

*InCharge*TM

Service Assurance Manager SQL Data Interface Adapter User's Guide

Version 1.2



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Preface

The InCharge Structured Query Language (SQL) Data Interface Adapter (SDI Adapter) subscribes to notifications from InCharge Service Assurance Manager, passes them to an Open Database Connectivity (ODBC) driver, and stores the notification information in a relational database. The database includes a special database schema designed for InCharge notifications.

The SQL Data Interface includes a component that processes the notification data on a daily basis and produces summary information for availability reports.

Notification information can then be extracted from the database and processed by SQL queries or a user-selected report application.

Purpose

The *InCharge SQL Data Interface Adapter User's Guide* provides an overview of the InCharge SDI Adapter, detailed configuration information, and procedures for its operation.

Intended Audience

This document is intended for network administrators, database administrators, and integrators who set up and maintain the InCharge SQL Data Interface, and for network services personnel who operate the InCharge SQL Data Interface.

Document Organization

This document consists of the following sections:

1. INTRODUCTION	Provides an overview of the InCharge SDI Adapter
2. CONFIGURING THE SDI ADAPTER	Details how to configure the InCharge SDI Adapter
3. USING THE SDI ADAPTER	Provides the procedures for operating the InCharge SDI Adapter
A. SQL DATA INTERFACE INSTALLATION CHECKLIST	Provides a checklist of installation tasks for the InCharge SDI Adapter
B. SDI ADAPTER DATABASE SCHEMA	Provides the database schema used by the InCharge SDI Adapter
C. DATA STORAGE CALCULATIONS	Provides information about data storage requirements

Table 1: Document Organization

Documentation Conventions

Several conventions may be used in this document as shown in Table 2.

CONVENTION	EXPLANATION
<code>sample code</code>	Indicates code fragments and examples in Courier font
keyword	Indicates commands, keywords, literals, and operators in bold
%	Indicates C shell prompt
#	Indicates C shell superuser prompt
<parameter>	Indicates a user-supplied value or a list of non-terminal items in angle brackets
[option]	Indicates optional terms in brackets
<i>/InCharge</i>	Indicates directory path names in italics
<i>yourDomain</i>	Indicates a user-specific or user-supplied value in bold, italics
<i>File > Open</i>	Indicates a menu path in italics
▼▲	Indicates a command that is formatted so that it wraps over one or more lines. The command must be typed as one line.

Table 2: Documentation Conventions

Directory path names are shown with forward slashes (/). Users of the Windows operating systems should substitute back slashes (\) for forward slashes.

Also, if there are figures illustrating consoles in this document, they represent the consoles as they appear in Windows. Under UNIX, the consoles appear with slight differences. For example, in views that display items in a tree hierarchy such as the Topology Browser, a plus sign displays for Windows and an open circle displays for UNIX.

Finally, unless otherwise specified, the term InCharge Manager is used to refer to InCharge programs such as Domain Managers, Global Managers, and adapters.

InCharge Installation Directory

In this document, the term **BASEDIR** represents the location where InCharge software is installed.

- For UNIX, this location is: `/opt/InCharge<n>/<productsuite>`.
- For Windows, this location is: `C:\InCharge<n>\<productsuite>`.

The `<n>` represents the InCharge software platform version number. The `<productsuite>` represents the InCharge product suite that the product is part of.

Table 3 defines the `<productsuite>` directory for each InCharge product.

PRODUCT SUITE	INCLUDES THESE PRODUCTS	DIRECTORY
InCharge IP Management Suite	<ul style="list-style-type: none"> • IP Availability Manager • IP Performance Manager • IP Discovery Manager • InCharge Adapter for HP OpenView NNM • InCharge Adapter for IBM/Tivoli NetView 	/IP

PRODUCT SUITE	INCLUDES THESE PRODUCTS	DIRECTORY
InCharge Service Assurance Management Suite	<ul style="list-style-type: none"> • Service Assurance Manager • Global Console • Business Dashboard • Business Impact Manager • Report Manager • SAM Failover System • Notification Adapters • Adapter Platform • SQL Data Interface Adapter • SNMP Trap Adapter • Syslog Adapter • XML Adapter • InCharge Adapter for Remedy • InCharge Adapter for TIBCO Rendezvous • InCharge Adapter for Concord eHealth • InCharge Adapter for InfoVista • InCharge Adapter for NetIQ AppManager 	/SAM
InCharge Application Management Suite	<ul style="list-style-type: none"> • Application Services Manager • Beacon for WebSphere • Application Connectivity Monitor 	/APP
InCharge Security Infrastructure Management Suite	<ul style="list-style-type: none"> • Security Infrastructure Manager • Firewall Performance Manager • InCharge Adapter for Check Point/Nokia • InCharge Adapter for Cisco Security 	/SIM
InCharge Software Development Kit	<ul style="list-style-type: none"> • Software Development Kit 	/SDK

Table 3: Product Suite Directory for InCharge Products

For example, on UNIX operating systems, InCharge IP Availability Manager is, by default, installed to `/opt/InCharge6/IP/smarts`. This location is referred to as **BASEDIR**/`smarts`.

Optionally, you can specify the root of **BASEDIR** to be something other than `/opt/InCharge6` (on UNIX) or `C:\InCharge6` (on Windows), but you cannot change the `<productsuite>` location under the root directory.

For more information about the directory structure of InCharge software, refer to the *InCharge System Administration Guide*.

Additional Resources

In addition to this manual, SMARTS provides the following resources.

InCharge Commands

Descriptions of InCharge commands are available as HTML pages. The *index.html* file, which provides an index to the various commands, is located in the **BASEDIR**/*smarts/doc/html/usage* directory.

Documentation

Readers of this manual may find other SMARTS documentation (also available in the **BASEDIR**/*smarts/doc/pdf* directory) helpful.

InCharge Documentation

The following SMARTS documents are product independent and thus relevant to users of all InCharge products:

- *InCharge Release Notes*
- *InCharge Documentation Roadmap*
- *InCharge System Administration Guide*
- *InCharge ICIM Reference*
- *InCharge ASL Reference Guide*
- *InCharge Perl Reference Guide*

InCharge Service Assurance Manager Documentation

The following SMARTS documents are relevant to users of the InCharge Service Assurance Management product suite.

- *InCharge Service Assurance Management Suite Installation Guide*
- *An Introduction to InCharge Service Assurance Manager*
- *InCharge Operator's Guide*
- *InCharge Service Assurance Manager Configuration Guide*
- *InCharge Service Assurance Manager Business Dashboard Configuration Guide*
- *InCharge Service Assurance Manager User's Guide for Business Impact Manager*

- *InCharge Service Assurance Manager User's Guide for Report Manager*
- *InCharge Service Assurance Manager Failover System User's Guide*

The following SMARTS documents are relevant to InCharge Service Assurance Manager adapters.

- *InCharge Service Assurance Manager Notification Adapters User's Guide*
- *InCharge Service Assurance Manager SQL Data Interface Adapter User's Guide*
- *InCharge Service Assurance Manager Adapter Platform User's Guide*
- *InCharge XML Adapter User's Guide*
- *InCharge Service Assurance Manager User's Guide for Remedy Adapter*
- *InCharge Service Assurance Manager User's Guide for Concord eHealth Adapter*
- *InCharge Service Assurance Manager User's Guide for InfoVista Adapter*

InCharge Application Services Manager Documentation

The following SMARTS documents are relevant to users of InCharge Application Service Manager.

- *InCharge Application Management Suite Installation Guide*
- *InCharge Application Services Manager User's Guide*
- *InCharge Application Services Manager Discovery Guide*
- *InCharge Application Connectivity Monitor User's Guide*

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Introduction

Detailed notification data, collected over specified time periods, provides network administrators and operations personnel with vital information that allows them to prioritize their work, troubleshoot failures, and initiate infrastructure changes to prevent problems.

The InCharge SQL Data Interface (SDI Adapter), an adapter that complements the extensive capabilities of InCharge Service Assurance Manager, enables network administrators to collect detailed notification information from Service Assurance Manager, store the information in a relational database, and create network operations and management reports either through Structured Query Language (SQL) queries or a user-selected report application.

This chapter provides a brief overview of the InCharge SQL Data Interface, and the work flow of the adapter.

InCharge SQL Data Interface

The InCharge SQL Data Interface includes several components that, when implemented with InCharge Service Assurance Manager, interact with the Global Manager, a relational database, and third-party applications.

The components of the SQL Data Interface are as follows:

- **SQL (Structured Query Language) Data Interface Adapter**
The adapter receives notifications from a Global Manager and passes notification records to a database server based on the contents of the notifications.
- **Database Schema**
The schema defines the tables, columns and fields of the database. The schema is specific to InCharge Service Assurance Manager.
- **Summarization Adapter**
The component selects notification records and device records, and inserts summarization records in the InCharge Schema.
- **Summary Device Adapter**
An adapter that collects device information from Service Assurance Manager, stores the information in the database, and periodically updates the device information. The stored information allows the Summarization Adapter to include devices that have no associated notifications.

The components of the SQL Data Interface interact with the following. (See [Supported Platforms](#) on page 5 for specific version numbers.)

- **Service Assurance Global Manager**
This is the source of the notifications that the SQL Data Interface Adapter collects and stores in the database.
- **ODBC (Open Database Connectivity) Driver**
The ODBC driver translates the general database requests from the SDI Adapter to actions for specific databases.
- **SQL Database**
This is a relational database that is used to store the notification information that is transferred from the SDI Adapter.

SDI Adapter Work Flow

The processes of the SDI Adapter are defined as follows. (See Figure 1.)

- 1** InCharge Applications, such as InCharge IP Availability Manager, send base MODEL events, for example Router:Router1:Down, to InCharge Service Assurance Manager.
- 2** InCharge Service Assurance Manager sends notifications to the SDI Adapter. The SDI Adapter subscribes to the notifications associated with a specified notification list.
- 3** The SDI Adapter uses the ODBC API (Application Program Interface) to insert and update notification records in a relational database that uses a schema specially designed for InCharge notifications.
- 4** When Oracle is used, the Oracle client libraries are required.
- 5** The Summarization Adapter of the SQL Data Interface uses the ODBC API to select notification records and insert summarization records in the InCharge schema. (It is advised that the Summarization Adapter be scheduled to run once a day to ensure that up-to-date summarization data is available for reporting. The Summarization Adapter summarizes data from the time of the last summarization to the current time.)
- 6** The Summary Device Adapter pulls topological information from the repository of Service Assurance Manager. Topological information is updated whenever the topology changes in SAM.
- 7** The Summary Device Adapter stores the topological information in its table in the database. The information, about devices without notifications, is used in the calculation of outage summaries.
- 8** Network administrators or operations personnel can query the InCharge event database schema, extract notification information from the database, and create reports.

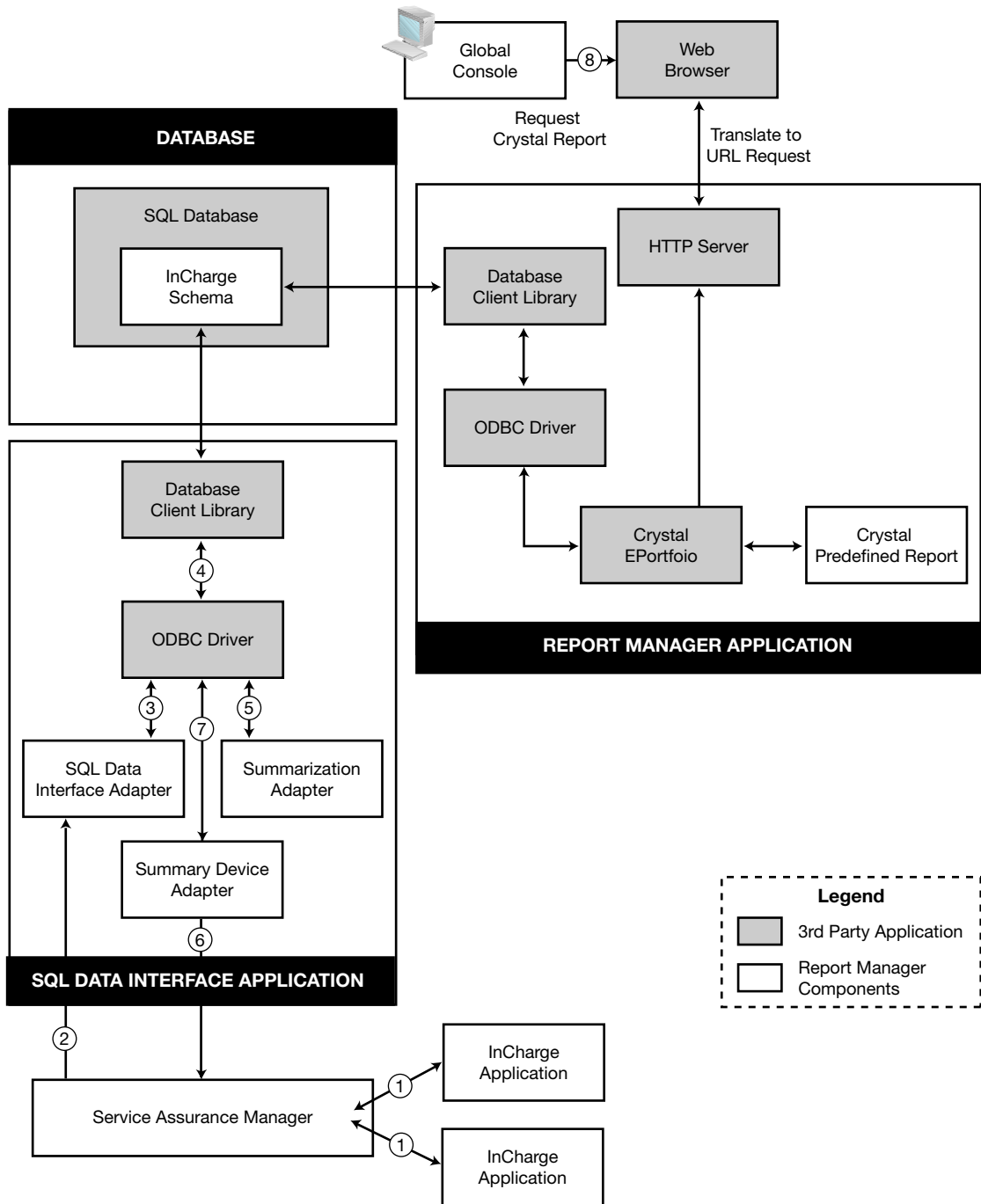


Figure 1: Report Manager/SDI Adapter Work Flow

Supported Platforms

The components of the SDI Adapter are supported on the following platforms.

COMPONENT	WINDOWS 2000 SERVER (SP4), WINDOWS 2003	SOLARIS 8, 9	HP-UX 11.00, 11.11	AIX 5.01	LINUX RH 2.1 (WS/AS/ES)
InCharge SAM	6.2	6.2	6.2	N/A	6.2
Oracle Database Server	8i, 9i	8i, 9i	8i, 9i	N/A	8i, 9i
Oracle Client Libraries	8i, 9i	N/A	N/A	N/A	N/A
ODBC Drivers for Oracle	MS ODBC for Oracle	DataDirect ODBC Connect 4.2	DataDirect ODBC Connect 4.2	N/A	DataDirect ODBC Connect 4.2
MS SQL Database Server	MS SQL Server 2002	N/A	N/A	N/A	N/A
ODBC Drivers for MS SQL	MS SQL Server	N/A	N/A	N/A	N/A

Table 4: Supported Platforms

SDI Adapter Deployment Scenarios

The SDI Adapter can be deployed in Windows or UNIX environments, or in combinations of the two environments. Common deployments include:

- UNIX with Oracle.
- Windows with MS SQL. A typical solution where all components run on Windows.
- Windows with Oracle. A somewhat less typical solution where Oracle is used in an all-Windows deployment.

Table 5 provides the most common deployment combinations.

COMPONENT	UNIX WITH ORACLE	WINDOWS WITH MS SQL	WINDOWS WITH ORACLE
InCharge SAM	Solaris 8, 9, SAM 6.2	Windows 2000, 2003, SAM 6.2	Windows 2000, 2003, SAM 6.2
ODBC Drivers	Data Direct ODBC Connect 4.2	MS ODBC for MS SQL Server	MS ODBC for Oracle
Database Server	Oracle 9i	MS SQL Server	Oracle 9i

Table 5: SDI Adapter Deployment Combinations

Note: The DataDirect ODBC Connect 4.2 driver is included with the SDI Adapter software, and is installed with it. The MS ODBC drivers must be installed separately. See your system administrator for the installation and configuration of the MS ODBC for Oracle and the ODBC for MS SQL Server drivers.

Deploying the SDI Adapter

The following highlights the installation and post-installation tasks for the SDI Adapter. See [SQL Data Interface Installation Checklist](#) on page 39 for a detailed checklist of installation and post-installation tasks.

Prerequisites

Before the SQL Data Interface Adapter can be deployed, the following prerequisites must be met.

Note: The prerequisites are vital to deploying the SDI Adapter. It is important that you plan for them, and implement them before you proceed with the installation of Service Assurance Manager with the SDI Adapter.

- The servers for the components must be patched to meet system requirements. See the *InCharge Service Assurance Management Suite Installation Guide* for additional information.
- The database must be installed and running. See the [Database Administrator Tasks](#) on page 8 for additional information.

Before you can successfully perform an SDI Adapter installation, gather the following information from your System Administrator.

DATA POINT	DESCRIPTION
Oracle_Host	The server hosting the Oracle Database Server
ORACLE_SID	Service identifier defined via SQL Net to access the Oracle Database Server
Oracle_Port	The port number of the Oracle Listener port
DBA_User	The database user ID with permissions to create databases/tablespaces/users/tables
DBA_User_Password	The password for the database user
MSSQL_Server	The name of the MS-SQL Server
SDI_USER	Database user ID with rights to insert/update/delete entries in/from InCharge Database Schema
SDI_USER_PASSWORD	The password for the SDI user
SAM_SERVER_NAME	The name of the Service Assurance Manager server
SMHOME	The installation of InCharge products
DSN_NAME	The ODBC data source name
SDI_NOTIFICATION_LIST	The notification list to which SDI subscribes

Table 6: Information Required for Installation

Installation of Service Assurance Manager with the SDI Adapter

Once the prerequisites have been met, the following tasks can be performed.

- Install InCharge Service Assurance Manager with the SDI Adapter (See the *InCharge Service Assurance Management Suite Installation Guide* for additional information)
- Perform Database Administrator tasks (See [Database Administrator Tasks](#) on page 8 for additional information)
- Install (if applicable) and configure the ODBC Drivers for the SDI Adapter (See [Configuring the Database Server and ODBC](#) on page 12 for additional information)

- Modify the Service Assurance Manager and SDI Adapter .conf files (See [Modifying InCharge Files](#) on page 24 for additional information)
- Start the SAM server and the SDI, Summarization, and Summary Device adapters

Database Administrator Tasks

The SDI Adapter requires a relational database management system (RDBMS). The database stores the event notification information that is transferred to the SDI Adapter from the InCharge Service Assurance Manager.

Because a relational database is a vital part of an SDI Adapter deployment, there are database administrator (DBA) tasks that must be performed for a successful installation. The DBA should be thoroughly familiar with the selected RDBMS (Oracle or MS SQL) and its tools and utilities.

Before the installation of SDI Adapter, the following DBA tasks must be completed:

- Ensure that the database server(s) are patched to date
- Install the Oracle database and set up the Oracle Listener and the Oracle SID
- Or, install the MS SQL database
- Define user, password, and database/tablespace for use with SDI.

After the installation of Service Assurance Manager and the SDI Adapter, the following tasks need to be completed:

- Create the database instance for the SDI Adapter
- Create the SDI Adapter tables and views
- Verify that the tables and views are set up correctly
- Set up the ODBC data source

Once the SDI Adapter is operational and it is transferring notification information to the database, the following DBA tasks need to be performed:

- Check the notification information that is collected in the database
- Monitor the performance of the database and tune it as necessary

- Monitor the size of the database and adjust it as necessary; use the sdi-archive utility to archive information contained in the database and clean out the tables
- Perform database backups as dictated by management policies

2

Configuring the SDI Adapter

To perform its functions and accomplish its tasks, different components of the InCharge SDI Adapter must be configured to communicate with the Service Assurance Global Manager, and with an ODBC driver and a relational database.

This chapter details how to configure the InCharge SDI Adapter.

Configuring Security

Note: The user executing the SQL Data Interface needs access to the Notification List. Update the user's profile to ensure access rights. For more information, refer to the *InCharge Service Assurance Manager Configuration Guide*.

The SQL Data Interface is a client of the Global Manager. The security configuration files, *clientConnect.conf* and *serverConnect.conf* allow you to set up the security for this relationship. The SQL Data Interface can run on the same host as the Global Manager but that is not a requirement. The *clientConnect.conf* file and the *serverConnect.conf* must both be configured. You should create a unique user name and password for the SQL Data Interface and give that user All privileges.

For more information about security configuration, see the *InCharge System Administration Guide*.

Configuring the Database Server and ODBC

Set up and configuration procedures for the ODBC and database components vary slightly depending on the operating system you are using. The basic steps involve:

- Setting up the InCharge database schema
- Configuring the data source for the ODBC driver
- Configuring the SQL Data Interface (SDI)

Setting Up the InCharge Database Schema for Oracle

There is a script to create the necessary schema for each of the supported SQL databases.

Setting Up the Oracle Database

Before running `sqlplus`, create a user on the database with enough space for the Incharge Schema. (See Appendix C, *Data Storage Calculations*, on page 57 for additional information.) Also, define the Oracle Service ID that is associated with the database.

Then, export `ORACLE_HOME` to the installation directory of Oracle.

On Solaris/Linux:

```
Export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$ORACLE_HOME/lib
```

On HPUX:

```
Export SHLIB_PATH=$SHLIB_PATH:$ORACLE_HOME/lib
```

Then run as:

```
$ORACLE_HOME/bin/sqlplus username@service name
```

Then, to run the script in `sqlplus` use:

```
@sdi_schema_oracle.sql
```

Note: If you are migrating from the previous version of the SDI Adapter, run the `sdi_schema_oracle_addendum.sql` script to add the `IC_T_Summary_Device` table to the Oracle database. Also, use the `sdi-archive` utility to archive data from the summary tables. Restarting the Summarization adapter will re-summarize all data collected by the SDI Adapter 1.1.

Setting Up the InCharge Database Schema for MS SQL

Setting Up the Microsoft SQL Database

The script to set up the schema for the Microsoft SQL database is **BASEDIR/smarts/conf/sql/sdi_schema_mssql.sql**. To run the script in Microsoft SQL Server use:

```
▼C:\Program Files\Microsoft SQL Server\80\Tools\Binn\isql /U
<username> /P <password> /S <server> /i sdi_schema_mssql.sql
/o sdi_schema_mssql.out /d <database> /e▲
```

▼▲ Indicates the command must be typed as one line.

Note: If you are migrating from the previous version of the SDI Adapter, run the *sdi_schema_mssql_addendum.sql* script to add the IC_T_Summary_Device table to the MS SQL database. Also, use the *sdi-archive* utility to archive data from the summary tables. Restarting the Summarization adapter will re-summarize all data collected by the SDI Adapter 1.1.

Setting Up the Data Source for ODBC on UNIX

The Data Direct 4.2 ODBC driver supports database specific wire protocols; it uses the Oracle client library to translate ODBC requests to the format understood by the Oracle database server.

To set up the data source for ODBC on UNIX, edit the `odbc.ini` file. The file is located in the **BASEDIR/smarts/datadirect-odbc** directory. The following fields (in bold) can be edited as needed.

```
[ODBC Data Sources]

Oracle_Wire_Protocol_SAM_DSN=Data Source Name using
DataDirect 4.20 Oracle Wire Protocol

[Oracle_Wire_Protocol_SAM_DSN]
Driver=SAM_ODBC_INSTALL/lib/S6ora19.so
Description=DataDirect 4.20 Oracle Wire Protocol
ApplicationUsingThreads=1
ArraySize=60000
CachedCursorLimit=32
CachedDescLimit=0
CatalogIncludesSynonyms=1
CatalogOptions=0
DefaultLongDataBuffLen=1024
DescribeAtPrepare=1
```

```
EnableDescribeParam=1
EnableNcharSupport=0
EnableScrollableCursors=1
EnableStaticCursorsForLongData=0
EnableTimestampWithTimeZone=0
LocalTimeZoneOffset=
LockTimeOut=-1
ProcedureRetResults=0
UseCurrentSchema=1
HostName=Oracle server
PortNumber=Oracle server port
SID=Oracle SID
LogonID=XXXXXXX
Password=YYYYYYY

[ODBC]
IANAAppCodePage=4
InstallDir=SAM_ODBC_INSTALL
Trace=0
TraceDll=SAM_ODBC_INSTALL/lib/odbctrac.so
TraceFile=odbctrace.out
UseCursorLib=0
```

The details about the editable fields, as extracted from the file, are as follows:

```
[Oracle_Wire_Protocol_SAM_DSN]
Driver=SAM_ODBC_INSTALL/lib/S6ora19.so
HostName=Oracle server
PortNumber=Oracle server port
SID=Oracle SID
LogonID=XXXXXXX
Password=YYYYYYY
```

Where:

- Oracle_Wire_Protocol_SAM_DSN is the data source name used for Oracle connecting without a client library. This is the recommended DSN to use for installation.
- SAM_ODBC_INSTALL will generally be **BASEDIR/smarts/datadirect-odbc**
- Oracle server is the name of the server where the Oracle database server is installed
- Oracle server port is the listener port for the Oracle database server
- Oracle SID is the SID that identifies the database server to which you want to connect

```
[ODBC]
InstallDir=SAM_ODBC_INSTALL
TraceDll=SAM_ODBC_INSTALL/lib/odbctrac.so
```

Where:

- **SAM_ODBC_INSTALL** will generally be **BASEDIR**/*smarts/datadirect-odbc*

The following export variables should also be defined:

- **ODBC_HOME**=**BASEDIR**/*smarts/datadirect-odbc*
- On Solaris: **LD_LIBRARY_PATH**=\$**ODBC_HOME**/lib
- On HP-UX: **SHLIB_PATH**=\$**ODBC_HOME**/lib

Additionally, add the following variables to **BASEDIR**/*local/conf/runcmd_env.sh*:

On Solaris/Linux:

```
LD_LIBRARY_PATH=$LD_LIBRARY_PATH:BASEDIR/smarts/datadirect-odbc/lib
ODBCINI=BASEDIR/smarts/datadirect-odbc/odbc.ini
```

On HP-UX:

```
SHLIB_PATH=$SHLIB_PATH:BASEDIR/smarts/datadirect-odbc/lib
ODBCINI=BASEDIR/smarts/datadirect-odbc/odbc.ini
```

Setting Up the Data Source for ODBC for MS SQL on Windows

To set up the data source for ODBC for MS SQL, perform the following steps.

- 1 Open the ODBC Data Source Administrator with *Control Panel > Administrative Tools > Data Sources (ODBC)*.
- 2 Click on the *System DSN* tab.
- 3 Click **Add...** to add a Data Source.

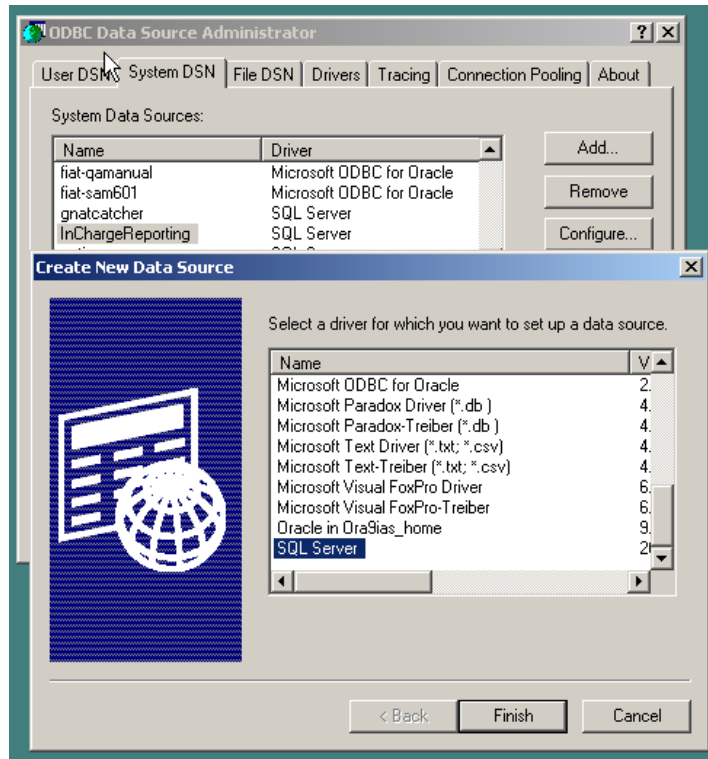


Figure 2: Driver Selection

- 4 Select *SQL Server* as the driver and click **Finish**.

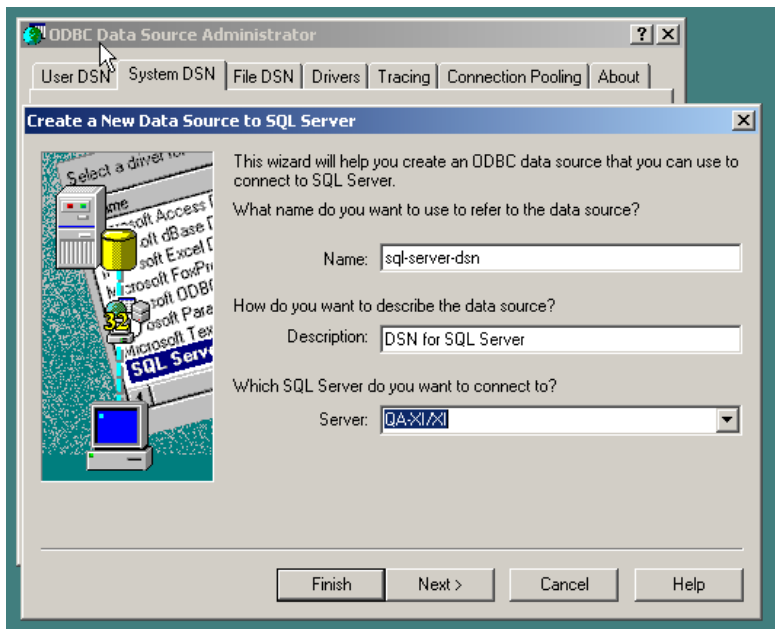


Figure 3: Data Source for SQL Server

- 5 Type the data source name, description and database server and click **Next**.

Name	sql-server-dsn
Description	DSN for SQL Server
Server	<SQL Server Name>

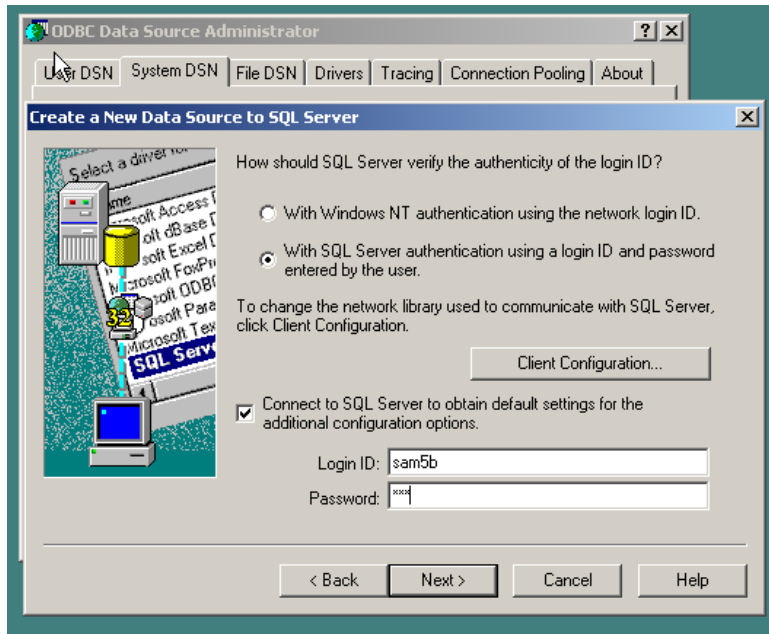


Figure 4: SQL Server Authentication

- 6** Select the *SQL Server authentication* option.
- 7** Type the *Login ID* and *Password* for connectivity to the database server.

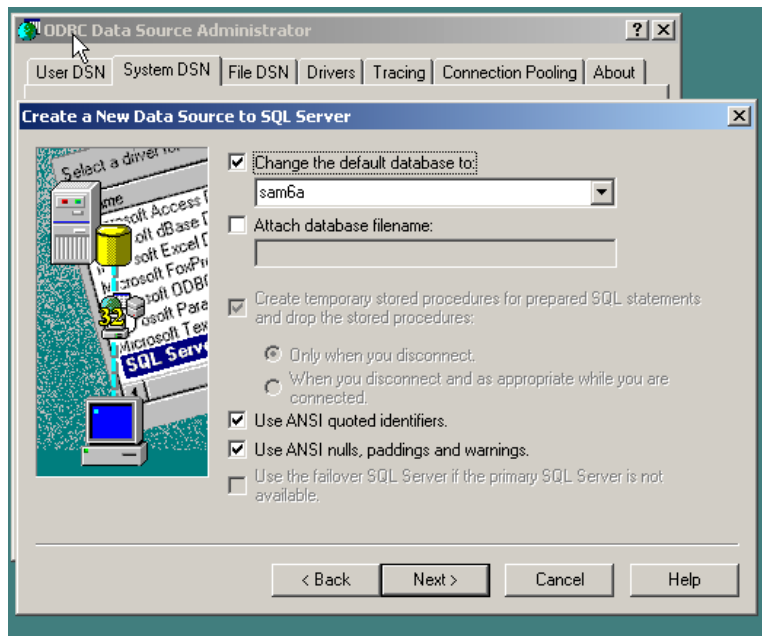


Figure 5: Default Database Name

- 8** Change the default database to the name of your database.

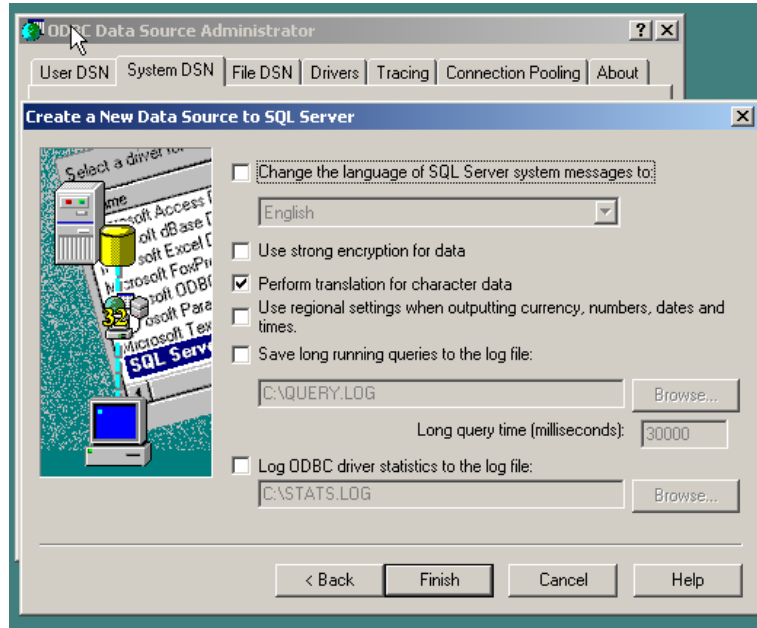


Figure 6: Perform Translation

- 9 Check the box beside "Perform translation for character data" and click **Finish**.

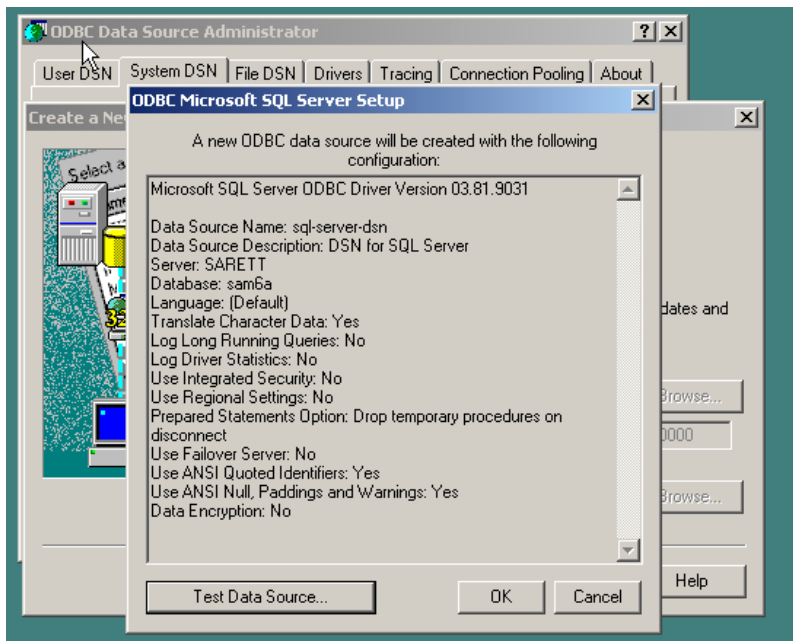


Figure 7: Test Data Source

- 10 When the ODBC Microsoft SQL Server Setup screen displays, click **Test Data Source...** before clicking **OK** to create the DSN.

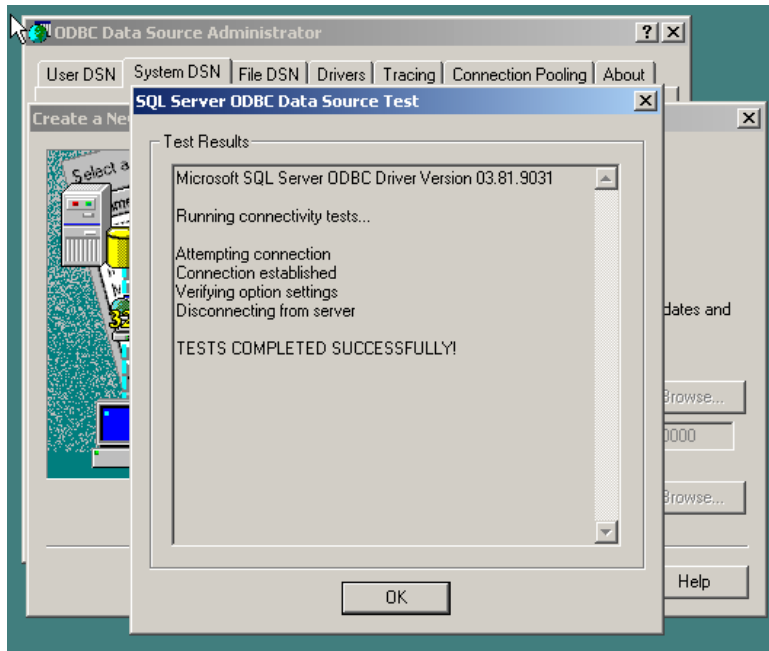


Figure 8: Connectivity Test Results

- 11** If the DSN is set up correctly, the test to connect to the database using the DSN is successful. Click **OK** to finish.

Setting Up the Data Source for ODBC for Oracle on Windows

To set up the data source for ODBC for Oracle on Windows, perform the following steps.

Note: The Oracle client libraries must be installed on this host before you can set up the data source.

- 1** Open the ODBC Data Source Administrator with *Control Panel > Administrative Tools > Data Sources (ODBC)*.
- 2** Click on the *System DSN* tab.
- 3** Click **Add...** to add a Data Source.

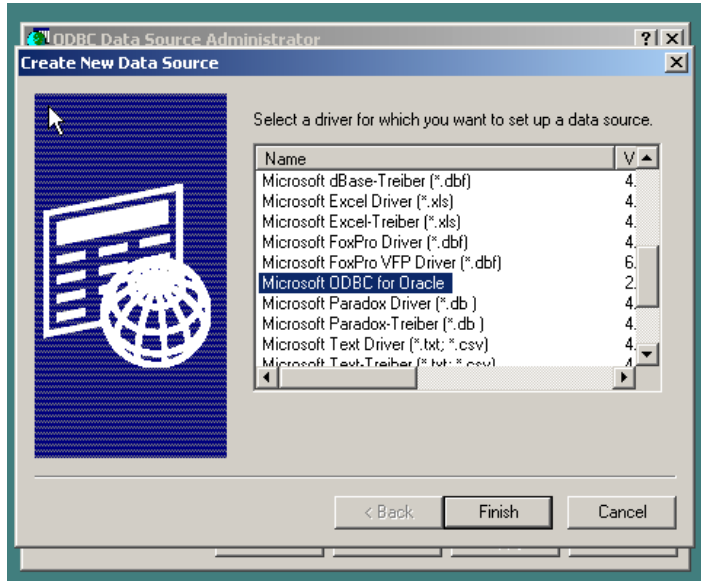


Figure 9: Oracle Driver Selection

4 Select *Microsoft ODBC for Oracle* as the driver and click **Finish**.

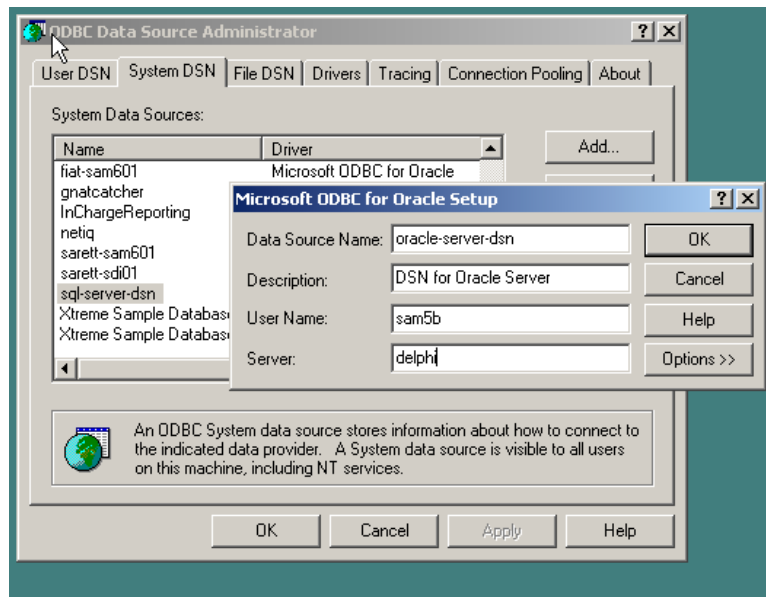


Figure 10: ODBC for Oracle Setup

- 5 Type the data source name, description, user name, and database server.

Name	oracle-server-dsn
Description	DSN for Oracle Server
User Name	<User Name>
Server	<Oracle SID>

- 6 Click **OK** to finish the process.

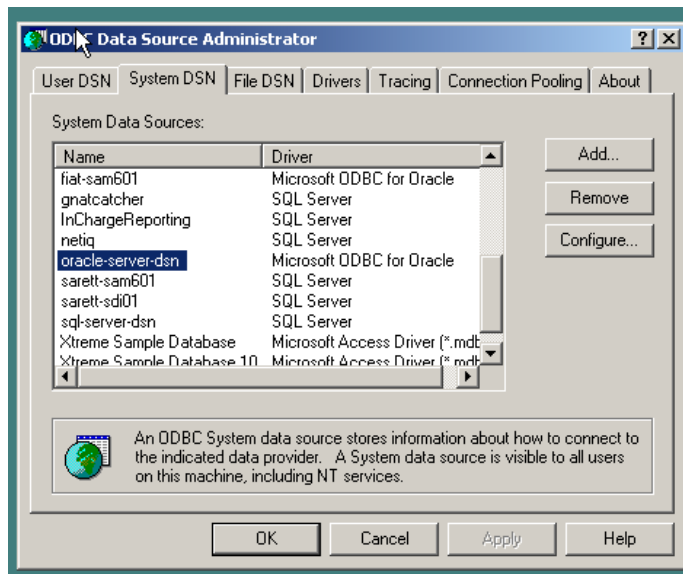


Figure 11: Data Source Added

Modifying InCharge Files

As part of the InCharge deployment and configuration process, you will need to modify certain files. User modifiable files include InCharge tool scripts, configuration files, rule set files, and templates. Original versions of these files are installed into appropriate subdirectories under the **BASEDIR**/smarts/ hierarchy. For example, on UNIX operating systems the original versions of Global Manager configuration files are installed to */opt/InCharge6/SAM/smarts/conf/ics*.

To edit a user modifiable file, create a local copy of the file in **BASEDIR**/*smarts/local* or one of its subdirectories. For example, a modified *ics.conf* file should be saved to */opt/InCharge6/SAM/smarts/local/conf/ics*. InCharge software is designed to first search for user modifiable files in **BASEDIR**/*smarts/local* or one of its subdirectories. If a modified version of a file is not found in the local area, InCharge software then searches appropriate nonlocal directories.

Note: Original versions of files may be changed or updated as part of an InCharge software upgrade. However, files located in **BASEDIR**/*smarts/local* are always retained during an upgrade.

To facilitate proper file editing, SMARTS provides the *sm_edit* utility with every InCharge product suite. When used to modify an original version of a file, this utility automatically creates a local copy of the file and places it in the appropriate location under **BASEDIR**/*smarts/local*. This ensures that the original version of the file remains unchanged. In both UNIX and Windows environments, you can invoke *sm_edit* from the command line. Optionally, you can configure Windows so that *sm_edit* is automatically invoked when user-modifiable files are double-clicked in Windows Explorer.

To invoke the *sm_edit* utility from the command line, specify the path and the name of the file you want to edit under **BASEDIR**/*smarts*. If multiple InCharge products are running on the same host, you should ensure that you invoke *sm_edit* from the *bin* directory of the product suite whose files you wish to edit. For example, to edit the configuration file for the Global Manager, you invoke the *sm_edit* utility as follows:

```
# /opt/InCharge6/SAM/smarts/bin/sm_edit conf/ics/ics.conf
```

The *sm_edit* utility automatically creates a local copy of the *ics.conf* file in the **BASEDIR**/*smarts/local/conf/ics* directory, if necessary, and opens the file in a text editor. If a local version of the file already exists, the *sm_edit* utility opens the local version in a text editor. In addition, *sm_edit* creates any necessary directories.

For more information about how to properly edit user modifiable InCharge files and how to use the *sm_edit* utility, refer to the *InCharge System Administration Guide*.

Configuration Files

There are several user-editable configuration files for the InCharge SQL Data Interface. The configuration files are used to define the connections to the Service Assurance Manager servers and the database servers.

Table 7 lists the configuration files included with the InCharge SQL Data Interface. The configuration files are located in **BASEDIR**/conf/sdi.

DIRECTORY UNDER BASEDIR	FILE NAME	DESCRIPTION
conf/sdi/sdi	sdi_ics.conf	Main configuration file for the SQL Data Interface.
	sdi_odbc.conf	Specifies database connection information.
conf/sdi/summary	sdi_odbc.conf	Specifies database connection information for summary component.
conf/sdi/device	sum_device.conf	Specifies database connection information for the summary device component.

Table 7: SQL Data Interface Editable Configuration Files

Configuring the sdi_ics.conf File

In order to use the SQL Data Interface with a Global Manager, you must configure the *sdi_ics.conf* file to include a Notification List. A Notification List enables you to filter out specific types of notifications, when applicable.

Specifying the Notification List

The SQL Data Interface configuration file is located in **BASEDIR**/smarts/conf/sdi/sdi_ics.conf. Use the *sm_edit* utility to access this file and configure the connection between the SQL Data Interface and a Global Manager via the Notification List.

The lines in the file are as follows:

```
#           SDI ICS configuration file.           #
#-----#
#-----#
#           Notification Subscription             #
#-----#
GA_NLSubscription::notificationSubscription{
    NLName = "ALL_NOTIFICATIONS"
}
```

```
#-----#
#           ConsolidatedServer           #
#-----#
GA_RestartableServer::icsServer{
    remoteServerName = "INCHARGE-SA"
}
```

Table 8 describes the parameters in the *sdi_ics.conf*.

PARAMETER	DESCRIPTION
NLName	The name of the notification list that the SQL Data Interface subscribes to.
remoteServerName	The name of the Service Assurance Manager server to connect to.

Table 8: Global Manager Connection Parameters

Ensure that the Notification List defined in *sdi_ics.conf* is also defined in the Service Assurance Manager. For more information about creating and modifying a Notification List see the *InCharge Service Assurance Manager Configuration Guide*.

Configuring the *sdi/sdi_odbc.conf* File

Use the *sm_edit* utility to access

BASEDIR/*smarts/conf/sdi/sdi/sdi_odbc.conf* and configure the connection between the SQL Data Interface and an ODBC Driver.

The lines in the file are as follows:

```
SDI_Server::sdiServer{
    serverName      = "SERVERNAME"
    userName        = "USERNAME"
    password        = "PASSWORD"
    protocol        = "ODBC"
    reconnectTimeout = 60
}
```

Table 9 describes the parameters in the *sdi_obdc.conf*.

PARAMETER	DESCRIPTION
serverName	The Data Source Name of the database to connect to through ODBC.
userName	The user name to use when connecting to the database. The user must have access privileges to select, insert, update and delete within tables in the InCharge schema.
password	The password associated with the user name.
protocol	The driver protocol. This should always be ODBC.
reConnectTimeout	The amount of time, in seconds, that the ODBC will attempt to reconnect if connection is lost. The default is 60 seconds.

Table 9: ODBC Connection Parameters

For UNIX, the server name must match the data source name defined in the ODBC initialization file, *odbc.ini*. For example, Oracle_Wire_Protocol_SAM_DSN. (See [Setting Up the Data Source for ODBC on UNIX](#) on page 13 for additional information.)

For Windows, the server name must match the data source name defined in the ODBC Administration Tool.

Configuring the *summary/sdi_obdc.conf* File

Use the *sm_edit* utility to access

BASEDIR/*smarts/conf/sdi/summary/sdi_obdc.conf* and configure the connection between the SQL Data Interface and an ODBC Driver.

There are two sets of parameters in the file: one set of parameters is for the notification tables (SDI_Server::notificationsSDIServer); the other set is for the summarization tables (SDI_Server::summarySDIServer). The values for the parameters can be the same.

The lines in the file are as follows:

```
SDI_Server::notificationsSDIServer{
  serverName      = "NOTIFICATIONS-SERVERNAME"
  userName        = "USERNAME"
  password        = "PASSWORD"
  protocol        = "ODBC"
  reConnectTimeOut = 60
}
```

```
SDI_Server::summarySDIServer{
    serverName      = "SUMMARY-SERVERNAME"
    userName        = "USERNAME"
    password        = "PASSWORD"
    protocol        = "ODBC"
    reconnectTimeOut = 60
}
```

Table 9 describes the parameters in the *sdi_odbc.conf*.

PARAMETER	DESCRIPTION
serverName	The Data Source Name of the database to connect to through ODBC.
userName	The user name to use when connecting to the database. The user must have access privileges to select, insert, update and delete within tables in the InCharge schema.
password	The password associated with the user name.
protocol	The driver protocol. This should always be ODBC.
reConnectTimeout	The amount of time, in seconds, that the ODBC will attempt to reconnect if connection is lost. The default is 60 seconds.

Table 10: Parameters for *sdi_odbc* for Summarization

Configuring the *sum_device.conf* File

Use the *sm_edit* utility to access

BASEDIR/*smarts/conf/sdi/device/sum_device.conf* and configure the file.

The lines in the file are as follows:

```
GA_RestartableServer::icsServer{
    remoteServerName = "INCHARGE-SA"
}

SDI_Server::SDI-Server{
    serverName      = "SUMMARY-SERVERNAME"
    userName        = "USERNAME"
    password        = "PASSWORD"
    protocol        = "ODBC"
    reconnectTimeOut = 60

    autoCommit = TRUE
    commitRetry = 5
}

SDI_Data::SDI-Data{
```

```
}  
  
SDI_Manager::SDI-Manager{  
    Manages += SDI-Server  
}
```

Table 11 describes the parameters in the *sum_device.conf*.

PARAMETER	DESCRIPTION
remoteServerName	The name of the Service Assurance Manager server.
serverName	The ODBC data source name of the Summary database.
userName	The user name of the Summary database.
password	The password associated with the user name.
protocol	The driver protocol. This should always be ODBC.
reConnectTimeout	The amount of time, in seconds, that the ODBC will attempt to reconnect if connection is lost. The default is 60 seconds.

Table 11: Parameters for *sum_device*

3

Using the SDI Adapter

This chapter explains how to use the InCharge SDI Adapter. It includes the following sections:

- Running the SDI components as services
- Manually starting and stopping the SDI components
- Using the `sdi-archive` utility to maintain the database

Running the SDI Components as Services

It is recommended that the components of the InCharge SQL Data Interface be installed as services. Services are programs that, once started, are generally intended to run continuously. On both Windows and UNIX, services are administered by the `sm_service` utility. (See the *InCharge System Administration Guide* for additional information about the `sm_service` utility.) Components installed as services start automatically upon system reboot; those not installed as services (manual processes or disabled processes) require that you issue commands to start and stop them as necessary.

Note: The SDI Summary adapter summarizes all notification data from the date of the last summarization. It is best to do this daily. Use the InCharge `sm_sched` utility to schedule the SDI Summary Adapter. Reports that include daily data are more informative. See the *InCharge IP Deployment Guide* for information about the `sm_sched` utility.

When installed as services during the installation process, the components of the SQL Data Interface are set up with default parameters.

The default parameters for the SDI Adapter are:

```
▼BASEDIR/smarts/bin/sm_service install --startmode=runonce
--description="SMARTS Report Manager Server" ic-sdi-server
  BASEDIR/smarts/bin/sm_sdi
  --name=INCHARGE-SDI
  --config=sdi/sdi
  --output ▲
```

The default parameters for the SDI Summary Adapter are:

```
▼BASEDIR/smarts/bin/sm_service install --startmode=runonce
--description="SMARTS Report Manager Summary" ic-sdi-summary
  BASEDIR/smarts/bin/sm_sdi
  --name=INCHARGE-SDI
  --config=sdi/summary
  --output ▲
```

The default parameters for the SDI Summary Device Adapter are:

```
▼BASEDIR/smarts/bin/sm_service install --startmode=runonce
--description="SMARTS SDI Summary Device Adapter"
ic-sdi-summary
  BASEDIR/smarts/bin/sm_sdi
  --name=INCHARGE-SUM-DEVICE
  --nonpriv
  --config=sdi/device
  --output ▲
```

▼▲ Indicates the command must be typed as one line.

Manually Starting and Stopping the SDI Components

If the components of the InCharge SQL Data Interface are not installed as services, they can be manually started and stopped with the *sm_service* utility when necessary.

The syntax for the *sm_service* start action is:

```
# sm_service start <name> [<name> ...]
```

The syntax for the *sm_service* stop action is:

```
# sm_service stop <name> [<name> ...]
```

The following provide examples of the *sm_service* start and stop actions.

For the start action:

```
# BASEDIR/smarts/bin/sm_service start ic-sdi-server
```

For the stop action:

```
# BASEDIR/smarts/bin/sm_service stop ic-sdi-server
```

The components of the SQL Data Interface that are installed as services on Windows can also be started and/or stopped from the Windows desktop.

To start a service from the Windows desktop, perform the following:

- Select *Settings > Control Panel > Administrative Tools*.
- Select *Services*
- Select the InCharge service.
- Choose *Start* or *Stop*.

See the *InCharge System Administration Guide* for additional information about starting and stopping InCharge applications, and for information about registering the SQL Data Interface as a service on Windows.

Using the sdi-archive Utility to Maintain the Database

The *sdi-archive* utility exports data from the InCharge Report Manager database to .dmp files, and then deletes the data from the database tables. In other words, it cleans out the database and reduces its size. The utility should be used on a schedule determined by customer policy and/or rate at which the SDI database/tablespace is filled.

There are two versions of the utility: one for Oracle databases on UNIX, and one for MS SQL databases on Windows. There is no utility for Oracle databases on Windows.

The sdi-archive Utility on UNIX

The utility for Oracle on UNIX, *sdi-archive.sh*, is located in the **BASEDIR**/*smarts/script/sdi-archival* directory. In order to have access to the Oracle *exp* utility, the *sdi-archive* utility must be executed on the same server on which the database server is installed. This utility is not available on a server where only client software is installed.

The utility uses two external utilities, *exp* and *sqlplus*, and produces the following files in the *script* directory.

- sdi-export.log
- sdi-archive.log
- notifdat.dmp
- attrsdat.dmp
- devicedat.dmp
- summarydat.dmp

Note: The .dmp files, which contain the data from the database tables, must be backed up after you run the utility. If you do not back up the files, they will be overwritten when you next use the utility, and you will lose critical data.

The sdi-archive Utility on Windows

The utility for MS SQL on Windows, *sdi-archive.cmd*, is located in the **BASEDIR**/*smarts/script* directory, and must be run from that directory.

The utility uses two external utilities, *bcp* and *isql*, and produces the following files in the *script* directory.

- sdi-export.log
- sdi-archive.log
- notifdat.dmp
- char_attrsdat.dmp
- int_attrsdat.dmp
- notif_serverdat.dmp
- devicedat.dmp
- summarydat.dmp

Note: The .dmp files, which contain the data from the database, must be backed up after you run the utility. If you do not back up the files, they will be overwritten when you next use the utility, and you will lose critical data.

Running the sdi-archive Utility on UNIX

Before you run the *sdi-archive* utility on UNIX, edit **BASEDIR**/*scripts/sdi-archive.sh*:

```
ORACLE_HOME="/opt/oracle00/app/oracle/product/8.0.5"
```

(Path to the Oracle installation)

```
LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$ORACLE_HOME/lib
```

When you run the *sdi-archive* utility on UNIX, you need to specify various parameters which define the data that you need to remove. The following lists the parameters (in bold) that you must specify in the command line.

```
sdi-archive
Database=databaseName \
Username=userName \
Password=passWord \
Archive=True/False \
ClearedAtDate="DD-MON-YYYY" \
ClearedAtDays=integer \
SummaryDate="DD-MON-YYYY" \
SummaryDays=integer \
Debug=0 \
```

Table 12 lists and describes the parameters along with their dependencies.

PARAMETER	REQUIRED OR OPTIONAL	DESCRIPTION
Database	Required	Database service name
Username	Required	Database user name
Password	Required	Database user password
Archive	Optional	If True, the data is deleted; if False, the data is not deleted. If Archive=True, either ClearedAtDate or ClearedAtDays is required.

PARAMETER	REQUIRED OR OPTIONAL	DESCRIPTION
ClearedAtDate	Required if ClearedAtDays is not specified	Cleared at date. All notifications which are cleared on or before this date are exported and deleted.
ClearedAtDays	Required if ClearedAtDate is not specified	The number of days before today. All notifications which are cleared on or before n days before today are exported and deleted.
SummaryDate	Required if SummaryDays is not specified	Cleared at date. All summarized data on or before this date are exported and deleted.
SummaryDays	Required if SummaryDate is not specified	The number of days before today. All summarized data n days before today are exported and deleted.
Debug	Optional	The values are 0 or 1. If 0, debug is disabled; if 1, it is enabled.

Table 12: sdi-archive Parameters

Running the sdi-archive Utility on Windows

Before you run the *sdi-archive* utility on Windows, you need to edit the *sdi-archive.cmd* script file. The file is located in the **BASEDIR**/*smarts/script* directory. The parameters in the file, which define the data that you need to remove, are the same as those used in the UNIX command line. Edit the parameters to reflect your environment.

Run the *sdi-archive* utility from the **BASEDIR**/*smarts/script* directory.

Importing the .dmp Files

After you use the *sdi-archive* utility to remove data from the InCharge Report Manager database and back up the files, it may become necessary to reload the data into the database to include historical data in reports.

The succeeding sections describe how to import data into the database that was previously exported by the *sdi-archive* utility.

For Oracle on UNIX

For Oracle on UNIX, use Oracle's *import* utility to import the archived data into the InCharge Report Manager database.

Export ORACLE_HOME to the installation directory of Oracle.

On Solaris/Linux:

```
Export LD_LIBRARY_PATH = $LD_LIBRARY_PATH:$ORACLE_HOME/lib
```

On HPUX:

```
Export SHLIB_PATH = $SHLIB_PATH:$ORACLE_HOME/lib
```

Run as:

```
▼% $ORACLE_HOME/bin/imp username/password@database  
FILE=notifdat.dmp IGNORE=Y FULL=Y▲
```

```
▼% $ORACLE_HOME/bin/imp username/password@database  
FILE=attrsdmp.dmp IGNORE=Y FULL=Y▲
```

For MS SQL on Windows

For MS SQL on Windows, use MS SQL's *bcp* utility to import the archived data into the InCharge Report Manager database. Execute the following:

```
▼C:\Program Files\Microsoft SQL Server\80\Tools\Binn\bcp"  
IC_T_Notification_Occurrences in "notifdat.dmp" -S "server" -  
U "user" -P "password" -n▲
```

```
▼C:\Program Files\Microsoft SQL Server\80\Tools\Binn\bcp"  
IC_T_Occurrence_Char_Attrs in "char_attrsdmp.dmp" -S "server"  
-U "user" -P "password" -n▲
```

```
▼C:\Program Files\Microsoft SQL Server\80\Tools\Binn\bcp"  
IC_T_Occurrence_Int_Attrs in "int_attrsdmp.dmp" -S "server" -  
U "user" -P "password" -n▲
```

```
▼C:\Program Files\Microsoft SQL Server\80\Tools\Binn\bcp"  
IC_T_Occurrence_Servers in notif_serverdat.dmp -S "server" -U  
"user" -P "password" -n▲
```

▼▲ Indicates the command must be typed as one line.



SQL Data Interface Installation Checklist

The following checklist summarizes the steps that need to be completed when installing the InCharge SQL Data Interface.

Data points that you need to collect are represented in **BOLD** _____

Data points to reference are represented in **BOLD (list entry)**

DATA POINT	DESCRIPTION
Oracle_Host	The server hosting the Oracle Database Server
ORACLE_SID	Oracle service identifier (SID) defined via SQL Net to access the Oracle Database Server
Oracle_Port	The port number of the Oracle Listener port
DBA_User	The database user ID with permissions to create databases/tablespaces/users/tables
DBA_User_Password	The password for the database user
MSSQL_Server	The name of the MS-SQL Server
SDI_USER	SQL Data Interface (SDI) database user ID with rights to insert/update/delete entries in/from InCharge Database Schema
SDI_USER_PASSWORD	The password for the SDI user

DATA POINT	DESCRIPTION
SAM_SERVER_NAME	The name of the Service Assurance Manager server
SMHOME	The installation of InCharge products
DSN_NAME	The ODBC data source name (DSN)
SDI_NOTIFICATION_LIST	The notification list to which SDI subscribes

Table 13: Installation Data Points

- 1** The following software is required to complete the installation of Report Manager 1.2
 - InCharge Supplied Software
 - SAM 6.2 CD (includes DataDirect ODBC Connect 4.2)
 - Third-Party Software
 - Windows
 - Database Server:*
 - Oracle 8i/9i
 - MS-SQL
 - Database Client Software:*
 - Oracle Client Library
 - SQL Net
 - ODBC Drivers:*
 - MS ODBC for SQL Server
 - MS ODBC for Oracle
 - Unix
 - Database Server:*
 - Oracle 8i/9i
 - Database Client Software:*
 - SQL Net
- 2** Database Tasks I
 - Install/Identify Database Server
 - Oracle

Oracle_Host _____

ORACLE_SID _____

Oracle_Port _____

DBA_User _____

DBA_User_Password _____

- MS SQL

MSSQL_Server _____

DBA_User _____

DBA_User_Password _____

- Calculate size of required database
- Create Database Instance for InCharge Schema
- Create SDI user:

SDI_USER _____

SDI_USER_PASSWORD _____

3 Install SAM 6.2 – SAM and the SDI Adapter

SAM_SERVER_NAME _____

SMHOME _____

Add the following variables to **BASEDIR/local/conf/runcmd_env.sh** (cmd):

BASEDIR/LOCAL/CONF/RUNCMD_ENV.SH (CMD)	REFERENCE IN CHECK LIST
On Solaris:	SMHOME (Step 3)
LD_LIBRARY_PATH= BASEDIR /smarts/datadirect-odbc/lib	
ODBCINI= BASEDIR /smarts/datadirect-odbc/odbc.ini	
On HP-UX:	SMHOME (Step 3)
SHLIB_PATH= BASEDIR /smarts/datadirect-odbc/lib	
ODBCINI= BASEDIR /smarts/datadirect-odbc/odbc.ini	

Table 14: runcmd_env Variables

4 Database Tasks II

- Instantiate InCharge Database Schema (using sqlplus or isql)
- Ensure SDI_User has access to the InCharge Database Schema
- Set up ODBC
 - Windows
 - ODBC Administrator on SDI Server
 - **DSN_NAME** _____

WINDOWS ODBC ADMINISTRATOR - MS-SQL	REFERENCE IN CHECKLIST
Server	MSSQL_SERVER (Step 2)
LoginID	SDI_USER (Step 2)
Password	SDI_PASSWORD (Step 2)

Table 15: ODBC Administrator Parameters (MS-SQL)

WINDOWS ODBC ADMINISTRATOR - ORACLE	REFERENCE IN CHECKLIST
Server	ORACLE_SID (Step 2)
User Name	SDI_USER (Step 2)

Table 16: ODBC Administrator Parameters (Oracle)

- Unix
 - DataDirect 4.2: odbc.ini on SDI server
 - **DSN_NAME** _____

BASEDIR/DATADIRECT-ODBC/ODBC.INI	REFERENCE IN CHECK LIST
Driver= SAM_ODBC_INSTALL /lib/S6ora19.so	SMHOME (Step 3)/datadirect-odbc
HostName= Oracle server	Oracle_Host (Step 2)

BASEDIR/DATADIRECT-ODBC/ODBC.INI	REFERENCE IN CHECK LIST
PortNumber= Oracle server port	Oracle_Port (Step 2)
SID= Oracle SID	ORACLE_SID (Step 2)
LogonID= XXXXXXX	SDI_USER (Step 2)
Password=YYYYYYY	SDI_PASSWORD (Step 2)

Table 17: odbc.ini Parameters

5 SAM Configuration Tasks

- Define/create notification list for SDI with Administration Console

SDI_NOTIFICATION_LIST _____

6 Report Manager Configuration Tasks

CONFIGURATION FILE - PARAMETER	REFERENCE IN CHECK LIST
BASEDIR/smarts/local/conf/sdi/sdi/sdi_ics.conf RemoteServerName	SAM_SERVER_NAME (Step 3)
BASEDIR/smarts/local/conf/sdi/sdi/sdi_ics.conf NLName	SDI_NOTIFICATION_LIST (Step 5)
BASEDIR/smarts/local/conf/sdi/sdi/sdi_odbc.conf servername	DSN_NAME (Step 4)
BASEDIR/smarts/local/conf/sdi/summary/sdi_odbc.conf servername	
BASEDIR/smarts/local/conf/sdi/device/sum_device.conf servername	

CONFIGURATION FILE - PARAMETER	REFERENCE IN CHECK LIST
BASEDIR /smarts/local/conf/sdi/sdi/ sdi_odbc.conf username	SDI_USER (Step 2)
BASEDIR /smarts/local/conf/sdi/ summary/sdi_odbc.conf username	
BASEDIR /smarts/local/conf/sdi/ device/sum_device.conf username	
BASEDIR /smarts/local/conf/sdi/sdi/ sdi_odbc.conf password	SDI_USER_PASSWORD (Step 2)
BASEDIR /smarts/local/conf/sdi/ summary/sdi_odbc.conf password	
BASEDIR /smarts/local/conf/sdi/ device/sum_device.conf password	

Table 18: Configuration Parameters

7 Start Report Manager Adapters using *sm_service*

B

SDI Adapter Database Schema

The InCharge SQL Data Interface Adapter transfers notifications from a Service Assurance Global Manager (Global Manager) to a relational database. Upon transfer, notification data is placed into a database schema, or set of tables, designed for InCharge notifications. The data can be extracted, either by SQL queries or by a user-selected report application, to produce standard reports.

InCharge Report Manager's Summarization Adapter processes the stored notification data on a daily basis, produces summarization data, and stores that data in a summary table. That data can also be used to generate reports.

This chapter describes the database schema that is used with the InCharge SDI Adapter.

Database Schema

The database schema used in conjunction with the SQL Data Interface Adapter and its Summarization Adapter consists of several tables. Figure 12 depicts the tables.

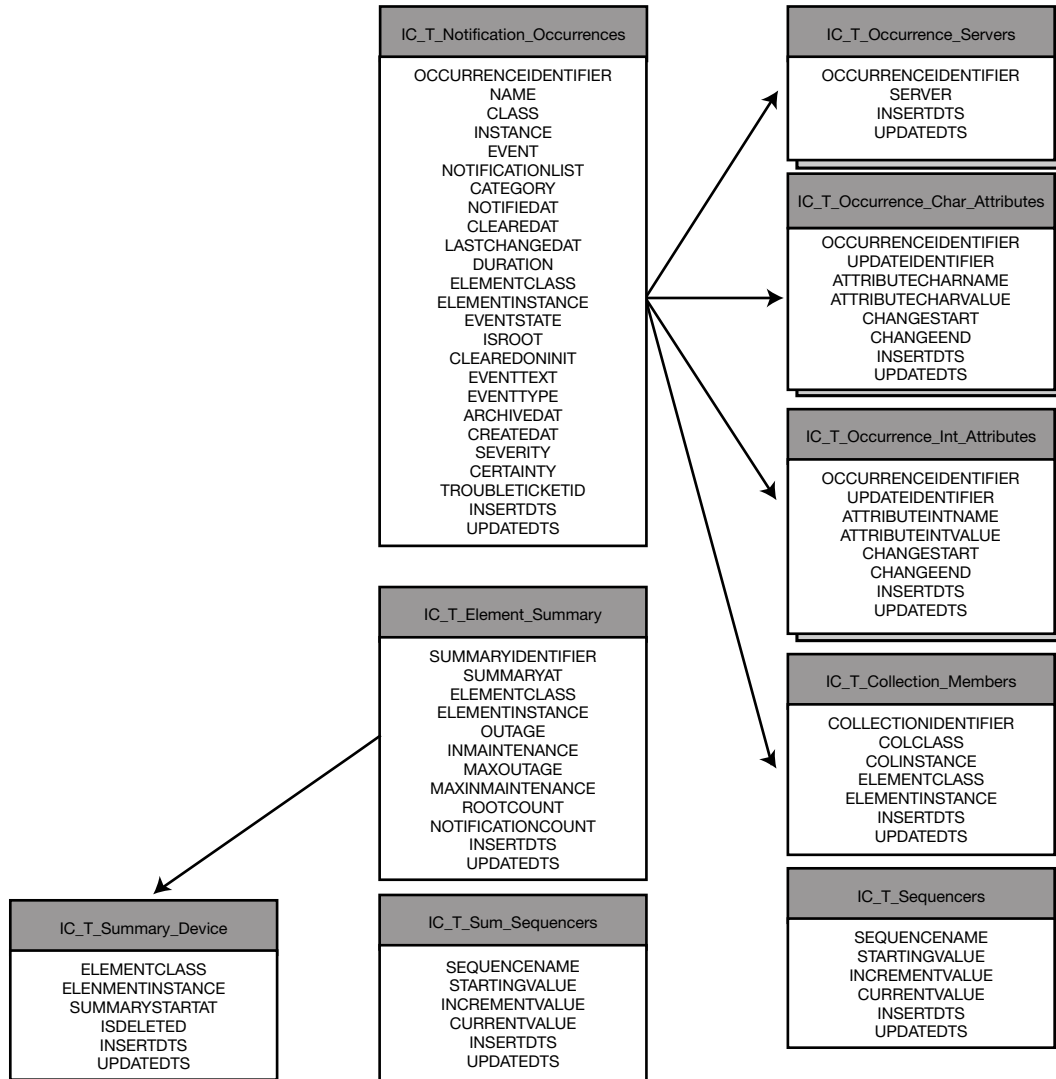


Figure 12: SDI Adapter Database Schema

The tables are designed to store different types of information about notifications, as well as summary data. The tables include:

- IC_T_Notification_Occurrences

This table contains a row for each notification that has occurred for a given element instance. Each notification (row) in the table includes all of the notification attributes for which a single value is stored.

- **IC_T_Occurrence_Servers**

This table stores the information about the originating source(s) of each notification. A source can be an InCharge Domain Manager (for example, an Availability Manager or an Application Services Manager), an InCharge Service Assurance Adapter Platform server, or another original source. Each row shows the relationship between a notification and each reporting source.
- **IC_T_Occurrence_Char_Attrs**

This table stores character string data associated with the notification. Character string data includes user-defined attributes and owner. This table stores the history of the value changes for a given attribute to support historical reporting on a single notification.
- **IC_T_Occurrence_Int_Attrs**

This table stores integer data associated with the notification. It includes the acknowledgement, priority and in-maintenance attributes for notifications. This table stores the history of the value changes for a given attribute to support historical reporting on a single notification.
- **IC_T_Collection_Members**

This table contains the members of collection objects: subscribers, service offerings, and hierarchical groups.
- **IC_T_Sequencers**

This table provides a running counter of the OCCURRENCEIDENTIFIER or UPDATEIDENTIFIER fields in the IC_T_Notification_Occurrences, IC_T_Occurrence_Char_Attrs, IC_T_Occurrence_Int_Attrs, and IC_T_Collection_Members tables
- **IC_T_Element_Summary**

This table summarizes notification data (by default, Unresponsive notifications for infrastructure devices, and Impacted notifications for business elements), by day, for each device/element that is managed by InCharge Service Assurance Manager. The data is used to generate summary reports.

- IC_T_Summary_Device

This table stores device information collected from the Service Assurance Manager topology by the SDI Summary Device Adapter. The information is used to calculate outage summaries. The Summary Adapter summarizes the availability for topology as defined in this table.

- IC_T_Sum_Sequencers

This table provides a running counter of the SUMMARYIDENTIFIER field in the IC_T_Element_Summary table

IC_T_Notification Occurrences

Table 19 describes the columns of the IC_T_Notification_Occurrences database schema.

COLUMN NAME	TYPE	DESCRIPTION
OCCURRENCEIDENTIFIER	Integer	The primary key for this table
NAME	Varchar(255)	The notification name assigned by Service Assurance
CLASS	Varchar(255)	The class name of the managed element where the event occurred
INSTANCE	Varchar(255)	The name of the instance where the problem was diagnosed
EVENT	Varchar(255)	The name of the notification
NOTIFICATIONLIST	Varchar(255)	The name of the notification list subscribed to by the SQL Data Interface that placed the information into the database.
CATEGORY	Varchar(255)	Represents a broad categorization of the event (for example, Availability versus Temperature). Valid values can be: Availability, Discovery, Error, Operational, Performance, PowerSupply, Resource, Temperature, and IMPACT
NOTIFIEDAT	DateTime	The date and time at which the event occurred (application server time)
CLEAREDAT	DateTime	The date and time at which the event was cleared (application server time)
LASTCHANGEDAT	DateTime	The date and time at which event attribute values were changed (application server time)

COLUMN NAME	TYPE	DESCRIPTION
DURATION	Float	Duration is in seconds. For inactive notifications, this is the difference between NotifiedAt from ClearedAt. This represents the length of time it took to clear the notification. For active notifications, the default duration value is 0. Duration is only non-zero when a notification is cleared.
ELEMENTCLASS	Varchar(255)	The class name of the topology element associated with the event in the repository where this event resides. This may or may not have the same value as Class or may be empty.
ELEMENTINSTANCE	Varchar(255)	The name of the element
EVENTSTATE	Integer	Indicates the state of the notification: 0 - Inactive (Cleared) 1 - Active (Notified) 2 - Unknown state
ISROOT	Integer	Yes indicates that the current notification is the root event. No indicates that the current notification is not a root event and is caused by another event.
CLEAREDONINIT	Integer	Indicates whether ClearedAt was set when the SQL Data Interface started or whether a clear was received from the Global Manager. At startup, all active notifications in the database are marked as cleared. They are then reactivated if they are still active in the Global Manager. This behavior ensures that notifications are not inappropriately marked as active in the database. 1 - ClearedAt was cleared by the adapter. 0 - ClearedAt was changed by change in the notification.
EVENTTEXT	Varchar(255)	The text that describes the event
EVENTTYPE	Integer	Indicates the nature of the event. A momentary event has no duration. A durable event has a period during which the event is active and after which the event is no longer active.
ARCHIVEDAT	DateTime	The date and time at which the record was archived in Service Assurance Manager
CREATEDAT	DateTime	The application server time at which the notification is created in Service Assurance Manager. Multiple notification occurrences may have the same CreatedAt time.

COLUMN NAME	TYPE	DESCRIPTION
SEVERITY	Integer	An enumerated value that describes the severity of the event from the notifier's point of view: 1 - Critical, indicates a fatal condition and that the scope is broad (for example, an outage to a critical resource). 2 - Major, indicates a serious condition. 3 - Minor, indicates an abnormal condition but not a serious one. 4 - Unknown, indicates that elements and/or events that are in an unknown state because of network or management connectivity failures. 5 - Normal, indicates a normal state and that an event is purely informational.
CERTAINTY	Float	The certainty of this event
TROUBLETICKETID	Varchar(255)	The last value of an external ticketing system identifier
INSERTDTS	DateTime	The date and time at which the record was inserted into the database
UPDATEDTS	DateTime	The date and time at which the record was updated in the database

Table 19: Column Names of IC_T_Notification_Occurrences

IC_T_Occurrence_Servers

Table 20 describes the columns of the IC_T_Occurrence_Servers database schema.

COLUMN NAME	TYPE	DESCRIPTION
OCCURRENCEIDENTIFIER	Integer	The joint Primary Key 1/Foreign Key that references IC_T_Notification_Occurrences
SERVER	Varchar(255)	The joint Primary Key 2. The name of the notifying server, for example, InCharge Open Integration, Availability Manager, Performance Manager, or some other original source.
INSERTDTS	DateTime	The date and time at which the record was inserted.
UPDATEDTS	DateTime	The date and time at which the record was updated.

Table 20: Column Names of IC_T_Occurrence_Servers

IC_T_Occurrence_Char_Attrs

Table 21 describes the columns of the IC_T_Occurrence_Char_Attributes database schema.

COLUMN NAME	TYPE	DESCRIPTION
OCCURRENCEIDENTIFIER	Integer	The joint Primary Key 1/Foreign Key that references IC_T_Notification_Occurrences. The OccurrenceIdentifier, the UpdateIdentifier, and the AttributeName together uniquely identify the row in the table
UPDATEIDENTIFIER	Integer	The joint Primary Key 2, which identifies unique values of a single attribute for a notification occurrence
ATTRIBUTECHARNAME	Varchar(255)	The joint Primary Key 3 that uniquely identifies a character string attribute (for example, UserDefined1-UserDefined 10, Owner)
ATTRIBUTECHARVALUE	Varchar(255)	The value of the character attribute
CHANGESTART	DateTime	The date and time at which the attribute was assigned the ATTRIBUTECHARVALUE value
CHANGEEND	DateTime	The date and time at which the attribute was assigned a different value or the event was cleared
INSERTDTS	DateTime	The date and time at which the record was inserted into the database
UPDATEDTS	DateTime	The date and time at which the record was last updated

Table 21: Column Names of IC_T_Occurrence_Char_Attributes

IC_T_Occurrence_Int_Attrs

Table 22 describes the columns of the IC_T_Occurrence_Int_Attributes database schema.

COLUMN NAME	TYPE	DESCRIPTION
OCCURRENCEIDENTIFIER	Integer	The joint Primary Key 1/Foreign Key that references IC_T_Notification_Occurrences. The OccurrenceIdentifier, the UpdateIdentifier, and the AttributeName together uniquely identify the row in the table
UPDATEIDENTIFIER	Integer	The joint Primary Key 2, which identifies unique values of a single attribute for a notification occurrence
ATTRIBUTEINTNAME	Varchar(255)	The joint Primary Key 3 that uniquely identifies an integer attribute (for example, InMaintenance, Priority, Acknowledged)
ATTRIBUTEINTVALUE	Integer	The value of the integer attribute
CHANGESTART	DateTime	The date and time at which the attribute was assigned the ATTRIBUTEINTVALUE value
CHANGEEND	DateTime	The date and time at which the attribute was assigned a different value or the event was cleared
INSERTDTS	DateTime	The date and time at which the record was inserted into the database
UPDATEDTS	DateTime	The date and time at which the record was last updated

Table 22: Column Names of IC_T_Occurrence_Int_Attributes

IC_T_Collection Members

Table 23 describes the columns of the IC_T_Collection Members database schema. Each row in this table represents a member of a collection group (for example, Service Offering, or Hierarchical Groups).

COLUMN NAME	TYPE	DESCRIPTION
COLLECTIONIDENTIFIER	Integer	A unique sequencer value which is the primary key for the table. Jointly, CollectionIdentifier, ColClass, ColInstance, ElementClass, ElementInstance are unique
COLCLASS	Varchar(255)	The collection type (possible values are HierarchicalGroup, ServiceOffering, ServiceSubscriber, or subclasses)
COLINSTANCE	Varchar(255)	The collection name
ELEMENTCLASS	Varchar(255)	The element class name

COLUMN NAME	TYPE	DESCRIPTION
ELEMENTINSTANCE	Varchar(255)	The element instance name
INSERTDTS	DateTime	The date and time at which the record was inserted into the database
UPDATEDTS	DateTime	The date and time at which the record was last updated

Table 23: Column Names of IC_T_Collection Members

IC_T_Sequencers

Table 24 describes the columns of the IC_T_Sequencers database schema. Each row in the table is a running counter of the OCCURRENCEIDENTIFIER or UPDATEIDENTIFIER fields in the IC_T_Notification_Occurrences, IC_T_Occurrence_Char_Attrs, IC_T_Occurrence_Int_Attrs, and IC_T_Collection_Members tables.

COLUMN NAME	TYPE	DESCRIPTION
SEQUENCENAME	Varchar(255)	The Primary Key. The sequence name: OccurrenceIdentifier, UpdateIdentifier, or CollectionIdentifier
STARTINGVALUE	Integer	The beginning counter: 1
INCREMENTVALUE	Integer	The increment value: 1000
CURRENTVALUE	Integer	The current value: 1001
INSERTDTS	DateTime	The date and time at which the record was inserted into the database
UPDATEDTS	DateTime	The date and time of the last update

Table 24: Column Names of IC_T_Sequencers

IC_T_Element Summary

Table 25 describes the columns of the IC_Element_Summary database schema. The table stores daily summaries of important data for each element in the topology. There may, in fact, be multiple rows per day, per element, if the Summarization Adapter is run twice in one day.

COLUMN NAME	TYPE	DESCRIPTION
SUMMARYIDENTIFIER	Integer	A unique sequencer value which is the primary key for the table. Jointly, SummaryIdentifier, SummaryAt, ElementClass, ElementInstance are unique
SUMMARYAT	DateTime	The date and time being summarized
ELEMENTCLASS	Varchar(255)	The element class being summarized
ELEMENTINSTANCE	Varchar(255)	The element instance being summarized
OUTAGE	Float	The unavailability of the device for a day, including in maintenance durations, in seconds
INMAINTENANCE	Float	The duration for the day that the device is in maintenance, in seconds
MAXOUTAGE	Float	The maximum outage time for the day, in seconds
MAXINMAINTENANCE	Float	The maximum in maintenance period, for the device, for the day, in seconds
ROOTCOUNT	Integer	The number of active root cause notifications for the device, for the day
NOTIFICATIONCOUNT	Integer	The number of notifications for the device
INSERTDTS	DateTime	The date and time at which the record was inserted into the database
UPDATEDTS	DateTime	The date and time at which the record was last updated

Table 25: Column Names of IC_T_Element_Summary

Note: Only Down events are included in the calculation of OUTAGE, INMAINTENANCE, MAXOUTAGE, and MAXINMAINTENANCE. All events are included in the calculation of ROOTCOUNT and NOTIFICATIONCOUNT.

IC_T_Summary Device

Table 26 describes the columns of the IC_T_Summary_Device database schema. The table stores device information gathered by the Summary Device Adapter. It is updated as the topology changes. New devices are added to the table; deleted devices are marked as deleted. Deleted devices are not considered during the summarization process.

COLUMN NAME	TYPE	DESCRIPTION
ELEMENTCLASS	Varchar(200)	The element class name
ELEMENTINSTANCE	Varchar(200)	The element instance name
SUMMARYSTARTAT	DateTime	The date and time from which the summary for this device will be calculated. This corresponds to the time the device was found by the Summary Device Adapter
ISDELETED	Integer	This indicates if the device is present in the topology. 0 indicates it is present; 1 indicates it was deleted
INSERTDTS	DateTime	The date and time at which the record was inserted into the database
UPDATEDTS	DateTime	The date and time at which the record was last updated

Table 26: Column Names of IC_T_Summary_Device

IC_T_Sum_Sequencers

Table 27 describes the columns of the IC_T_Sum_Sequencers database schema. Each row in the table is a running counter of the SUMMARYIDENTIFIER field in the IC_T_Element_Summary table.

COLUMN NAME	TYPE	DESCRIPTION
SEQUENCENAME	Varchar(255)	The unique sequence name initialized to IC_Element_Summary.SummaryIdentifier
STARTINGVALUE	Integer	The beginning counter: 1
INCREMENTVALUE	Integer	The increment value: 1000
CURRENTVALUE	Integer	The current value: 1001
INSERTDTS	DateTime	The date and time at which the record was inserted into the table
UPDATEDTS	DateTime	The date and time of the last update

Table 27: Column Names of IC_T_Sum_Sequencers

C

Data Storage Calculations

This appendix provides information for calculating the data storage required by the InCharge SDI Adapter database.

Note that the sizes given in this appendix are approximate. The following variants affect the size of the tables in the database. The numbers in parentheses refer to cells in the table.

- Storage for indexes
- Database server differences
- The number of notifications notified per day - (1)
- The amount of time that data needs to be available for reporting – Aging (2)
- The number of topological elements that are monitored by SAM – (3)
- The number of topological elements in groups – (4)
- The number of UserDefined fields that are populated with data – (5)
- The number of changes made to notification attributes:
 - InMaintenance
 - Acknowledged
 - Impact
 - Owner
 - UserDefined 1
 - UserDefined 2

- UserDefined 3
- UserDefined 4
- UserDefined 5
- UserDefined 6
- UserDefined 7
- UserDefined 8
- UserDefined 9
- UserDefined 10

TABLE	ROW SIZE	COL SIZE	NOTIFICATIONS PER DAY	AGING	TOPOLOGICAL COUNT	TOPOLOGICAL COUNT IN COLLECTIONS	NUMBER OF ATTRIBUTES	ROW COUNT	TABLE SIZE (F10)
IC_T_NOTIFICATION_OCCURRENCES	2665	107	(1) 1000	(2) 90	N/A	N/A	N/A	(F1) 90,000	239,850,000
IC_T_OCCURRENCE_CHAR_ATTRS	582	73	(1) 1000	(2) 90	N/A	N/A	(5) 6	(F2) 540,000	314,280,000
IC_T_OCCURRENCE_INT_ATTRS	349	44	(1) 1000	(2) 90	N/A	N/A	3	(F3) 270,000	94,230,000
IC_T_OCCURRENCE_SERVERS	291	73	(1) 1000	(2) 90	N/A	N/A	N/A	(F4) 90,000	26,190,000
IC_T_ELEMENT_SUMMARY	575	48	N/A	(2) 90	(3) 10,000	N/A	N/A	(F5) 900,000	517,500,000
IC_T_SUMMARY_DEVICE	443	74	N/A	N/A	(3) 10,000	N/A	N/A	(F6) 10,000	4,430,000
IC_T_COLLECTION_MEMBERS	836	119	N/A	N/A	N/A	(4) 2000	N/A	(F7) 2000	1,672,000
IC_T_SUM_SEQUENCERS	335	56	N/A	N/A	N/A	N/A	N/A	(F8) 4	1340
IC_T_SEQUENCERS	335	56	N/A	N/A	N/A	N/A	N/A	(F9) 1	335
								Total	1,198,153,675

Formulas. F1 through F10 refer to formulas referenced in cells in the table.

- F1 – Notifications Per Day * Aging
- F2 – Notifications Per Day * Aging * Number of char attributes
- F3 – Notifications Per Day * Aging * Number of int attributes
- F4 - Notifications Per Day * Aging (there may be some variant here if notifications are notified by more than one server)
- F5 – Aging * Topological Count
- F6 – Topological Count
- F7 – Topological Count in Collections
- F8 – Fixed at 4
- F9 – Fixed at 1
- F10 – Row Size * Row Count

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