports	12
Editing a CIC Report	12
CIC Report Templates	12
PureConnect Data Dictionary	12
Before customizing Interaction Reporter Crystal Reports	13
Opening templates and connecting to report logs	13
Connecting your report template to the correct log	13
Determining which tables are in a report log	14
Determining the contents of a log	14
Viewing the Details of Report Logs in Interaction Administrator	14
Activating and deactivating logs	15
CIC Report Editing for Crystal Reports	16
Configuring a Custom Crystal Report in Report Management	16
Examples of Edited Reports	17
Changing a formula	18
Replacing a field	20
Copying a formula from one report to another	20
Merging Reports	22
Using Custom Columns in the Logs	23
Managing call attributes	23
Step One: Interaction Designer - Set the Values of Custom Call Attributes	23
Step Two: Interaction Designer - Get the Values of Custom Call Attributes	24
Step Three: Assign Variables and Add Values to Custom Columns	25
Step Four: Display your custom call attribute in a Crystal Report template	25
Using Crystal Reports	25
Displaying your custom call attribute in a new report template	27
Logging Custom Passthrough	28
LCP Example	29
Another LCP Example	29
Custom Counters	30
CIC Report Groups and Statistic Groups (STIDs)	31
Report Groups	31
Report Group Tools	31

Assign Report Group	31
Query Report Group	31
Statistics Groups	32
Statistics Group Tools	32
Assign Stats Group	32
Query Stats Groups	32
Remove Stats Groups	32
Gathering Statistics	32
STID summary	33
Multi-site Reporting	34
Option 1	35
Appendix A: How statistics are generated for each log	36
Calls	36
Chats	36
Agent, Queue, Line and Line Group Queues	36
User Status Changes	36
Appendix B: CIC Reporting Tools Design	37
Introduction	37
Overview of Tools	38
Common Parameters	38
Known Export Limitations	38
Report Print Tool	41
Report Export File Tool	43
Report e-mail tool	45
Report HTML Export Tool	47
Special Export Options	49
Explanation of Special Options	49
Appendix C: Reporting Terms Glossary	52
Appendix C: Reporting Terms Glossary	52
Appendix D: CIC Report Guidelines (Crystal Reports)	53
Text Font Defaults	53
Page Defaults	53
Font Defaults	53
Data Defaults	53
Printer Defaults	53
Report (Page) Header	53
Report Title	53
Parameters (from left)	54
Logo (flush right)	54
Header Separator	54
Section Header	54
Group Label(s)	54
Summary Data	54
Column Headers	54
Text Body	54
Group Columns	54
Graph Defaults	55
X-axis data labels	55
Graph Type	55
Warning Messages	55
Section Footer	55
Summary Data	55
Group Footer	55
Summary Separator	55
Report Footer	55
No Border Lines	55
Left Text Object	55
Center Text Object	56
Right Text Object	56
Appendix E: Reporting Log Relationships and Report Use Guidelines	57
General Types of Report Logging	57
Call Detail Data	57
Queue Statistics Data	57
Agent/User Status Data	58

Line and Line Group	58
Administrative	58
Configuration Mirror Data	59
Appendix F: Including Ex-Agents in Reports	60
Appendix F: Including Ex-Agents in Reports	60
Appendix G: Parameter Types for Custom Crystal Reports	61
Appendix G: Parameter Types for Custom Crystal Reports	61
Appendix H: U2LININSUPPORTU.DLL Function Calls	62
Appendix H:U2LININSUPPORTU.DLL Function Calls	62
Appendix I: Parser Functionality	63
Data Types	63
Operators	63
Precedence	65
Constants	65
Functions	65
Parser Errors	66
Execution Errors	66
Appendix J: Internet Enabled Reporting	67
Configure Internet enabled reporting in Interaction Administrator	67
Configure reports for your CIC server	67
Configure the data source	67
Extra configuration for Oracle data source	68
Connection String Formats	70
Configuration Behavior	71
Appendix K: Report Log Purging for Large Databases	72
Large Database Purge Method	72
Adding the Server Parameter	72
Change Log	73

# Interaction Reporting in CIC

Customer Interaction Center provides several reporting options, available in IC Business Manager, to help customers with their reporting requirements. The reporting applications include:

- Interaction Reporter
- Report Manager in Interaction Administrator
- Interaction Report Assistant in IC Business Manager

The following is a brief description of the IC Business Manager reporting modules and how to access them.

## Interaction Reporter

Interaction Reporter, an add-on module for IC Business Manager, allows you to generate pre-defined reports. Depending on the report, Interaction Reporter uses the ActiveReports 6 or Crystal Reports reporting runtime. Using a report filter, simply configure the report parameters and run the report. You can save a report filter to use again, and you can export a filter to a file.

Depending on the report, when viewing a report, you can use the Report Viewer toolbar to annotate a report, print a report, and export a report for distribution. You can also customize your Interaction Reporter Workspace to display multiple Views.

## Report Manager in Interaction Administrator

Report Management allows you to configure reports that were created using ActiveReports and Crystal Reports. The reports configured in Report Management are run in Interaction Reporter in IC Business Manager. The Report Management Report Configuration page allows you to edit and manage metadata related to a report.

## Interaction Report Assistant in IC Business Manager

Interaction Report Assistant is a reporting tool that allows you to create a special report that you design. You choose the data and the layout, and generate a customized report that uses your specifications. You can edit and update the wizard selections for the reports you create, and print or export the output for distribution. This easy-to-use reporting tool contains *packages* of data for you to choose from. You simply select the *layout* for your report and Interaction Report Assistant guides you through your selection options to create the special report you need. You can also save your report queries to use again.

# Where to find Interaction Reporting information

Reporting information is included in technical references, user's guides, and Helps. These documents are available in the PureConnect Documentation Library on your CIC server.

Customer Interaction Center (CIC) supports two interaction management client applications. This documentation uses the term "CIC client" to refer to either Interaction Connect or Interaction Desktop.

The latest version of these documents can also be accessed from the PureConnect Documentation Library on the PureConnect Web site at:

<https://help.genesys.com/cic>

The following technical references, user's guides, Help and links can provide additional reporting information.

## IC Business Manager Getting Started Help

For assistance in using IC Business Manager Workspaces and Views, see the Getting Started Help. To access this Help, from the IC Business Manager Help menu, click **Getting Started**.

## Interaction Reporter Help

To learn about generating Interaction Reporter's pre-defined reports and using report filters, see the Interaction Reporter Help. When working with Interaction Reporter filters or reports, press F1 for contextual Help. You can also access Interaction Reporter Help from the IC Business Manager Help menu.

## Report Management Help

For more information about Report Management, see the Interaction Administrator Help.

## Interaction Report Assistant Help

To learn about designing special reports in Interaction Report Assistant, when working in the Interaction Report Assistant wizard, press F1 for Help.

To read more about generating custom reports, editing and updating queries, and printing or exporting the report for distribution, see the *Interaction Report Assistant User's Guide*.

## PureConnect Customer Care Self Help

The Self Help section of the PureConnect Customer Care Web site provides more in-depth architectural-focused troubleshooting information categorized by topic and component. Each section provides architectural insight, common problems and solutions, what to collect for problems, and how to troubleshoot.

## PureConnect Data Dictionary

The online PureConnect Data Dictionary provides a concise and detailed description of the database tables CIC uses to store and generate reports on historical data. This includes information stored for interactions, queue statistics, agent and user activity, line and line groups, administrative changes, and other Interaction Administrator configuration information. This data dictionary also contains information on Custom Logging. It also assists you in understanding the structure and contents of CIC tables.

## Sample Reports for Interaction Reporter

The *Sample Reports for Interaction Reporter* document includes examples of actual reports generated by Interaction Reporter.

## PureConnect Licensing Technical Reference

The *PureConnect Licensing Technical Reference* describes the system management for licensing PureConnect products. It includes steps for managing license information using the Activation File Management tool. You can access the tool on the My Support Dashboard at <https://genesyspartner.force.com/customercare/GenesysCommunityLogin>. You must have the appropriate credentials to access this portal.

## CIC Installation and Configuration Guide

See the *PureConnect Installation and Configuration Guide* for information on installing and configuring report applications.

## Interaction Administrator Help

See the Interaction Administrator Help for information on basic report logs that store all line, call, and user related CIC interaction data. Information for Report Logs is accessed under System Configuration. Information for configuring report tables and parameters, multi-language support, and custom attributes is also available in the Interaction Administrator Help.

# Overview of the CIC Reporting Process

Customer Interaction Center (CIC) uses the powerful and comprehensive features of Persistent Message Queue (PMQ) in the logging process, if you are storing your data in an Oracle SQL Server database.

## PMQ Logging

All CIC report data logging is performed through Persistent Message Queuing (PMQ). Logging is the mechanism by which CIC moves reporting data from the CIC server to the database. If you are going to use CIC's Reporting option and have a database server, PMQ is the logging mechanism.

PMQ is embedded within the CIC application on a CIC server with a connection to a database server. No prerequisite software, separate logging server, or external delivery is necessary. PMQ is a store-and-forward system that guarantees delivery of data between networked applications. For detailed information on PMQ, see the *PureConnect Installation and Configuration Guide* in the PureConnect Documentation Library.

## Report Logging Process Summary

This section provides background information to read before beginning to customize or configure CIC's reporting features. It also describes the major components involved and reveals their role in CIC's reporting process. Depending on your topology, the report logging process might differ from the following summary. In this summary, we use SQL Server as our database.

Automated logging functionality is responsible for logging most CIC data. Instead of using handlers to log data, CIC uses a parser and executor to define values, relative to log data, and assigns values to output columns. Along with this automated functionality, you can make customizations to your reporting system through handlers.

Each log extends the parser and executor to include support for identifiers specific to the log. In the Call Detail log, **Call Attribute** is an identifier that returns the string value of a CIC call attribute that CIC provides as a parameter. For example, `CustomString1 = CallAttribute ('CallLog')` sets the column `CustomString1` equal to the content of the call's `CallLog` attribute.

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## CIC Server Parameters

CIC uses two server parameters to control the assignment, or custom binding, of values to fields in the CIC report tables (or logs):

- **ServerReportLogCustomOutputMapN** (where N = Interaction Administrator LogID #)

CIC dynamically processes the value of this parameter to bind the columns if the OutputMap is valid. If the OutputMap is not valid, CIC uses the original default mapping and ignores the custom output map. CIC records any errors to the event and trace logs.

- **ServerReportLogAutoN** (where N = Interaction Administrator Log ID #)

CIC uses this parameter to deactivate the automated logging in the event that the logging is not operating correctly. CIC provides this parameter merely as a mechanism to turn off the automated logging functionality. Set the value to anything other than **Y, Yes, T, TRUE, or 1** (not case-sensitive) to deactivate automated processing of a log.

After gathering the generated statistics, the CIC server sends the captured data to PMQ, then to the CIC logging process. CIC Logging Service reads the data that is written to the actual queue. CIC Logging Service acts as a bridge that connects the CIC server to the SQL Server or Oracle Database through the PMQ.

Some logs require some data manipulation by CIC Logging Services before they can be stored in the database. This is done by stored procedures and it is CIC Logging Services responsibility to determine how the data interfaces to the database via PMQ. CIC Logging Services has the intelligence to know that certain newer logs require a stored procedure as opposed to table insert invocations.

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## Report Log Purging for Large Databases

CIC uses the **UseExternalTranProviderForPurging** server parameter to avoid a five-minute timeout that prevents purging from working on large databases. For more information, see [Appendix K: Report Log Purging for Large Databases](#).



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## Using CIC Server Parameters with a Report Log

Note that CIC's automated logging replaces the previous functionality of the CallDisconnectMonitor handler. Automated logging operates on call data and processes the information or values to Log ID 11. You control the Call Detail log using: **ServerReportLogAuto11** and **ServerReportLogCustomOutputMap11**.

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## Custom Logging

Custom logging is CIC's term for specifying what data is logged under each column in the report database. Several tables in the CIC database provide extra unused columns. Use Custom logging to specify what is logged to these columns. See "Custom Logging to Report Tables" in the *PureConnect Data Dictionary* for information on activating and deactivating custom logging. This document is available in the Technical Reference Documents section of the PureConnect Documentation Library, or it can be downloaded from our PureConnect Customer Care Web site.

## Logs

CIC stores the logs in the database you configured during installation. The content of these logs is detailed in the *PureConnect Data Dictionary*.

For detailed information on reporting logs and database tables, see the *PureConnect Data Dictionary* in the PureConnect Documentation Library.

For each report log configured in Interaction Administrator there is a tool available for use within handlers. More information on logging tools can be found in [Appendix B: CIC Reporting Tools Design](#).

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## Log Details

- **Interaction Administrator Change Notification Log**

This log contains details about changes made using the Interaction Administrator program.

- **IC Change Notification Log**

This log contains details of the change notifications transmitted by the Admin Server and tracks all changes to DS. This log is turned off by default. It produces enormous volumes of information—every DS change—not just IA changes. Because of the potential size of this log, it's a good tool for diagnosing problems.

- **IC Application Login Logout Change Log**

This log contains data (for example, the date and time of the event, user ID, application name, success or failure code and machine name) about user login and logout activities per application.

- **Interaction Custom Attributes Log**

This log contains custom attributes about the interaction. This log contains details inserted from StatServer.

- **Interaction Summary and Detail Log**

This log contains summary and detail statistics about the interaction.

- **Interaction Wrap-up Log**

This log contains segmented wrap-up code for the interaction.

- **User To Workgroup Relationships**

This log contains a mirror image of users and their workgroup membership as you have them currently configured in CIC. This table is not used on any of the CIC reports.

- **Line Configuration Mirror**

This log contains a mirror image of the lines as you have them currently configured in CIC.

- **Line Group configuration**

This log contains a mirror image of the line groups as you have them currently configured in CIC.

- **Line Group to Lines Relationship Mirror**

This log contains a mirror image of the line group to lines relationship as they are currently configured in CIC.

- **Account Code Mirror**

This log contains a mirror image of the account codes as they are currently configured in CIC. This table is not used on any of the CIC reports.

- **Agent Activity Log**

This log contains details of individual status changes. It is updated each time an agent manually changes phone status, such as lunch, available, or gone home.

- **Interval Line Group Statistics**

This log contains interval statistics for line groups configured for reporting in CIC.

- **Interval Line Statistics**

This log contains interval statistics for lines configured for reporting in CIC.

- **Fax Envelope History**

The Fax Envelope History Log table records all fax attempts made in the CIC system. The attempts can either be successful or fail to transmit the fax. CIC tracks each fax by its envelope ID, call ID, and fax ID.

- **IVR History**

This log contains historical data about activity within the IVR.

- **IVR Interval**

This log contains IVR navigation data that is accumulated and reported on a configurable interval.

- **Agent Queue Activation History**

This log contains data about each agent's activation and deactivation change history in each queue. It records an entry each time the agent is activated or deactivated from a workgroup with a queue, where the agent is a member of that workgroup.

- **Pre 4.0 Wrap-Up Statistics**

This log contains legacy data.

- **Agent Queue Statistics Interval**

This log contains details inserted from StatServer.

- **Statistics Group Interval**

This log contains details inserted from StatServer. It is similar to Agent Queue Statistics Interval Log except that the agent values are not present because statistics groups are not associated with agents.

- **Workgroup Queue Statistics Interval**

This log contains details inserted from StatServer. It is similar to Agent Queue Statistics Interval Log, but contains information on workgroup/queue for which there was activity, or agents logged in to the system.

- **Custom Passthrough**

This is a special log that is inactive by default. Before the feature can be used, the log must be activated and selected in the Interaction Administrator Server configuration.

# Interaction Administrator

If you are customizing or creating new reports, some work will be done from the Interaction Administrator. From the Interaction Administrator, you can perform the following report configurations:

- Mark logs as active or inactive
- Configure reports in Report Management
- Create and modify server and system parameters that control the location of reports and logs
- Change the interval at which CIC generates statistics

# Overview of Crystal Report Templates in CIC

CIC provides many reports to help you analyze interactions and resource usage. These reports retrieve statistics recorded in the report logs. We have tried to anticipate where and how you will need this information, and the reports that ship with CIC will probably meet most of your needs. In some cases, you might want to customize the reports that ship with CIC, or create new reports. This section offers the background and procedural information needed to customize and create Interaction Reporter Crystal Reports. For more information on CIC report layout, see [Appendix D: CIC Report Guidelines \(Crystal Reports\)](#).

## Customization Requirements for Crystal Reports

Crystal Reports Runtime, for viewing standard, prepackaged reports generated from CIC, is installed when running the IC Business Manager Applications install when Interaction Supervisor is selected. If you want to edit, customize, or create new reports, you must purchase the full Crystal Reports software package.

### Note

If you want to use Crystal Reports to make customizations to CIC reports, you will need the DLL file U2LININSUPPORTU.DLL. This DLL is installed on any workstation where you run the IC Business Manager Applications install with Interaction Supervisor selected. This file must be accessible to Crystal Reports to do your customizations. Put the DLL in the %CommonProgramFiles%\Crystal Decisions\xxx\bin, where xxx will vary depending on the version of Crystal Reports used. For example, if using CR9.0, xxx will equal 2.0. Our install program automatically installs the file in this path, so no additional steps need to be taken, except expanding the path. If, for example, you are using CR10.0, xxx will equal 2.5, and you will need to copy the file into the directory.

For more information about the functions contained in U2LININSUPPORTU.DLL, see Appendix H.

## Editing a CIC Report

To edit CIC reports, you must perform these additional steps:

1. If necessary, copy the **U2LININSUPPORTU.DLL** to the directory as described in the previous Note.
2. To extend the path in a Windows environment, right click on **My Computer** and click **Properties**. On the system Properties dialog, click **Advanced system settings**, and click **Environment Variables**. In the **System Variables** box, scroll down and select **Path**, and click **Edit**. In the **Edit System Variable** dialog, select the text in the **Variable Value** field and go to the end of the string. At the end of the string, add the path to where IC Business Manager applications are installed on your workstation. Typically, this location is C:\Program Files\Interactive Intelligence.
3. Restart the Crystal Reports designer application.

**Warning:** Do not modify or customize reports on the CIC server.

## CIC Report Templates

Associated with each CIC report is a Crystal Reports template. For example, CIC reports use templates with the RPT file extension. These templates provide framework for displaying the statistical information in the logs. Templates also contain formulas that calculate information displayed in the report. The Crystal Report templates for each report are located on the CIC server in a directory called Reports. Map a drive to the CIC server containing the Reports directory. When you open a template, you must point to the log that contains the data used in the template.

## PureConnect Data Dictionary

The *PureConnect Data Dictionary* details the contents of each of the report logs located on the CIC server. The CIC report templates retrieve information from these logs anytime someone runs a report. Each variable field in a template is either pulling data directly from the log, or contains a formula that calculates a number based on information found in a log. Use the data dictionary to quickly determine the contents and function of a field in a template. If you are customizing or creating new reports, use the data dictionary to determine what information to retrieve from the logs. The *PureConnect Data Dictionary* is located in the Technical Reference Documents section of the PureConnect Documentation Library.

## Before customizing Interaction Reporter Crystal Reports

Before you begin customizing reports or creating new reports, you should have a thorough understanding of how reporting works in CIC. Be sure to read the background information in the first section of this document, and be sure that you are familiar with the report logs and how they are generated.

Note CIC Reporting has limited support for generating subreports.

## Opening templates and connecting to report logs

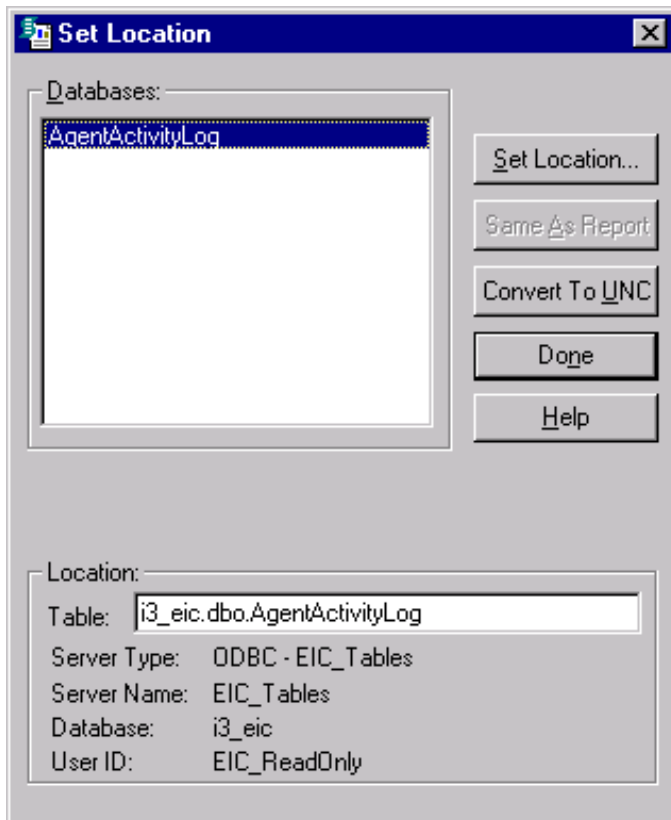
After you install Crystal Reports, you can edit the report templates. These templates reside in the \IC\_reports directory on your CIC server and have RPT extensions. Before you open a template for editing, make sure you copy the template to another area and rename it. You will need to make sure the renamed report template is pointing to the correct report log. You can also use this procedure to connect your report templates to the report logs.

After using the following procedure to connect your template to the report logs, you can run your report from Crystal Reports to test changes you make to the template. You also have access to all of the tables within that report log. For a description of these tables, refer to the *PureConnect Data Dictionary*, located in the Technical Reference Documents section of the PureConnect Documentation Library at:

<https://help.genesys.com/cic>.

## Connecting your report template to the correct log

1. From the Crystal Reports Database menu, choose **Set Datasource Location**. The Set Location dialog box appears. This dialog shows the logs from which this report retrieves information. It also displays the Table, Server Type, Server Name, Database, and User ID. When you first open the renamed report template, specify the location of the log on the CIC server.



The set location dialog box shows you the databases to which your report template connects

2. If you need to specify the location of the report log, click **Set Location** in the dialog box. The Data Explorer dialog box is displayed.
3. Under ODBC, browse through the items and choose the table you want to use. You have now specified the location of the log from which your report template retrieves information. You can now run your report from Crystal Reports to test any changes

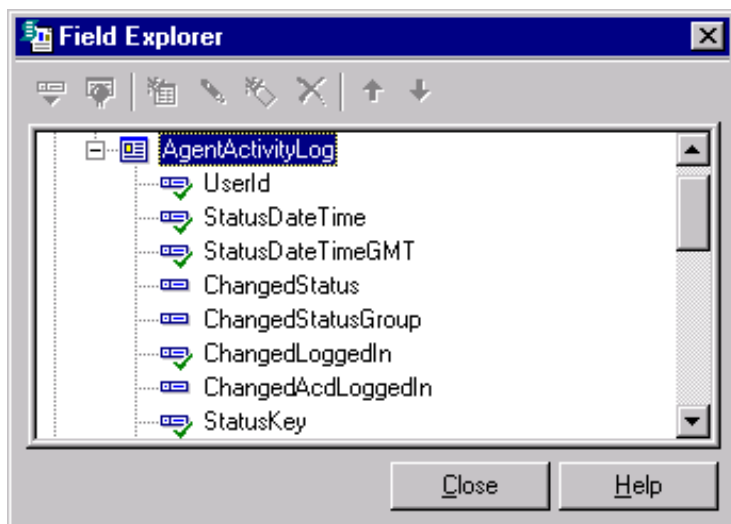
you make to your template. You also have access to all of the tables within that CIC log. For a description of these tables, refer to the *PureConnect Data Dictionary* in the PureConnect Documentation Library.

## Determining which tables are in a report log

Perhaps the quickest way to determine the contents of the predefined report logs included with CIC is to look in the PureConnect Data Dictionary . This document lists the contents of all CIC report logs. If you've made changes to these logs, however, you can also determine the contents of a log using Crystal Reports, using the following procedure. Be sure your template is pointing to the appropriate databases using the previous procedure.

## Determining the contents of a log

1. From the Crystal Reports **Insert** menu, choose **Field**. The Field Explorer dialog box appears. This dialog box displays each field within the log (under Database Fields), and any formulas (under Formula Fields) or parameters (under Parameter Fields) for the report.



2. The Field Explorer dialog shows the fields available in a report log

## Viewing the Details of Report Logs in Interaction Administrator

From Interaction Administrator, you can view all kinds of configuration information for the existing CIC logs. This information includes the log's name, the frequency at which statistics are generated for that log, the type of columns collected for the log, and many other details. Use the following procedure to examine a CIC report log's configuration.

To view the details of a report log's configuration

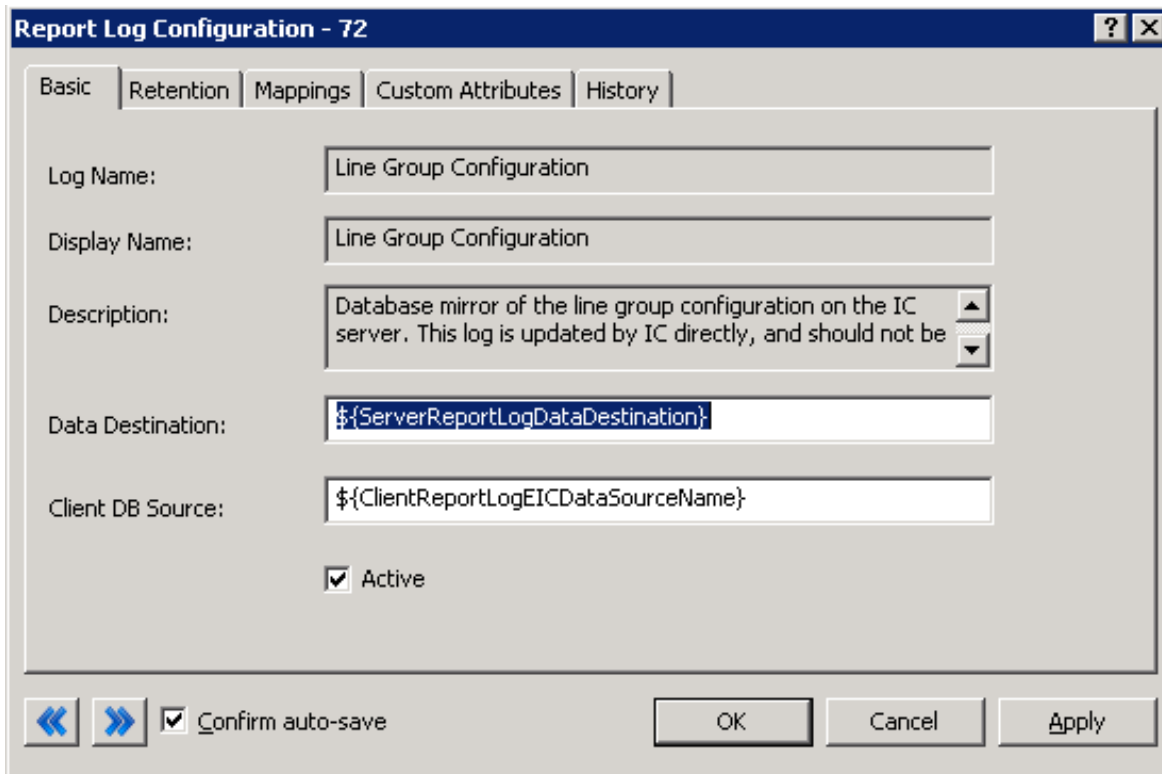
1. From Interaction Administrator, select the **Report Logs** container. All the logs currently configured for CIC appear in the right-pane of Interaction Administrator. Note that only numbers appear for the default logs that ship with CIC. This is done to assist localization.
2. Double-click one of the log names that appear in the list in the right pane. That report log's configuration dialog appears. From this dialog box, you can view the configuration details for the log.

## Activating and deactivating logs

Use this procedure to activate or deactivate a log.

To activate or deactivate a log

1. From Interaction Administrator, under System Configuration, select **Report Logs**. The list of Log IDs appears.
2. Double-click on a report log to display its configuration dialog.



The screenshot shows a dialog box titled "Report Log Configuration - 72". It has five tabs: "Basic", "Retention", "Mappings", "Custom Attributes", and "History". The "Basic" tab is selected. The dialog contains the following fields and controls:

- Log Name:** Line Group Configuration
- Display Name:** Line Group Configuration
- Description:** Database mirror of the line group configuration on the IC server. This log is updated by IC directly, and should not be
- Data Destination:** \${ServerReportLogDataDestination}
- Client DB Source:** \${ClientReportLogEICDataSourceName}
- Active:**  Active

At the bottom of the dialog, there are navigation buttons (left and right arrows), a checkbox for "Confirm auto-save" which is checked, and three buttons: "OK", "Cancel", and "Apply".

3. Select the **Active** box to activate the log, or clear the box to deactivate the log. Use the pages in this dialog to configure the report log.

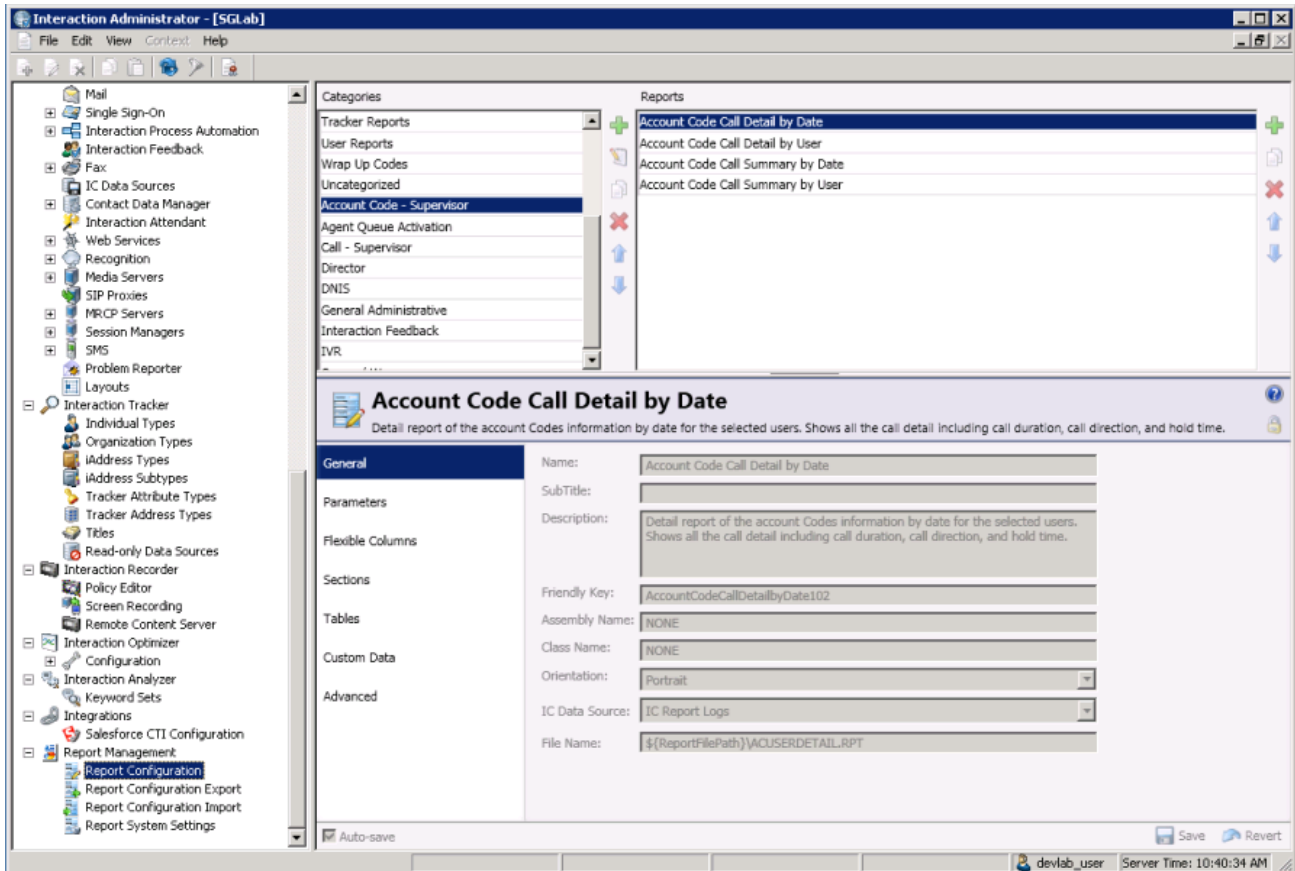
# CIC Report Editing for Crystal Reports

The following information describes how to customize CIC's reporting features, including adding, changing, and deleting fields and formulas in existing reports.

## Configuring a Custom Crystal Report in Report Management

Use this procedure to configure a custom Crystal Report to run in Interaction Reporter in IC Business Manager.

1. In Interaction Administrator under Report Management, select **Report Configuration**. The Report Configuration page appears on the right.



2. In the master view under Categories, identify the category you want to use for the custom report. You can select an existing category or add a category (for example, you can add the Custom Reports category).
3. Copy an existing report into an existing category or copy an existing report from an existing category to the category you created. For example, you identify the existing Account Code Call Detail by Date Crystal Report in the Account Code - Supervisor category as a report similar to the custom report. Copy the existing report to the Custom Reports category that you created. The new report appears in the Custom Reports category as Account Code Call Detail by Date (Copy).

**Tip:** The report that you copy must have a report type of Crystal Report. You can identify the report type in the Advanced tab in the detail view.

4. In the detail view for the new report, select **General**. Update the following information:
  - **Name** - Enter the name of the custom report as you would like it appear in the Navigation Pane in IC Business Manager.
  - **Description** - Enter a brief, one-sentence description of the new report. This description appears next to the name of the report in the Navigation Pane in IC Business Manager.
  - **Friendly Key** - Enter a unique value that easily identifies the new report in the database.
  - **File Name** Enter the Crystal Report template for the new report.
5. In the detail view for the new report, select **Parameters**. Use the existing parameters from the report that you copied if they apply to the new report. You can add a parameter to the report, change an existing parameter, or delete a parameter from the report. Determine whether to update the following information if you add a parameter or change an existing parameter:
  - The **Class Name** on the General tab indicates the parameter type.



- The **Source** on the Data tab indicates whether the report prompts a user to enter a value for the parameter.
- The **Data Type** on the Data tab indicates the type (for example, string, numeric, Boolean, and date) of data that the parameter expects.
- The **Default Value** on the Data tab indicates the default value for the parameter.
- The **Parameter Type** field on the Miscellaneous tab indicates whether to use the parameter as a filter.
- The **User Control Class Name** field on the Miscellaneous tab indicates the user control type that corresponds to the parameter type on the General tab. Refer to *Appendix G: Parameter Types* for more information.
- The **Column Name** on the SQL Table Columns tab indicates the name of the parameter in the Crystal template that maps to the data in the database column.

**Note** You can configure report parameters that limit which data users see based on the ACLs to which they have access. Secure report parameters are available for all Crystal Reports that use queue parameters. For additional information on configuring secure report parameters, see the Help topic **Configure secure report parameters** in the Interaction Administrator Help.

6. In the detail view for the new report, select **Tables** to add the tables and views that the report uses.
7. In the detail view for the new report, select **Custom Data** to identify any custom data that the report uses.
8. In the detail view for the new report, select **Advanced**. Update the following information:
  - **Report Visible** Select the check box so that the report appears in IC Business Manager.
  - **Report Type** Select **Crystal Report**.
  - **Require ACL** Select the check box to use an **Access Control List for the report**.
9. When you finish entering the configuration information, click **Save**.

After you configure a custom report, provide a CIC user access to run the report. In Interaction Administrator, configure the Default User, Workgroup, or User container to have access to the report.

## Examples of Edited Reports

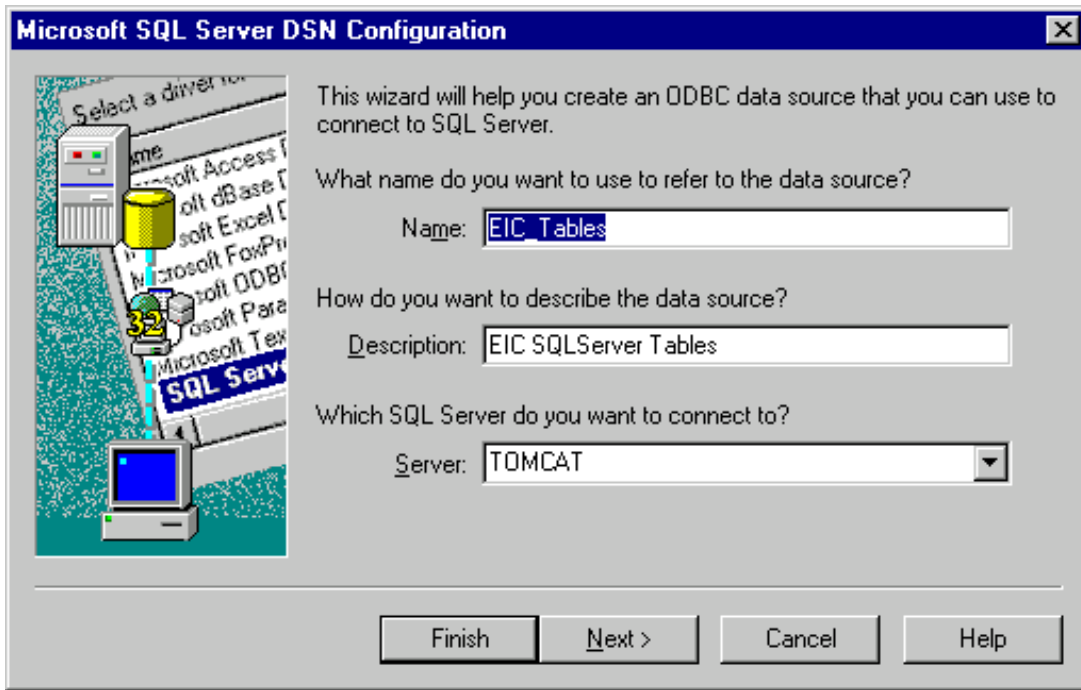
We have compiled some of the most common report edits, such as adding, changing, or deleting fields or formulas in existing CIC reports, to give you a guideline for your report customization needs. These examples are only possible if you are working with reports that query data from exactly the same database tables.

For the examples in this section, we use the *User Summary by Date* report (usersummary.rpt) and the *User Call Detail* report (userdetail.rpt).

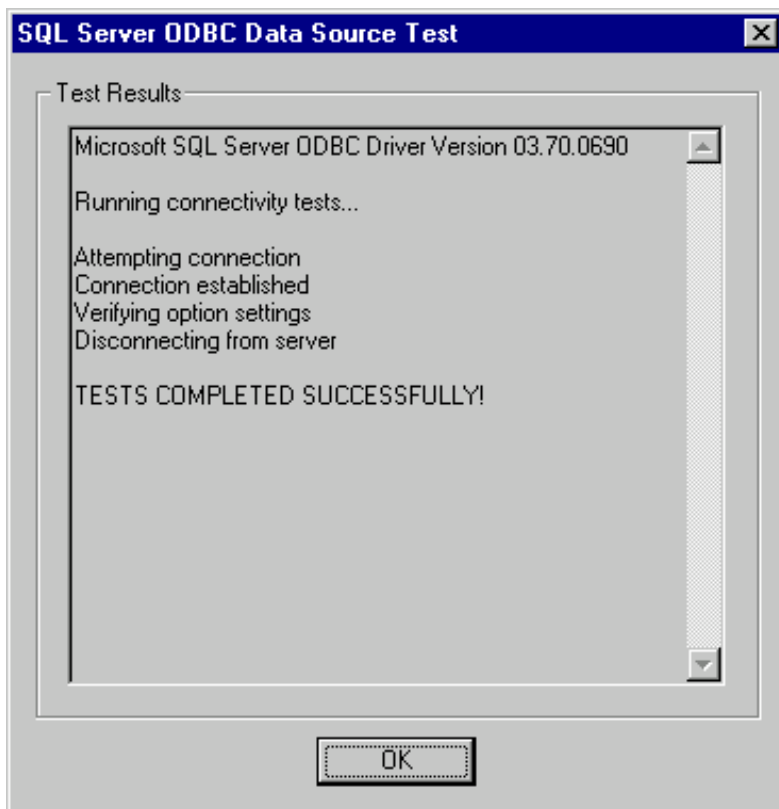
CIC ships with many Crystal Report templates. These templates are stored in a Reports directory on your CIC server. Use one of these templates to display the custom call attribute you created.

### Note

When you customize reports, you also make several ODBC configuration changes. The reporting install creates an EIC\_TABLES ODBC data source on the machine where the install is executed. However, this data source does not contain all of the information needed to connect to the CIC reporting tables so that you can edit reports. Use the ODBC data source configuration wizard, as shown in the following figure, to correctly configure this for use with Crystal reports.



Set the correct SQL Server, network protocol, and default database (i3\_eic), and then execute the data source test, as shown in the following figure.



After you complete this configuration, the data source will be available from within Crystal. You are now ready to run Crystal Reports.

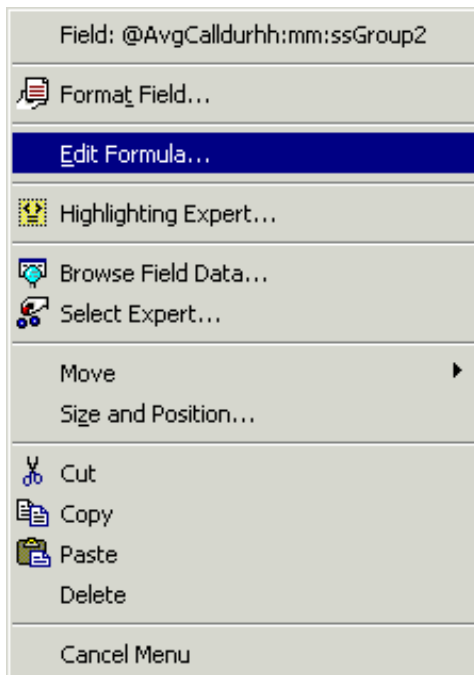
## Changing a formula

In this first example, we'll change the average call duration formula to maximum call duration in the standard CIC report template for the User Summary by Date report. Open usersummary.rpt in Crystal Reports. The rpt files are located on the CIC server at I3\IC\Reports.

### Important Note

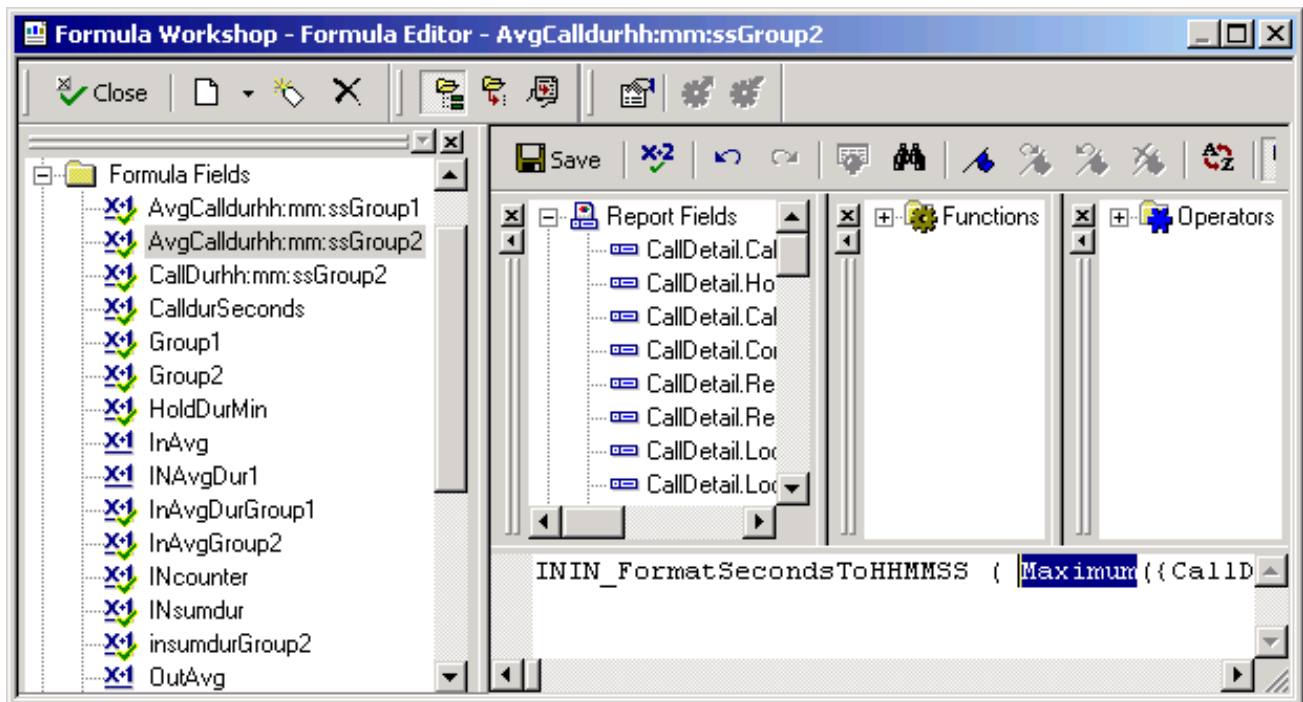
You do not want to overwrite the standard CIC template. Before you begin, copy the report to a new working location, or from the **File** menu, click **Save As**, and save the report under a new name.

1. Right-click the average call duration field located in Group Footer 2, and select **Edit Formula** on the drop-down menu as shown in the following figure.



Right-click a field to show the available actions. The associated dialog box is displayed.

The Formula Editor allows you to change the existing formula.



2. In the Formula Editor, highlight **Sum** and type **Maximum**. Delete all characters beyond the "/". The formula should now read as follows:

```
ININ_FormatSecondsToHHMMSS ( Maximum({CallDetail.CallDurationSeconds},{@Group2})
```

3. Right-click the formula name and change it to reflect **Maximum** instead of **Sum**. Save your changes.

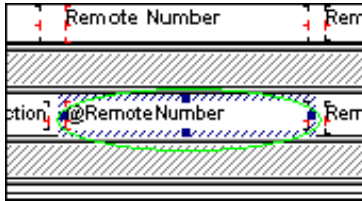
## Replacing a field

In this example, we will replace the **Remote Name** field with the **Call Type** field in the standard CIC report template for the *User Detail* report. Open userdetail.rpt in Crystal Reports.

### Important Note

Before you begin, copy the report to a new working location, or from the **File** menu, click **Save As**, and save the report under a new name. You do not want to overwrite the standard CIC template.

1. Click the Remote Name field, as shown in the following figure, located in the **Details** section, and then click **Delete**.



Select the field you want to replace in the Details section.

2. Double-click the report column heading **Remote Name**, to change the name to **Call Type**.
3. Insert a new database field in the Details section. In the **Insert Field** box, right-click the **Call Type** field and drag the field to the Details section under the Call Type column. Save your changes.

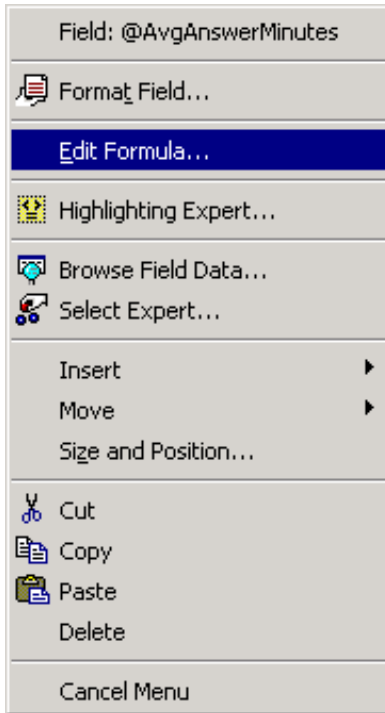
## Copying a formula from one report to another

In this example, we will copy the **Average Speed of Answer** formula from the *Queue Period Statistics Workgroup Daily Detail* report, to the *Queue Period Statistics Service Level* Reports. Open both the *QperiodDailyQueueActivity.rpt* and the *Qperiodlwrkgrpsvclvl.rpt* templates in Crystal Reports.

### Important Note

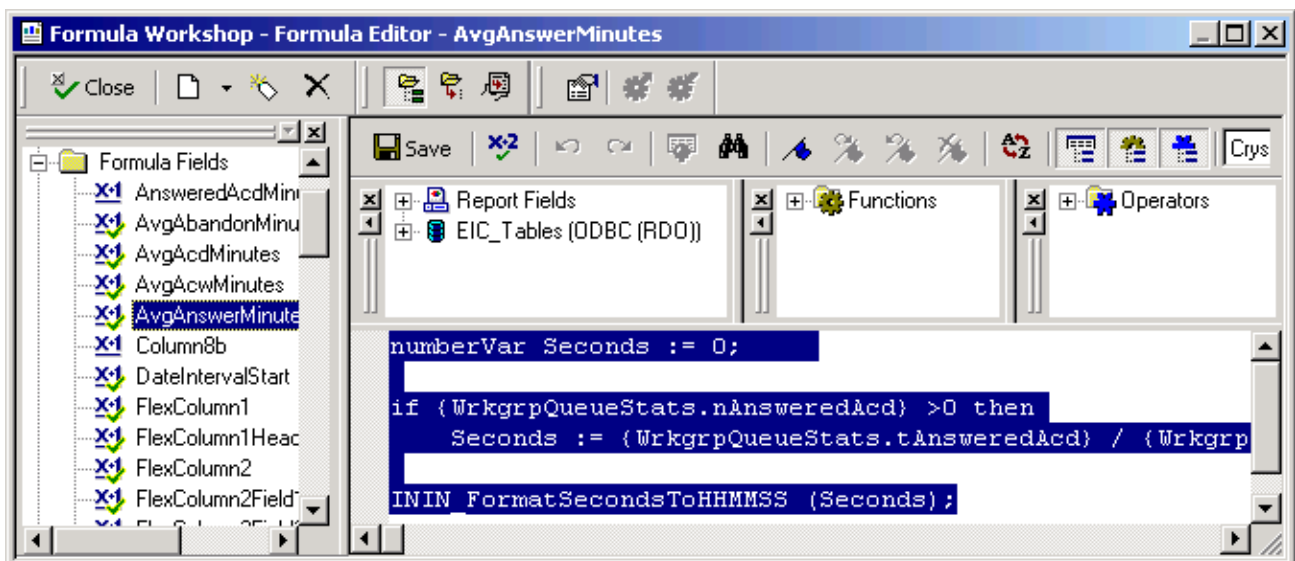
Before you begin, copy the report to a new working location, or from the **File** menu, click **Save As**, and save the report under a new name. You do not want to overwrite the standard CIC template.

1. In the *QperiodDailyQueueActivity.rpt* template, locate the **Average Speed of Answer** formula by right-clicking the field and selecting **Edit Formula** from the drop-down menu, as shown in the following figure.



Right-click the Average Speed of Answer formula and select edit formula from the menu.

2. Highlight the formula in the Formula Editor as shown below in the next figure, and press **Ctrl+C** to copy.



3. Switch windows to the service level report template and add a new column header, **Average Speed of Answer**. Press **Ctrl+V** to paste the formula into the **Details** section under this new heading. Save your changes to your new report.

## Merging Reports

To merge two or more reports, copy fields and formulas as explained earlier in the section "Copying a formula from one report to another topic." Remember, this is only possible if the reports query data from the same database tables.

### Note

Merging reports or adding and copying formulas to Service Level reports can be tricky. Keep in mind there are multiple group levels. The formulas will differ on each level because Crystal Reports requires a formula to be added and modified for each grouping in order to properly calculate at each group level.

When you copy formulas to a new report, be sure to check if there are references to additional formulas or statistics. If so, make sure these formulas or statistics are located in this new report.

# Using Custom Columns in the Logs

In some cases, you might want to report on information that is captured but not reported on or stored permanently. To do this, you will need to use the **Custom Columns** feature of the *Call Detail Record Log* and *Queue Period Statistics Log*. Before using the Custom Columns feature, study your tables in Interaction Administrator so that you can plan and design highly functional handlers.

## Managing call attributes

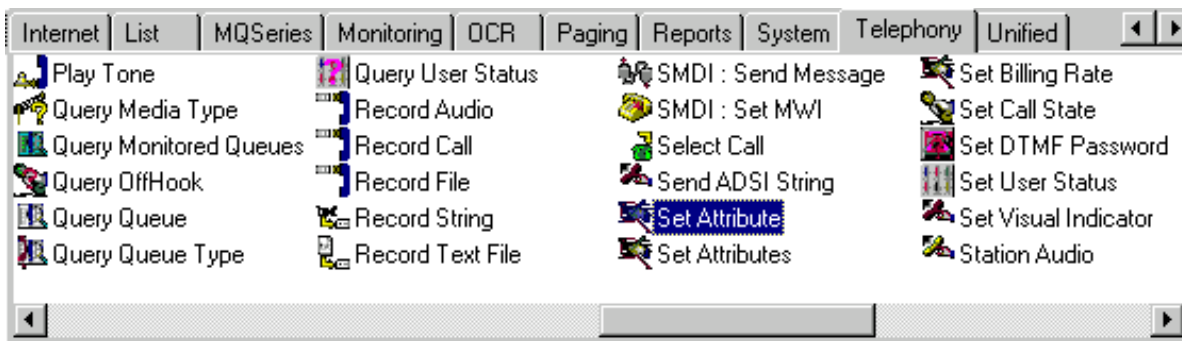
In this example of managing call attributes, we will add a custom value to the Call Detail Record Log. We will set our own call attribute and assign values to this attribute.

### Step One: Interaction Designer - Set the Values of Custom Call Attributes

Creating and assigning values to custom columns is a way of storing information with a call as it moves through the system, while being processed by multiple handlers. Calls already have many attributes when they are created, including Call ID, Direction, and Type.

The tool we will use for creating and assigning call attributes is Set Attribute (a Telephony tool) shown in the following figure. Using Set Attribute, you can create a new call attribute and assign a value to that attribute. You will use a Set Attribute step for each attribute you want to assign. In this example we will use the Set Attribute tool in a monitor handler that starts when there is a new incoming call.

First, open the handler in Interaction Designer and double-click the Set Attribute tool.



When you double-click the **Set Attribute** tool, Interaction Designer places the object for this tool in your handler.



Right-click the tool object, and select Properties. Enter the following information in the property page parameters:

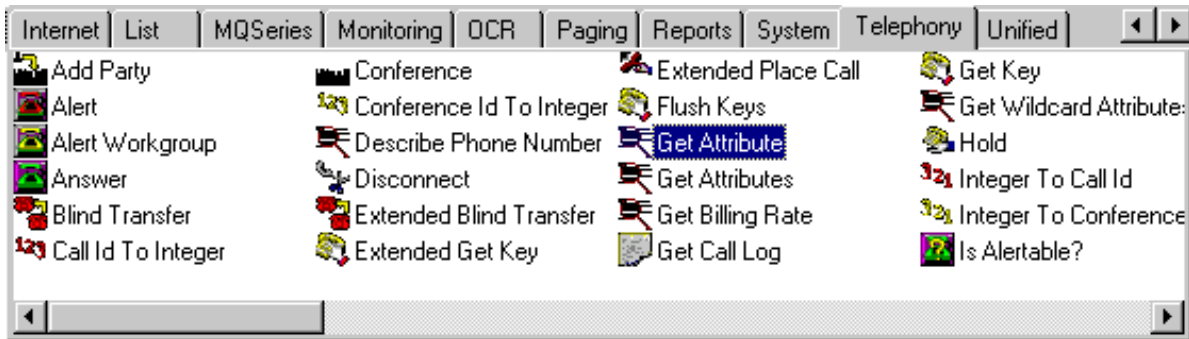
- Enter the **Call Attribute Name** in the Inputs properties page.
- Enter the **Call Attribute Value** in the Inputs properties page.
- Click **OK** to save your changes.

You have now created and assigned a new call attribute. Next, put the variable in scope for this new call attribute by using Get Attribute.

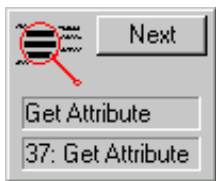
## Step Two: Interaction Designer - Get the Values of Custom Call Attributes

The tool we will use for getting or retrieving the new call attribute is **Get Attribute**, another Telephony tool as shown in the following diagram. Using Get Attribute, you can retrieve the new call attribute value. You will use a Get Attribute step for each attribute value you want to retrieve. We will use the Get Attribute tool in a monitor handler that starts after the call disconnects.

In Interaction Designer Telephony tools, double-click on the **Get Attribute** tool.



When you double-click the **Get Attribute** tool, Interaction Designer places the object for this tool in your handler.



Right-click the tool object, and select **Properties**. Enter the following information in the property page parameters:

- Enter the **Call Attribute Name** in the Inputs properties page.
- Enter the **Call Attribute Value** in the Outputs properties page.
- Click **OK** to save your changes.

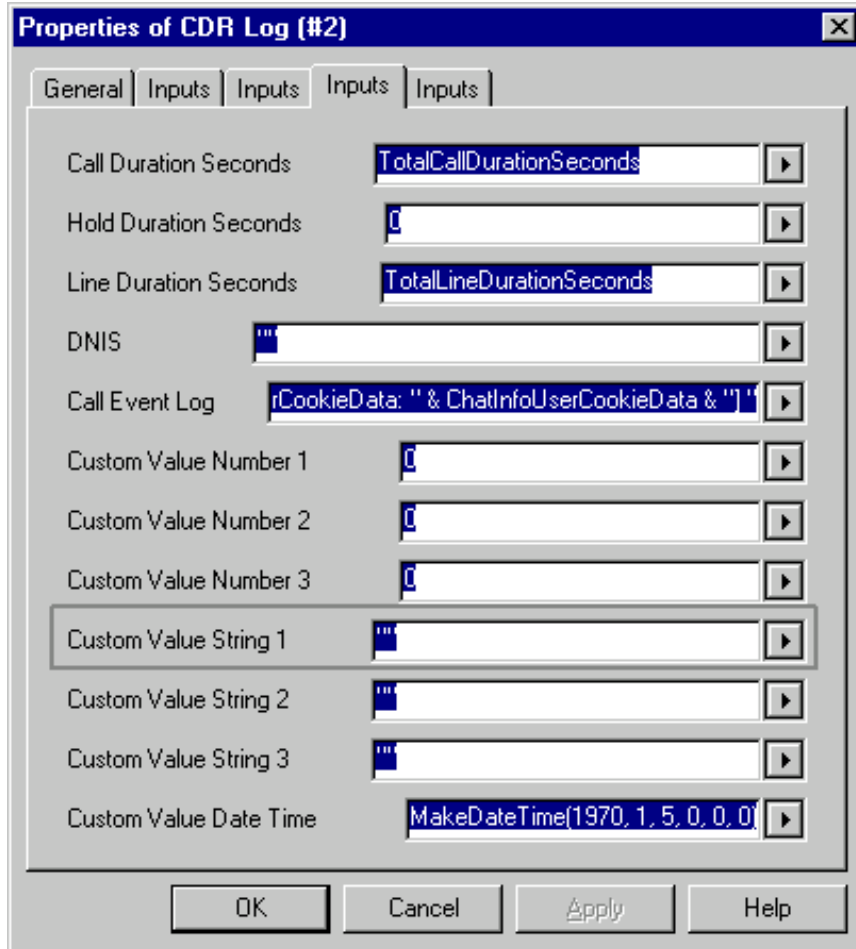
You have now put the variable in scope and are ready to make your changes to the custom column in the Call Detail Record Log object as detailed in the next step, Step Three.



---

## Step Three: Assign Variables and Add Values to Custom Columns

CIC's automated logging now assigns variables and adds values to custom columns using custom column bindings. You can view the properties of the CDR log to see the inputs of the custom columns as shown in the following figure.



The Properties page of the CDR Log lists the inputs for your custom columns.

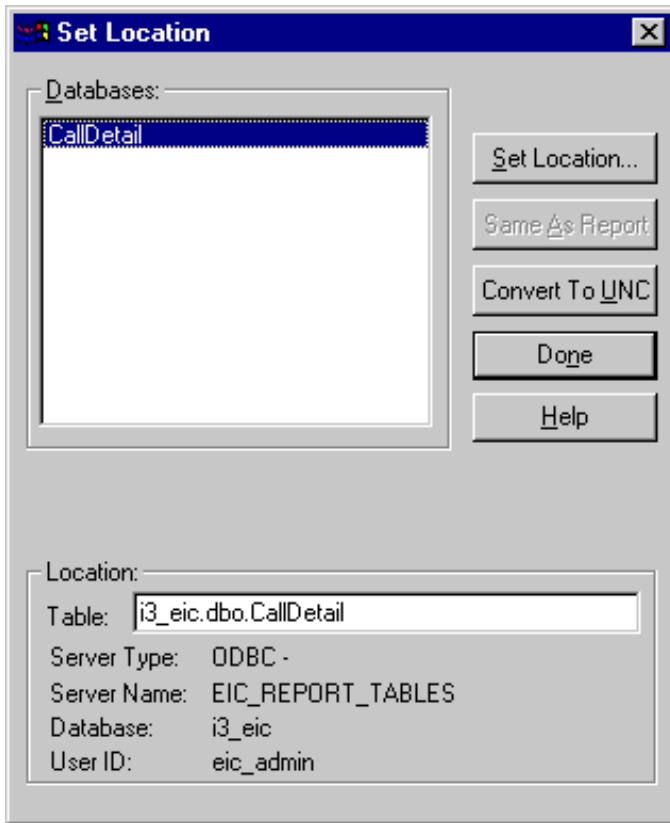
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## Step Four: Display your custom call attribute in a Crystal Report template

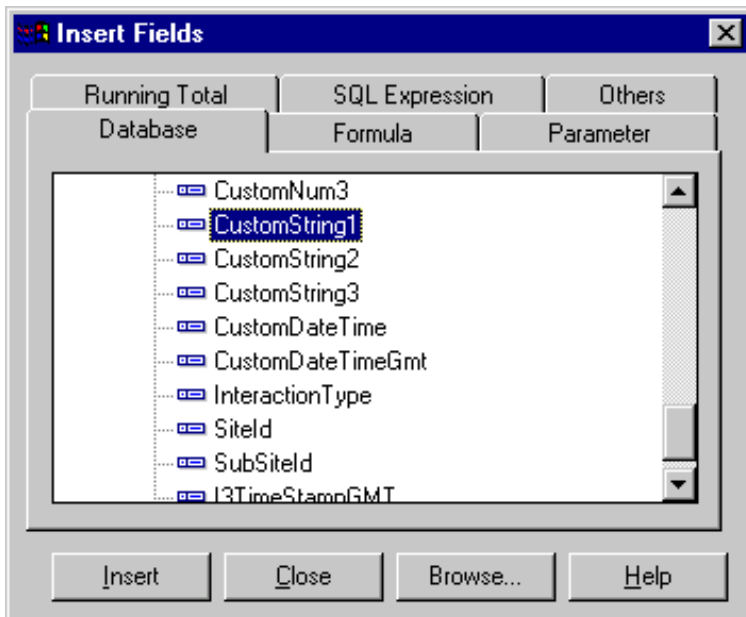
To report on the new call attribute, you can either add a field to an existing report template that shipped with CIC, or create a new report template.

## Using Crystal Reports

1. Open the template you want to modify in Crystal Reports. After the template opens, make sure you are connected to the desired table in the CIC database.
2. Save the template using a different file name. When modifying the report templates that ship with CIC, always save the customized template with a different name. This is to safeguard your changes from future upgrades to the existing templates. If you saved your changes in the shipping template, a future upgrade might overwrite your customizations.
3. From the Crystal Reports Database menu, choose **Set Location**. The Set Location Dialog box appears, as shown in the following figure. This dialog shows which log this template retrieves information. For example, if you opened the USERDETAIL.RPT template, you would see that it requires the CallDetail\_viw (Alias CallDetail) from i3\_IC database.



4. If you need to specify the location of the table, click **Set Location**. The **Choose SQL Table** dialog box is displayed.
5. Specify the table your template requires, and click **OK**.
6. Verify that your template can view all the fields in the table. Since you are using a custom column in the table, make sure that this column is available in Crystal Reports. From the Database menu, choose Verify Database. Now you can add the field that contains the custom call attribute information.
7. From the **Insert** menu, choose **Database Field**. The Insert Fields dialog is displayed, as shown in the following figure. From this dialog box, you can insert the field, or create a formula that performs calculations on the data within the field. See the Crystal Reports documentation for more information on data manipulation.



The Insert Fields dialog box displays the columns of your table.

## Displaying your custom call attribute in a new report template

Use the following procedure to create a new report template.

In Crystal Reports, choose **New Report** from the **File** menu. The Report Expert is displayed, allowing you to base your report on one of the provided styles, or some other existing report. If you want your report to look like the other reports that shipped with CIC, then choose one of the reports in the Reports directory on the CIC server. If you want to create a report with a different look, choose one of the pre-made report templates provided.

- If you are not basing your report on one of the existing CIC report templates, use the Report Expert to pick your table and the fields you want to display, and to configure your report.
- If you are basing your report on one of the CIC report templates, check the following items to make this report unique:

**Table** Verify that you are pointing to the correct CIC table. You might need to remove the currently configured database from the list of databases to which this report is connected. Then choose another table in the database to which the report is connected.

**Fields and formulas** The fields and formulas in the CIC report template will not calculate correctly if you are connected to a different database. Delete the existing fields from the report, leaving just the basic layout elements.

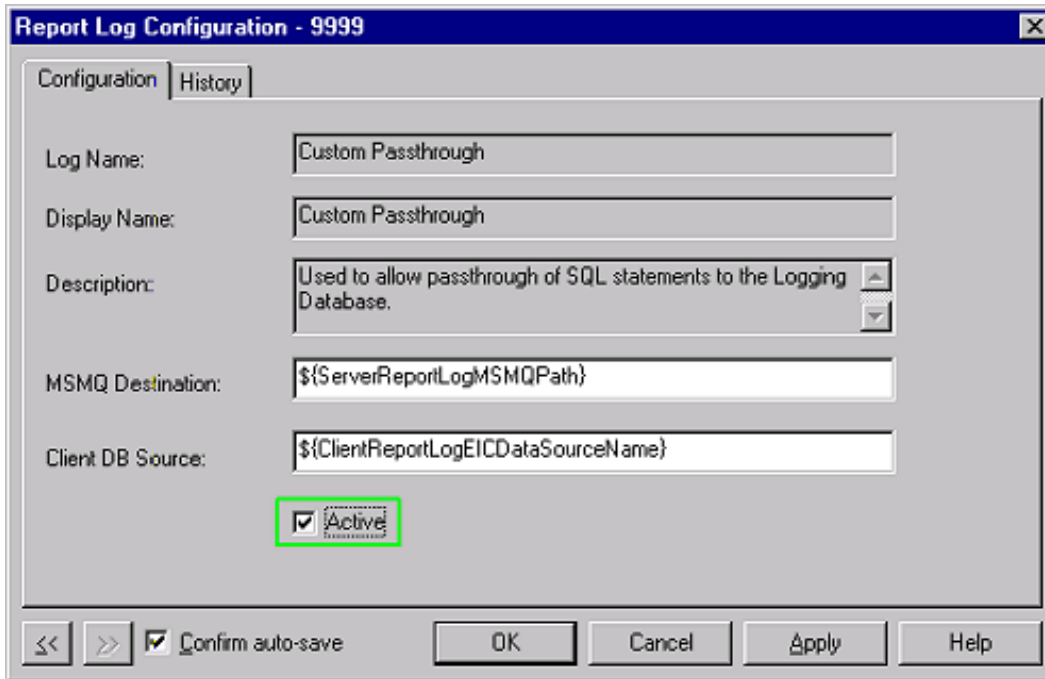
**New filename** Be sure to save your report under a different name so you do not overwrite the report template you are using as a guide for the new template.

# Logging Custom Passthrough

The tool step simply takes an ODBC SQL statement given and forwards it to the CIC logging service through a special log.

CIC logging service executes the statement and logs any errors in the normal manner. The service does not do any special processing against this statement. The submitter is responsible for formatting the statement, and for escaping any quotes in any of its strings. You can use the SQLStr function, as seen the **Another LCP Example** below, to format data automatically. You use this escape function the same way you use it with the SQL tool step.

The special log that is used is numbered 9999, **Custom Passthrough**, and is inactive by default. Before the feature can be used, the log must be activated and selected in the Interaction Administrator server configuration, as shown in the following figure.



Use this tool to modify data using an ODBC SQL statement or statements. The ODBC distinction indicates that this tool allows escape sequences. CIC assumes this statement will run on the same server and on the same database. While the database utilities can be used to modify data as well, we recommend using the Logging Custom Passthrough (LCP) tool when asynchronous writing to a database is desired.

You can also run stored procedures using the LCP, with the limitations being no outputs.

For more information on reporting tools, see [Appendix B: CIC Reporting Tools Design](#).

## LCP Example

By using the SQL INSERT and UPDATE commands with the LCP, you have expanded use of reporting data. For example, a small accounting business that would like to charge clients for phone support could use the LCP to perform operations for the user so that the client is charged for phone support. The charge could be for a specific type of service, or per minute for support.

**Note** A simple way of achieving this could be the use of custom columns, as covered in the section "Using Custom Columns", earlier in this document. Although the LCP method is more complex in nature, it allows you to do more with your data.

To expand on this example, let us say the client can use a credit card to pay up-front for support. After the client's credit card number is entered and an approval is obtained through a handler, use LCP to enter the approval number in your database using INSERT. When the approval number is stored, move the caller into the support queue. When the state of the call is client\_connected, you can start charging for time. On call disconnect, you can call a sub-routine to finish handling the process. Use the LCP to do an UPDATE to write to the database.

Using LCP in this case is ideal, because you do not need to query the data immediately. This provides a more reliable conduit for the information.

**Note** You can wait until after the call is complete, and after you have performed the support service, to determine what to bill the client. Because you will query the data after—not during—the call, you minimize the number of hits at any one time on the database.

## Another LCP Example

This example is based on capturing the times when someone switches a call to private using the **Private** Button on a CIC client. When this occurs an event is sent for Call Objects called **PrivateStart**. You can monitor this event with the Call Monitor Initiator. Every time this occurs CIC activates the initiator in StatServer, and inserts a row of data into a database.

A simple table to capture this data might contain the following information:

- CallIDKey
- Private start time
- Private end time

You can use the LCP tool to create an insert statement that inserts data into a table.

```
"insert into CustomPrivateCallLog (CallIdKey, StartingDateTime, EndingDateTime) values (" &  
SQLStr(CallAttribute_CallIdKey) & ", " & SQLStr(DateTimeNow()) & ", NULL )"
```

**Note** Use the LCP to run any valid SQL statement, such as stored procedures or blocks of transact SQL. Remember, CIC logging service does no preprocessing or filtering to the statements.

## Custom Counters

You can create custom countersthrough the Advanced/Query Counter tool steps. For more information on this tool step, see the *Interaction Designer* online Help. To learn more about logging custom counters to the database, see “Custom Logging to Report Tables” in the *PureConnect Data Dictionary*.

# CIC Report Groups and Statistic Groups (STIDs)

CIC generates advanced statistics on interactions and reports on these statistics to provide you with advanced statistical reporting. CIC enables this functionality by using report group and statistic group (STID) assignments.

In CIC, there are three statistical hierarchies implemented. These hierarchies are **Workgroup to Report Group**, **User to Workgroup**, and **STID to Report Group**. StatServer also collects statistics on the Report Group on each queue or STID. Read this section on report groups and statistic groups, so that you can have a better understanding of CIC's statistical tracking concepts.

**Note** CIC uses report groups for the DNIS reporting feature. Make sure the DNIS server parameter in Interaction Administrator is disabled—it is disabled by default—before you can use the report groups for another purpose.

## Report Groups

In addition to categorizing calls as ACD or non-ACD, you can create your own custom groups called report groups. You can designate specific queue items as belonging to a report group. Report Groups are useful for reporting on a subset of the queue items within any container, including workgroup queues, user queues, and statistics groups. When StatServer generates statistics for a container, it additionally generates statistics for all the queue items belonging to a report group. A queue item cannot belong to more than one report group.

CIC assigns each queue item a report group through Interaction Designer's Assign Report Group tool. For example, you can create a report group called Language, and then mark certain calls as belonging to either the Danish Report Group or the English Report Group. When StatServer generates statistics for queues and statistics groups, it provides an additional list of all the calls in that queue that belonged to the Danish Report Group, and an additional list of calls in that queue that belonged to the English Report Group.

---

## Report Group Tools

The **Assign Report Group** tool in a handler assigns a queue item to a particular report group. The **Query Report Group** tool returns the name of the report group to which a queue item belongs. A queue item cannot belong to more than one report group. For more information on assigning and querying calls from report groups, see the Interaction Designer online documentation.

### Assign Report Group

This tool assigns a call to a report group. By leaving the report group name field empty, you can remove the call from its current report group.

### Query Report Group

This tool returns the name of the report group to which the call belongs.

**Note** The report group you assign to a queue object as it enters a statistics container is the report group that is used for the life of that object within the container. In other words, if a report group and a STID are both assigned to a call, the report group should be assigned before the STID. If you assign the report group first, the STID will contain a report group appropriate to the call. If the report group is assigned after adding the call to the STID, the report group will have no effect on the STID's data collection.

## Statistics Groups

An STID is a statistics tracking ID, or arbitrary string that represents a statistic group. CIC assigns each interaction an STID through Interaction Designer's **Assign Stats Group** tool.

STIDs are mechanisms that can be used to collect data on calls regardless of where they reside. STIDs allow StatServer to generate statistics about calls across all queues. CIC analyzes collections of related calls that reside on more than one queue. You can flag a call as belonging to a statistics group, and the call remains a member of that statistics group even if it is placed on a different queue. At the interval designated in Interaction Administrator, StatServer generates statistics for statistics groups along with the workgroup queues and user queues.

This is a simplified example of what a STID can be used for, and it is representative of one of many uses of STIDs. As an example of how statistics groups work, imagine that your call center receives calls on three separate toll-free numbers. You want to determine how well your agents are processing these calls, so you need a way of organizing the statistics information generated by StatServer. Each time a call enters SystemIVRWorkgroup, you assign that call to one of three statistics groups, depending upon which toll-free number the caller dialed. Unlike report groups, a call can belong to more than one statistics group. When StatServer generates statistics information about all of the calls in CIC, it also lists statistics for the groups of calls belonging to each statistics group. In other words, StatServer generates statistics information for all of the calls, then for the three separate statistics groups.

---

## Statistics Group Tools

The Assign Statistics Group tool in a handler assigns a queue item to a particular statistics group. The **Query Statistics Group** tool returns a list of statistics groups to which a queue item belongs, and the **Remove Statistics Group** tool removes a queue item from a statistics group. A queue item can belong to more than one statistics group. For more information on assigning and removing calls from statistics groups, see the Interaction Designer online documentation.

### Assign Stats Group

This tool assigns a call to a statistics group.

### Query Stats Groups

This tool returns a list of all statistics groups to which a call belongs.

### Remove Stats Groups

This tool removes a call from a statistics group.

## Gathering Statistics

It is possible to accumulate certain call statistics on more than one queue, resulting in the sum of the queue data not being equal to the sum of the call data.

**Note**We distinguish these statistics as call statistics and not as agent statistics because agent statistics or staffing statistics do not require a call. This distinction helps differentiate the **tAgent** values from the other call values.

For example, using **tAcw**, **nAcwCalls**, and **tAcwCalls**, time and counts accumulate as follows:

Time accumulates as **tAcw** when in an ACW status. If an agent places a call while in an ACW status, the call is included in the **nAcwCalls** count. The duration of the time spent on that call, while in ACW status, or time of the ACD call on hold, is included in the **tAcwCalls** time. If the ACD call terminates or the agent leaves the ACW status, the **tAcwCall** time stops accumulating.

If an agent goes into the ACW status, all of the above is accumulated relative to the statistics hierarchy, **Queue-STID-Report Group**, of the last ACD call.

Note that logging out clears the last ACD call data, so it is possible for the agent to go into ACW without any record of a previous ACD call to guide the accumulation of the data. In this case, the data is collected relative to all of the queues of which the agent is a member, so it is possible to accumulate **tAcw**, **tAcwCalls**, and **nAcwCalls** on more than one queue.



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## **STID summary**

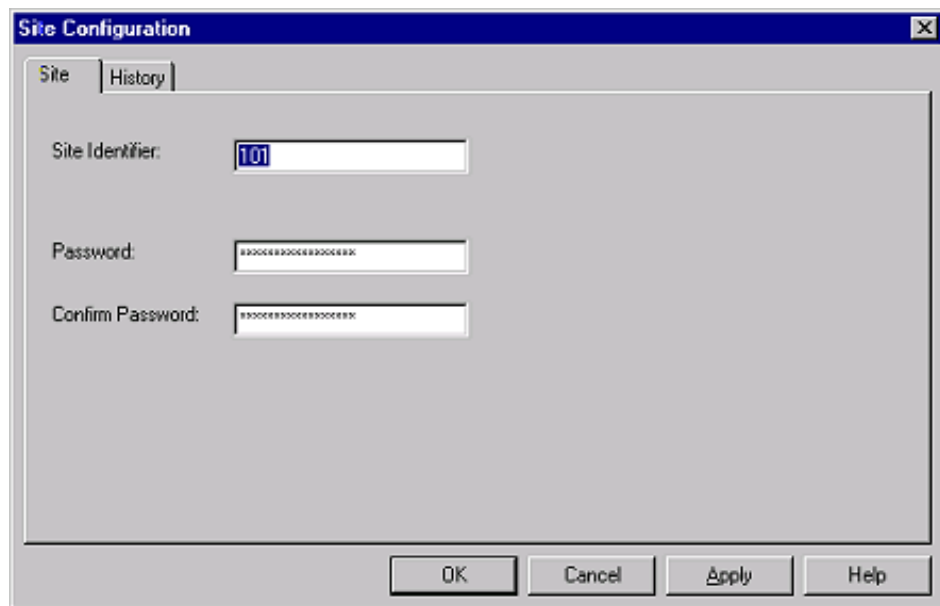
Simply stated for STIDs:

- If the statistic is associated with a call, the statistic is tracked to the STID.
- Because agents are not members of STIDs, staffing numbers are not tracked.

## Multi-site Reporting

Multi-site configuration provides a distributed environment—one where multiple CIC servers are connected and can share resources, such as users, workgroups, and queues. Multi-site configuration is an appropriate solution for a large customer’s global, enterprise, or business needs.

Multi-site reporting is available to you if you have multiple CIC servers at different sites that send report log output to a single database server (for exceptions, see Option 3 below) via a LAN, WAN, or some other remote connection. When you have a central SQL Server or Oracle machine to host all of the call center report logs, each call center or site can be uniquely identified in the report log data by assigning a unique Site Identifier in the Site Configuration container, as shown in the following figure. Simply double-click the container under your **Site Name** in the tree view in Interaction Administrator.



The Site Identifier in the Site Configuration container is used to identify reporting data from multiple sites.

All CIC report logs include a **SiteID** field to identify the site for each row of data in the logs. This site ID number appears in all CIC report logs and can be used to create custom queries that isolate data for this site. The default value for SiteID is 0 (zero), which implies a single CIC server is writing data to the report logs. To correctly configure your CIC system to enable accurate site reporting data, it is important to understand the importance of setting up site ID numbers for all sites.

Even if you have multiple sites, you can still report on all sites as a whole entity. On the other hand, you might want to report on each site as a separate entity. In each case, certain requirements must be met to report accurately.

If you have multiple sites, consider the following guidelines to help decide on the type of reporting you require and the configuration issues that need to be addressed.

Are your multiple CIC sites considered to be contiguous entities? In other words, are your sites each distinct in terms of user IDs, workgroup names, line names, and line group names?

To answer this question with yes, the overall configuration has to resemble a single, large CIC configuration. If this is true, then the resulting data from the systems can be easily mingled into a single database set of tables, and reporting can be run across the whole set as if it were a single, large CIC entity. The existing reports use the single combined set of information without modification. This is the only version of multiple-site shared reporting that is fully supported in CIC; please see Option 1 below. If this is not true, then you will need to implement Option 2 or 3.

## Option 1

Careful planning and configuration are necessary if you intend to use this option. We do not recommend this option as your first choice, because you could encounter parsable data collisions, for example, from users or fields having the same names.

- Send all data to a single CIC logging process and put it into common database tables.
- Run reports across the entire tables as if the sites were a single, large CIC entity.
- No customizations required. Be sure to confirm that all sites use the correct parameter configuration for the **ServerReportLogDataDestination**, the common queue name.

**Note** It is a good idea to create separate site IDs for each CIC system. In the event your data overlaps, the site ID helps you trace any problems.

# Appendix A: How statistics are generated for each log

This appendix details how CIC generates the information written to logs. It details how information is generated for calls, users, workgroups, lines, user status changes, and user status change intervals.

## Calls

Telephony Services generates a notification each time a call disconnects. Included in that notification is all of the attribute information about that call object. Automated logging writes the information to the CallDetailRecord Log. Calls have an interaction ID of 0.

## Chats

Chats are processed to the CallDetailRecord Log with an interaction ID of 1. Chats are generated through Web notifications. For detailed information on Chats, see the Web Services technical reference, located in the Technical Reference Documents section of the PureConnect Documentation Library.

## Agent, Queue, Line and Line Group Queues

The Statistics Server generates information for each User, Workgroup, Line, and Line Group queue and writes the information to the appropriate log. User, Workgroup, and Statistics Group data are processed to the Queue Period Statistics tables by PMQ (Persistent Message Queuing).

### Note

User queue, Workgroup, Line, and Line Group information is collected at an interval that you specify in Interaction Administrator Server Configuration dialog. The Queue/IVR reporting interval option on the Report Configuration page of the Server Configuration dialog controls the frequency to which the Agent, Workgroup, and Statistics Group tables are written. The Line reporting interval option controls the frequency to which the Line and Line Group tables are written. Both options are set at half hour (1800 seconds) during the CIC server installation.

## User Status Changes

The Statistics Server generates information on agent (user) availability, when an agent's status is changed, and writes the information to the AgentActivity Log.

# Appendix B: CIC Reporting Tools Design

## Introduction

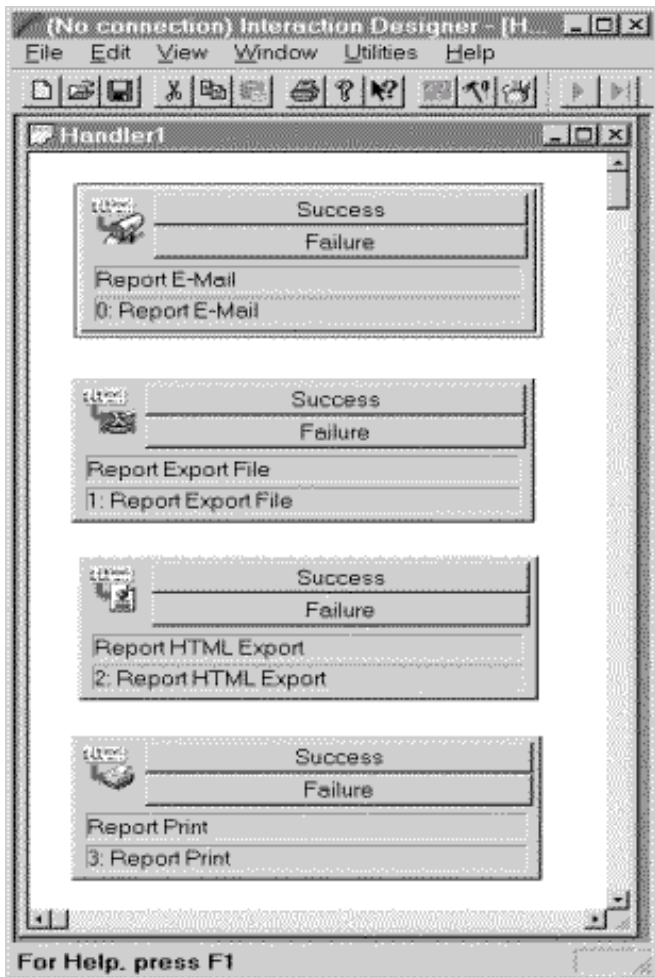
The report tools are extensions of the CIC reporting system and allow the automation of reporting tasks through handler steps. These tools execute the I3RunCrReport executable from within the IP environment and pass the parameters required for execution via a named pipe. The tool steps operate synchronously and wait for a code returned from the report execution via the named pipe.

In order to limit the impact of the reports in CIC, only five (5) instances of the I3RunCrReport executable are allowed to be running at any point in time from IP report tools. This is accomplished by use of a semaphore that counts the number of instances being executed. If five instances are already executing, the sixth (6<sup>th</sup>) reporting thread in IP will wait up to 10 minutes for a previous instance to terminate. If one does not terminate and free the semaphore before the timeout of 10 minutes, the waiting report thread will log an error message and fail.

If an instance of a report takes longer than the timeout of ten (10) minutes to execute, it will be terminated, and an error message will be logged. This behavior is intended to keep long running reports from degrading system performance, and to catch zombie processes that might be blocked on a window waiting for user input. This precaution must be taken because some types of errors will cause the Crystal, or ODBC subsystems to display a dialog box error message, which blocks the process completions.

## Overview of Tools

There are four tools to cover a range of report output options. Simple printing can be accomplished using the Report Print tool. Simple exporting can be accomplished with the Report Export File tool. Exporting to HTML and exporting to an e-mail message are more complex options, and require a special tool for each operation. These are the Report e-mail tool, and Report HTML export tool.



Each of these tools operates by taking a report name as defined in Interaction Administrator, and four parameter list pairs, plus any special parameters. The four parameter list pairs are String, Date Time, Number, and Boolean pair lists. A pair consists of a string list that specifies the name of the user parameter, and the matching list contains the value to be used in the report.

Any parameter that is defined for the report in Interaction Administrator as a USER supplied value must have a matching value supplied in the parameters pairs, or the report cannot be executed.

The remaining special parameters are specific to the type of export being performed.

## Common Parameters

Many of the parameters used by the tools are similar. Report Name is required for each report tool to determine the report that will be executed. The following table is an explanation of the parameter types, the allowed values, and general use.

---

### Known Export Limitations

Some reports might export with a loss of formatting, although the reports do not exhibit a loss of information. The following are examples of known formatting issues that occur when you export an CIC report:

- **Microsoft Word Document Export Type**
- There are occasional differences in precision. For example, numbers shown as "1" in the report preview might be displayed as "1.00" in the Word document.

- Occasionally, a blank (blank, other than the header) page is at the beginning of the report before the actual data starts.
  - Graphs are usually cut off at the bottom (the footer overlays the graph).
  - With some extra wide reports, the export misaligns the columns, that is, it merges two separate lines into one line. We have seen this occur with the Line Activity Summary by Line report.
  - Times might show up as "A" and "P" instead of "AM" and "PM" as they are shown in the preview.
- **XLS Export Type**
- Version 8.0e with default special options
  - Graphics (graphs and logos) never show up.
  - Columns might not align. For example, Line Activity Summary by Line report shows the **From:** text object in column A while the **?StartLineGroup** parameters are listed in column B.
  - Export might not justify correctly. The DNIS Detail report, for example, right-justifies the **Call Duration** and **Hold Time** columns, whereas it centers these columns in the RPT, PDF, and DOC export versions.
  - You might see the same differences in precision as listed above in the Microsoft Word Document Export Type. Also, the export inserts thousands separators, such as 1,000.

XLS Export Type Parameters		
Input	Allowed Values	Explanation
<b>Report Name</b>	Identifier Name of Report configured in Interaction Administrator	This is the report definition that will be used to processes the requested report.
<b>Export Type</b>	Acrobat Format (PDF), Character-separated values, Comma-separated values (CSV), Crystal Reports (RPT), Crystal Reports(RPT), Data Interchange Format (DIF), Excel 5.0 (XLS), Excel 5.0 (XLS) Extended, Excel 7.0 (XLS), Excel 7.0 Extended (XLS), Excel 8.0 (XLS), Excel 8.0 Extended (XLS), HTML 3.2, HTML 4.0 (DHTML), Lotus 1-2-3 (WK1), Lotus 1-2-3 (WK2), Lotus 1-2-3 (WKS), ODBC, Paginated Text, Record style (columns of values), Report Definition, Rich Text Format (RTF), Tab-separated text, Tab-separated values, Text, Word for Windows document, XML.  Note: We list file extensions in "()" above to give you an example of file types. Do not enter the information contained in "()". For example, if you want "Acrobat Format" you need to enter exactly that (without the information in the "()"). If you enter "Acrobat Format (PDF)", you will receive an error.	Export format to be used for output of report.
<b>Mail To</b>	Textual List of Valid mail addresses for CIC as allowed by other e-mail tools.	List of mail addresses to receive exported report.
<b>Carbon Copy</b>	Textual List of Valid mail addresses for CIC as allowed by other e-mail tools.	List of mail addresses to be copied on exported report.
<b>Subject</b>	Any text	Text to be used as subject of e-mail.
<b>Message</b>	Any text	Text to be used as the body of e-mail.
<b>String Parameter Names</b>	List of Parameter Names	List of strings specifying the names of the string user parameters for the report.
<b>String Parameter Values</b>	List of String values	List of strings specifying the value for each of the parameters named in the String Parameter Values list. They must match 1 for 1 with the String Parameter Names list.

<b>Datetime Parameter Names</b>	List of Parameter Names	List of strings specifying the names of the datetime user parameters for the report.
<b>Datetime Parameter Values</b>	List of Datetime values	List of datetimes specifying the value for each of the parameters named in the Datetime Parameter Names list. They must match one for one with the Datetime Parameter Names list.
<b>Number Parameter Names</b>	List of Parameters Names	List of strings specifying the names of the number user parameters for the report.
<b>Boolean Parameter Values</b>	List of Boolean values	List specifying the values of the Boolean parameters for the report.
<b>Number Parameter Values</b>	List of Number values	List of numbers specifying the value for each of the parameters named in the Number Parameter Names list. They must match one for one with the Number Parameter Name list.
<b>Special Export Options</b>	<p>Depending on export type, any of the following values separated by a semicolon:</p> <p>LinesPerPage=n</p> <p>UseReportNumberFormat=0 or 1</p> <p>UseReportDateFormat=0 or 1</p> <p>StringDelimiter={character}</p> <p>FieldDelimiter={character}</p> <p>DSN={ODBC data source}</p> <p>UID={logging in user id}</p> <p>PWD={logging in password}</p> <p>TABLE={export table}</p> <p>ExcelColumnHeadings=0 or 1</p> <p>ExcelConstColWidth=0 to n, where n is the constant column width. Default is 9.</p> <p>ExcelTabularFormat=0 or 1</p> <p>ExcelBaseAreaType={PAGEHEADER, PAGEFOOTER, REPORTHEADER, REPORTFOOTER, GROUPHEADER, GROUPFOOTER}</p> <p>ExcelBaseAreaGroupNum=n where n is a group number</p> <p>ExcelNoWorksheetFunc</p> <p>When exporting to PDF, HTML, or RTF, users can optionally specify a starting and ending page range.</p>	List of special export parameters used to control export for special export types.
<b>Export File Path Name</b>	Valid file path name	<p>File name with path. The exact intent is dependent on export type. ODBC export will ignore this parameter.</p> <p>If no path is supplied, the file will be placed in the CIC work directory if one exists, or the temp directory, or the root of the C: drive.</p>

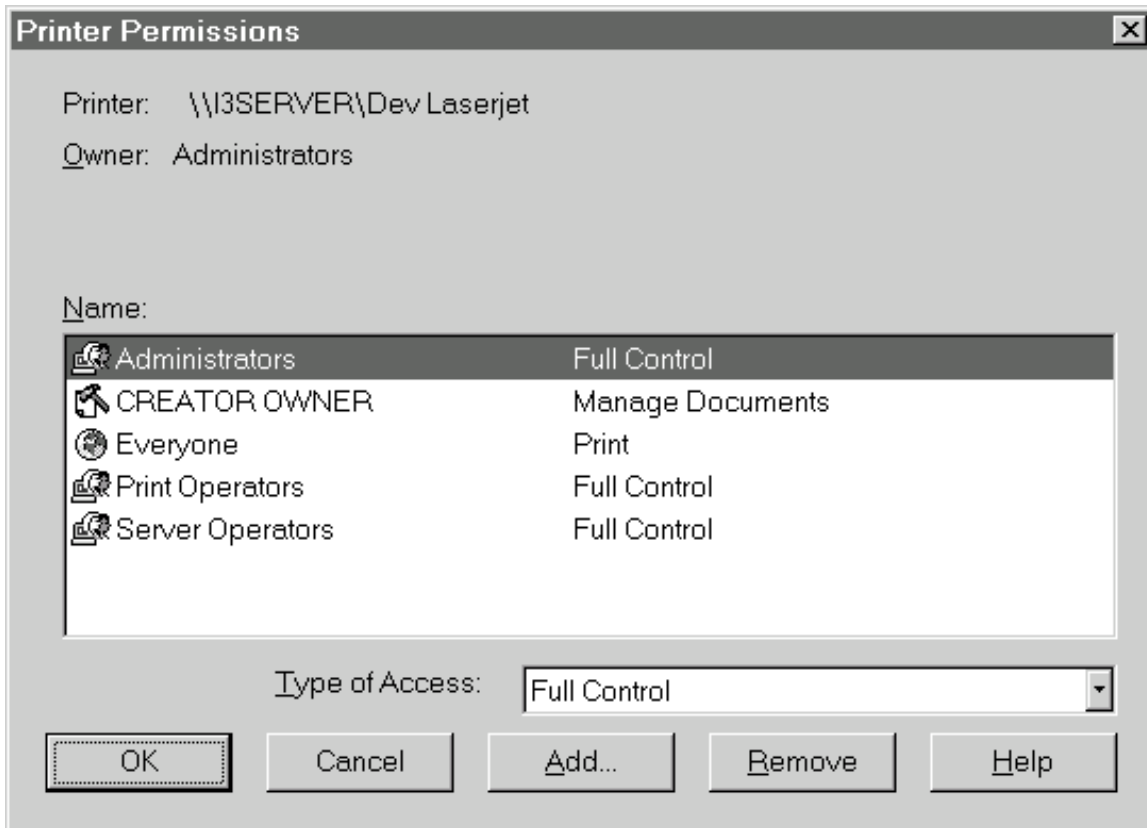


<b>HTML Directory and File Name</b>	Valid file path name	File name with path. The exact intent is dependent on export type. HTML export types will use the file name as the base name for the HTML, and will put any JPG file in the associated directory with the file.  If no path is supplied, the file will be placed in the CIC work directory if one exists, or the temp directory, or the root of the C: drive.
<b>HTML Output Type</b>	Valid HTML export type: HTML 3.2 and HTML 4.0	Export type
<b>Printer Name</b>	Valid name of printer accessible from server.	Printer name used for output. A UNC path might be required to correct address the printer if it is a network printer.  If no printer name is supplied, the default printer will be used.
<b>Number of copies</b>	Empty to 65000	Tells print engine number of copies to print. Value defaults to one if nothing is supplied.
<b>Starting output page</b>	Empty or 1 to maximum number of pages in document	Specifies the starting page of output. If nothing is supplied, 1 is assumed.
<b>Ending output page</b>	Empty or 1 to maximum number of pages in document.	Specifies the ending page of output. If nothing is supplied then the last page is assumed.
<b>Collate Flag</b>	Empty, or true or false	If empty, the printer will collate by default.
<b>Print File</b>	Valid path file name	Forces output to be printed to this file. This can be used to create PostScript output or to print to file from the Fax Printer to create a file that can be processed for faxing.  If no path is supplied, the file will be placed in the CIC work directory if one exists, or the temp directory, or the root of the C: drive.

## Report Print Tool

The report print tool is used to output to a printer, or to file via the printer drivers. A blank printer name will output to the default printer. If printing to file, no automated cleanup of the files will take place. Either automated or manual cleanup routines will have to be executed to remove any files after they have been used.

When CIC runs as a service, care must be taken to ensure that the printers being used are accessible by the service. Services either have to be given specific user privileges, or devices need to have printing rights granted to everyone to ensure that printing is possible. Also, the full path to the printer as seen on the Printer Properties/Security/Permissions will likely have to be used unless the printer is local.



The Printer Permissions dialog box shows specific user privileges.

Report Print Tool Parameters		
Input	Allowed Values	Explanation
<b>Report Name</b>	Identifier Name of Report configured in Interaction Administrator	This is the report definition that will be used to process the requested report.
<b>Printer Name</b>	Valid name of printer accessible from server.	Printer name used for output. A UNC path might be required to correctly address the printer if it is a network printer.  If no printer name is supplied, the default printer will be used.
<b>Number of copies</b>	Empty to 65000	Tells print engine number of copies to print. Value defaults to one if nothing is supplied.
<b>Starting output page</b>	Empty or 1 to maximum number of pages in document	Specifies the starting page of output. If nothing is supplied, 1 is assumed.
<b>Ending output page</b>	Empty or 1 to maximum number of pages in document.	Specifies the ending page of output. If nothing is supplied then the last page is assumed.
<b>Collate Flag</b>	Empty, or true or false	If empty, the printer will collate by default.
<b>String Parameter Names</b>	List of Parameter Names	List of strings specifying the names of the string user parameters for the report.
<b>String Parameter Values</b>	List of String values	List of strings specifying the value for each of the parameters named in the String Parameter Values list. They must match 1 for 1 with the String Parameter Names list.
<b>Datetime Parameter Names</b>	List of Parameter Names	List of strings specifying the names of the datetime user parameters for the report.
<b>Datetime Parameter Values</b>	List of Datetime values	List of datetimes specifying the value for each of the parameters named in the Datetime Parameter Names list. They must match one for one with the Datetime Parameter Names list.
<b>Number Parameter Names</b>	List of Parameters Names	List of strings specifying the names of the number user parameters for the report.
<b>Boolean Parameter Values</b>	List of Boolean values	List specifying the values of the Boolean parameters for the report.
<b>Number Parameter Values</b>	List of Number values	List of numbers specifying the value for each of the parameters named in the Number Parameter Names list. They must match one for one with the Number Parameter Name list.
<b>Print File</b>	Valid path file name	Forces output to be printed to this file. This can be used to create PostScript output or to print to file from the Fax Printer to create a file that can be processed for faxing.  If no path is supplied, the file will be placed in the CIC work directory if one exists, or the temp directory, or the root of the C: drive.

## Report Export File Tool

Export any report file using this tool. The file path name supplied is used to create the output. If the output file already exists, it will

be replaced. The tool will do nothing to clean up files created for export. Either automated or manual cleanup routines will have to be executed to remove any files after they have been used.

The I3RunCrReport.exe automatically registers as the processor of the RPT file extension. This allows an exported RPT file with data to be opened and previewed simply by executing a shell open command on the file. A full copy of Crystal Reports is not required for a recipient to preview an RPT file. They need only install printing support, and execute I3RunCrReport once to register the extension.

Report Export File Tool Parameters		
Input	Allowed Values	Explanation
<b>Report Name</b>	Identifier Name of Report configured in Interaction Administrator	This is the report definition that will be used to process the requested report.
<b>Export Type</b>	<p>Acrobat Format (PDF), Character-separated values, Comma-separated values (CSV), Crystal Reports (RPT), Crystal Reports (RPT), Data Interchange Format (DIF), Excel 5.0 (XLS), Excel 5.0 (XLS) Extended, Excel 7.0 (XLS), Excel 7.0 Extended (XLS), Excel 8.0 (XLS), Excel 8.0 Extended (XLS), HTML 3.2, HTML 4.0 (DHTML), Lotus 1-2-3 (WK1), Lotus 1-2-3 (WK2), Lotus 1-2-3 (WKS), ODBC, Paginated Text, Record style (columns of values), Report Definition, Rich Text Format (RTF), Tab-separated text, Tab-separated values, Text, Word for Windows document.</p> <p><b>Note</b> We have listed file extensions in “()” to give you an example of file types. Do not enter the information contained in “()”. For example, if you want “Acrobat Format” you need to enter exactly that (without the information in the “()”). If you enter “Acrobat Format (PDF)”, you will receive an error.</p>	Export format to be used for output of report.
<b>String Parameter Names</b>	List of Parameter Names	List of strings specifying the names of the string user parameters for the report.
<b>String Parameter Values</b>	List of String values	List of strings specifying the value for each of the parameters named in the String Parameter Values list. They must match 1 for 1 with the String Parameter Names list.
<b>Datetime Parameter Names</b>	List of Parameter Names	List of strings specifying the names of the datetime user parameters for the report.
<b>Datetime Parameter Values</b>	List of Datetime values	List of datetimes specifying the value for each of the parameters named in the Datetime Parameter Names list. They must match one for one with the Datetime Parameter Names list.
<b>Number Parameter Names</b>	List of Parameters Names	List of strings specifying the names of the number user parameters for the report.
<b>Number Parameter Values</b>	List of Number values	List of numbers specifying the value for each of the parameters named in the Number Parameter Names list. They must match one for one with the Number Parameter Name list.

<b>Special Export Options</b>	Depending on export type, any of the following values separated by a semicolon: LinesPerPage=n UseReportNumberFormat=0 or 1 UseReportDateFormat=0 or 1 StringDelimiter={character} FieldDelimiter={character} ExcelColumnHeadings=0 or 1 ExcelConstColWidth=0 to n, where n is the constant column width. Default is 9. ExcelTabularFormat=0 or 1 ExcelBaseAreaType={PAGEHEADER, PAGEFOOTER, REPORTHEADER, REPORTFOOTER, GROUPHEADER, GROUPFOOTER} ExcelBaseAreaGroupNum=n where n is a group number ExcelNoWorksheetFunc	List of special export parameters used to control export for special export types.
<b>Export File Path Name</b>	Valid file path name	File name with path. The exact intent is dependent on export type. ODBC export will ignore this parameter.  If no path is supplied, the file will be placed in the CIC work directory if one exists, or the temp directory, or the root of the C: drive.

## Report e-mail tool

### Important Note

For CIC versions 2015 R2, or later, the reporting executable, **ReportingExecutable.exe**, should be used in place of the Report E-mail Tool. To run the reporting executable, see "Appendix C: Run an Interaction Reporter report or a Report Assistant report using command line parameters" in the *CIC Scheduled Reports Installation and Configuration Guide*.

The report e-mail tools export the report in the desired format, and then send the file to the Mail To and Carbon Copy (CC) list. All temp files created in the process are automatically cleaned up.

For the report e-mail tool, enter e-mail addresses in typical SMTP format, for example, JohnDoe@xyz.com. You can also enter e-mail addresses in the format specified in the Address field of the user's Mailbox Selection window. This allows you to be more explicit about which transport to use.

### Note

If you are using multiple e-mail servers with CIC and you want a specific e-mail server to deliver a message to a recipient, specify the recipient using the native format for that email server.

Report e-mail tool Parameters		
Input	Allowed Values	Explanation
<b>Report Name</b>	Identifier Name of Report configured in Interaction Administrator	This is the report definition that will be used to processes the requested report.

<b>Export Type</b>	<p>Acrobat Format (PDF), Character-separated values, Comma-separated values (CSV), Crystal Reports (RPT), Crystal Reports (RPT), Data Interchange Format (DIF), Excel 5.0 (XLS), Excel 5.0 (XLS) Extended, Excel 7.0 (XLS), Excel 7.0 Extended (XLS), Excel 8.0 (XLS), Excel 8.0 Extended (XLS), HTML 3.2, HTML 4.0 (DHTML), Lotus 1-2-3 (WK1), Lotus 1-2-3 (WK2), Lotus 1-2-3 (WKS), Paginated Text, Record style (columns of values), Report Definition, Rich Text Format (RTF), Tab-separated text, Tab-separated values, Text, Word for Windows document.</p> <p>Note: We have listed file extensions in “()” to give you an example of file types. Do not enter the information contained in “()”. For example, if you want “Acrobat Format” you need to enter exactly that (without the information in the “()”). If you enter “Acrobat Format (PDF)”, you will receive an error.</p>	Export format to be used for output of report. ODBC types are excluded from this list.
<b>Mail To</b>	Textual List of Valid mail addresses for CIC as allowed by other e-mail tools.	List of mail addresses to receive exported report.
<b>Carbon Copy</b>	Textual List of Valid mail addresses for CIC as allowed by other e-mail tools.	List of mail addresses to be copied on exported report.
<b>Subject</b>	Any text	Text to be used as subject of e-mail.
<b>Message</b>	Any text	Text to be used as the body of e-mail.
<b>String Parameter Names</b>	List of Parameter Names	List of strings specifying the names of the string user parameters for the report.
<b>String Parameter Values</b>	List of String values	List of strings specifying the value for each of the parameters named in the String Parameter Values list. They must match 1 for 1 with the String Parameter Names list.
<b>Datetime Parameter Names</b>	List of Parameter Names	List of strings specifying the names of the datetime user parameters for the report.
<b>Datetime Parameter Values</b>	List of Datetime values	List of datetimes specifying the value for each of the parameters named in the Datetime Parameter Names list. They must match one for one with the Datetime Parameter Names list.
<b>Number Parameter Names</b>	List of Parameters Names	List of strings specifying the names of the number user parameters for the report.
<b>Number Parameter Values</b>	List of Number values	List of numbers specifying the value for each of the parameters named in the Number Parameter Names list. They must match one for one with the Number Parameter Name list.

<b>Special Export Options</b>	<p>Depending on export type, any of the following values separated by a semicolon:</p> <p>LinesPerPage=n</p> <p>UseReportNumberFormat=0 or 1</p> <p>UseReportDateFormat=0 to n, where n is the constant column width. Default is 9.</p> <p>StringDelimiter={character}</p> <p>FieldDelimiter={character}</p> <p>ExcelColumnHeadings=0 or 1</p> <p>ExcelConstColWidth=0 or 1</p> <p>ExcelTabularFormat=0 or 1</p> <p>ExcelBaseAreaType={PAGEHEADER, PAGEFOOTER, REPORTHEADER, REPORTFOOTER, GROUPHEADER, GROUPFOOTER}</p> <p>ExcelBaseArea=n where n is a group number and ExcelBaseAreaType=GROUPHEAER or GROUPFOOTER</p> <p>ExcelNoWorksheetFunc</p>	<p>List of special export parameters used to control export for special export types.</p>
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## Report HTML Export Tool

The HTML export tool creates an HTML export file that contains a single running body of the report with a single footer and a single header section. Obviously, this type of export is applicable to certain applications.

The HTML Directory and File name are used to create a directory, and an HTML file contains the body of the report. Also placed into the directory are any related JPG files that must be generated to support graphics in the report. The directory used must be unique to the report, as this is the only way to guarantee that these supporting JPG files will not collide with JPG files from other exports.

Report HTML Export Tool Parameters		
Input	Allowed Values	Explanation
<b>Report Name</b>	Identifier Name of Report configured in Interaction Administrator	This is the report definition that will be used to processes the requested report.
<b>HTML Output Type</b>	Valid HTML export type: HTML 3.2, HTML 4.0 (DHTML)	Export type
<b>HTML Directory and File Name</b>	Valid file path name	File name with path. The exact intent is dependent on export type. HTML export types will use the file name as the base name for the HTML, and will put any JPG file in the associated directory with the file.  If no path is supplied, the file will be placed in the CIC work directory if one exists, or the temp directory, or the root of the C: drive.
<b>String Parameter Names</b>	List of Parameter Names	List of strings specifying the names of the string user parameters for the report.
<b>String Parameter Values</b>	List of String values	List of strings specifying the value for each of the parameters named in the String Parameter Values list. They must match 1 for 1 with the String Parameter Names list.
<b>Datetime Parameter Names</b>	List of Parameter Names	List of strings specifying the names of the datetime user parameters for the report.
<b>Datetime Parameter Values</b>	List of Datetime values	List of datetimes specifying the value for each of the parameters named in the Datetime Parameter Names list. They must match one for one with the Datetime Parameter Names list.
<b>Number Parameter Names</b>	List of Parameters Names	List of strings specifying the names of the number user parameters for the report.
<b>Number Parameter Values</b>	List of Number values	List of numbers specifying the value for each of the parameters named in the Number Parameter Names list. They must match one for one with the Number Parameter Name list.



## Special Export Options

Several of the exporttypes allow special parameter options to control the export process. The options were basically outlined in the common parameter sections, but more detail is needed to use them effectively.

The following is a table of the export types, and the special export options that can be used with these export types.

Special Export Options Parameters	
Export Types	Special Parameters Supported
<b>All Microsoft Excel Extended</b>	ExcelColumnHeadings=0 or 1 ExcelConstColWidth=0 to n, where n is the constant column width. Default is 9. ExcelTabularFormat=0 or 1 ExcelBaseAreaType={PAGEHEADER, PAGEFOOTER, REPORTHEADER, REPORTFOOTER, GROUPHEADER, GROUPFOOTER} ExcelBaseAreaGroupNum=n where n is a group number and ExcelNoWorksheetFunc
<b>Paginated Text</b>	LinesPerPage=n
<b>Text, Tabbed Text, Comma Separated Text, Tab Separated Text, Character Separated Text, Records, DIF</b>	UseReportNumberFormat=0 or 1 UseReportDateFormat=0 or 1
<b>Character Separated Text</b>	StringDelimiter={character} FieldDelimiter={character}
<b>ODBC</b>	DSN={ODBC data source} UID={logging in user id} PWD={logging in password} TABLE={export table}

## Explanation of Special Options

Any special option that takes a value must be followed immediately by an "=" and the values. Example ExcelConstColWidth=15. If there are any spaces, tabs, or other characters between the "=" on either side, the parameters is considered invalid.

### ExcelColumnHeadings

Default is off/false. If true, then the column headings from the Page Header or Report Header area will be used.

### ExcelConstColWidth

Default is off/false. If true, constant column widths will be enabled with a default width of nine (9).

### ExcelTabularFormat

Default is off/false. If true, a tabular format will be generated for a specified area of the report. A tabular format is one where the data of the report is flattened into a row. The base area to be flattened is specified by the ExcelBaseArea and ExcelBaseAreaType.

### ExcelBaseAreaType=(see options)

Defines the base area to be used for tabular formatting. This will be some section of the Crystal reporting hierarchy. The possible values are PAGEHEADER, PAGEFOOTER, REPORTHEADER, REPORTFOOTER, GROUPHEADER and GROUPFOOTER.

If no ExcelBaseAreaType is defined, the report detail section will be used as the tabular format area.

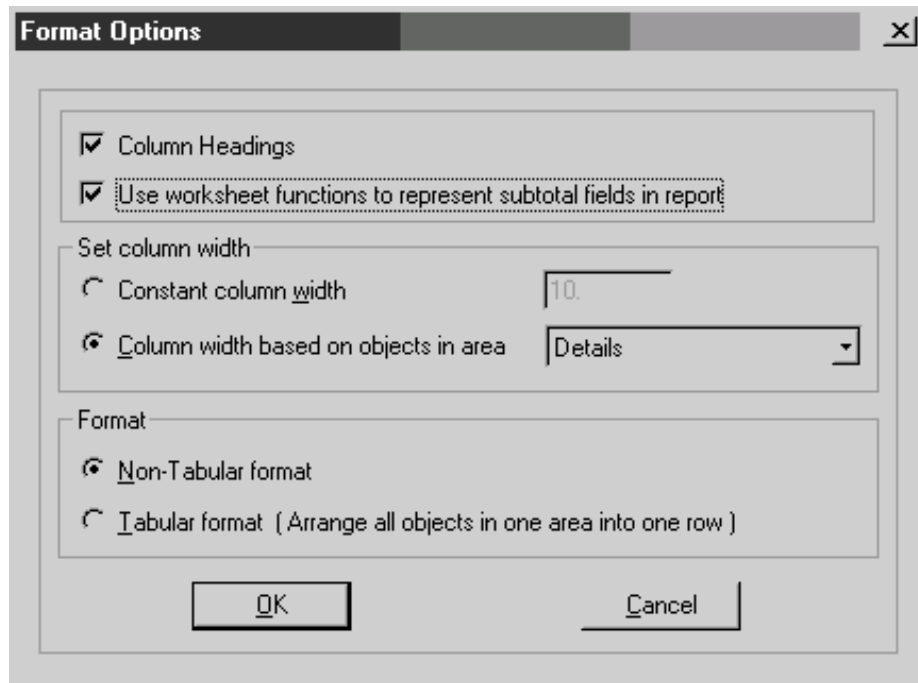
If the base area is a group header or group footer, the ExcelBaseAreaGroupNum identifies which of the group sections defines the tabular base area.

#### **ExcelBaseAreaGroupNum=1 to n**

If the ExcelBaseAreaType is GROUPHEADER or GROUPFOOTER, this defines the group that is to be used for the tabular format.

#### **ExcelNoWorksheetFunc**

This is a new special option. It corresponds to the second option when exporting from Crystal's RPT designer:



If present, it uses Excel worksheet functions to represent subtotal fields in the exported report. If not present, it will not using them.

#### **LinesPerPage=1 to n**

For paginated export type, this sets the number of lines to be used for each page of output. The default value is 66.

#### **UseReportNumberFormat**

The default value for this is false. If true the report number formatting will be used for numeric output values in the export. If false, then the system default numeric formats as defined by the Locale settings will be used.

#### **UseReportDateFormat**

The default value for this is false. If true, the report date and time formatting will be used for date and time output values in the export. If false, then the system default date and time formats as defined by the Locale settings will be used.

#### **StringDelimiter={character}**

Specified the single character that will be used as a delimiter at the beginning and end of a string value. The default is a double quote.

#### **FieldDelimiter={character}**

Specifies the single character that will be used to separate fields in the export. The default value is a comma.

#### **DSN={ODBC data source}**

Specifies the ODBC data source name that will be used to connect to the database where the ODBC export should occur. This value is not optional for ODBC exports. If not provided, the export will fail.

#### **UID={logging in user id}**

User identifier for the data source specified in the DSN export options. This value might not be required if the ODBC source has some other means of authenticating and connecting the user.

#### **PWD={logging in password}**

User password to be used with the UID and DSN. This value might not be required if the ODBC source has some other means of authenticating the connecting user.

**TABLE={export table}**

Destination table for the ODBC exports. This value is required for the export to succeed.

# Appendix C: Reporting Terms Glossary

## Appendix C: Reporting Terms Glossary

### Attribute

An attribute is a piece of information describing a queue item. Attributes are stored with the queue item and can be retrieved with the Get Attribute tool. Some of the attributes for a call are CallId, LineName, and CallDirection. See Call Attribute in the Interaction Designer online help for a complete listing of call object attributes.

### Interaction Administrator

Interaction Administrator is the application you use to customize and configure the many features in CIC. You'll use Interaction Administrator almost every time you customize or configure reports.

### Logging Handlers

The handlers that write information to the logs. One such logging handler is CallDisconnectMonitor that writes call information to the Call Detail Record log when a call disconnects.

### Logs (also called Report Logs and CIC Logs)

CIC logs hold statistical information calls, queues, and users. The report templates extract data from the logs when a user runs a report. Report log tools in Interaction Designer are used to build handlers that route the specified system data into the actual report log tables. Each report log defined in Interaction Administrator has its own report log tool.

CIC provides essential report logs that store all line, call, and user related CIC interaction data. In Interaction Administrator, these report logs are identified with numbers, such as, 7, 8, and 20.

### CIC Logging Service(EICLoggingU.exe)

The CIC logging service is the subsystem that manages the writing of data to the report logs. It can run as a service on the CIC server, or as a standalone application on the CIC server. It uses the new Persistent Message Queue (PMQ). For detailed information on PMQ, see the *Persistent Message Queuing (PMQ) Fact Sheet* in the Technical Reference Documents section of the PureConnect Documentation Library. The latest versions of technical reference documents can also be downloaded from our PureConnect Customer Care Web site.

### Report Templates

Report templates are shells for reports with links to columns in the CIC logs. When a CIC user runs a report, Crystal Report retrieves information from a CIC log and calculates the statistical information from the report. A template for each report is located in the **IC\_Reports** folder on the CIC server. They have a .rpt extension.

# Appendix D: CIC Report Guidelines (Crystal Reports)

## Text Font Defaults

These defaults apply to all sections of the reports, unless noted below.

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## Page Defaults

Default margins OFF, all sides .25" (one quarter inch). This is found on the 'File|Page Margins' menu entry.

---

## Font Defaults

Body text: Arial 10pt, Arial 8pt on detail reports.

Row, Column Labels and Data: Arial 10pt Bold

Summary Labels and Data: Arial 10pt Bold

Group Separator Labels and Data: Arial 12pt Bold

Report Title Bar: Arial 16pt Bold.

---

## Data Defaults

Date: MM/DD/YY, No leading zeros.

Time: HH:MM XM, 12 hour clock.

Number Precision: 2 places where applicable.

---

## Printer Defaults

Since Crystal Reports saves the default printer within the report file, use 'Radio Shack' printer driver 'Radio Shack JP500' during design. This will avoid intersecting an existing driver, and force use of the station DEFAULT printer during testing.

---

## Report (Page) Header

### Station ID Summary

Date Time Range:	5/5/2014 12:00:00 AM - 5/5/2014 9:00:00 AM
Shift Time Range:	<All>
Station ID Range:	buca004
Site ID Range:	<All>
Purpose Code Range:	<All>

---

## Report Title

- Text object, top border, bottom border.
  - Width should equal full-page width.
  - Colors: White text with Navy background.
  - Text should have one leading space inside text object block.
-

---

## Parameters (from left)

- First Parameter should be one grid unit in from the left margin.
- Title and parameters on vertical guides, evenly spaced
- Left half of Header block.
- Vertical orientation where possible,
- In case of Name parameter, the rest of the parameter columns should be spaced from the right bitmap backwards, to maximize the name length.

---

## Logo (flush right)

- Bitmap .\13smlogo2c450.bmp

---

## Header Separator

- Single line, 3pt, Navy.Should match width of Report Title.

## Section Header

<b>CallerID:101</b>				<b>Summary:</b>	CallerID Number of Calls:	4
Name: Smith, John					Total CallerID Duration:	8.38
					Avg. Duration:	2.10
	<u>Date</u>	<u>Total Calls</u>	<u>Total Duration</u>	<u>Avg. Duration</u>	<u>Total Hold Time</u>	<u>Avg. Hold Time</u>

---

## Group Label(s)

- Flush to left margin.

---

## Summary Data

- As Body Text, evenly spaced.
- Vertical columns on guides as necessary.

---

## Column Headers

- Centered above data column, on guideline.
- Column Header Separator
- Single line 1pt Black, on guideline.

## Text Body

---

## Group Columns

- Indented 3 grid units, if necessary.
- Text Positioning
- Rows should be hooked to formatting guidelines.
- Numeric data right justified, w/Right-guideline to center of column header.
- Text data left justified, w/Left-guideline to center data.

## Graph Defaults

---

### X-axis data labels

- 45° Rotation.
- 

### Graph Type

- 3-D graphs.
- 

### Warning Messages

- Known Bug: any graph which has no data does not display. In this case, a warning message should display to explain why the page is blank. 'Chart not printed because all data points were zero. (0)' is the current message.

## Section Footer

---

---

**310 Summary**

**20.62**

**8**

**2.58**

- Summary Separator
  - 2 Single lines 1pt Black, with minimum space between.
  - (less than the CR default grid of .083")
- 

### Summary Data

- Same as Summary Font default.

## Group Footer

### Summary Separator

- 1 Single line 3pt Black.

## Report Footer

Print Date: Wednesday, November 07, 2001 12:43:48PM

Interaction Center

Page 3 of 38

---

### No Border Lines

- Remove existing trailing lines, not part of a group header/footer
  - One leading line for spacing
- 

### Left Text Object

- Font: Arial 9pt. "Print Date: [PrintDate]" (Embed left-justified 'PrintDate' field in Text object)
  - Flush to left margin
-

---

## Center Text Object

- Font: Arial 10pt Bold."Interaction Center"

---

## Right Text Object

- "Page [PageNumber] of [TotalPageCount]" (Embed right-justified fields within the text object)
- Font: Arial 9pt. Flush to right margin



# Appendix E: Reporting Log Relationships and Report Use Guidelines

To use reporting logs and reports in the Customer Interaction Center (CIC) data collection and reporting system effectively, it is important for you to know details about each log and its relationship to other logs in the system. For example, some of the data within CIC is intended for more general use, such as enterprises running CIC. While these reports might benefit a call center running CIC, they would not be suited to report on tasks performed by agents. In this appendix, we provide detailed descriptions of the types of data, and the procedures and circumstances used to collect it. We also discuss data constraints anticipated by developers.

## General Types of Report Logging

We can place the report logging within CIC into several data types or categories; Call, Queue Statistics, Agent/User Status, Line and Line Group, and Administrative. Although relationships exist between these data types, the CIC logging system handles as them as distinct and separate sets of information.

---

### Call Detail Data

CIC primarily stores the call detail data, the CDR Log, which we also reference as the Call Detail Log in many documents.

- **Source of data:** Snapshot of call state information at time of call disconnect.
- **Type of information:** End call state, call origination, call duration, last user active with call.
- **Relationships to other data:** Very limited. Because CIC captures only the user's latest information, it cannot be directly related to much of the data in the Queue Statistics, unless you have a very simple environment. Any transfers between workgroups and agents are lost in the view of this data, so CIC will not reflect this data in any reports.
- **Reports types using this data:** Call and Call—Supervisor categories of reports. These categories include Call Detail and User Summary reports showing simple call activity. These simple enterprise or summary activity reports will not be as complete as the call counts of Queue Period Statistics agent reports. You should take care not to use these report values for purposes when stringent control is required, such as calculating compensation, because there is no guarantee that a user's complete activity will be represented.

---

### Queue Statistics Data

This category of data includes the IAgentQueueStats, IWrkgrpQueueStats, and IStatsGroup logs. These logs contain interval-based data that accumulates the activity for agents, work groups, and custom statistics groups. CIC collects the standard ACD management values, including counts of entered calls, answered and abandoned calls, and calls that flow out. Most actions that trigger counts also track the sum time until this action occurred, thus tracking the total time to abandon, answer and flow out. Included with these times is time spent on calls, time with calls on hold at an agent, and time in "after call work" state. Where appropriate, CIC collects Agent staffing values including time logged in, time in available to take ACD call state, and time in other states. The IStatsGroup does not have these times because no agents are associated with statistics groups, so there is no pool of agents to drive these values.

Please note these logs include ACD and non-ACD data. Interactions (calls, chats) that are not distributed via ACD can still appear on workgroup-queues, so it is possible to have ACD and non-ACD values relative to interactions. For attributes that are explicitly ACD, the name will include ACD as a suffix, or as a portion of the name. Attributes without ACD are either ALL activity including ACD, or are not differentiated by ACD. Examples of this type of attribute are "nAnswered" and "nAnsweredAcid". "nAnswered" includes ACD and non-ACD calls that were answered. "tAgentLoggedIn" and "tAgentAvailable" are examples of values that cannot be distinguished by the ACD attribute, as they are related to the agent, and not the interaction type. "tAcw" is an example of a value that is related to ACD because it is time accumulated in a "After Call Work" state that might be (but does not have to be) after an ACD call. Since "tAcw" is not directly related to an ACD interaction, it does not have ACD in the name.

- **Source of data:** Interval collection for Agent, Workgroup and Statistics Group.
- **Type of information:** Counts of entry, answer, abandon, and flow out. Times for answer, abandon, flow out. Time on calls, held with an agent, and in "after call work". In the case of Agent and Workgroups, the staffing times for agents and times agent were in particular states.
- **Report types using this data:** Agent Performance and Queue categories. These categories include all of the Queue Period Statistics reports.

---

## Agent/User Status Data

CIC records user status changes in the Agent Activity Log. These changes include the login and logout events, including the status at the time of login or logout. System changes to users' status as seen in a CIC client are also logged in the Agent Activity Log.

You'll see some status changes when you monitor agents that you do not see in this log. This is because some statuses are only shown on real time monitoring, and do not represent actual changes of the user's state.

It is important to know that CIC does not record the current state of the agent until the user ends his or her time in that status by selecting another status. The one exception to this is that the status at midnight is written out to avoid having indefinitely long periods associated with a status. Twenty-four hours should be the longest time recorded for a status.

- **Source of data:** Delayed event driven by change of user state. The previous state is recorded any time a new state is selected.
- **Type of information:** Login Indicator, status used, time starting and ending the status, along with the calculated duration in seconds. Flags also indicate if the status was an ACD, ACW, or DND type status.
- **Report Types using this data:** Agent and Agent Supervisor reports show this information in detail and summary form.

---

## Line and Line Group

Line and Line group statistics are interval data generated for each line and reporting line group you have configured. Reporting line groups are line groups that you have activated using the "Reporting" attribute. No reporting line groups are created by default in CIC. The system administrator must create these groups if there is going to be any meaningful data created for the line group reports.

It is worth noting that report group information is summary data about the lines of the group over the interval. Because of this, it is possible for you to add or remove lines from the configuration during the interval. This does not cause any computation problems because CIC does not record the number of lines, but instead records the total number of seconds the lines were in the configuration. If you divide this total by the seconds in the duration, you'll compute a fractional number of lines for this period.

- **Source of data:** Interval-generated summary information about activity against the lines and line groups.
- **Type of information:** Length of interval. Sum of seconds the lines were active. The sum of seconds all lines were busy. Number of calls and total time for all and outbound traffic (subtract outbound from all to get inbound). Number of outbound calls that were blocked.
- **Report types using this data:** The Line Group reports all use combinations of line and line group information for both reports and charts.

---

## Administrative

This type of data includes the Interaction Administrator (IA) Change Notification and IC Change Notification logs that are audit trail logs for configuration changes. Both of these logs record changes made in CIC, but they do it from different levels of the system. An IA Change Notification is recorded for any change you make using the Interaction Administrator. Only changes made using this application are recorded here.

The IC Change Notification records any change you make via the Directory Services subsystem, and includes any configuration change. These changes include every persistent user/agent status change made by a user, or handler. For this reason, the IC Change Notification log is not active by default. If you require tighter auditing, this log can provide that functionality at the cost of additional database space.

- **Source of data:** Event driven by changes to configuration in Interaction Administrator, or any change made to the configuration in the case of the IC Change Notification log.
- **Types of Information:** The class, path, key, user, and station making the change (not available for IC Change Notification) and type of change.
- **Report types using this data:** Administrative reports allow searching for changes by class and other attributes.

---

## Configuration Mirror Data

The configuration mirror data is data that the system copies (mirror images) from the CIC configuration to aid in the generation of reports. There are several mirror logs that include data for user and workgroup relationships, line and line group configuration, and line-to-line group relationships. It is important to note that these logs reflect current configuration. There are two common uses for this data. The user-to-workgroup relationship allows you to build reports that group user data by workgroups. CIC uses the line and line group configuration information on the line and line group reports to show least used lines by group, or to display additional configuration information about the line or group.

Reports that use these tables might not represent historical information correctly if you have changed the configuration information since the historical data was generated. Currently, the Queue Period Statistics Agent Performance and Line Group reports operate with this restriction.

- **Source of data:** CIC configuration copied from CIC to database on any restart, and updated any time the configuration is changed.
- **Types of information:** Portions of configuration information for user to workgroup relationships, line and line group configuration, account codes, and line to line group relationships.
- **Report types using this data:** Some Queue reports use data to restrict users to non-queue workgroups, and Line Group reports use this information to show details about lines and line group configurations, as well as to find the least used lines in a group.

# Appendix F: Including Ex-Agents in Reports

## Appendix F: Including Ex-Agents in Reports

There might be an instance where you want to include an ex-agent, who is no longer included in a workgroup, in a report that you run in Interaction Reporter. Use the User List parameter to select the users to include in a filter for the report. For example, a former employee who was in a workgroup in February 2014 no longer appears in the User Call Detail report run on December 2014 data using a current workgroup. To include an ex-agent in the report, use the User List parameter and add the current workgroup and the name of the ex-agent to the selected users for the filter. You can save the filter to use again. For additional information about the User List parameter and using a filter, see Interaction Reporter Help.

# Appendix G: Parameter Types for Custom Crystal Reports

## Appendix G: Parameter Types for Custom Crystal Reports

When you configure the parameters for a custom Crystal Report, use the following table to identify the setting to use for the User Control Class Name field on the Miscellaneous tab that corresponds to the parameter type in the Class Name field on the General tab.

Class Name	User Control Class Name
ININ.Reporting.Historical.Engine.Module.Parameters.ViewModels.AutoCompleteDataDrivenComboBox	ININ.Reporting.Historical.Engine.Module.Parameters.Views.AutoCompleteDataDrivenComboBox
ININ.Reporting.Historical.Engine.Module.Parameters.ViewModels.Boolean	ININ.Reporting.Historical.Engine.Module.Parameters.Views.ComboBoxParameter
ININ.Reporting.Historical.Engine.Module.Parameters.ViewModels.CrystalNumericUpDown	ININ.Reporting.Historical.Engine.Module.Parameters.Views.NumericUpDown
ININ.Reporting.Historical.Engine.Module.Parameters.ViewModels.CrystalStringParameter	ININ.Reporting.Historical.Engine.Module.Parameters.Views.TextBoxParameter
ININ.Reporting.Historical.Engine.Module.Parameters.ViewModels.DateTimeParameter	ININ.Reporting.Historical.Engine.Module.Parameters.Views.DateTimeParameter
ININ.Reporting.Historical.Engine.Module.Parameters.ViewModels.DateTimeRange	ININ.Reporting.Historical.Engine.Module.Parameters.Views.DateTimeRange
ININ.Reporting.Historical.Engine.Module.Parameters.ViewModels.NumericUpDownRange	ININ.Reporting.Historical.Engine.Module.Parameters.Views.NumericUpDownRange
ININ.Reporting.Historical.Engine.Module.Parameters.ViewModels.ShiftTimeParameter	ININ.Reporting.Historical.Engine.Module.Parameters.Views.ShiftTime

# Appendix H: U2LININSUPPORTU.DLL Function Calls

## Appendix H:U2LININSUPPORTU.DLL Function Calls

This appendix provides a description of the function calls included in the DLL U2LININSUPPORTU.

The DLL file U2LININSUPPORTU.DLL extends the functionality of formulas in Crystal Reports. It adds CIC specific functions to the list of available functions. To display the function calls in Crystal Report:

1. Start **Crystal Reports**.
2. From the **File** menu, click **New**.
3. The Crystal Reports Gallery dialog is displayed. Select **As a Blank Report**, and click **OK**.
4. The Database Expert dialog is displayed. Click **Cancel**.
5. In the Field Explorer pane (from the **View** menu, you might have to click **Field Explorer** to display) right-click **Formula Fields**, and click **New**.
6. The Formula Name dialog is displayed. Type a name, and click **Use Editor**.
7. The Formula Workshop Formula Editor dialog is displayed. Expand the window.
8. In the Functions pane, expand **Additional Functions**.
9. Below Additional Functions, expand ininsupportu (u2lininsupportu.dll), to display the list of function calls.

# Appendix I: Parser Functionality

This section includes information on the parser, including recognized operators and built-in functions.

## Data Types

Conversions of data types happen automatically in almost all cases within the parsing and execution of expression and values. Explicit conversion can be performed using functions defined later in this document. If implicit conversion occurs to process an expression, the rules used for explicit conversions are followed. This is important because it can cause loss of significant portions of a value if a *double* gets converted to a *long* to perform an operation.

Type	Description
Long	Long integer value using 32bit signed value.
Double	Double float value. The form Digits-Dot-Digits, or Digits-E-Digits (scientific notation) are both supported.
Boolean	Boolean value of true or false.
String	String value.
Datetime	Date time value as the number of seconds since 1970/1/1 00:00:00.

## Operators

Operators are the implicit actions performed within an expression. The parser and executor resolve to perform operators in highest order of precedence first. To assist you, think of strings, integer and floating point values, and parentheses also as operators.

Operator	Description
( )	Left and right parentheses must be used as a matched pair or a syntax error will occur. The contents of the parentheses will be resolved first, and then used as a whole in operation with the highest operator to the left or right.
<b>Integer</b>	Literal integer value (123, or 458)
<b>Float</b>	Literal floating point value (123.456, or 0.5, or 23E7)
<b>Identifier</b>	Any alpha-numeric name supported as a function, constant or variable by the parser. Some of the constants supported are defined under Constants.
.	Use this operator (.) at the end of an expression. It is used to separate multiple expressions.
"	Double quotes are used to define a string literal.
'	A single quote is used to define a string literal. String values can be between single or double quotes. For example, 'This' and "This" are legal. The two cannot be mixed like "error", but a single or double quote can be included within a string stated with the other. 'This' contains a double quote' for example. If a single or double quote must be included in a string literal, starting with the same quote, the quote must be doubled as an escape. "This is how to include "" a double within a double quote".
**	Raise to a Power. Operand1 ** Operand2 Used as 2 ** 3 => 8.
~	Bit wise Inversion. ~Operand1.
!	Binary inversion or NOT. !Operand1. !True equals False.
*	Multiplication. Operand1 * Operand2. If the first operand is long integer, then the second this will be converted to integer and this will be an integer operation returning a long integer.
/	Division. Operand1 / Operand2. If the first operand is a long integer, then the second operator will be converted to a long and this will be an integer division returning a long integer.
%	Modulus. Operand1 % Operand2. Only valid for integers. Returns the remainder from an integer division.
+	Add. Operand1 + Operand2.
-	Subtract. Operand1 - Operand2.
<	Less than. Operand1 < Operand2. True if Operand1 is less than the value of Operand2.
<=	Less than or equal.
=	Equal (not assignment)
<>	Not Equal. Same as !=.
>	Greater than.
>=	Greater than or equal
	Or. Operand1   Operand2. This is a binary OR. So the Operand1 will be bit wise ored with Operand2. If Operand1 is Binary, then if the Binary value of either operand is true, the expression is true.
^	Exclusive Or.
&	And.



## Precedence

Operators are the implicit actions performed within an expression. The parser and executor resolve and perform operators in highest order of precedence first. To assist you, think of strings, integer and floating point values, and parentheses also as operators. The parser resolves the closure, or parsing, of these values following the order of precedence rules.

```
/*7*/ '(', ')', integer, float, identifier, ',', '"', ''',  
/*6*/ '**',  
/*5*/ '~', '!',  
/*4*/ '*', '/', '%',  
/*3*/ '+', '-',  
/*2*/ '<', '<=', '=', '<>', '>', '<=',  
/*1*/ '|', '^', '&'
```

## Constants

null\_datetime = January 1st, 1970

true = ToBoolean(True)

false = ToBoolean(False)

## Functions

Long Round( Double )

Rounds the value up to the nearest integer and returns a long integer value. Examples: 12.1 => 12, 1.5 => 2, -1.5 => -1.

Long Trunc( Double )

Drops the fractional portion of the floating point value, and returns a long.

Examples: 12.1 => 12, 1.5 => 1, -1.5 => -1.

Long Toint( Any Type )

Forces an explicit type conversion from any type to Long. Doubles will be truncated. Strings will be parsed and converted based upon the same rules as parsing a number. Any fraction in the string will be truncated. Datetimes will convert to the number of seconds since 1970/1/1 00:00:00.

Long Tolong( Any Type )

Same as Toint().

Double Todouble( Any Type )

Forces an explicit type conversion from any type to a Double. Strings will be parsed and converted based upon the same rules as parsing a number. Datetimes will convert to the number of seconds since 1970/1/1 00:00:00.

Boolean Tboolean( Any Type )

Forces an explicit type conversion from any type to Boolean. Strings values of '1' will be converted to true, all others are false. Non zero numeric values will be true, zero will be false.

Boolean Todatetime( Any Type )

Forces an explicit type conversion from any type to Datetime. Strings must be in the format YYYY-MM-DD HH:MM:SS. Numeric values will be treated as the number of seconds since 1970/1/1 00:00:00.

## Parser Errors

ErrorDivideByZero  
ErrorInvalidOp  
ErrorRange  
ErrorType  
ErrorSyntaxGeneral  
ErrorSyntaxParenExpected  
ErrorSyntaxEOF  
ErrorSyntaxErrorNumber  
ErrorSyntaxErrorQuote  
ErrorSyntaxErrorOperator  
ErrorFunction  
ErrorSyntaxNotSupported

## Execution Errors

ErrorFeatureNotSupported  
ErrorGeneralFailure  
ErrorInvalidFunctionIdentifier  
ErrorInvalidValueIdentifier  
ErrorStackUnderflow  
ErrorInvalidType  
ErrorVariantException

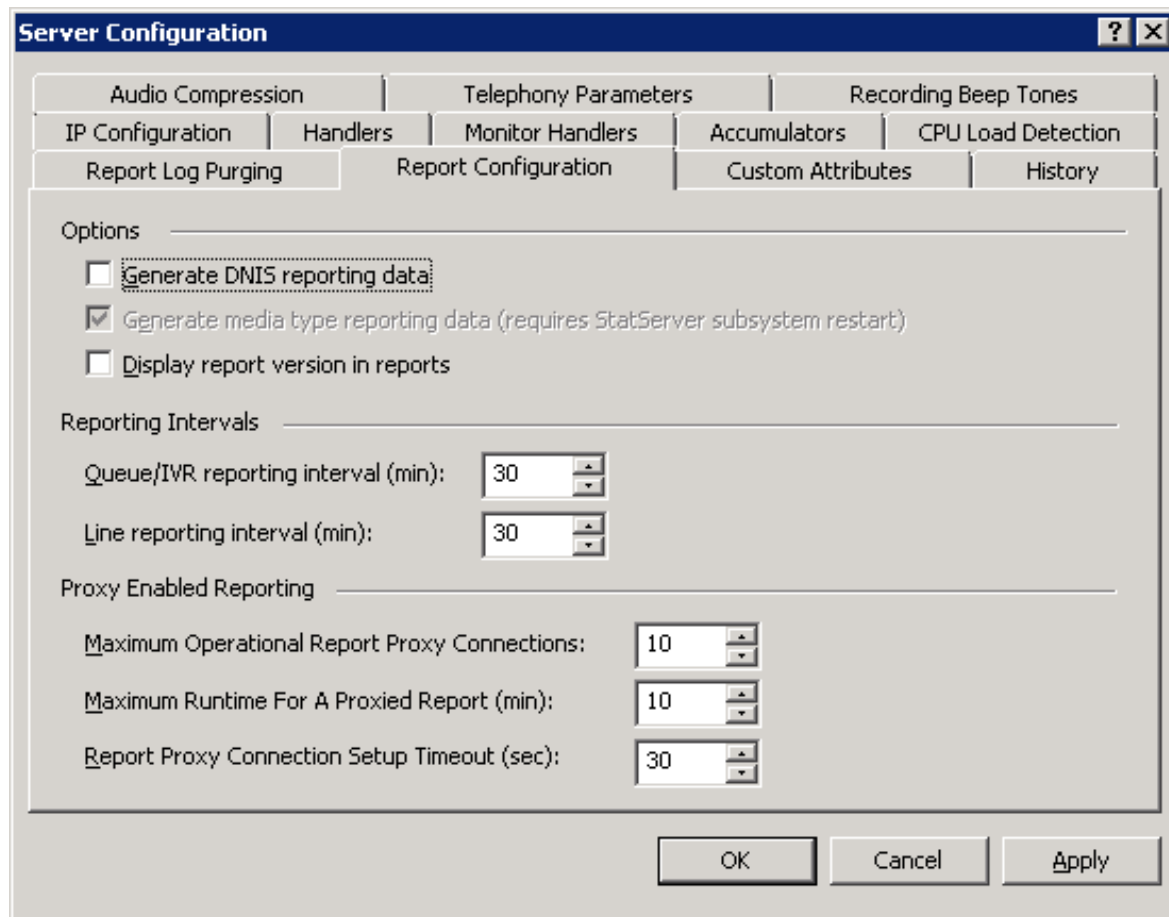
## Appendix J: Internet Enabled Reporting

Internet enabled reporting allows reporting services to execute without a direct connection from a workstation to the database server. The connection to the database server uses a reporting plug-in added to the HttpPlugin Host to facilitate a proxy connection to the database server. A secure (SSL/TLS) WebSocket tunnel between Interaction Reporter and the reporting plug-in establishes a connection to the database. All database traffic uses this connection without the need for Interaction Reporter to establish direct connection to the database.

### Configure Internet enabled reporting in Interaction Administrator

#### Configure reports for your CIC server

Select <IC Server> >Configuration > Server Configuration > Report Configuration and complete the information under Proxy Enabled Reporting. For more information, see Interaction Administrator help.



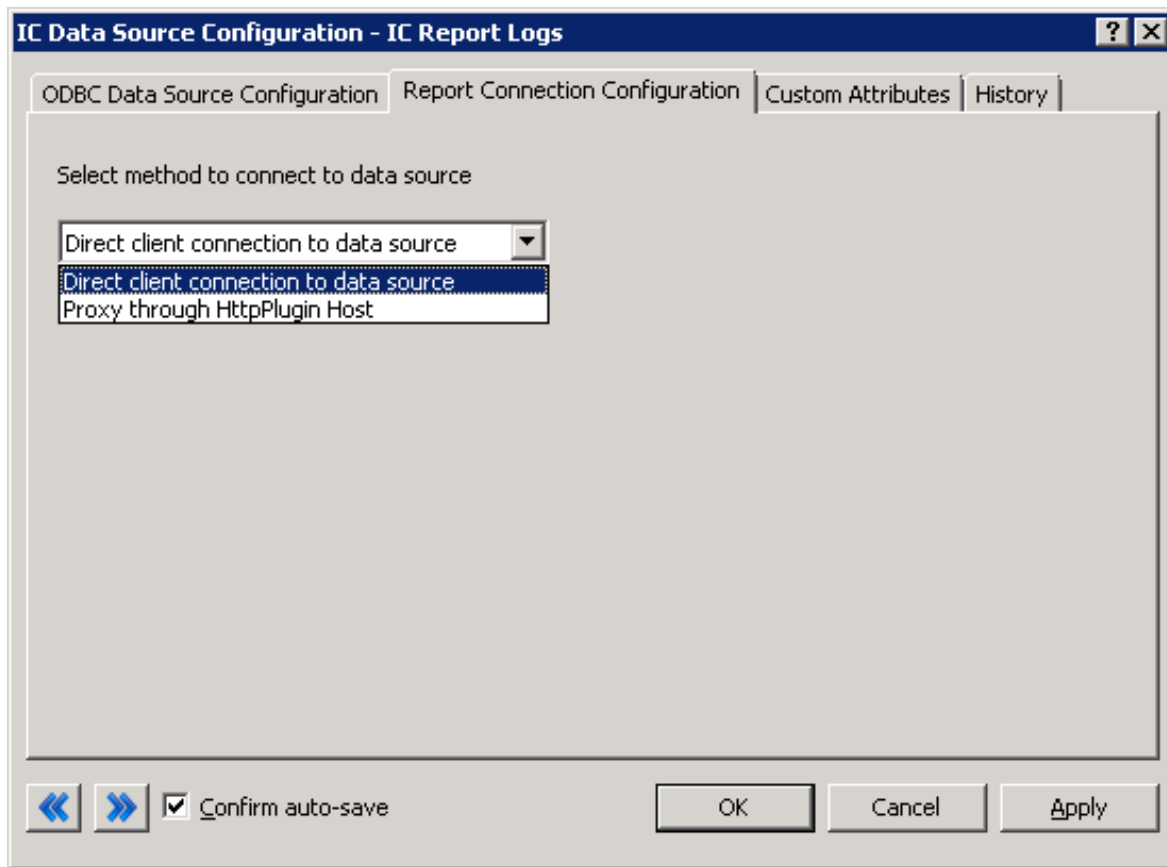
The screenshot shows the 'Server Configuration' dialog box with the 'Report Configuration' tab selected. The dialog has a title bar with a question mark and a close button. Below the title bar is a tabbed interface with the following tabs: Audio Compression, Telephony Parameters, Recording Beep Tones, IP Configuration, Handlers, Monitor Handlers, Accumulators, CPU Load Detection, Report Log Purging, Report Configuration (selected), Custom Attributes, and History. The 'Report Configuration' tab contains the following sections:

- Options:**
  - Generate DNIS reporting data
  - Generate media type reporting data (requires StatServer subsystem restart)
  - Display report version in reports
- Reporting Intervals:**
  - Queue/IVR reporting interval (min): 30
  - Line reporting interval (min): 30
- Proxy Enabled Reporting:**
  - Maximum Operational Report Proxy Connections: 10
  - Maximum Runtime For A Proxied Report (min): 10
  - Report Proxy Connection Setup Timeout (sec): 30

At the bottom of the dialog are three buttons: OK, Cancel, and Apply.

#### Configure the data source

Select <IC Data Sources> <Data source > >IC Data Source Configuration > Report Connection Configuration and complete the information. For more information, see Interaction Administrator help.



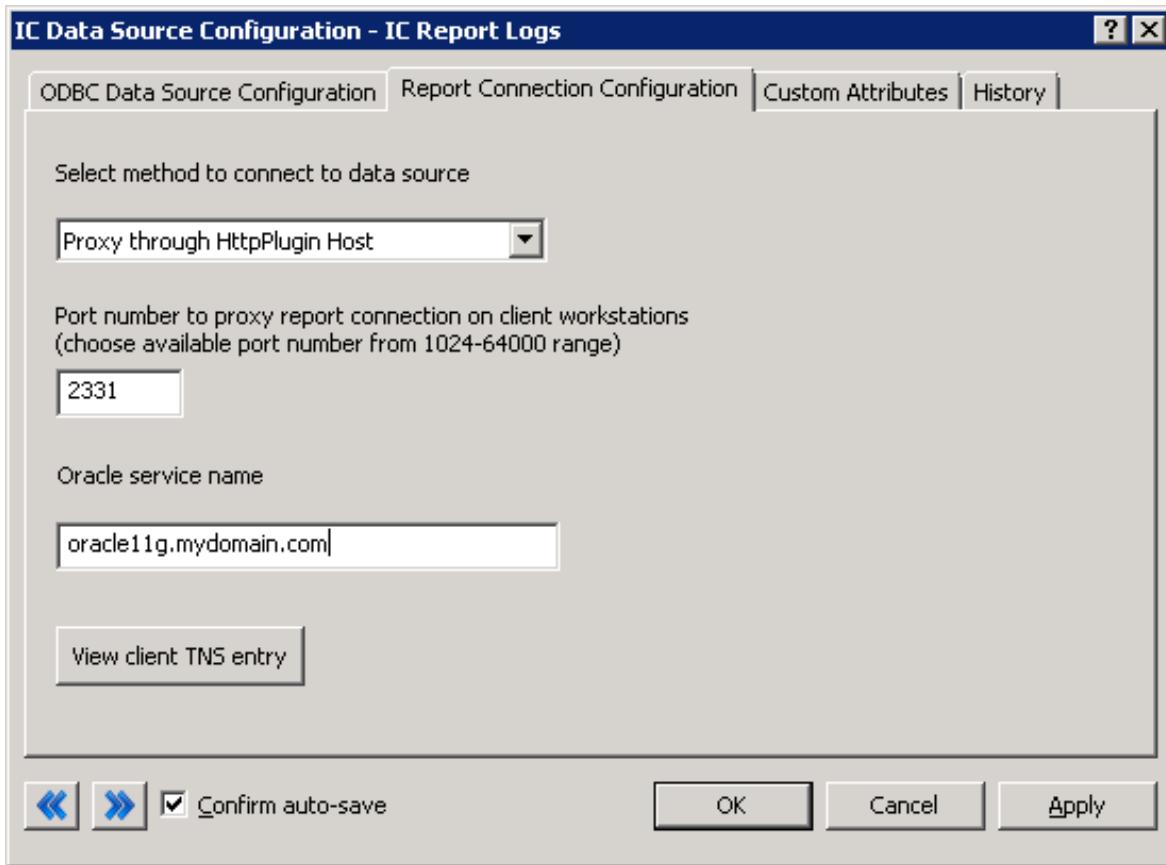
## Extra configuration for Oracle data source

Oracle clients on client workstations require a new TNS entry per data source. Before you complete the extra configuration for Oracle, a IC data source that uses Oracle must exist or you know how to configure the Oracle data source.

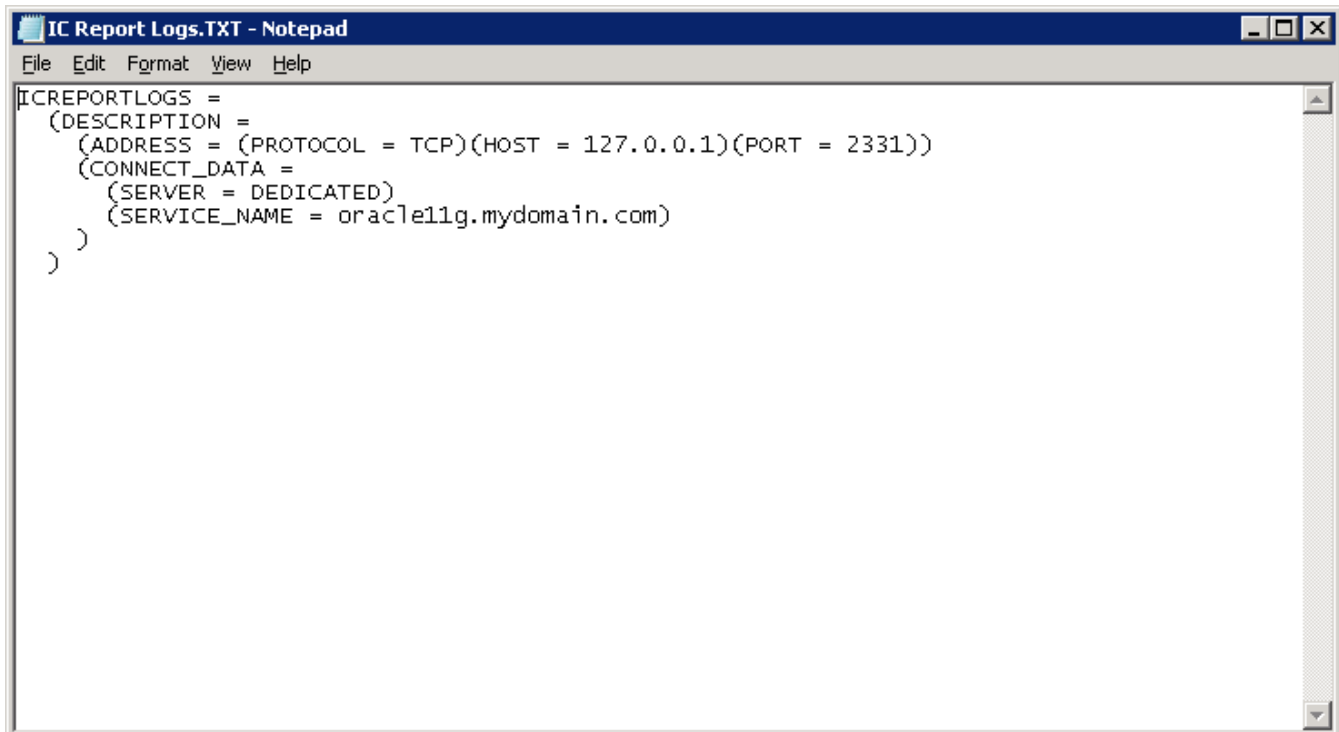
**Note:**

Verify that the CIC server or off-server Session Manager has the ORACLE\_HOME variable set to point to Oracle client directory (for example, C:\oracle\app\devlab\_user\product\11.2.0\client). Restart the CIC server or the off-server Session Manager after you set this variable.

The settings for Oracle appear on the **Report Connection Configuration** page. After you save the **Report Connection Configuration** page, reopen the page to access the extra configuration for Oracle. For more information, see Interaction Administrator help.



After you configure the **Report Connection Configuration** page, click **View client TNS entry** to generate a text file. The text file shows the entry to add in the TNS.Ora files on all client machines. The text file uses the same name as the IC data source followed by the .txt extension. Copy the text file in the same directory as the Interaction Administrator application. For example, if Interaction Administrator runs on a CIC server, copy the text file in I3\IC\Server directory. The following example illustrates a text file.



To update the tnsnames.ora file for each client machine, complete the following steps:

1. On a client machine, edit the tnsnames.ora file (for example, C:\oracle\app\devlab\_user\product\11.2.0\client\network\admin\tnsnames.ora)
2. Insert the complete entry from the text file to the tnsnames.ora file.
3. Verify the reports execute correctly.

## Connection String Formats

The reporting plug-in parses the connection string in the **Additional Information** field on the **ODBC Data Source Configuration** page to identify the host and port number for the tunnel connection. The IC Setup Assistant automatically sets the connection string in the **Additional Information** field. To view the Additional Information field, select **IC Data Sources > < Data source > IC Data SourceConfiguration > Report Connection Configuration**.

The screenshot shows the 'IC Data Source Configuration - IC Report Logs' dialog box. The 'Report Connection Configuration' tab is selected. The 'Subtype' is set to 'Microsoft SQL Server'. The 'Read Only' checkbox is checked, and 'File DSN' is unchecked. In the 'Connection Information' section, 'ODBC DSN' is empty, 'Qualifier' is 'dbo', 'User ID' is 'IC\_ReadOnly', and 'Password' is masked with two dots. The 'Manually enter connection string' checkbox is unchecked. The 'Additional Information' field contains the connection string: 'Driver={SQL Server};Database=SIM4CDB;Server=clay;NETWORK=dbmssocr'. At the bottom, there are navigation arrows, a 'Confirm auto-save' checkbox (checked), and 'OK', 'Cancel', and 'Apply' buttons.

The following table contains example connection strings that the reporting plug-in can resolve.

**Note:** If the connection string contains the optional ENCRYPT=TRUE parameter on the connection string, the reporting plug-in does not scan the incoming cipher text for SQL injection attacks.

DBMS Platform	Connection String Example
SQL Server	Driver={SQL Server};Database=l3_IC;Server=dbserver;NETWORK=dbmssocn;Trusted_Connection=No <p>Note: Connect to default SQL server instance on dbserver by using the default port.</p>
SQL Server	Driver={SQL Server};Database=l3_IC;Server=dbserver\instance;NETWORK=dbmssocn;Trusted_Connection=No <p>Note: Connect to a named instance of SQL server. SQL Browser Service must be running on dbserver and firewalls must allow UDP communication to port 1434.</p>
SQL Server	Driver={SQL Server};Database=l3_IC;Server=dbserver;PORT=62413;NETWORK=dbmssocn;Trusted_Connection=No <p>Note: Connect to an unnamed instance of SQL server on dbserver by using port 62413. Use this string if security restriction prevents SQL Browser resolution of named instances.</p>
SQL Server	Driver={SQL Server};Database=l3_IC;Server=dbserver,62413;NETWORK=dbmssocn;Trusted_Connection=No <p>Note: Connect to an unnamed instance of SQL server on dbserver by using port 62413. Use this string if security restriction prevents SQL Browser resolution of named instances.</p>
Oracle	Driver={Oracle};DBQ=tnsnameofdatabase; <p>Note: Only use a connection through TNS name resolution for Oracle. Set the ORACLE_HOME environment variable before starting the CIC server or the off-server Session Manager so that TNS resolution works.</p>

## Configuration Behavior

The following table explains how the different configurations behave based on the client session connection and data source connection methods. For these configurations, the data source exists on the customer site.

Session Connection Method	Data Source Connection Method	Behavior
Direct (Over MPLS)	Direct	Traditional on-premises setup.
Proxy	Direct	Client sessions connect to CIC servers over the Internet by using a proxy connection. The report data would be delivered to the client by using the proxy connection to the database.
Direct	Proxy	Client sessions connect directly to the CIC servers. The report data would be delivered to the client by using the proxy connection to the database.

# Appendix K: Report Log Purging for Large Databases

With large report log databases, the purge process might run for an extended period of time, causing locks on the database for the attempted delete. The purge process, which runs on the Transaction Server, has a five-minute timeout that could prevent the purge from completing.

## Large Database Purge Method

To avoid the five-minute timeout, use the server parameter `UseExternalTranProviderforPurging`, which allows CIC to execute the purge process using external scripts. Using external scripts requires the Microsoft SQL Server command line tools or the Oracle SQL\*Plus utility. If the tools or utility is not installed before setting the server parameter, it will require restarting the PureConnect service for the tools or utility to be in the path for the Transaction server.

## Adding the Server Parameter

Add the `UseExternalTranProviderforPurging` Server Parameter in Interaction Administrator, and configure the value to a case-insensitive setting of "True", "Yes", or "1".



## Change Log

Date	Changes
12-January-2015	New document created by combining the Advanced Reporting TR and the IC Reporting TR. Updated copyright and trademark information.
05-May-2015	Updated documentation to reflect the addition of two CIC client applications, Interaction Desktop and Interaction Connect.
15-May-2015	Updated image of Report Configuration in the Configuring a Custom Crystal Report in Report Management section.
09-June-2015	Updated cover page for new logo.
06-August-2015	Updated image for rebranding.
30-November-2015	Updated link to CIC documentation library.
22-February-2016	<ul style="list-style-type: none"> <li>• Added "Appendix J: Internet Enable Reporting".</li> <li>• Updated copyright and trademark information.</li> </ul>
21-August-2016	Added reference to Interaction Administrator for additional information on configuring secure report parameters
12-April-2017	<ul style="list-style-type: none"> <li>• Updated Copyright and Trademarks for 2017</li> <li>• Updated references for CIC Client</li> </ul>
09-May-2017	Added information on running a reporting executable in place of the Report e-mail tool
02-August-2017	Rebranded Title Page and Copyright & Trademark Information
08-August-2017	Updated Documentation Library link
02-November-2017	Update for Windows environment
04-December-2017	<ul style="list-style-type: none"> <li>• Updated CIC Server parameters section for Report Log purging for large databases</li> <li>• Added Appendix K: Report log purging for large databases</li> </ul>
01-February-2018	<ul style="list-style-type: none"> <li>• Converted source to HTML5</li> <li>• Edits to converted files</li> </ul>
09-February-2018	Update for Report e-mail tool
30-March-2018	Removed information for converting a report to a fax, as the Convert PRN to 13F tool step was deprecated in CIC 4.0
26-September-2018	Updated licensing information for the new Activation File Management tool