Oracle® Application Server
CDC Adapters for VSAM User's Guide
10g Release 3 (10.1.3.4)
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This guide is the primary source of user and reference information on the OracleAS CDC adapter for VSAM, which enables Oracle users to use change data capture in their integration architecture, working with the Oracle Application Server.

This document describes the features of the OracleAS CDC adapter for VSAM.

This preface covers the following topics:

- **Audience**
- **Documentation Accessibility**
- **Related Documents**
- **Conventions**

### Audience

This manual is intended for Oracle integration administrators and developers who perform the following tasks:

- Installing and configuring OracleAS CDC Adapters for VSAM
- Using OracleAS for developing integration solutions using change data capture

**Note:** You should understand the fundamentals of OracleAS, OC4J, the UNIX and Microsoft Windows operating system before using this guide to install or administer OracleAS Adapters for VSAM.

- Diagnosing errors

### Documentation Accessibility

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Related Documents
For more information, see the following documents in the Oracle Other Product One Release 10.0 documentation set or in the Oracle Other Product Two Release 6.1 documentation set:

- Oracle Application Server Adapter Concepts Guide
- Oracle Application Server Adapter Installation Guide
- Oracle Application Server Adapter Concepts Guide
- Oracle Application Server Containers for J2EE User’s Guide
- Oracle Application Server Containers for J2EE Services Guide
- Oracle Application Server Containers for J2EE Security Guide

Conventions
The following text conventions are used in this document:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>boldface</strong></td>
<td>Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.</td>
</tr>
<tr>
<td><em>italic</em></td>
<td>Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.</td>
</tr>
<tr>
<td>monospace</td>
<td>Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.</td>
</tr>
</tbody>
</table>
Change data capture (CDC) is an integration technology that enables efficient near real-time integration by capturing changes made to enterprise data sources and providing them for processing in integration middleware, such as Oracle Fusion Middleware. The CDC Adapter can be used by Oracle SOA Suite (BPEL, ESB) and Oracle Data Integrator (ODI).

The OracleAS CDC Adapter for VSAM captures changes for captured VSAM clusters that are written to the CICS User Journal or updated by batch programs.

This section provides an overview of the features and architecture of the OracleAS CDC adapter for VSAM. It includes the following topics:

- OracleAS CDC adapter for VSAM Overview
- OracleAS CDC Adapter for VSAM Architecture

**OracleAS CDC adapter for VSAM Overview**

The OracleAS CDC Adapter for VSAM captures and delivers changes (such as insert, update, and delete operations) made to data in VSAM data sources. By using the CDC Adapter, you can build efficient data integration solutions that use VSAM data, synchronize systems to ensure data integrity, update data warehouses and operational data stores in near real-time, and enable event-driven business activity monitoring and processing.

The OracleAS CDC adapter for VSAM has the following capabilities:

- **Non-intrusive change capture**: The OracleAS CDC Adapter for VSAM is a log-based CDC technology. The CDC agent accesses a logstream that is polled to access the changes. The agent begins polling from a specific point called the stream position (or agent context). The last position read is saved as the stream position. This next time the agent polls the logstream for information, it starts at the saved stream position.

- **Real-time data capture**: The OracleAS CDC Adapter for VSAM captures changes to data in near-real-time for applications that demand zero latency and require the most up-to-date data. Unlike scheduled CDC solutions, near real-time data capture guarantees that a change event is can be made available in a matter of seconds at the consumer. The term near-real-time data capture is used because after a period of inactivity changes may be available after a few seconds.

- **Change storage**: The Oracle CDC Adapter for VSAM provides a staging area that stores the captured changes in a format that is easy to access and process. The staging area ensures that changes are persisted until they are processed, and provides facilities to clean up old change records.
Change access and delivery: The Oracle CDC Adapter for VSAM includes a JCA Resource Adapter that can be configured in BPEL and ESB as an inbound endpoint, delivering changes in XML format.

Filtering. The OracleAS CDC Adapter for VSAM enables you to filter captured data based on the type of operation (INSERT, UPDATE, DELETE), based on column selection and even based on specific column values.

Reliable delivery and recovery: The Oracle CDC Adapter for VSAM stores changes in a reliable persistent storage and uses the concept of a 'stream position' that indicates the location in the change stream that was successfully moved and processed. By storing stream positions, the CDC Adapter can always restart after failure, recover, and continue moving and delivering changes from wherever it was stopped.

Ease of use: The OracleAS CDC Adapter for VSAM provides an easy and intuitive way to configure CDC solutions using Oracle Studio.

Using the OracleAS CDC Adapter for VSAM makes ETL (extract, transform, and load) processes more efficient and less disruptive to the operation of the source database systems, eliminating the need for the traditional ETL downtime window.

OracleAS CDC Adapter for VSAM Architecture

The following figure illustrates the system components used for change data capture using the OracleAS CDC adapter for VSAM.

Figure 1–1  Component Architecture used with the VSAM CDC adapter

The OracleAS CDC adapter for VSAM component architecture includes the following components:

- **Database Platform**: The database platform is the data source that contains the data to be captured.

- **Database Log**: The database log is a log stream that contains the raw change data.
Oracle Connect: Oracle Connect runs on the backend system and handles from the special J2CA adapter that runs on the Oracle Application Server.

CDC agent: This is an OracleAS CDC Adapter for VSAM component that runs under the control of the daemon (a listener process) on the computer where the backend data is located. The capture agent provides access to change events in the transaction log for the change router.

The agent is located on the same computer as the changes to be captured. It maintains the last position read in the journal (the stream position or context) and starts at this point the next time it polls the journal. The context is stored in the repository where the adapter definition is stored. The adapter definition includes a single primary interaction which is used to access the appropriate journal and includes the list of tables to monitor for changes.

BPEL/ESB: This is where the change events are consumed by means of a JCA provider that sends change records to an end point configured in either ESB or BPEL.

JC2A Resource Adapter: A special version of the J2CA 1.5 VSAM adapter that can read change records from the staging area. It implements inbound endpoints for BPEL and ESB that pulls change events from the staging area and deliver them as XML change documents. Each endpoint handles change records for a single captured table at the source database.

The J2CA adapter uses multiple connections to the staging area to be able to process changes from multiple tables in parallel.

JDBC Driver: Enables access to changes in the staging area using SQL queries.

OC4J / BPEL Components: Any OracleAS component that hosts and gets messages from the JC2A adapter.

Staging Area: This is a set of change tables where change records are stored before being sent to BPEL/ESB. Old records from the Staging Area are deleted based upon the specified aging policy.

The Staging Area contains a DISAM data source for SQL access and a Database Events adapter for the XML access.

See The Staging Area for more information.

The staging area includes the following components:

- Change Router: This is an OracleAS CDC Adapter for VSAM service that runs under the control of the daemon (a listener process) on the Oracle platform. The change router reads the change stream from the CDC agent, sorts them in transaction/commit order eliminating rolled-back changes, and distributes the changes into the various change tables.

  Only one instance of the change router is active at a time against a captured database. The change router also deletes old changes from the change tables according to a configurable aging policy. policy (48 hours is the default, which means that records that have been in the staging area for more than 48 hours will be deleted).

- Change Tables: The staging area is made of change tables, each containing changes to one captured table in the source database. These change tables maintain change events in transaction order and in occurrence order within a transaction for each captured table. The change tables are DISAM files that are indexed to support fast access to the change data, that can be accessed directly using the stream position.
– **Change Access Service.** This is an instance Oracle Connect that is installed on a separate computer or the same computer as BPEL/ESB that allows access to the change tables. This instance of Oracle Connect is configure as the staging area.

- **Oracle Studio:** Provides the developer or administrator with a graphical user interface for setting up the CDC Agent and Staging Area, using intuitive wizards. Oracle Studio can be installed on Linux, UNIX, or Windows.

**The Staging Area**

The staging area is an area used by Oracle Connect to store captured data from a journal. The journal is scanned once and changes for every required table read during that scan are passed to the staging area, where they are stored. This means that the journal is scanned once each time it is polled. After the changes are written to the staging area, processing of these changes is carried out independently of the journal.

The staging area is a benefit when transactions are used. The changed data is not written to the change queue until the transaction is committed. Thus, if the transaction fails, there is no overhead of having to back out any processing done with the steps in the failed transaction.

The staging area can be on any computer with a Windows, Linux, or UNIX operating system that is running the Oracle Application Server and does not need to be run on the same server as the VSAM CDC adapter. Once the information is extracted from the journal and written to the staging area, processing of changes is carried out on the staging area only. Thus, the staging area should be setup to consider the network configuration and where the consumer application runs.

The staging area maintains the last position read by the consumer application (the staging area context) and starts at this point the next time a request from the consumer application is received. The context is stored in the repository where the staging area is maintained.

The staging area is indexed so that access to the staging area for a specific stream is quick.

The staging area is cleared by default every 48 hours. All events that have been in the staging area for more than 48 hours are deleted.
Installing Oracle Connect and Oracle Studio

This section describes how to install Oracle Connect and Oracle Studio.

Note: In addition to the installation procedures described in this section, the J2CA 1.5 VSAM adapter must be installed with Oracle Application Server. Installing the J2CA 1.5 VSAM adapter is described in Oracle Application Server Adapter Installation Guide.

This section includes the following topics:

- Preinstallation Tasks
- Installing Oracle Connect on an IBM z/OS Series Platform
- Updating an Existing Oracle Connect Installation with VSAM
- Installing Oracle Connect on UNIX
- Installing Oracle Connect on Windows
- Installing Oracle Studio

Preinstallation Tasks

Before installing OracleAS Adapter for VSAM, ensure that your computer meets the following requirements:

- z/OS Hardware and Software Requirements
- Windows Hardware and Software Requirements
- UNIX Requirements

z/OS Hardware and Software Requirements

This section describes the following requirements for installing Oracle Connect on an IBM z/OS platform:

- Hardware Requirements
- Software Requirements

Hardware Requirements

The following table summarizes the hardware requirements for Oracle Connect.
Preinstallation Tasks

Table 2–1  Oracle Connect Hardware Requirements

<table>
<thead>
<tr>
<th>Hardware Component</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>An IBM zSeries computer.</td>
</tr>
<tr>
<td>Memory</td>
<td>The minimum requirement is 4MB for each connection. A connection is defined as a connection to a server process or daemon. The actual memory requirement depends on such things as the size of the database and the number of databases accessed.</td>
</tr>
<tr>
<td>Disk Space (3380 and 3390 disks)</td>
<td>150 cylinders.</td>
</tr>
</tbody>
</table>

Software Requirements

The following table summarizes the software requirements for Oracle Connect.

Table 2–2  Oracle Connect Software Requirements

<table>
<thead>
<tr>
<th>Software Component</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>IBM z/OS</td>
</tr>
<tr>
<td>CICS TP Monitor (when accessing VSAM data under CICS)</td>
<td>V4R1 or higher (recommended to use CICS V6R1 or higher) CICS EXCI support must be installed and IRCSTRT=YES must be specified in the CICS initialization parameters, so that the IRC (Inter Region Communication) starts. You can also set the IRC to open by issuing the following command: CEMT SET IRC OPEN. Also the IBM group DFH$EXCI (or an equivalent user-defined group) must be installed in the CICS region: using the CEDA RDO facility.</td>
</tr>
<tr>
<td>TCP/IP</td>
<td>The operating system must support the TCP/IP protocol for using the Internet.</td>
</tr>
<tr>
<td>C Runtime Library</td>
<td>The C runtime library has all the standard C runtime programs.</td>
</tr>
<tr>
<td>Oracle Application Server</td>
<td>Oracle Application Server 10g (10.1.3.4).</td>
</tr>
</tbody>
</table>

Windows Hardware and Software Requirements

This section describes the following requirements for installing Oracle Studio:

- **Hardware Requirements**
- **Software Requirements**

Hardware Requirements

The following table summarizes the hardware requirements for Oracle Connect.

Table 2–3  Oracle Connect Hardware Requirements for Windows

<table>
<thead>
<tr>
<th>Hardware Component</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>An Intel or 100% compatible computer, based on a Pentium processor</td>
</tr>
<tr>
<td>Memory</td>
<td>256 MB of RAM</td>
</tr>
<tr>
<td>Disk Space for Oracle Studio</td>
<td>40 MB of free disk space</td>
</tr>
</tbody>
</table>
Software Requirements
The following table summarizes the software requirements for Oracle Connect.

<table>
<thead>
<tr>
<th>Software Component</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Microsoft Windows 2000 with service pack 2 or higher, Microsoft Windows XP, or Microsoft Windows Server 2003.</td>
</tr>
<tr>
<td>Microsoft</td>
<td>Network transport protocol software, TCP/IP, included with Microsoft Windows.</td>
</tr>
</tbody>
</table>

UNIX Requirements
Oracle Connect can be installed on the following UNIX operating systems:
- Red Hat Linux
- Linux SUSE
- HP-UX
- IBM AIX
- Sun Solaris
For all of the operating systems, the required disk space is 48MB.

Installing Oracle Connect on an IBM z/OS Series Platform
This section explains how to install Oracle Connect. This section includes the following:
- Installation Worksheet
- Preinstallation Instructions
- Importing the Installation Kit
- Installation Instructions
- Post-Installation Instructions

**Note:** If you have an Oracle Connect back-end adapter already installed on the z/OS platform, then follow the instructions described in "Updating an Existing Oracle Connect Installation with VSAM".

Installation Worksheet
Verify that you have all the information detailed in the following installation worksheets, so you can refer to it during the configuration process.
### Table 2–5 Preinstallation Information

<table>
<thead>
<tr>
<th>Topic</th>
<th>Required Information</th>
<th>Default</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Operating system</td>
<td>-</td>
<td>z/OS</td>
</tr>
<tr>
<td></td>
<td>Disk space</td>
<td>-</td>
<td>150 cylinders</td>
</tr>
<tr>
<td></td>
<td>Memory</td>
<td>-</td>
<td>The minimum requirement is 4MB for each connection. A connection is defined as a connection to a server process or daemon. The actual memory requirement depends on such things as the size of the database and the number of databases accessed.</td>
</tr>
<tr>
<td></td>
<td>Installation high-level qualifier</td>
<td>OCL10134</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Volume</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Unit</td>
<td>3390</td>
<td>SMS only: unit where SMS resides.</td>
</tr>
<tr>
<td></td>
<td>Output class</td>
<td>A</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>JCL job card</td>
<td>-</td>
<td>An optional card (up to 6 lines) to replace the prefix job (entered as it will appear in the job)</td>
</tr>
<tr>
<td></td>
<td>ISPF load library name</td>
<td>ISP:SISPLOAD</td>
<td>-</td>
</tr>
<tr>
<td>CICS</td>
<td>CICS EXCI load library name</td>
<td>CICS.CICS.SDFHEXCL</td>
<td>To access VSAM data under CICS</td>
</tr>
</tbody>
</table>

### Table 2–6 Required Permissions

<table>
<thead>
<tr>
<th>Permission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permission to define an APF-authorized library</td>
</tr>
<tr>
<td>Permission to write to an active proclib, such as user.proclib</td>
</tr>
<tr>
<td>Permission to read the CICS EXCI library (when accessing VSAM data under CICS)</td>
</tr>
<tr>
<td>Permission to update the security manager, such as RACF</td>
</tr>
<tr>
<td>Optionally, permission to specify an output class for Oracle Connect output</td>
</tr>
</tbody>
</table>

### Table 2–7 Installation Checklist

<table>
<thead>
<tr>
<th>Step</th>
<th>Comment/Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>tso profile prefix</td>
<td>Ensures that the user name is not used as part of the dataset name allocated in the next steps</td>
</tr>
<tr>
<td>Allocate dataset: [HLQ].TRANSMIT.KIT</td>
<td>130 tracks (3390), format=FB, record length=80, block size=3120</td>
</tr>
<tr>
<td>Allocate dataset: [HLQ].TRANSMIT.LOAD</td>
<td>420 tracks (3390), format=FB, record length=80, block size=3120</td>
</tr>
<tr>
<td>FTP files to z/OS</td>
<td>FTP using binary mode</td>
</tr>
<tr>
<td>RECEIVE INDSNAME([HLQ].TRANSMIT.KIT)</td>
<td>-</td>
</tr>
<tr>
<td>da([HLQ].TRANSMIT.LIB) UNIT(unit) VOLUME(volume)</td>
<td>-</td>
</tr>
<tr>
<td>EX [HLQ].TRANSMIT.LIB(PREPARE)</td>
<td>Successful MAXCC is 0, 4 or 8</td>
</tr>
<tr>
<td></td>
<td>BUILDKIT.SRC and BUILDKIT.LOAD created</td>
</tr>
<tr>
<td>EX [HLQ].BUILDKIT.SRC(NAVINST)</td>
<td>Successful MAXCC is 0 or 4</td>
</tr>
</tbody>
</table>
Preinstallation Instructions

Before starting the installation, make sure that you have the following information available:

- The output class for the installation output if you do not want to use the default value A.
- If you use SMS to manage all datasets, then you cannot provide unit and volume information, which is the unit where SMS resides.

Before starting the installation, make sure that you have the following permissions:

- Permission to define an APF-authorized library
- Permission to write to an active proclib, such as user.proclib
- Permission to read the CICS EXCI library when accessing VSAM data under CICS
- Permission to update the security manager, such as RACF

---

Note: Optionally, make sure that you have permission to specify an output class for Oracle Connect output. Assigning a device which is set on HOLD prevents the loss of log information when Oracle Connect started tasks finish.

---

Oracle Connect for the IBM z/OS platform is contained in the following datasets:

- OCL10134.TRANSMIT.KIT
- OCL10134.TRANSMIT.LOAD

Importing the Installation Kit

Perform the following steps to import Oracle Connect installation kit to the Mainframe:

1. Run the following command:
   
   ```
   tso profile noprefix
   ```
   
   The user name will not be used as part of the dataset name. On some systems this is the default.

2. Allocate datasets with the following space for each of these files:

   - OCL10134.TRANSMIT.KIT = 130 tracks (3380 and 3390 disks)
   - OCL10134.TRANSMIT.LOAD = 420 tracks (3380 and 3390 disks)

   For each dataset: RECFM=FB and LRECL=80. The block size is 3120.

Transferring the Kit to the Dataset

You need to move the contents of the kit to the mainframe computer in the dataset that you allocated. When you copy the contents of the kit, you will see that the contents are now utilized.

Perform the following steps to copy the Oracle Connect installation kit contents to the mainframe:

1. Extract the compressed file to a folder on a computer running Microsoft Windows.
2. Open the Command console on the Windows computer.
3. Type FTP and the name of the mainframe computer where you want to connect. This creates an FTP connection to the mainframe machine. You may have to enter a user name and password to use the machine.

4. Type bin to transfer binary data.

5. Enter the following command to transfer the data from the .KIT file to the mainframe computer:
   
   ```
   put OCL10134.transmit.kit ' [HLQ].transmit.kit' [replace]
   
   where:
   ■ OCL10134.transmit.kit is the name of your installation file.
   ■ (replace ensures that any data on the volume where the kit is installed is overwritten.
   ```

6. Enter the following command to transfer the data from the .LOAD file to the mainframe computer:
   
   ```
   put OCL10134.transmit.load ' [HLQ].transmit.load' [replace]
   ```

7. Close the FTP connection.

## Installation Instructions

Perform the following steps to install Oracle Connect:

1. From within TSO, run the following command at the TSO prompt:
   
   ```
   RECEIVE INDSNAME('nnn.TRANSMIT.KIT')
   
   Where nnn represents the high-level qualifier you want to assign for the Oracle Connect installation. Assign the high-level qualifier you specified in step 7 of the preinstallation. The default value is OCL10134.
   ```

   **Note:** You can use more than one high-level qualifier (such as ACME.DEV.OCL10134) with the following conditions:
   
   - The total length must be less than or equal to twenty characters.
   - The words transmit and buildkit cannot be used as high-level qualifiers.

2. Enter the following command when prompted for the restore parameters:
   
   ```
   da('nnn.TRANSMIT.LIB') [UNIT(unit) VOLUME(volume)]
   
   This extracts the nnn.TRANSMIT.LIB library from the nnn.TRANSMIT.KIT kit to the specified unit and volume. If a unit and volume are not specified, then the library is extracted to the current unit and volume.
   ```

3. Run the PREPARE member of the nnn.TRANSMIT.LIB library:
   
   ```
   ex PREPARE
   ```

   Follow the instructions in the Response column in this table for each entry in the Screen column.
The following libraries are generated:

nnn.BUILDKIT.LOAD
nnn.BUILDKIT.SRC
nnn.BUILDKIT.GENDEMO

Where nnn is the high-level qualifiers you assigned in step 1.

4. In the nnn.BUILDKIT.SRC library, run the NAVINST member:

   ex NAVINST

   Follow the instructions in the Response column in this table for each entry in the Screen column.
In the `nnn.BUILDKIT.SRC` library, run the `VSAM` member:

```
ex VSAM
```
Follow the instructions in the Response column in this table for each entry in the Screen column.

**Table 2–10  VSAM Adapter-Specific Installation Prompts and Responses**

<table>
<thead>
<tr>
<th>Screen</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO YOU WANT ORACLE CONNECT FOR LEGACY ADAPTER TO WORK WITH VSAM UNDER CICS (YES/NO) [NO]:</td>
<td>Answer YES to this prompt if you want to access VSAM data under CICS.</td>
</tr>
<tr>
<td>ENTER THE CICS EXCI LOAD LIBRARY NAME [CICSTS13.CICS.SDFHEXCI]:</td>
<td>If you responded YES to working with VSAM under CICS, then enter the CICS EXCI load library name only if you do not want the default.</td>
</tr>
<tr>
<td>PLEASE CONFIRM (YES/NO/QUIT) [YES]:</td>
<td>If you responded YES to working with VSAM under CICS, then confirm the entered details.</td>
</tr>
<tr>
<td>ENTER THE ISPF LOAD LIBRARY NAME [ISPSISPLLOAD] :</td>
<td>Enter the ISPF load library name only if you do not want the default.</td>
</tr>
<tr>
<td>PLEASE CONFIRM (YES/NO/QUIT) [YES]:</td>
<td>Confirm the entered details</td>
</tr>
<tr>
<td>ENTER THE OUTPUT CLASS FOR INSTALLATION OUTPUT [A]:</td>
<td>Enter the output class for Oracle Connect output. Assigning a device which is set on HOLD prevents the loss of log information when the Oracle Connect started tasks finish (the default is A).</td>
</tr>
<tr>
<td>DO YOU WANT TO USE THE DEFAULT JOB CARD Y/N [Y]</td>
<td>A job card is displayed. If you want to use a replacement card, then it must be entered as it will appear in the job. You can enter up to six lines. Enter a blank card to end input. If you do not enter a card, then the Oracle Connect default card is used.</td>
</tr>
</tbody>
</table>

The installation is completed. All JCL jobs and REXX procedures are written to the `INSTROOT.USERLIB` library. `INSTROOT` is the high-level qualifier for the installation.

**Post-Installation Instructions**

The following post-installation tasks must be done to work with Oracle Connect:

- Copy and Install Programs into CICS
- Post-Installation Procedures
- Starting the Daemon
- Setting Up Oracle Connect for Reentrancy
- Setting Up Oracle Connect to Update VSAM Data

**Copy and Install Programs into CICS**

You must copy and install some supporting programs when you use a CICS session. The following describes the steps necessary to copy and install these programs under CICS.

1. In the Data Set List Utility screen, type the name of the `<HLQ>` on the Dname Level line. This will return a list of the files.
2. In the Command column next to the `<HLQ> . LOAD`, type M.
3. Type C next to following programs you are using. The available programs are listed below:
Installing Oracle Connect on an IBM z/OS Series Platform

- **ATTHRDPL**: Use this program when working under CICS. This is the CICS queue.
- **ATTICSD**: Use this program when working under CICS.
- **ATTHRDPL**: Use this program when working under CICS if you are using connection pooling.
- **ATTCALL**: Use this program when working under CICS if you are using connection pooling.
- **ATTCNTRL**: Use this program when working under CICS if you are using connection pooling.
- **UPDTRNS**: Use this program for the OracleAS CDC Adapter for VSAM.
- **TRANS2GL**: Use this program if you are using the 3GL interface. This is an example program.

4. Exit the session, then start a new session.
5. Enter a new CICS session.
6. At the code line, run the following:

   ```
   CEDA INS PROG(<PROG NAME>) G(ATY)
   The <PROG NAME> is on one of the programs listed in step 3. Run this for each of the programs you are using.
   ```

**Post-Installation Procedures**

Perform the following procedures after completing the installation, to configure Oracle Connect.

- Allocate a dataset for `INSTROOT.DEF.BRANDBIN`, using 1 track and with `RECFM=VB` and `LRECL=256`. The block size is 6233.

  `INSTROOT` is the high-level qualifier where Oracle Connect is installed.

  Using FTP, copy the `BRANDBIN` file, in binary mode, from the `Oracle_Connect\VSAM_Legacy_Adapter` directory to the mainframe, to `INSTROOT.DEF.BRANDBIN`.

- Define the `LOADAUT` library as an APF-authorized library

---

**Note:** To define a DSN as APF-authorized, in the SDSF screen enter the following command:

```
*/setprog apf,add,dsn=INSTROOT.loadaut,volume=vol002*
```

Where `vol002` is the volume where you installed Oracle Connect and `INSTROOT` is the high-level qualifier where Oracle Connect is installed.

If the site uses SMS, then when defining APF-authorization in the SDSF screen, enter the following command:

```
*/setprog apf,add,dsn=INSTROOT.loadaut,SMS*
```

Ensure that the library is APF-authorized, even after an IPL (restart) of the computer.
- Move the `INSTROOT.USERLIB(ATTDXMN)` and `INSTROOT.USERLIB(ATTSRV)` members to any active proclib (such as `user.proclib`). `ATTDXMN` and `ATTSRV` are run as started tasks.

If you decide to change the name of the `ATTSRV` member when you move it to a general high-level qualifier, then change the name specified in the `StartupScript` parameter in the daemon configuration to the new name:

- Run `INSTROOT.USERLIB(NAVCMC)` and enter `EDIT DAEMON IRPCDINI` at the prompt.
- Change the `startupScript` parameter from `ATTSRV` to the new name for the server:
  ```xml
  <Workspace name="Navigator"
          startupScript="NEW_NAME"
          serverMode="reusable"
          ... />
  ```
- Exit and save the change.

- Change the following line in the `ATTDXMN` script to include the IP address and port of the IBM z/OS platform.
  For example, before:
  ```
  // PARM='-B START IRPCDINI'
  ```
  After:
  ```
  // PARM='-B -L ip_address:2551 START IRPCDINI'
  ```
  Where `ip_address` is the ip address of the computer, 2551 is the default port for starting the daemon and `IRPCDINI` is the default daemon configuration.

- The `ATTDXMN` and `ATTSRV` started tasks need permission to use an Open Edition TCP/IP stack. The owner must be a user with OMVS segment defined and OMVS UID=0000000000.

- In the security manager, such as RACF, define `ATTDXMN` and `ATTSRV` with a started task class and a general profile that enables the following:
  - Permission to issue master console commands.
  - `START` authority for the `ATTSRV` job.
  - Access to an Open z/OS segment (that defines access to TCP/IP OA sockets).
  - `ALTER` authority on datasets under `INSTROOT` (to access to read, write, allocate and delete datasets under `INSTROOT`).

- The installation includes a PS, `INSTROOT.DEF.GBLPARMS`, that contains global environment information. This PS is read at startup and the correct software version is used, based on the details provided in the startup task.

If you change the location of this member, then you must also change the relevant cards in the following jobs to the new locations:

- `ATTSRV`: located in an active proclib, such as `user.proclib`)
- `ATTDXMN`: located in an active proclib, such as `user.proclib`)
- `NAVSQL`: located in `INSTROOT.USERLIB`

- The input during the installation procedure is written to `nnn.BUILDKIT.SRC(PARS)`. You can use this file to provide the same inputs if
you rerun the installation, where *nnn* is the high-level qualifier you assign for the installation.

- For information about specifying Oracle Connect as the service using port 2551 in the TCP/IP network services file, consult TCP/IP documentation.

### Starting the Daemon

Activate `INSTROOT.USERLIB(ATTDAEMN)` as a started task to invoke the daemon. For example, in the SDSF screen enter the following:

`'/s ATTDAEMN'`

`INSTROOT` is the high-level qualifier where Oracle Connect is installed.

To submit the daemon as a job, uncomment the first two lines of the `ATTDAEMN` JCL, change the PARM line as described earlier, and run the job using the sub command. The `ATTDAEMN` JCL is similar to the following:

```plaintext
//*ATTDAEMN JOB 'RR','TTT',MSGLEVEL=(1,1),CLASS=A,
//* MSGCLASS=A,XMITYPE=SYSUID,REGION=8M
//STEP1 EXEC PGM=IRPCD,
// PARM='-B  START IRPCDINI'
//* PARM='-B -L :8883 START'
//STEPLIB DD DSN=INSTROOT.LOADAUT,DISP=SHR
//SYSPRINT DD SYSOUT=A
//GBLPARMS DD DSN=INSTROOT.DEF.GBLPARMS,DISP=SHR
// EXEC PGM=IRPCD,COND=((1,EQ,STEP1),(2,EQ,STEP1)),
// PARM='-KATTDAEMN START ''INSTROOT.DEF.IRPCDINI'''
//STEPLIB DD DSN=INSTROOT.LOADAUT,DISP=SHR
//SYSPRINT DD SYSOUT=A
//GBLPARMS DD DSN=INSTROOT.DEF.GBLPARMS,DISP=SHR
//SYSDUMP DD DUMMY
```

### Setting Up Oracle Connect for Reentrancy

All Oracle Connect load modules are reentrant to enable sub-tasking. Therefore, move `INSTROOT.LOAD` to the Link Pack Area (LPA).

*Where* `INSTROOT` is the high-level qualifier where Oracle Connect is installed.

Using the LPA reduces real storage usage (because everyone shares the LPA copy) and fetch time.

---

**Note:** If you intend on using impersonation, so that you can run in a security context that is different than the context of the process that owns the server, then do the following:

- Place the `INSTROOT.LOAD(ATYSVCW)` member in an APF-authorized library outside the LPA.

- Change the `ATTTSRVR` member (located in the active proclib), by adding the following to the STEPLIB list:

  ```plaintext
  // DD DSN=apf_library,DISP=SHR
  ```

  *Where* `apf_library` is the APF-authorized library outside the LPA where the `ATYSVCW` member was moved.

---

### Setting Up Oracle Connect to Update VSAM Data

Perform the following to set up Oracle Connect so that you can update VSAM data.
VSAM Running Under CICS  To set up Oracle Connect so that you can update VSAM data from a CICS transaction, copy the UPDTRNS load module from INSTROOT.LOAD to a CICS DFHRPL library, such as CICS.USER.LOAD, and then define the UPDTRNS program under CICS using any available group such as ORA group:

CEDA DEF PROG(UPDTRNS) G(ORA) LANG(C) DA(ANY) DE(ORACLE VSAM UPDATE PROG)

Where INSTROOT is the high-level qualifier where Oracle Connect is installed.

After defining the UPDTRNS program to a group, install it as follows:

CEDA IN G(ORA)

VSAM Not Running Under CICS  To enable Oracle Connect to create and delete VSAM data, run the following JCL:

```
// IDCSYSIN DD DSN=&VSAM,DISP=(NEW,DELETE,DELETE),
// SPACE=(TRK,(1)),UNIT=SYSDA,
// DCB=(BLKSIZE=3200,LRECL=80,RECFM=FB)
```

Updating an Existing Oracle Connect Installation with VSAM

Verify that you have all the information detailed in the following installation worksheets, so you can refer to it during the configuration process.

<table>
<thead>
<tr>
<th>Table 2–11</th>
<th>Preinstallation Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Required Information</td>
</tr>
<tr>
<td>CICS</td>
<td>CICS EXCI load library name</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2–12</th>
<th>Required Permissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permission</td>
<td></td>
</tr>
<tr>
<td>Permission to read the CICS EXCI library</td>
<td></td>
</tr>
</tbody>
</table>

In the nnn.BUILDKIT.SRC library, run the VSAM member:

```
ex VSAM
```

Follow the instructions in the Response column for each entry in the Screen column.

<table>
<thead>
<tr>
<th>Table 2–13</th>
<th>VSAM Adapter-Specific Installation Prompts and Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen</td>
<td>Response</td>
</tr>
<tr>
<td>DO YOU WANT ORACLE CONNECT FOR LEGACY ADAPTER TO WORK WITH VSAM UNDER CICS (YES/NO) [NO]:</td>
<td>Answer YES to this prompt if you want to access VSAM data under CICS.</td>
</tr>
<tr>
<td>ENTER THE CICS EXCI LOAD LIBRARY NAME [CICSTS13.CICS.SDFHEXCI]:</td>
<td>If you responded YES to working with VSAM under CICS, then enter the CICS EXCI load library name only if you do not want the default.</td>
</tr>
<tr>
<td>PLEASE CONFIRM (YES/NO/QUIT) [YES]:</td>
<td>If you responded YES to working with VSAM under CICS, then confirm the entered details.</td>
</tr>
<tr>
<td>ENTER THE ISPF LOAD LIBRARY NAME [ISPSISPLOAD]:</td>
<td>Enter the ISPF load library name only if you do not want the default.</td>
</tr>
</tbody>
</table>
Installing Oracle Connect on UNIX

You must install Oracle connect on any UNIX machine that you are using for a staging area for the CDC adapter. The following sections explain how to install Oracle Connect on a UNIX machine.

Installing Oracle Connect on a UNIX Platform

This section explains how to install Oracle Connect on a UNIX platform. This section includes the following:

- Preinstallation Tasks
- Installing Oracle Connect
- Installation Tasks
- Post-Installation Tasks

Preinstallation Tasks

Before starting the installation procedure, ensure that you have the following information is available:

- The root directory where you want to install Oracle Connect.

Notes: The root directory cannot be a system root directory, /var or /tmp.

- The account name where Oracle Connect will run.
- Whether the installation source media is removable media or a disk archive file.

If you are installing from the removable media that is not a default device in the system, you need to know the media device name (such as /dev/rmt/0m). See the operating system manuals or ask the system administrator to find out the device name for the site.

The installation is completed. All JCL jobs and REXX procedures are written to the INSTROOT.USERLIB library. INSTROOT is the high-level qualifier for the installation.

After completing the installation, perform post-installation tasks, as described in "Post-Installation Instructions" on page 2-9, as required.

### Table 2–13 (Cont.) VSAM Adapter-Specific Installation Prompts and Responses

<table>
<thead>
<tr>
<th>Screen</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLEASE CONFIRM (YES/NO/QUIT) [YES]:</td>
<td>Confirm the entered details</td>
</tr>
<tr>
<td>ENTER THE OUTPUT CLASS FOR INSTALLATION OUTPUT [A]:</td>
<td>Enter the output class for Oracle Connect output. Assigning a device which is set on HOLD prevents the loss of log information when the Oracle Connect started tasks finish (the default is A).</td>
</tr>
<tr>
<td>DO YOU WANT TO USE THE DEFAULT JOB CARD Y/N [Y]</td>
<td>A job card is displayed. If you want to use a replacement card, then it must be entered as it will appear in the job. You can enter up to six lines. Enter a blank card to end input. If you do not enter a card, then the Oracle Connect default card is used.</td>
</tr>
</tbody>
</table>
If you are installing from the disk archive file, you need to know the name of the Oracle Connect disk archive file (such as /tmp/nav.2.0.tar).

- The shell being used: C-shell Korn-, shell, or Bourne-shell. The installation creates a startup file according to the indicated shell.

When running the installation below, use the following as the <filename>:

- For RedHat Linux: OCL10134-linuxrh.tar.Z
- For Linux Suse: OCL10134-linuxsuse.tar.Z
- For HP-UX: OCL10134-hpux.tar.Z
- For IBM AIX: OCL10134-ibmaix.tar.Z
- For Solaris Operating System (SPARC): OCL10134-sunsol2.8.tar.Z

**Installing Oracle Connect**

Perform the following steps to install Oracle Connect:

1. Transfer the tar.Z file to the system.
2. Decompress the file using the following command:
   
   ```
   uncompress <filename>
   ```
3. Run the tar command, as shown in the following example:

   ```
   tar xvf <filename> nav_install
   ```

   The following message is displayed:

   ```
   x nav_install, nnnn bytes, mmmm tape blocks
   ```

   **Note:** Ensure that the directory used to run the installation files has WRITE privileges.

**Installation Tasks**

Perform the following steps to install Oracle Connect:

1. Run the following command:

   ```
   ./nav_install
   ```

   This command initiates the installation procedure. The installation procedure is displayed in a series of screen prompts and responses.

2. Enter the full path of the disk archive (.tar) file, and press Enter.

3. Enter the root directory name for the installation, and press Enter. You must have a WRITE permission for this directory. The default directory is the user's home directory.

   **Notes:**

   - The root directory cannot be a system root directory or /var or /tmp directory.
   - Oracle Connect is installed into a fixed directory named navroot.
4. Confirm the directory name in which Oracle Connect will be installed, and press Enter.

5. Enter the account name where you want Oracle Connect to run, and press Enter. This account name will be used for anonymous access to the server by clients. It can be changed after the installation is complete.

6. Confirm the account name, and press Enter.

7. Specify the required shell, under which Oracle Connect should run, and press Enter. The following options are displayed:
   - C-shell (/bin/csh).
   - Korn-shell (/bin/ksh)
   - Bourne-shell (/bin/sh)

8. Enter the account name for a user with administrative authorization. Optionally, press Enter to enable any user to administer Oracle Connect.

Post-Installation Tasks
After installing Oracle Connect, perform the following post-installation tasks:
- Configuring the Oracle Connect Environment
- Configuring the Oracle Connect Script
- Starting the Oracle Connect Daemon

Configuring the Oracle Connect Environment
When Oracle Connect is installed on a UNIX platform, using FTP, copy the brand.bin file to the Oracle Connect computer, to NAVROOT/bin.

Where NAVROOT is the directory where Oracle Connect is installed.

Configuring the Oracle Connect Script
The program that manages Oracle Connect server processes (nav_server) is accessed by a symbolic link to a file for the C-shell, Bourne and Korn shells.

To set up nav_server, perform the following steps:
1. In the bin directory, under the directory where Oracle Connect is installed, delete the existing link to nav_server using the following command:

   `rm nav_server`

2. In the bin directory, under the directory where Oracle Connect is installed, link to the required version of nav_server as follows:

   - C-shell: `ln -s nav_server.csh nav_server`
   - Bourne: `ln -s nav_server.sh nav_server`
   - Korn: `ln -s nav_server.ksh nav_server`

Note: Instead of renaming files, use a symbolic link.

The Oracle Connect nav_login procedure defines the default environment when Oracle Connect runs. If you want site-dependent variables to be included in the environment, create a file called site_nav_login and save this file in the bin...
directory under the Oracle Connect root directory. nav_login runs site_nav_login automatically.

nav_login must be invoked to run Oracle Connect. It can be invoked from the user login script.

The command line for invoking nav_login varies according to the shell the user is running. The following table lists the different options for invoking the command line:

<table>
<thead>
<tr>
<th>Shell</th>
<th>nav_login Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSH</td>
<td>source root/bin/nav_login</td>
</tr>
<tr>
<td>Bourne</td>
<td>. root/bin/nav_login.sh</td>
</tr>
<tr>
<td>Korn</td>
<td>. root/bin/nav_login.sh</td>
</tr>
</tbody>
</table>

In the nav_login command, root represents the root directory of the Oracle Connect installation. After running the login procedure, the environment variable NAVROOT points to this root directory.

Ensure that users have READ and EXECUTE permissions on the Server files. Use the chmod command to change the permissions.

**Starting the Oracle Connect Daemon**

The Oracle Connect daemon must run on a server for client/server access to Oracle Connect. To start the daemon with the system startup, add the following command invoking the daemon to the end of the /etc/inittab file:

nv:3:once:navroot/bin/irpcd -l ip:2551 start >/dev/console 2>&1

In this command, the symbol navroot should be replaced with the directory where Oracle Connect is installed and ip replaced by the ip address of the computer.

---

**Note:** To allow automatic client/server access to Oracle Connect, start the daemon at system startup time from a super user account.

---

## Installing Oracle Connect on Windows

You must install Oracle connect on any Windows machine that you are using for a staging area for the CDC adapter. This following sections explain how to install Oracle Connect on a Windows machine.

### Installing Oracle Connect on a Windows Platform

This section explains how to install Oracle Connect. Do the following to install Oracle Connect.

---

**Note:** If you are upgrading from version 10.1.3.3, you must use the upgrade option in the installation wizard. Do not uninstall Version 10.1.3.3 and then install the newer version. If you do this, you will lose all data in the DeC directory.

---

1. Copy the following installation files into a folder on the Windows computer where you are installing Oracle Connect.
Installing Oracle Studio

This following sections explain how to install Oracle Studio.

- Oracle Studio Requirements
- Installing Oracle Studio on Windows
- Installing Oracle Studio on Linux

Note: If you have Oracle Studio version 10.1.3.4 or higher installed on your computer because you are using a legacy adapter or OracleAS CDC adapter, you do not need to reinstall it. If you have an older version of Oracle Studio, you must install the newest version to work with the OracleAS CDC Adapter for VSAM.

Oracle Studio Requirements

The following are the hardware requirements for Oracle Studio:

- Processor: Intel or 100% compatible computer, based on a Pentium processor
- Memory: 256 MB
- Disk space: 120 MB of free disk space

You can install Oracle Studio on the following operating systems:

- Windows XP with Service Pack 2 or higher
- Windows 2003
- Windows Vista
- Linux OS with GTK

Installing Oracle Studio on Windows

Oracle Studio is installed with a standard install wizard. Do the following to install Oracle Studio.

- Run the installation file, either using the Run option in the Windows Start menu or through Windows Explorer. Follow the instructions on the wizard screen.
Installing Oracle Studio on Linux

The Oracle Studio installation on Linux can be carried out by one of the following:

- Installing Oracle Studio with the Wizard (SH installation)
- Installing with a Silent Installation (RPM)

Installing Oracle Studio with the Wizard (SH installation)
You can install Oracle Studio by using the installation wizard. This allows you to easily carry out any standard or custom installation. Do the following for the Linux SH installation.

1. Install into a directory where you have permission.
2. Change the mode to execute mode. Type in:
   ```bash
   chmod +x <file name>
   ```
3. Enter the following:
   ```bash
   ./ <file name>
   ```
   If you are not installing to the current directory, enter the full path.

Installing with a Silent Installation (RPM)
You can use the Linux RPM method to install Oracle Studio. Do the following to carry out a silent installation on Linux.

- Enter the following:
  ```bash
  rpm -i <file name>
  ```
  You can use RPM parameters to create a custom installation.
This section describes how to configure a change data capture using the OracleAS CDC Adapter for VSAM.

Most of the configurations are done using Oracle Studio. To use Oracle Studio, you first configure it to enable access to the z/OS computer where the VSAM data resides. Then you set up a VSAM data source and finally create the change data capture solution.

This section contains the following topics:

■ Setting Up the IBM z/OS Platform in Oracle Studio
■ Securing Access to Oracle Connect
■ Setting up Metadata for the OracleAS VSAM Data Source
■ Setting Up a Change Data Capture with the OracleAS CDC Adapter for VSAM

Note: These tasks assume you have permission to access the IBM z/OS platform and that the Oracle Connect daemon is running on this computer.

Check with the system administrator to ensure these requirements are fulfilled.

---

### Setting Up the IBM z/OS Platform in Oracle Studio

Using Oracle Studio, perform the following steps to configure the IBM z/OS platform:

1. From the Start menu, select Programs, Oracle, and then select Studio. Oracle Studio opens.

2. Right-click Machines in the Configuration Explorer and select Add Machine. The Add Machine screen is displayed.
3. Enter the name of the computer you want to connect to, or click **Browse** to select the computer from the list of computers that is displayed and which use the default port 2551.

4. Specify the username and password of the user who was specified as the administrator when Oracle Connect was installed.

   **Note:** Selecting **Anonymous connection** enables anyone having access to the computer to be an administrator, if this was defined for the computer.

5. Click **Finish**.
   The computer is displayed in the Configuration Explorer.

---

**Securing Access to Oracle Connect**

Oracle Studio includes mechanisms to secure access to Oracle Connect both during modeling and runtime.

During modeling the following security mechanisms can be applied:

- Setting Password Access to Oracle Studio
- Specifying Users with Administrative Rights

During run time client access to Oracle Connect is provided by the user profile:

- Setting Up Run-Time User Access to the IBM z/OS Platform

---

**Setting Password Access to Oracle Studio**

Initially, any operation performed using Oracle Studio does not require a password. You can set a password so that the first operation that involves accessing the server from Oracle Studio requires a password to be entered.

Perform the following steps to set the password:
1. From the Start menu, select Programs, Oracle, and then select Studio.

2. Select Window from the menu bar and then select Preferences. The Preferences screen is displayed.

3. Select the Studio node, as shown in the following figure:

   **Figure 3–2  The Preferences screen**

4. Click Change master password. The Change Master Password screen is displayed as shown in the following figure:

   **Figure 3–3  The Change Master Password Screen**

5. Leave the Enter current master password field blank and type a new master password in the Enter new master password field.

6. Enter the new password again in the Confirm new master password field.

7. Click OK.

**Specifying Users with Administrative Rights**

By default, only the user who was specified during the installation as an administrator has the authorization to modify settings on that computer from Oracle Studio. This
user can then authorize other users to make changes or to view the definitions for a selected computer. Adding a computer to Oracle Studio is described in "Setting Up the IBM z/OS Platform in Oracle Studio".

---

**Note:** The default during installation is to enable all users to be administrators.

---

1. From the **Start** menu, select **Programs, Oracle**, and then select **Studio**.
2. In the Design perspective Configuration view, Right-click the computer and select **Administration Authorization**.

   The Administration Authorization screen is displayed as shown in the following figure.

**Figure 3–4  The Administration Authorization Identities tab**

![Administration Authorization Identities tab](image)

The screen has the following sections:

**Administrators:** Administrators can view and modify all the definitions in Oracle Studio for the selected computer. On initial entry to Oracle Studio, every user is defined as a system administrator.

**Designers:** Designers can view all the definitions for the computer in Oracle Studio and can modify any of the definitions under the **Bindings** and **Users** nodes for the selected computer. For example, Oracle Studio database administrator can add new data sources and adapters and can change metadata definitions for a table in a data source.

**Users:** Users can view all the definitions for the computer in Oracle Studio for the selected computer. Regular users cannot modify any of the definitions.

3. Add users or groups of users by clicking **Add User** or **Add Group** for the relevant sections.
The user or group that is added must be recognized as a valid user or group for the computer. Once a name has been added to a section, only the user or group who logs on with that user name has the relevant authorization.

Setting Up Run-Time User Access to the IBM z/OS Platform

During run time, client access to Oracle Connect is provided by the user profile. A user profile contains name and password pairs that are used to access a computer, data source or application at run time, when anonymous access is not allowed.

1. From the Start menu, select, Programs, Oracle, and then select Studio. Oracle Studio opens.
2. From the Design perspective, Configuration view, expand the Machines folder, then expand the machine where you want to set the user name and password.
3. Expand Users.
4. Right-click NAV and select Open The NAV user profile editor is displayed.

Figure 3–5  The User Editor

5. In the User editor, click Add. The Add Authenticator screen is displayed:
Setting up Metadata for the OracleAS VSAM Data Source

Figure 3–6  The Add Authenticator screen

7. Enter the name of the IBM z/OS computer defined in Oracle Studio.
8. Enter the name and password used to access the computer and confirm the password.
9. Click OK.

Setting up Metadata for the OracleAS VSAM Data Source

Setting up a change data capture with the OracleAS CDC adapter for VSAM and VSAM under CICS is done using Oracle Studio. The first step is to define a VSAM or VSAM (CICS) data source and import the metadata. The definitions are created on a z/OS machine.

Note: The type of VSAM data source that you select depends whether you are working under CICS. If you are working under CICS you must select a VSAM (CICS) data source and also select VSAM (CICS) when Setting Up a Change Data Capture with the OracleAS CDC Adapter for VSAM.

This section contains the following:
- Setting Up the VSAM Data Source
- Configuring the Data Source Driver
- Importing Metadata for the VSAM Data Source
- Verifying the Metadata Definition

Setting Up the VSAM Data Source

You should configure a VSAM data source as the first step in setting up the CDC adapter.

Perform the following steps to setup the VSAM data source:
1. From the Start menu, select Programs, Oracle and then select Studio.
2. In the Design perspective, Configuration view expand the **Machines** folder.

3. Expand the machine defined in **Setting Up the IBM z/OS Platform in Oracle Studio**.

4. Expand the **Bindings** folder. The binding configurations available on this computer are listed.

5. Expand the **NAV** binding. The NAV binding configuration includes branches for data sources and adapters that are located on the computer.

6. Right-click **Data sources** and select **New Data source**.
   
   The New Data Source wizard is displayed.

   **Figure 3–7  The New Data Source screen**

   ![New Data Source Screen](image)

7. Enter a name for the VSAM data source. The name can contain letters and numbers and the underscore character only.

8. In the Type field, select **VSAM (CICS)** or **VSAM**.

9. Click **Next**. The **Data Source Connect String** screen is displayed.

10. Enter the parameters for the Data source connect string.
   
   If you are using a VSAM (CICS) data source, enter information for the following parameters:
   
   - **CICS Application ID**: The VTAM applid of the CICS target system. The default value is **CICS**. This parameter is used when updating VSAM data. You can determine this value by activating the **CEMT** transaction on the target CICS system. On the bottom right corner of the screen appears the legend `APPLID=target_system`.
   
   - **Transaction ID**: The mirror transaction within CICS that receives control through MRO, which transfers the transaction from the Oracle Connect for VSAM environment to CICS. The default value is **EXCI**.
   
   - **VTAM NetName**: The VTAM netname of the specific connection being used by **EXCI** (and **MRO**) to relay the program call to the CICS target system. For example, if you issue to **CEMT** the following command:

     ```
     CEMT INQ CONN
     ```
Then you will see on the display screen that the netname is BATCHCLI (this is the default connection supplied by IBM upon the installation of CICS). The default value is ATYCLIEN.

- **Program Name**: The UPDTRNS program that is supplied by Oracle Connect for VSAM to enable updating VSAM data.
- **Trace Queue**: The name of queue for output which is defined under CICS when tracing the output of the UPDTRNS program. When not defined, the default CICS queue is used.

If you are using a VSAM data source, enter information for the following parameters:

- **Data HLQ**: The high-level qualifier where the data files are located.
- **Disk Volume Name**: The high-level qualifier (volume) where the data resides.

The values specified are used in the Data File field in the Oracle Studio Design perspective, Metadata tab. For tables created using the `CREATE TABLE` statement, the values specified are used to create the data files. If values are not specified, then data files are written to the DEF high-level qualifier under the high-level qualifier where Oracle Connect is installed.

When SMS is used to manage the volumes, leave this value empty and set the `newFileSMSStorageClass` and `newFileSMSDataClass` properties as described in **VSAM Properties**.

11. Click **Finish**.

The new data source is displayed in the Configuration Explorer.

### Configuring the Data Source Driver

After setting up the VSAM data source, you can set its driver properties according to specific requirements. To edit the properties:

1. In the Configuration view, right-click the VSAM data source that you created and select **Open**.
2. Click the **Configuration** tab.

The VSAM or VSAM (CICS) data source configuration is displayed in the editor. This editor has two sections.

The **Connection** section shows the connections you defined when **Setting Up the VSAM Data Source**.

The **Properties** section displays the properties that can be configured for the data source. See the following for a list of the properties:

- **VSAM (CICS) Properties**
- **VSAM Properties**
- **Configuring the Data Source Driver Advanced Properties**

3. Click **Save** to save the changes you made to the configuration properties.

### VSAM (CICS) Properties

The following properties can be configured for the VSAM (CICS) data source. You set the properties in Oracle Studio, Design perspective.
■ allowUpdateKey: When set to true, this parameter specifies that the key is updatable.

■ disableExplicitSelect: When set to true, this parameter disables the ExplicitSelect ADD attribute; every field is returned by a SELECT * FROM... statement.

■ trigger: A name of a user defined trigger or user exit that can be setup. User code is activated on specific events like PRE-UPDATE, POST-READ etc. Triggers are normally used for either compression/decompression code or advanced logic for filtering.

VSAM Properties
The following properties can be configured for the VSAM data source. You set the properties in Oracle Studio, Design perspective. For information on how to set data source properties in Oracle Studio.

■ disableExplicitSelect: When set to true, this parameter disables the ExplicitSelect ADD attribute; every field is returned by a SELECT * FROM... statement.

■ filepoolCloseOnTransaction: This parameter specifies that all files in the file pool for this data source close at each end of transaction (commit or rollback).

■ filepoolSize: This parameter specifies how many instances of a file from the file pool may be open concurrently.

■ newFileSMSStorageClass: This parameter specifies the storage class when SMS is used to manage volumes.

■ newFileSMSDataClass: This parameter specifies the data class when SMS is used to manage volumes.

■ trigger: A name of a user defined trigger or user exit that can be setup. User code is activated on specific events like PRE-UPDATE, POST-READ etc. Triggers are normally used for either compression/decompression code or advanced logic for filtering.

■ useGlobalFilepool: This parameter specifies whether or not a global file pool that can span more than one session is used.

Configuring the Data Source Driver Advanced Properties
You configure the advanced properties for a data source in the Advanced tab of the data source editor. The advanced settings are the same for every data source. Advanced settings let you do the following:

■ Define the transaction type
■ Edit the syntax name
■ Provide a table owner
■ Determine if a data source is updateable or readable
■ Provide repository information
■ Set the virtual view policy

Use the following procedure to configure the data source advanced features.

1. Open Oracle Studio.
2. In the Design Perspective Configuration View, expand the **Machine** folder and then expand the machine where you want to configure the data source.

3. Expand the **Data sources** folder, right click the data source you are configuring, then select Open.

4. Click the **Advanced** tab and make the changes that you want. The table below describes the available fields:

<table>
<thead>
<tr>
<th><strong>Table 3–1 Data Source Advanced Configuration</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Field</strong></td>
</tr>
<tr>
<td><strong>Properties</strong></td>
</tr>
<tr>
<td>Transaction type</td>
</tr>
</tbody>
</table>
| Syntax name | A section name in the NAV.SYN file that describes SQL syntax variations. The default syntax file contains the following predefined sections:
- OLESQL driver and the SQL Server 7 OLE DB provider (SQLOLEDB):
  - syntaxName="OLESQL_SQLOLEDB"
- OLESQL driver and JOLT:
  - syntaxName="OLESQL_JOLT"
- Rdb driver and Rdb version:
  - syntaxName="RDBS_SYNTAX"
- ODBC driver and EXCEL data:
  - syntaxName="excel_data"
- ODBC driver and SQL/MX data:
  - syntaxName="SQLMX_SYNTAX"
- ODBC driver and SYBASE SQL AnyWhere data:
  - syntaxName="SQLANYS_SYNTAX"
- Oracle driver and Oracle case sensitive data:
  - syntaxName="ORACLE8_SYNTAX" or
  - syntaxName="ORACLE_SYNTAX"
  
  For case sensitive table and column names in Oracle, use quotes (") to delimit the names. Specify the case sensitivity precisely.
| Default table owner | The name of the table owner that is used if an owner is not indicated in the SQL |
| Read/Write information | Select one of the following:
- **Updateable data**: Select this if you want to be able to update the data on the data source.
- **Read only data**: Select this to allow users to only view the data on the data source. |
| **Repository Directory** |  |
| Repository directory | Enter the location for the data source repository. |
Importing Metadata for the VSAM Data Source

Oracle Connect requires metadata describing the VSAM data source records and the fields in these records. Use the Import Metadata procedure in Oracle Studio to import metadata for the VSAM data source from COBOL copybooks, which describe the data.

The metadata import procedure is has the following steps:

- **Select the COBOL Copybooks**
- **Applying Filters**
- **Selecting Tables**
- **Import Manipulation**
- **Create VSAM Indexes** (VSAM Batch only)
- **Assigning File Names** (VSAM under CICS only)
- **Assigning Index File Names** (VSAM under CICS only)
- **Metadata Model Selection**
- **Importing the Metadata**

**Select the COBOL Copybooks**

Carry out the following steps to select the COBOL copybooks.

1. From the **Start** menu, select **Programs**, **Oracle**, and then select **Studio**.
2. In the Design perspective, Configuration view expand the **Machines** folder.
3. In the Design perspective Configuration view, expand the machine defined in Setting Up the IBM z/OS Platform in Oracle Studio.

4. Expand Bindings folder. The binding configurations available on this computer are listed.

5. Expand the NAV binding.

6. Expand the Data sources folder.

7. Right-click the VSAM data source defined in Setting Up the VSAM Data Source.

8. Select Show Metadata View to open the Metadata tab, with the VSAM data source displayed under the data sources list.

9. Right-click the VSAM data source and select New Import.

   The New Import screen is displayed.

10. Enter a name for the import. The name can contain letters and numbers and the underscore character only.

11. Select the import type from the Import Type list, as shown in the following figure:

   Figure 3–8  The Metadata Import screen

   ![Metadata Import Screen]

   Note: The same New Import screen is displayed for both VSAM imports (VSAM under CICS and VSAM direct), with the exception of the Import type field value: either VSAM Under CICS Import Manager or VSAM Import Manager, respectively.

12. Click Finish. The Get Input Files screen is displayed.
13. Click Add.

The Select Resources screen is displayed, which provides the option to select files from the local computer or copy the files from another computer.

14. If the files are on another machine, then right-click My FTP Sites and select Add.
The Add FTP Site screen is displayed. Enter the correct information to connect to the FTP site.

15. Enter the server name where the COBOL copybooks are located and, if not using anonymous access, enter a valid username and password to access that computer. The username is then used as the high-level qualifier.

16. Click OK. After accessing the remote computer, you can change the high-level qualifier by right-clicking the machine in the Add Resource screen, and selecting Change Root Directory.

17. Select the files to import and click Finish to start the file transfer. When complete, he selected files are displayed in the Get Input Files screen.

To remove any of these files, select the required file and click Remove.

18. Click Next (The Apply Filters screen opens) to continue to the Applying Filters step.

**Applying Filters**
This section describes the steps required to apply filters on the COBOL copybooks used to generate the Metadata. It continues the Select the COBOL Copybooks procedure. Do the following to apply filters:

1. Expand all in the Apply Filters screen.

2. Apply the required filter attributes to the COBOL copybooks. The available filters are listed and described in the table that describes the Metadata Filters.

3. Click Next (The Select Tables screen opens) to continue to the Selecting Tables step.

This figure shows the Apply Filters screen.

*Figure 3–11 The Apply Filters screen*

![](image)

The following table lists the available filters:
Selecting Tables

This section describes the steps required to select the tables from the COBOL copybooks. The import manager identifies the names of the records in the COBOL copybooks that will be imported as tables.

Do the following to select the required tables. This continues the Applying Filters procedure.

1. From the Select Tables screen, select the tables that you want to access. To select all tables, click Select All. To deselect all selected tables, click Unselect All.

<table>
<thead>
<tr>
<th>Filter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP_6 switch</td>
<td>The MicroFocus COMP-6 compiler directive. Specify either COMP-6’1’ to treat COMP-6 as a COMP data type or COMP-6’2’ to treat COMP-6 as a COMP-3 data type.</td>
</tr>
</tbody>
</table>
| Compiler source | The compiler vendor. The following are available:  
  - z/OS  
  - AS400  
  - HP NonStop  
  - VMS  
  - MICROFOCUS  
  - Hardware (UNIX vendor)  
  - Default/Not known/Other |
| Storage mode | The MicroFocus Integer Storage Mode. Specify one of the following:  
  - NOIBMCOMP for byte storage mode.  
  - IBMCOMP for word storage mode. |
| Ignore after column 72 | When set to true, ignores columns 73 to 80 in the COBOL copybook. |
| IgnoreFirst6 | When set to true, ignores the first six columns in the COBOL copybook. |
| Replace hyphens (-) in record and field names with underscores (_) | When set to true, replaces all hyphens in either the record or field names in the metadata generated from the COBOL with underscore characters. |
| Prefix nested columns | When set to true, prefix all nested columns with the previous level heading. |
| Case sensitive | Specifies whether to be sensitive to the search string case. |
| Find | Searches for the specified value. |
| Replace with | Replaces the value specified for Find with the value specified here |
2. Click Next (the Import Manipulation screen opens) to continue to the Import Manipulation step.

**Import Manipulation**

This section describes the operations available for manipulating the imported records (tables). It continues the Selecting Tables procedure.

The import manager identifies the names of the records in the DDM Declaration files that will be imported as tables. You can manipulate the general table data in the Import Manipulation Screen. The following describes how to manipulate the records in the tables.

1. From the Import Manipulation screen (see Import Manipulation Screen figure), right-click the table record marked with a validation error, and select the relevant operation. See the table, Table Manipulation Options for the available operations.

2. Repeat step 1 for all table records marked with a validation error. You resolve the issues in the Import Manipulation Screen.

Once all the validation error issues have been resolved, the Import Manipulation screen is displayed with no error indicators.

3. Click Next. .

If you are importing metadata for a VSAM data source, continue to the Create VSAM Indexes step.

If you are importing metadata for a VSAM (CICS) data source, continue to the Assigning File Names step

**Import Manipulation Screen**

The Import Manipulation screen is shown in the following figure:
Figure 3–13  Import Manipulation Screen

The upper area of the screen lists the COBOL files and their validation status. The metadata source and location are also listed.

The Validation tab at the lower area of the screen displays information about what needs to be resolved in order to validate the tables and fields generated from the COBOL. The Log tab displays a log of what has been performed (such as renaming a table or specifying a data location).

The following operations are available in the Import Manipulation screen:

- Resolving table names, where tables with the same name are generated from different files during the import.
- Selecting the physical location for the data.
- Selecting table attributes.
- Manipulating the fields generated from the COBOL, as follows:
  - Merging sequential fields into one (for simple fields).
  - Resolving variants by either marking a selector field or specifying that only one case of the variant is relevant.
  - Adding, deleting, hiding, or renaming fields.
  - Changing a data type.
  - Setting the field size and scale.
  - Changing the order of the fields.
  - Setting a field as nullable.
  - Selecting a counter field for array for fields with dimensions (arrays). You can select the array counter field from a list of potential fields.
– Setting column-wise normalization for fields with dimensions (arrays). You can create new fields instead of the array field where the number of generated fields will be determined by the array dimension.

– Creating arrays and setting the array dimension.

The following table lists and describes the available operations when you right-click a table entry:

**Table 3–3 Table Manipulation Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fields Manipulation</td>
<td>Customizes the field definitions, using the Field Manipulation screen. You can also access this screen by double-clicking the required table record.</td>
</tr>
<tr>
<td>Rename</td>
<td>Renames a table. This option is used especially when more than one table with the same name is generated from the COBOL.</td>
</tr>
<tr>
<td>Set data location</td>
<td>Sets the physical location of the data file for the table.</td>
</tr>
<tr>
<td>Set table attributes</td>
<td>Sets the table attributes.</td>
</tr>
<tr>
<td>XSL manipulation</td>
<td>Specifies an XSL transformation or JDOM document that is used to transform the table definitions.</td>
</tr>
<tr>
<td>Remove</td>
<td>Removes the table record.</td>
</tr>
</tbody>
</table>

You can manipulate the data in the table fields in the Import Manipulation Screen. Double-click a line in the Import Manipulation Screen to open the Field Manipulation Screen.

**Field Manipulation Screen**

The Field Manipulation screen lets you make changes to fields in a selected table. You get to the Field Manipulation screen through the Import Manipulation Screen. The Field Manipulation screen is shown in the following figure.
You can carry out all of the available tasks in this screen through the menu or toolbar. You can also right click anywhere in the screen and select any of the options available in the main menus from a shortcut menu. The following table describes the tasks that are done in this screen. If a toolbar button is available for a task, it is pictured in the table.

### Table 3–4 Field Manipulation Screen Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>General menu</td>
<td></td>
</tr>
<tr>
<td>Undo</td>
<td>Click to undo the last change made in the Field Manipulation screen.</td>
</tr>
<tr>
<td>Select fixed offset</td>
<td>The offset of a field is usually calculated dynamically by the server at runtime according the offset and size of the proceeding column. Select this option to override this calculation and specify a fixed offset at design time. This can happen if there is a part of the buffer that you want to skip. When you select a fixed offset you pin the offset for that column. The indicated value is used at runtime for the column instead of a calculated value. Note that the offset of following columns that do not have a fixed offset are calculated from this fixed position.</td>
</tr>
</tbody>
</table>
Table 3–4 (Cont.) Field Manipulation Screen Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test import tables</td>
<td>Select this table to create an SQL statement to test the import table. You can base the statement on the Full table or Selected columns. When you select this option, the following screen opens with an SQL statement based on the table or column entered at the bottom of the screen.</td>
</tr>
</tbody>
</table>

Enter the following in this screen:

- **Data file name**: Enter the name of the file that contains the data you want to query.
- **Limit query results**: Select this if you want to limit the results to a specified number of rows. Enter the amount of rows you want returned in the following field. 100 is the default value.
- **Define Where Clause**: Click Add to select a column to use in a Where clause. In the table below, you can add the operator, value and other information. Click on the columns to make the selections. To remove a Where Clause, select the row with the Where Clause you want to remove and then click Remove.

The resulting SQL statement with any Where Clauses that you added are displayed at the bottom of the screen.

Click OK to send the query and test the table.

**Attribute menu**

**Change data type**

Select Change data type from the Attribute menu to activate the Type column, or click on the Type column and select a new data type from the drop-down list.
### Table 3-4 (Cont.) Field Manipulation Screen Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create array</td>
<td>This command allows you to add an array dimension to the field. Select this command to open the Create Array screen.</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Create Array" /></td>
</tr>
<tr>
<td></td>
<td>Enter a number in the Array Dimension field and click OK to create the array for the column.</td>
</tr>
<tr>
<td>Hide/Reveal field</td>
<td>Select a row from the Field manipulation screen and select Hide field to hide the selected field from that row. If the field is hidden, you can select Reveal field.</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Field Attributes" /></td>
</tr>
<tr>
<td></td>
<td>Select this to change or set a dimension for a field that has an array. Select Set dimension to open the Set Dimension screen.</td>
</tr>
<tr>
<td></td>
<td>Edit the entry in the Array Dimension field and click OK to set the dimension for the selected array.</td>
</tr>
<tr>
<td>Set field attribute</td>
<td>Select a row to set or edit the attributes for the field in the row. Select Set field attribute to open the Field Attribute screen.</td>
</tr>
<tr>
<td></td>
<td>Click in the Value column for any of the properties listed and enter a new value or select a value from a drop-down list.</td>
</tr>
<tr>
<td>Nullable/Not nullable</td>
<td>Select Nullable to activate the Nullable column in the Field Manipulation screen. You can also click in the column.</td>
</tr>
<tr>
<td></td>
<td>Select the check box to make the field Nullable. Clear the check box to make the field Not Nullable.</td>
</tr>
<tr>
<td>Set scale</td>
<td>Select this to activate the Scale column or click in the column and enter the number of places to display after the decimal point in a data type.</td>
</tr>
<tr>
<td>Set size</td>
<td>Select this to activate the Size column or click in the column and enter the number of total number of characters for a data type.</td>
</tr>
</tbody>
</table>
**Table 3-4  (Cont.) Field Manipulation Screen Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add</td>
<td>Select this command or use the button to add a field to the table. If you select a row with a field (not a child of a field), you can add a child to that field. Select Add Field or Add Child to open the following screen:</td>
</tr>
</tbody>
</table>

![Set Field Name dialog box](image)

Enter the name of the field or child, and click OK to add the field or child to the table.

Delete field      | Select a row and then select Delete Field or click the Delete Field button to delete the field in the selected row. |

Move up or down   | Select a row and use the arrows to move it up or down in the list.                                                                            |

Rename field      | Select Rename field to make the Name field active. Change the name and then click outside of the field.                                           |

**Structures menu**

Columnwise Normalization | Select Columnwise Normalization to create new fields instead of the array field where the number of generated fields will be determined by the array dimension. |

Combining sequential fields | Select Combining sequential fields to combine two or more sequential fields into one simple field. The following dialog box opens: |

![Combining sequential fields dialog box](image)

Enter the following information in the Combining sequential fields screen:

- **First field name**: Select the first field in the table to include in the combined field
- **End field name**: Select the last field to be included in the combined field. Make sure that the fields are sequential.
- **Enter field name**: Enter a name for the new combined field.
Flatten group

Select Flatten Group to flatten a field that is an array. This field must be defined as Group for its data type. When you flatten an array field, the entries in the array are spread into a new table, with each entry in its own field. The following screen provides options for flattening.

- Select Recursive operation to repeat the flattening process on all levels. For example, if there are multiple child fields in this group, you can place the values for each field into the new table when you select this option.
- Select Use parent name as prefix to use the name of the parent field as a prefix when creating the new fields. For example, if the parent field is called Car Details and you have a child in the array called Color, when a new field is created in the flattening operation it will be called Car Details_Color.

Mark selector

Select Mark selector to select the selector field for a variant. This is available only for variant data types. Select the Selector field form the following screen.

Replace variant

Select Replace variant to replace a variant’s selector field.
Create VSAM Indexes
This wizard page is used to create VSAM indexes. It is valid only for VSAM data sources. If you are using a VSAM CICS data source, go to the Assigning File Names step. This step continues the Import Manipulation step.

This figure shows the Create VSAM Indexes step.

Figure 3–15  Create Indexes (For VSAM (ADD) only)

To create VSAM Indexes
■ Click Next to go to the Metadata Model Selection step. The indexes are created automatically.
Assigning File Names

This section describes the steps required to specify the physical file name (including the high-level qualifier), and the CICS logical file name for each record. It is valid only for VSAM CICS data sources. If you are using a VSAM data source, go to the Create VSAM Indexes step. This step continues the Import Manipulation step. Do the following to assign file names.

1. In the Assign File Names screen enter the physical file name, including the high-level qualifier, for each record listed.
2. Specify the CICS logical file name for each record listed.
3. Click Next (The Assign Index File Names screen opens) to continue to the Assigning Index File Names step.

This figure shows the Assign File Names step.

Figure 3–16 The Assign File Names screen

<table>
<thead>
<tr>
<th>Table Name</th>
<th>Physical File Name</th>
<th>Logical File Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>orders.obj</td>
<td>ORDERS</td>
<td>YES</td>
</tr>
</tbody>
</table>

Assigning Index File Names

This section describes the steps required to specify the physical index file name, and the CICS logical index file name for each record. It continues the Assigning File Names step. Do the following to assign index file names.

1. In the Assign Index File Names screen, enter the physical index file name for each record listed.
2. Specify the CICS logical index file name for each record listed.
3. Click Next (The Import Metadata screen opens) to continue to the Metadata Model Selection step.

Note: Make sure that the data location is supplied in the Import Manipulation step.
This figure shows the Assign Index File Names screen.

Figure 3–17  The Assign Index File Names screen

Metadata Model Selection

This section lets you generate virtual and sequential views for imported tables containing arrays. In addition, you can configure the properties of the generated views. It continues the Create VSAM Indexes step if you are using a VSAM data source or it continues the Assigning Index File Names procedure if you are using a VSAM CICS data source. This step allows you to flatten tables that contain arrays.

In the Metadata Model Selection step, you can select configure values that apply to all tables in the import or set specific settings for each table. Do the following to configure the metadata model.

- Select one of the following:
  - **Default values for all tables**: Select this if you want to configure the same values for all the tables in the import. Make the following selections when using this option:
    - **Generate sequential view**: Select this to map non-relational files to a single table.
    - **Generate virtual views**: Select this to have individual tables created for each array in the non-relational file.
    - **Include row number column**: Select one of the following:
      - **true**: Select true, to include a column that specifies the row number in the virtual or sequential view. This is true for this table only, even in the data source is not configured to include the row number column.
      - **false**: Select false, to not include a column that specifies the row number in the virtual or sequential view for this table even if the data source is configured to include the row number column.
default: Select default to use the default data source behavior for this parameter.

- **Inherit all parent columns**: Select one of the following:
  
  true: Select true, for virtual views to include all the columns in the parent record. This is true for this table only, even if the data source is not configured to include all of the parent record columns.
  
  false: Select false, so virtual views do not include the columns in the parent record for this table even if the data source is configured to include all of the parent record columns.
  
  default: Select default to use the default data source behavior for this parameter.

- **Specific virtual array view settings per table**: Select this to set different values for each table in the import. This will override the data source default for that table. Make the selections in the table under this selection. See the item above for an explanation.

When you are finished configuring the metadata model, click Next to go to the Importing the Metadata procedure.

The Metadata Model Selection screen is shown in the following figure:

**Figure 3–18 The Metadata Model Selection Screen**

![Metadata Model Selection Screen](image)

**Importing the Metadata**

This section describes the steps required to import the metadata to the target computer. It continues the Metadata Model Selection step.

You can now import the metadata to the computer where the data source is located, or import it later (in case the target computer is not available).
Do the following to import the metadata.

1. Select **Yes** to transfer the metadata to the target computer or **No** to transfer the metadata later.

2. Click **Finish**.

If you specified Yes, then the metadata will be imported to the target computer immediately.

The Import Metadata screen is shown in the following figure:

*Figure 3–19  The Import Metadata screen*

After performing the import, you can view the metadata in the Metadata tab in Oracle Studio. You can also make any fine adjustments to the metadata and maintain it, as necessary.

**Verifying the Metadata Definition**

After you finish Importing Metadata for the VSAM Data Source, you need to verify that the metadata is correct. Do the following to verify that the metadata was imported correctly.

---

Note: If you want to update the metadata using the VSAM data source, and then access the data under CICS, you must:

- Close the file in CICS
- Make the updates in with the VSAM data source
- Exit navcmd. This closes the file in VSAM
- Return to CICS and open the file there. The data should be available and you can now read the file.

---
Setting Up a Change Data Capture with the OracleAS CDC Adapter for VSAM

1. From the **Start** menu, select **Programs, Oracle** and then select **Studio**.
2. In the Design perspective, Configuration view expand the **Machines** folder.
3. Expand the machine defined in **Setting Up the IBM z/OS Platform in Oracle Studio**.
4. Expand the **Bindings** folder. The binding configurations available on this computer are listed.
5. Expand the **NAV** binding. The NAV binding configuration includes branches for data sources and adapters that are located on the computer.
6. Expand the **Data Sources** folder.
7. Right-click the data source that you set up when **Setting Up the VSAM Data Source**, and select **Show Metadata View**. The Metadata view opens with the data source you selected expanded.
8. Expand the **Tables** folder.
9. Right-click the table or tables where you carried out the metadata import and select **Test**. The Test wizard opens.
10. Click **Next** to view the metadata. The tables are displayed from the metadata. Check to see that the correct information is displayed.

**Setting Up a Change Data Capture with the OracleAS CDC Adapter for VSAM**

You must set up the Oracle Connect CDC adapter for VSAM on the z/OS platform to handle capture changes to the VSAM data.

To work with the VSAM under CICS CDC adapter, you must set up the CICS user journal on the z/OS computer. To work with the VSAM Batch adapter, you must set up the CDC Logger. After you finish making the required configurations on the z/OS machine, configure the change data capture using the Oracle Studio CDC Solution perspective. Oracle Studio must be installed on a Windows or UNIX computer.

Carry out the following to set up the change data capture and configure the OracleAS CDC Adapter for VSAM under CICS:

- **Managing the CICS User Journal (VSAM CICS Only)**
- **Configuring the Logger (VSAM Batch Only)**
- **Setting up a Change Data Capture in Oracle Studio**
- **Deploying a Change Data Capture**

**Managing the CICS User Journal (VSAM CICS Only)**

The following are the tasks used for managing the VSAM CDC adapter:

- **Setting up the CICS User Journal for VSAM**
- **Print out the CICS User Journal Content**

**Setting up the CICS User Journal for VSAM**

This section describes how to set up the CICS user journal for VSAM. Do the following to set up the CECS user journal for VSAM.
1. Check if a relevant CICS User Journal is available by entering the following CICS command:

```
CEMT I JO
```

This displays the list of all the available CICS Journals, for example:

```
Jou(DFHJ77) Mvs Ena Str(CICSTS13.CICS.DFHJ77)
Jou(DFHJ66) Mvs Ena Str(CICSTS13.CICS.DFHJ66)
Jou(DFHLOG) Mvs Ena Str(CICSTS13.CICS.DFHLOG)
```

Each User Journal has the CICS name `DFHJxx`, where `xx` is the number of the journal. You can use any of them as the CDC Logger. Its logstream name (for example, `CICSTS13.CICS.DFHJ77`) should be provided as the CDC Logger Name property.

If you cannot use one of the available journals, go to steps 2 and 3. If you can use a journal in the list, go to step 4.

2. Create an MVS logstream that can be used as a CICS journal. A sample job for the creation of DASD MVS logstream called `ORACLE.CDC.VSAMBTCH` is supplied in the `<HLQ>.USERLIB(LOGCRVSM)` member. For additional information, see IBM’s MVS Setting Up a Sysplex manual.

3. Define and install the log stream as a user journal by entering the following CICS command:

```
CEDA DEF JO(<journal name>) GR(<CICS group name>) TY(MVS) STR(<logstream name>)
CEDA INST JO(journal name) GR(<CICS group name>)
```

4. For each VSAM cluster to be captured, use the CICS command `CEDA DI FI`, and edit the properties as shown in the following example:

```
+ J0urnal : <journal number>
JNLRead : Updateonly
JNLSYNCRead : Yes
JNLUpdate : Yes
JNLAdd : After
JNLSYNCWrite : Yes
RECOVERY PARAMETERS
RECOvery : Backoutonly
Fwdrecovlog : No
Backuptype : Static
SECURITY
RESsecnum : 00
```

The value `JNLRead` means that before images are also written to the journal. The value `JNLSYNCWrite` means that CICS writes the changes to the journal immediately, instead of saving them in a buffer and writing them to the journal in blocks.

Close the VSAM cluster by using the following CICS command:

```
CEMT S F(<CICS file name>) CLOSE
```

Reinstall the cluster by using the following CICS command:

```
CEDA INST F(<CICS file name>) GR(<CICS group name>)
```

Open the cluster by using the following CICS command:

```
CEMT S F(<CICS file name>) OPEN
```

**Print out the CICS User Journal Content**

You can print out a CICS journal content running a job as described in the following example:

```
//PRINTLOG JOB 'RR','TTT',MSGLEVEL=1,1,CLASS=C
```
Configuring the OracleAS CDC Adapter for VSAM

3-31

// MSGCLASS=X,NOTIFY=&SYSUID
//PRNJNL EXEC PGM=DFHJUP
//STEPLIB DD DSNAME=<HLQ>.SDFHLOAD,DISP=SHR
//SYSPRINT DD SYSOUT=A,DCB=RECFM=FBA
//SYSUT1 DD DSNNAME=<logstream name>,
// DCB=BLKSIZE=32760,
// SUBSYS=(LOGR,DFHLGCNV,
// *
// 'FROM=(2003/261,22:07:16),TO=YOUNGEST,LOCAL')
// 'FROM=(2003/261,22:07:16),TO=YOUNGEST,LOCAL')
// SYSIN DD *
//-----------------------------------------------------* CONTROL STATEMENT :
DEFAULTS *
* INPUT = SYSUT1 *
* OUTPUT = SYSPRINT *
* SELECTION QUALIFIERS : *
* 1. DEFAULT = ALL INPUT RECORDS *
*----------------------------------------------------*
OPTION PRINT END
*----------------------------------------------------*
/*
where:
■ DSNAME: This is the name of the journal logstream.
■ FROM: This is the earliest change you want to print out.
■ TO: This is the latest change you want to print out (TO=YOUNGEST prints all the entries up to the last change logged).

Configuring the Logger (VSAM Batch Only)

To use the OracleAS CDC Adapter for VSAM Batch solutions, carry out the following:

■ Creating the Logstream
■ Creating the CDC$PARAM Data Set
■ Updating Jobs and Scripts

Creating the Logstream

A sample job for the creation of DASD MVS logstream called ORACLE.CDC.VSAMBTCH is supplied in the <HLQ>.USERLIB(LOGCRVSM) member.

For additional information, see IBM's MVS Setting Up a Sysplex manual.

Managing the MVS Logstream

The ATYLOGR program provided is used to manage MVS logstreams. It has the following options:

■ Delete all events
■ Delete events to a specific timestamp
■ Delete the newest events
■ Print events between two timestamps
■ Print all the events from the oldest to a specified timestamp
- Print all the events from the newest to a specified timestamp
- Print all the events

A sample job for managing the default VSAM Batch CDC MVS Logstream called ORACLE.CDC.VSAMBTCH is supplied in the <HLQ>.USERLIB(RUNLOGR) member.

**Creating the CDCSPARM Data Set**

CDCSPARM is the name of the DD card used to configure the JRNAD and Logical Transaction Manager. It can be any QSAM data set or member with the LRECL=80 definition. For example, you can build it as a member of the <HLQ>.USERLIB library.

The data set contains parameters, one per a line, according to the follow syntax:

```
<parameter name>=<parameter value>
```

The parameters and their valid values are described in CDCSPARM Properties (VSAM Batch Only).

The minimal set of the parameters for any solution can be taken from Project Information section of Deployment Summary screen of Oracle Studio Solution Perspective.

If the CDCSPARM data set is not provided to the JRNAD or Logical Transaction Manager, it is managed as follows:

```
DSNAME=*  
LOGSTREAM=ORACLE.CDC.VSAMBTCH
```

**Updating Jobs and Scripts**

To make sure that the changes are captured, you have to update the jobs and REXX scripts used to change the VSAM data.

- Updating Jobs for Activating CDC JRNAD
- Updating Jobs for Using the Logical Transaction Manager
- Update the REXX Scripts

**Updating Jobs for Activating CDC JRNAD**

To get the CDC JRNAD program that is being called, add three DD cards to each step that activates a program that is being updated, as shown in the example below:

```
STEPLIB DD DSN=<HLQ>.LOADCDCY,DISP=SHR  
ATYLIB DD DSN=<HLQ>.LOADAUT,DISP=SHR  
CDC$PARM DD DSN=<CDC$PARM DS name>,DISP=SHR
```

Make sure that that the <HLQ>.LOADAUT load library is APF authorized.

**Updating Jobs for Using the Logical Transaction Manager**

To use the Logical Transaction manager, add additional steps to the jobs used as a part of the logical transaction.

- Start a Logical Transaction: To begin a logical transaction, add the following step as the first step in a job:
  ```
  //BEGINLT EXEC PGM=ATYLTRAN,  
  // PARM='BEGIN,TRAN_NAME=<logical transaction name>'
  //STEPLIB DD DSN=<HLQ>.LOADAUT,DISP=SHR  
  //CDC$PARM DD DSN=<CDC$PARM DS name>, DISP=SHR
  ```
- Move a Logical Transaction to another job: To move a logical transaction to another job, add the following step as the last step of the job:
//MOVELT EXEC PGM=ATYLTRAN,COND=(4,LT)
//STEPLIB DD DSN=<HLQ>.LOADAUT,DISP=SHR
//CDC$PARM DD DSN=<CDC$PARM DS name>, DISP=SHR

- Continue Logical Transaction: To continue a logical transaction in another job, add the following step as the first step of this job:
  //CONTLT EXEC PGM=ATYLTRAN,
  // PARM='TRAN_NAME='<logical transaction name>'
  //STEPLIB DD DSN=<HLQ>.LOADAUT,DISP=SHR
  //CDC$PARM DD DSN=<CDC$PARM DS name>, DISP=SHR

- Terminate Logical Transaction: To terminate a logical transaction, add the following two steps as the last steps of this job:
  //COMMITLT EXEC PGM=ATYLTRAN,COND=(4,LT),
  // PARM='COMMIT'
  //STEPLIB DD DSN=<HLQ>.LOADAUT,DISP=SHR
  //CDC$PARM DD DSN=<CDC$PARM DS name>, DISP=SHR
  //RLBCKLT EXEC PGM=ATYLTRAN,COND=(EVEN,(0,EQ,COMMIT))
  // PARM='ROLLBACK'
  //STEPLIB DD DSN=<HLQ>.LOADAUT,DISP=SHR
  //CDC$PARM DD DSN=<CDC$PARM DS name>, DISP=SHR

The COND clause in the COMMITLT step should provide the condition when the Logical Transaction terminates successfully by COMMIT. The COND clause in the RLBCKLT step always writes a ROLLBACK to the logstream when COMMITLT is not executed or fails.

Update the REXX Scripts
If you use REXX scripts to run VSAM update programs, you should change them for this purpose. The member NVCMDCDC in <HLQ>.USERLIB is supplied as an example of a REXX script.

Setting up a Change Data Capture in Oracle Studio
You set up the change data capture in Oracle Studio. Oracle Studio can be installed on Windows XP or Vista operating systems, or on UNIX. For more information, see Installing Oracle Studio.

A change data capture is defined in the CDC Solution perspective, which contains a series of links to guide you through the CDC set up process. The CDC solution perspective guides display the following symbols in front of a link to show you what tasks should be done, and what tasks were completed.

- Triangle: This indicates that there are subtasks associated with this link. When you click the link, the list expands to display the subtasks.
- Asterisk (*): This indicates that you should click that link and carry out the tasks and any subtasks presented. If more than one link has an asterisk, you can carry out the marked tasks in any order.
- Check mark (✓): This indicates that the tasks for this link and any sublink are complete. You can double click the link to edit the configuration at any time.
- Exclamation mark (!): This indicates a potential validation error.

Carry out the Following to set up a change data capture:

- Create a CDC Project
- Set up the CDC Server
- Set up the Staging Area Server
Create a CDC Project
Do the following to create a CDC Project

1. From the Start menu, select, Programs, Oracle, and then select Studio.

2. Open the CDC Solution perspective, click the Perspective button on the perspective toolbar and select CDC Solution from the list.
   The CDC Solution perspective opens with the Getting Started guide in the left pane of the workbench.

3. Click Create new project.
   The Create new project screen opens.

4. In the Project name field, enter a name for your project.
   The types of projects available are listed in the left pane just below.

5. Select Change Data Capture.
   From the the right pane, select VSAM-CICS or VSAM-BATCH.

   Figure 3–20  Create New Project

6. Click Finish. The Project Overview guide is displayed in the left pane.

7. Click Design. The Design wizard opens. Use this wizard to enter the basic settings for your project.

   Note: The wizard screens are divided into sections. Some sections provide information only and other sections let you to enter information about the project. If you do not see any information or fields for entering information, click the triangle next to the section name to expand the section.
8. In the **Client Type** you can select **Oracle SOA/ODI** only. The **Use staging area** is selected and cannot be changed, you must use a staging area with the OracleAS CDC adapter for VSAM.

9. Click **Next**.

The Design Wizard’s second screen is displayed. In this step you configure the machines used in your solution. Enter the following information:

- **Server Machine Details**: Information about the machine where Oracle Connect is installed. The selection here is always **Server Machine** and **Mainframe**.

- **Staging Area Details**: Information about the machine platform where the staging area is located.

  For the server machine **Name**, select one of the following:
  - **CDC Stream Service**: Select this if the Staging Area is on a staging area computer. This is the default selection.
  - **Server Machine**: Select this if the staging area is on the same machine where Oracle Connect is installed.
  - **Client Machine**: Select this if the Staging area is on the local computer.

  In the **Platform** list, select the operating system for the staging area. This can be Windows, Linux or UNIX. The available options are:
  - **Microsoft Windows**
  - **HP-UX**
  - **IBM AIX**
  - **Sun Solaris**
Setting Up a Change Data Capture with the OracleAS CDC Adapter for VSAM

- Linux (Red Hat)
- Suse (Linux)

Figure 3–22 Design Wizard (Configure Solution Machines)

10. Click Finish. The wizard closes.

Set up the CDC Server
Click Implement in the Getting Started guide to open the Implementation guide. In the Implementation guide, do the following to set up the CDC server:

- Set up the Machine
- Configure the VSAM Data Source
- Copy the Metadata
- Set up the CDC Service

Set up the Machine
You do the following to define the IP Address/host name and Port for the CDC server machine.

1. Click Machine.
   The machine definition screen is displayed:
2. In the **IP address/host name** field, do one of the following:
   - Enter the server machine's numeric IP address.
   - Click the **Browse** button and select the host machine from the ones presented, then click **Finish**.

### Figure 3–24 Select Machine

3. Enter the port number.
   
The default port number is **2551**.

4. If you want to connect with user authentication, enter a user name and password, with confirmation, in the Authentication Information area.

---

**Note:** The machine you enter must be compatible with the platform designated in the Design Wizard (Configure Solution Machines) screen.
5. Select the Connect via NAT with a fixed IP address checkbox if you are using Network Access Translation and want to always use a fixed IP address for this machine.

6. Click OK.

Continue setting up the CDC Server on the z/OS computer.

**Configure the VSAM Data Source**

In this step, configure the VSAM data source that is part of the VSAM CICS CDC solution. Carry out the following procedure to configure the data source.

1. In the CDC Solution perspective, click Implement.

2. In the Server Configuration section, click Data Source. The Data Source Configuration window is displayed. The following figure shows the Data Source Configuration window.

3. Define the parameters for your data source in the Data Source Configuration window.

   If you are using a VSAM CICS data source define the following parameters:
   - **CICS Application ID**: Enter the VTAM ID of the CICS target system (mandatory).
   - **Transaction ID**: Enter the EXCI or other CICS transaction that activates DFHMIRS CICS program.
   - **VTAM NetName**: Enter the VTAM network name of the specific connection being used by EXCI (and MRO) to relay the program call to the CICS target system (mandatory).
   - **Program Name**: Enter the UPDTRNS program (supplied with the OracleAS CDC adapter for VSAM under CICS).
   - **Trace Queue**: Enter the name of queue for output which is defined under CICS when tracing the output of the UPDTRNS program. When not defined, the default CICS queue is used.

   If you are using a VSAM Batch data source define the following parameters:
   - **Data HLQ**: The high-level qualifier where the data files are located.
   - **Disk volume Name**: The high-level qualifier (volume) where the data resides.

   The values specified are used in the Data File field in the Oracle Studio Design perspective, Metadata tab. For tables created using the CREATE TABLE statement, the values specified are used to create the data files. If values are not specified, then data files are written to the DEF high-level qualifier under the high-level qualifier where Oracle Connect is installed.

   When SMS is used to manage the volumes, leave this value empty and set the newFileSMSStorageClass and newFileSMSSDataClass properties as described in VSAM Properties.

4. Click Finish.

Continue setting up the CDC Server on the z/OS computer.

**Copy the Metadata**

In this step, copy the metadata that you imported when Importing Metadata for the VSAM Data Source. Do the following to copy the metadata.
1. Click Metadata.
   The Create metadata definitions view is displayed.

   **Note:** The Select Metadata Source link has an asterisk (*) next to it to indicate that you must carry out this operation first.

2. Click the Select Metadata Source link.
3. Select Copy from existing metadata.
5. Click Copy from existing metadata source.
   The Copy Existing Metadata Source screen is displayed showing your local machine and with metadata compatible with the data source selected.

   **Figure 3–25 Copy Existing Metadata Source**

6. From the sources in the left pane, expand the list until you see the tables from the data source you configured when Importing Metadata for the VSAM Data Source.
7. Using the arrow buttons, select the required tables and move them into the right pane.
8. Once you have selected all the desired tables, click Finish.
9. Click Customize Metadata.
   The customize metadata screen is displayed.
To change a table name, right-click in the any field under Customize Metadata, and select Add.

11. Enter the table name in the field presented, and click OK.

Note: You may have validation errors in the tables created, which you can correct by the end of the procedure.

12. To make changes to any field in a table, right-click the table created and select Fields Manipulation.

The Field Manipulation screen is displayed.
13. Right-click in the upper pane and select Field | Add | Field.

14. Enter the name of the field in the screen provided, and click OK.

15. Default values are entered for the table. To manipulate table information or the fields in the table, right-click the table and choose the option you want. The following options are available:

   - **Add table**: Add a table.
   - **Field manipulation**: Access the field manipulation window to customize the field definitions.
   - **Rename**: Rename a table name. This option is used especially when more than one table is generated from the COBOL with the same name.
   - **Set data location**: Set the physical location of the data file for the table.
   - **Set table attributes**: Set table attributes.
   - **XSL manipulation**: You specify an XSL transformation or JDOM document that is used to transform the table definition.

   The **Validation** tab in the bottom half of the window displays information about what you must do to validate the tables and fields generated from the COBOL. The **Log** tab displays a log of what has been performed (such as renaming a table or specifying a data location).

16. Correct any remaining validation errors.

17. Click **Finish** to generate the metadata.

Continue setting up the CDC Server on the z/OS computer.

**Set up the CDC Service**

In this step you define the starting point or event for the change capture and then indicate the name of the change logger. Do the following to set up the CDC service.

1. In the CDC Solution perspective, click **Implement**.
2. In the Server Configuration section, click **CDC Service**. The CDC Service wizard is displayed.

3. In the first screen select *one* of the following to determine the Change Capture starting point:
   - **All changes recorded to the journal**
   - **On first access to the CDC (immediately when a staging area is used, otherwise, when a client first requests changes**
   - **Changes recorded in the journal after a specific date and time.**
     When you select this option, click **Set time**, and select the time and date from the dialog box that is displayed.

4. Click **Next** to define the logger. The following is displayed.

   **Figure 3–28  CDC Logger Definition Window**

   ![CDC Logger Definition Window](image)

   In the **Logger Name** field, enter the name of the MVS logstream used for the data capture.

5. Click **Next** to go to the next step where you set the CDC Service Logging. Select the log level to use from the **Logging level** list.


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Setting Up a Change Data Capture with the OracleAS CDC Adapter for VSAM

Figure 3–29  Logging Level

Select one of the following from the list:

- None
- API
- Debug
- Info
- Internal Calls

7. Click Finish.

Continue setting up the CDC Server on the z/OS computer.

Set up the Staging Area Server

Click Implement in the Getting Started guide to open the Implementation guide.

In the Implementation guide, do the following under the Stream Service Configuration section, to set up the staging area server:

- Set Up the Staging Area Machine
- Set up the Stream Service
- Configure the Access Service Manager

Set Up the Staging Area Machine

To set up the machine for the staging area, do the following.

1. Under the Stream Service Configuration section, click Machine.
2. Use the same configurations used to Set up the Machine for the CDC server.

Continue setting up the staging area Server.

Set up the Stream Service

In this step you set up the stream service. The Stream Service configures the following:

- Staging area
- Filtering of changed columns
- Auditing

**Note:** Null filtering is currently unsupported. Filtering empty values is supported. Space values are truncated and are handled as empty values.


*Figure 3–30  Staging Area*

![Staging Area](image)

**Note:** This screen will only appear if you selected the inclusion of a staging area in your solution.

2. You can configure the following parameters in this screen:
   - Select **Eliminate uncommitted changes** to eliminate uncommitted changes from your CDC project.
   - Select the **Use secured connection** check box to configure the staging area to have a secured connection to the server. This is available only if you logged into the server using user name and password authentication.
   - Set the event expiration time in hours.
   - Under File Locations, click the Browse buttons to select the location of the changed files, and temporary staging files, if necessary.

3. Click Next to select the tables to include in the filtering process.
4. Click the required tables in the left pane and move them to the right pane using the arrow keys.

   Note: You can remove the tables and add new ones to be captured after you have already added the tables to the right pane. For more information, see Adding and Removing Tables.

5. Click Next. From the tables selected above, select the columns that receive changes. Select the check box next to the table to use all columns in the table.
Setting Up a Change Data Capture with the OracleAS CDC Adapter for VSAM

Any data changes in the columns selected will be recorded.

6. Click Next. The Filter selection screen is displayed. the types of changes you want to receive in the tables and which columns to display.

**Figure 3–33 Filter Selection**

7. You can do the following in this screen:

Select the actions from which you want to receive change information:

- Update
- Insert
- Delete

**Note:** These items are all selected by default.

- Under the Changed Columns Filter column, select the columns for which you want to receive notification of changes.
8. In the **Content Filter** column of the Filter screen, double-click a table column and then click the **Browse** button to filter content from the selected column. The Content Filter screen is displayed.

   ![Content Filter](image.png)

9. Select a filter type:
   - Select **In** for events to be returned where the relevant column value equals the values you specify (if a column is NULL, it is not captured).
   - Select **Not In** for events to be returned where the column value is not in the values you specify (if the column is NULL, it is captured).
   - Select **Between** for when the column value is between the two values you specify (if a column is NULL, it is not captured).

10. Click **Add** in the lower-left corner of the **Content Filter** screen.

    **Note:** If you select more than one condition, you will receive the change information as long as one of the conditions is true.

11. Depending on your selection, do one of the following:
   - If you selected **In/Not In**, continue with step 12.
   - If you selected **Between**, continue with step 14.

12. Click **Add** in the Add items to the list screen. Enter a value for events to be returned where the column value appears (or does not appear) in that value. To
filter empty values ("") for the Not In filter type, leave this field blank in the dialog box that is displayed.

Figure 3–35 Add Items (In or Not In)

13. Repeat steps 12 as many times as necessary, and then proceed to step 16.
14. Click Add in the Add items to list screen.

The Add between values screen is displayed.

Figure 3–36 Add Items (Between)

15. Enter values for events to be returned where the column value is between the two values you specify.
16. In the content filter screen, click Next.
17. Select the required auditing level when receiving changes. Your options are:

- **None**: For no changes.
- **Summary**: For an audit that includes the total number of recorded delivered, as well as system and error messages.
- **Headers**: For an audit that includes the total number of records delivered, system and error messages, and the record headers for each captured record.
- **Detailed**: For an audit that includes the total number of records delivered, system and error messages, the record headers for each captured record, and the content of the records.

18. Click Finish.

Continue setting up the staging area Server.

**Configure the Access Service Manager**

In this step you set up a daemon workspace for the CDC adapter. Do the following to configure the access service manager.

1. Click **Access Service Manager**.

   The Setup Workspace wizard opens.
2. Select the scenario that best meets your site requirements:
   - Application Server using connection pooling
   - Stand-alone applications that connect and disconnect frequently
   - Applications that require long connections, such as reporting programs and bulk extractors

3. Click Next.

The next screen that is used to create a workspace server pool. The parameters available depend on the selection you made in the first screen. The following are the available parameters:

   - If you selected **Application Server using connection pooling**:
     - What is the average number of expected concurrent connections? Enter the number of expected connections, which cannot be greater than the number of actual available connections.
     - What is the maximum number of connections you want to open? Enter the number of connections you want to open.

   - If you selected **Stand-alone applications that connect and disconnect frequently**, in addition to the choices listed in the item above, you can also set the following:
     - What is the minimum number of server instances you want available at any time? Enter the number of instances, which cannot be greater than the number of actual available instances.
     - What is the maximum number of server instances you want available at any time? Enter the number of instances you want to be available.

   - If you selected **Stand-alone applications that connect and disconnect frequently**:
     - How many connections do you want to run concurrently? Enter the number of concurrent connections that you want to run.
4. Click Next. In the next screen you set time out parameters. These parameters should be changed if the system is slow or overloaded. The parameters are:

- **How long do you want to wait for a new connection to be established?** Enter the amount of time you want to wait for a new connection to be established (in seconds).
- **How long do you want to wait for a response that is usually quick?** Change this parameter if you have a fast connection. Enter the amount of time to wait for a response (in seconds).

5. Click Next. In the next screen you set security parameters. You should consult with the site security manager before changing these parameters.

Edit the following parameters in this screen:

- Enter the operating system account (user name) used to start server instances.
- Select **Allow anonymous users to connect via this workspace**, if you want to allow this option.
- Enter the permissions for the workspace. You can allow **All users** to access the workspace, or select **Selected users only** to allow only the users/groups that you want to have exclusive access.
- Select **Do you want to access server instances via specific ports**, if you want to allow this options. If this option is cleared, the defaults are used.

   If you select this option, indicate the **From port** and **To port** and make sure that you reserve these ports in the TCP/IP system settings.

![Figure 3-39 Site Security](image)

6. Click Next.

   The summary screen opens.
Figure 3–40  Workspace Setup Summary

7. Click Save and then click Finish.

When you complete all the Implementation operations, a check mark (✓) is displayed next to every link. Click Done to return so you can begin Deploying a Change Data Capture.

Continue setting up the staging area Server.

Deploying a Change Data Capture

After you complete the design and implementation guides, the following procedures are available.

- **Deployment Procedure**: This section is used to deploy the project.
- **Control**: This section is used to activate or deactivate workspaces after the project is deployed and you are ready to consume changes. In this section, you can deactivate the workspace anytime you want to suspend consumption of changes from the staging area.

Do the following to deploy the CDC solution:

1. Click Deploy. The Deployment Procedure and Control sections are displayed in the Deployment view.

2. Click Deploy in the Deployment Procedure section.
   Studio processes the naming information. This may take a few minutes. If there are naming collisions, a message is displayed asking if you want Oracle Studio to resolve them.
3. Click **Yes** to resolve any naming collisions.
   The Deployment Guide is displayed.

4. If you are ready to deploy, click **Finish**.
   Otherwise, click **Cancel** and you can return to Create a CDC Project, Set up the CDC Server, or Set up the Staging Area Server to make any changes.

   If this project was deployed previously, you will be notified that re-deployment will override the previous instance.
5. Where applicable, click **OK** to redeploy.

6. Click the **Deployment Summary** link.

   The Deployment Summary is shown. It includes the ODBC connection string and JDBC connection string, as well as specific logger scripts to enable CDC capturing.

   **Figure 3-43 Deployment Summary**

7. Cut and paste any information required from the Deployment Summary screen to your environment as necessary.

8. If there is nothing wrong with your deployment results, click **Finish**.

### Notes:

- When you redeploy a project where the metadata is changed, the Staging Area (SA) tables should be deleted so that no incorrect information is reported.
- When you redeploy a solution, the a new binding is created for the solution. The new binding is created with the default parameters only. Any temporary features that were added are lost.
If you found problems, click **Cancel** and to return **Create a CDC Project**, **Set up the CDC Server**, or **Set up the Staging Area Server** to modify the solution.

---

**Note:** If you are redeploying a solution you must follow these directions to make sure that the context and adapter_context fields of the SERVICE_CONTEXT table should be saved. Follow these directions to save the fields:

1. In the staging area data source run: select context, agent_context from SERVICE_CONTEXT; and save the returned values.
2. Delete the SERVICE_CONTEXT table physical files.
3. Redeploy the solution.
4. Activate the router to create the SERVICE_CONTEXT table.
5. Disable the router.
6. In the staging area datasource run: insert into SERVICE_CONTEXT (context, agent_context) values('XXX', 'YYY'). This will Insert the saved values to the SERVICE_CONTEXT table.
7. Activate the solution.

---

**Activating and Deactivating Solution Workspaces**

In the Project guide for your OracleAS CDC adapter solution, click **Deploy**, then do one of the following to activate or deactivate the workspaces for a solution:

- To activate workspaces, under the Control section click the **Activate Workspaces** link.
- To deactivate workspaces, click the **Deactivate Workspaces** link.

During the activation/deactivation process, you may receive messages indicating that the daemon settings on one or more of the machines involved in your solution have changed. Click **Yes** to proceed.
To deploy and integrate OracleAS CDC Adapters for VSAM with Oracle BPEL Process Manager, you need to configure the BPEL Process Manager.

This section includes the following topics:

- Overview of Oracle BPEL Process Manager Integration
- Configuring the VSAM CDC Adapter In the Application Server
- Configuring the Oracle BPEL Process Manager

Overview of Oracle BPEL Process Manager Integration

Oracle BPEL Process Manager provides a comprehensive solution for creating, deploying, and managing BPEL business processes. Oracle BPEL Process Manager is based on the Service Oriented Architecture (SOA) to provide enterprises with flexibility, interoperability, reusability, extensibility, and rapid implementation of Web services and business processes. It reduces the overall costs of management, modification, extension, and redeployment of existing business processes. Each business activity is a self-contained, self-describing, and modular application whose interface is defined by the WSDL, and the business process is modeled as a Web Service.

A Web Service is first published and then composed or orchestrated into business flows. Publishing a service is implemented by taking a function within an existing application or system and making it available in a standard way, while orchestration is implemented by composing multiple services into an end-to-end business process. The CDC solutions that are defined as part of the configuration of the OracleAS CDC Adapter for VSAM are integrated into the orchestration as PartnerLinks. Every PartnerLink is linked to a WSDL that describes the CDC table.

See Also: Oracle Application Server Adapter Concepts Guide.

Configuring the VSAM CDC Adapter In the Application Server

You can use the OC4J or WebLogic application servers to deploy the Oracle Connect Legacy adapter. This section describes how to deploy the Legacy adapter, set up the necessary connections, and build the CDC Stream Positions table.

This section includes the following topics:

- CDC Stream Positions Table Definition
CDC Stream Positions Table Definition

Each CDC inbound process is defined for one source table only. You create one CDC Stream Positions table for each CDC adapter. The CDC Stream Positions table contains one row for each process (for each table) to control its stream position and XA transaction. The following SQL statement is used to define the table:

```sql
create table CDC_STREAM_POSITIONS
(TABLE_NAME varchar(127) not null,
 STREAM_POSITION varchar(127),
 PREPARED_STREAM_POSITION varchar(127),
 ROLLBACK_STREAM_POSITION varchar(127),
 NEW_STREAM_POSITION varchar(127),
 XID_FORMAT int,
 XID_BRANCH varchar(128),
 XID_GLOBAL varchar(128));
create unique index CDC_STREAM_POSITIONS_INDEX on CDC_STREAM_POSITIONS
(TABLE_NAME);
```

You can change the name of the table, but not the columns.

The following table describes the CDC Stream Positions table columns.

<table>
<thead>
<tr>
<th>Columns</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLE_NAME</td>
<td>The name of the CDC table for the inbound process. You should not change the data in this column.</td>
</tr>
<tr>
<td>STREAM_POSITION</td>
<td>The last committed stream position of the CDC process for the current table. You should not change the data in this column.</td>
</tr>
<tr>
<td>PREPARED_STREAM_POSITION</td>
<td>The last prepared stream position of the CDC process for the current table. You should not change the data in this column.</td>
</tr>
<tr>
<td>ROLLBACK_STREAM_POSITION</td>
<td>In case of a Rollback Loop, this column contains the stream position of the event that occurred at the time of the rollback.</td>
</tr>
<tr>
<td>NEW_STREAM_POSITION</td>
<td>You can enter a valid stream position value in this column to manually change the current stream position. Before you update this column, deactivate the corresponding CDC process. Note: Make sure that the XID_FORMAT column has a null value. If the XID_FORMAT column is not null, do not enter a value for this column.</td>
</tr>
<tr>
<td>XID_FORMAT</td>
<td>The last prepared XID fields. If the XID_FORMAT column is null, the stream position is committed. In this case the XID_BRANCH and XID_GLOBAL columns will contain the last committed XID fields.</td>
</tr>
<tr>
<td>XID_BRANCH</td>
<td></td>
</tr>
<tr>
<td>XID_GLOBAL</td>
<td></td>
</tr>
</tbody>
</table>

You should configure the native data source that contains the CDC Stream Positions tables in your application server. The following example shows an example of a data source definition in OC4J (in the data-sources.xml file):

```xml
<native-data-source
 name='CdcContextOracleDS'
 jndi-name='jdbc/CdcContextOracleDS'
 description='Native CDC Context DataSource'
 data-source-class='oracle.jdbc.pool.OracleDataSource'
 user='system'
```
password='manager'
url='jdbc:oracle:thin:@//server1-xp:2551/ora10202'>
</native-data-source>

**Configuring the VSAM CDC Adapter Connection Factory**

Deploy the Oracle Connect Legacy Adapter RAR into the OC4J or WebLogic server with the name **jca-legacy-adapter**.

Create the appropriate connection factories in the OC4J or WebLogic application server.

This table provides a description of the connection factory properties.

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eisName</td>
<td>Required. Sets the name of the adapter to use. The adapter is defined in the Oracle Connect server using Oracle Studio.</td>
</tr>
<tr>
<td>serverName</td>
<td>Required. Enter the name of the server with the TCP/IP address or host name where the Oracle Connect daemon is running. See Also: Advanced Tuning of the Daemon for details about the daemon.</td>
</tr>
<tr>
<td>workspace</td>
<td>Required. Specifies the name of an Oracle Connect server workspace to use. See Also: Workspaces for details about workspaces.</td>
</tr>
<tr>
<td>portNumber</td>
<td>Optional. Specifies the TCP/IP port where the Oracle Connect daemon is running on the server. The default port is 2551.</td>
</tr>
<tr>
<td>userName</td>
<td>Optional. Specifies a user who can access the Oracle Connect server. The user is defined in the Oracle Connect daemon configuration. See also: daemon Security and workspace Security for details about users allowed to access an Oracle Connect server</td>
</tr>
<tr>
<td>password</td>
<td>Optional. Specifies a valid password for the user.</td>
</tr>
<tr>
<td>persistentConnection</td>
<td>By default this is set to true. You should not change this value.</td>
</tr>
<tr>
<td>keepAlive</td>
<td>By default this is set to true. You should not change this value.</td>
</tr>
<tr>
<td>firewallProtocol</td>
<td>Optional. Specifies the firewall protocol used: either none or fixedNat (the Nat protocol using a fixed address for the daemon). The default is set to none.</td>
</tr>
<tr>
<td>connectTimeout</td>
<td>Optional. Specifies the connection timeout in seconds. The default is 0, indicating that there is no connection timeout.</td>
</tr>
<tr>
<td>encryptionProtocol</td>
<td>Optional. Specifies the name of encryption protocol to use. The default is set to RC4. If the value of the property is not defined, the RC4 protocol is used.</td>
</tr>
<tr>
<td>encryptionKeyName</td>
<td>Optional. Specifies the name of the symmetric encryption key to use.</td>
</tr>
<tr>
<td>encryptionKeyValue</td>
<td>Optional. Specifies the value of the symmetric encryption key to use.</td>
</tr>
</tbody>
</table>
Configuring the Oracle BPEL Process Manager

This section includes the following topics:

- Setting up the Connection to the Oracle Connect Server Metadata
- Using JDeveloper to Integrate a CDC Inbound Process to the Inbound Application

### Setting up the Connection to the Oracle Connect Server Metadata

Perform the following steps to set up the connection to the Oracle Connect server to provide an automatic BPEL application built by JDeveloper:

1. Open the Oracle BPEL Admin window.
2. On the Server tab, on the Configuration tab, specify the following:
   - **LegacyServer**: The IP address of the server where Oracle Connect is installed.
   - **LegacyPort**: The port number of the server where Oracle Connect is installed.
3. Repeat the previous step for each Oracle Connect server to be used by Oracle BPEL Process Manager. Use a comma as a separator between the different servers and ports.
4. Click **Apply**.
5. Restart the Oracle SOA Suite.

### Using JDeveloper to Integrate a CDC Inbound Process to the Inbound Application

The following sections describe how to integrate the CDC inbound process to the inbound application.

- Configuring a CDC Adapter Partner Link
- Configuring WSDL
Configuring a CDC Adapter Partner Link
Carry out the following steps in Oracle JDeveloper to configure a CDC Adapter Partner Link.

1. Drag a Partner Link into one of the Services lanes of the visual editor.
2. In the Create Partner Link dialog box, click the Service Explorer button (the second button under WSDL Settings).
3. In the Service Explorer, expand Adapter Services.
4. Expand the connection server on which you deployed the VSAM resource adapter (this is the server where you created your CDC solution).
5. Under Adapters, expand Legacy to view a list of the Oracle Connect servers that you defined by using the Oracle BPEL Admin window.
6. Expand the Oracle Connect server with the metadata you want to check, to view a list of workspaces.
   Expand the CDC staging area workspace that you created when . This workspace will have the name with the suffix _sa.
7. Expand the CDCQueue adapter to view a list of captured tables.
8. Select the table you are working with and click OK.
9. Define the Partner Role and My Role then click OK.

Configuring WSDL
When you build an inbound Partner Link, Oracle BPEL Process Manager automatically creates the WSDL that corresponds to the captured table, including the properties of the AttuCDCActivationSpec class. These properties are the only relevant properties for a CDC inbound process. These properties, except for the TableName, can also be provided using the Connection Factory. For information on how to configure the Connection Factory, see Configuring the VSAM CDC Adapter Connection Factory.

The WSDL specifies the name of the adapter’s connection factory as the value of the adapterInstanceJndi attribute of the <jca:address> element in the <service> section. If a connection factory exists on the application server, its properties are taken. Otherwise, the properties specified by the ActivationSpec are used. If a value is specified by both the connection factory and the ActivationSpec, the ActivationSpec property overrides the value in the connection factory. If you want to use the value specified in the connection factory, you have to delete the property from the WSDL.

The following is an example of a CDC inbound WSDL:

```xml
<?xml version = '1.0' encoding = 'UTF-8'?>
<definitions name="nation" targetNamespace="http://xmlns.oracle.com/pcbpel/dlg1_CDCQueue/nation" xmlns="http://schemas.xmlsoap.org/wsdl/
xmlns:legacyReq="noNamespace://dlg1_CDCQueue"
xmlns:tns="http://xmlns.oracle.com/pcbpel/dlg1_CDCQueue/nation"
xmlns:plt="http://schemas.xmlsoap.org/ws/2003/05/partner-link/
xmlns:jca="http://xmlns.oracle.com/pcbpel/wsd1/jca/
xmlns:pcc="http://xmlns.oracle.com/pcbpel/
xmlns:legacyRes="noNamespace://DEN0#">
<types>
    <xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns="noNamespace://dlg1_CDCQueue" targetNamespace="noNamespace://dlg1_CDCQueue"
elementFormDefault="qualified" attributeFormDefault="unqualified">
```
<xsd:element name="nationStream" type="nationStreamDescription"/>
<xsd:complexType name="nationStreamDescription">
  <xsd:sequence>
    <xsd:element name="nation" type="nationOut" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="nationOut" type="nationOut"/>
<xsd:complexType name="nationOut">
  <xsd:sequence>
    <xsd:element minOccurs="0" maxOccurs="1" name="header" type="nation__header"/>
    <xsd:element minOccurs="0" maxOccurs="1" name="data" type="nation__data"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="nation__data" type="nation__data"/>
<xsd:complexType name="nation__data">
  <xsd:attribute name="n_nationkey" type="xsd:int" use="required"/>
  <xsd:attribute name="n_name" use="required">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string">
        <xsd:maxLength value="25"/>
      </xsd:restriction>
    </xsd:simpleType>
  </xsd:attribute>
  <xsd:attribute name="n_regionkey" type="xsd:int" use="required"/>
  <xsd:attribute name="n_comment" use="required">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string">
        <xsd:maxLength value="152"/>
      </xsd:restriction>
    </xsd:simpleType>
  </xsd:attribute>
</xsd:complexType>
<xsd:element name="nation__header" type="nation__header"/>
<xsd:complexType name="nation__header">
  <xsd:attribute name="timestamp" use="required">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string">
        <xsd:maxLength value="26"/>
      </xsd:restriction>
    </xsd:simpleType>
  </xsd:attribute>
  <xsd:attribute name="tableName" use="required">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string">
        <xsd:maxLength value="64"/>
      </xsd:restriction>
    </xsd:simpleType>
  </xsd:attribute>
  <xsd:attribute name="operation" use="required">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string">
        <xsd:maxLength value="12"/>
      </xsd:restriction>
    </xsd:simpleType>
  </xsd:attribute>
  <xsd:attribute name="transactionID" use="required">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string">
        <xsd:maxLength value="26"/>
      </xsd:restriction>
    </xsd:simpleType>
  </xsd:attribute>
</xsd:complexType>
<xsd:restriction base="xsd:string">
  <xsd:maxLength value="24"/>
</xsd:restriction>
</xsd:simpleType>
</xsd:attribute>
<xsd:attribute name="context" use="required">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="32"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:attribute>
<xsd:attribute name="agent_context" use="required">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="64"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:attribute>
<xsd:attribute name="terminalID" use="required">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="4"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:attribute>
<xsd:attribute name="taskID" use="required">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="8"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:attribute>
</xsd:complexType>
</xsd:schema>
<message name="event">
  <part name="event_nation" element="legacyReq:nationStream"/>
</message>
<portType name="nationPortType">
  <operation name="nation">
    <input name="Event_nation" message="tns:event"/>
  </operation>
</portType>
<binding name="nationJCABinding" type="tns:nationPortType">
  <jca:operation
    ActivationSpec="com.oracle.adapter.oracle.AttuCDCActivationSpec"
    TableName="nation" JdbcDataSource="jdbc/CdcContextOracleDS"
    CdcStreamPositionsTable="" EisName="dlgl_CDCQueue" ServerName="server1-xp"
    PortNumber='2551' UserName="" Password="" Workspace="dlgl_sa" RetryInterval='15'
    ConnectTimeout='0' />
  <input/>
</jca:operation>
</binding>
<service name="nationService">
  <port name="nationPort" binding="tns:nationJCABinding">
    <jca:address
      ResourceAdapterClassName="com.oracle.adapter.AttuResourceAdapter"
Troubleshooting Rollback Loops

When a problem occurs in the CDC resource adapter work thread, the thread will wait for a defined period of time (retryInterval) then it will retry the last operation. If you want to stop the adapter, you must deactivate the endpoint. The behavior of the resource adapter is different according to the type of rollback loop. In all cases, the resource adapter writes the corresponding error messages to the resource adapter log file and sends the message to the message listener onAlert method.

- If the connection to Oracle Connect is lost, the resource adapter always waits for a defined period of time (retryInterval) until the connection is reestablished.
- In all other cases, the resource adapter retries the last operation immediately and if the problem returns, the resource adapter waits for ascending periods of time, beginning with the retryInterval and doubling the wait time for each successive attempt, but not for more than one minute.

If the OracleAS resource manager invokes a rollback before a 2PC prepare operation, the CDC resource adapter take steps to carry out a special operation that assists you in troubleshooting the problem. In this case, the resource adapter separately sends each event from the last event array to the BPEL endpoint, which saves the stream position of the last problematic event in the ROLLBACK_STREAM_POSITION column.

If you notice that a rollback loop occurs in the CDC resource adapter work thread, check the value of the ROLLBACK_STREAM_POSITION is not null. If the value is not null, check whether there was a data problem. You can select the problematic event from the staging area, using the current stream position value. In this way you can analyze the data to determine what the problem is. In addition, you can skip the problematic event. In this case you stop the endpoint and update the NEW_STREAM_POSITION column with the value of the ROLLBACK_STREAM_POSITION.
Runtime tasks are executed after you install and configure the OracleAS CDC Adapter for VSAM. This chapter describes how to carry out basic maintenance tasks, and make changes to CDC solutions. These tasks include:

- Adding and Removing Tables
- Handling Metadata Changes
- Staging Area Maintenance
- Monitoring the Change Data Capture
- Daemon Life-Cycle Tasks
- Resolving Communication Errors
- Resolving Specific Errors

Adding and Removing Tables

After you deploy the OracleAS CDC adapter solution and start working with it, you may want to change the tables that are being monitored. You do this in the CDC Solution perspective of Oracle Studio. The following describes the main steps that you need to follow to make changes to the table. During this operation you will need to go back and change some of the configurations you made when you set up the OracleAS CDC adapter solution during design time. Do the following to change tables:

1. From the Start menu, select Start, Programs, Oracle, and then select Studio.
2. From the Window menu, click the Open Perspective button and select CDC Solution.
3. In the Getting Started pane, under Recent projects, click the OracleAS CDC solution that you are changing.
   
   If you do not see the CDC solution you want to edit in the list under Recent projects, click Open an existing project and select your solution from the drop-down list in the dialog box that is displayed.

4. Click Implement.
5. Under the Stream Service Configuration section, click Stream Service.
6. In the first screen of the Stream Service wizard, you can change the location of the change files or click Next to make changes to the tables to be captured.
7. Select one or more tables from either pane.
Handling Metadata Changes

- Select a table from the right pane then click the left arrow to move a selected table into the left pane and remove it from the list of tables to be captured.
- Select a table from the left pane then click the right arrow to move a selected table into the right pane and add it to the list of tables to be captured.

8. Click Next, in the screen displayed, clear check boxes from the columns you no longer want to capture. Select check boxes from columns that are not currently included in the change data capture to include them.

9. Click Next, in the screen displayed, clear and select the check boxes to change the filters used in the change data capture.

10. Click Next, in the final screen you can make changes to the auditing configuration.

11. Click Finish to close the wizard and save the changes.

12. You must re-deploy the solution for the changes to be recognized at runtime. See Deploying a Change Data Capture.

For more information on configuring the Stream Service, see Set up the Stream Service.

---

**Note:** When adding a new table, be sure to create a corresponding endpoint for capturing changes. See Using JDeveloper to Integrate a CDC Inbound Process to the Inbound Application.

---

Handling Metadata Changes

When you make changes to the way an application accesses a VSAM file, you need to be sure that the solution recognizes the changes and works with them. This section provides you with a procedure to handle the metadata when working with an Oracle AS CDC Adapter for VSAM solution if changes are made after deploying the solution. You should carry out these steps at a time when there is little or no activity in the system. If you want to receive new events with a new structure, consume the changes for the table you are updating before carrying out any of the steps in this process. Do the following to handle any changes to the metadata:

1. Deactivate the Solution workspaces using the CDC Solution perspective in Oracle Studio.

2. Update the metadata in the VSAM CICS data source and Staging Area by doing one of the following:
   - If you made manual changes to the CDC solution after deployment, or if you do not want to redeploy the solution, then on the Router’s (Staging Area) machine, do the following:
     - Run Oracle Studio, and open the Design perspective.
     - Edit the Metadata for the Router’s Data source.
     - Expand the table list and edit the metadata for the table.
     - If you are adding a new column, make sure to add it to the end of the COLUMN list. This operation can also be done using the Source view. Make sure you select the correct datatype.
     - If you are modifying a datatype, make sure to select the corresponding data type when making the modification.
     - Save the metadata.
Repeat this procedure on the CDC adapter machine for the VSAM CICS data source.

For more information, see Importing the Metadata.

- For cases where you can redeploy the solution:
  
  Run Oracle Studio, and open the CDC Solution perspective.

  Open the CDC solution project.

  Click **Implement** and then click **Stream Service**.

  Run the wizard. Make sure that you are using the modified metadata.

  Redeploy the solution, but do not activate it.

  For more information, see Deploying a Change Data Capture.

3. Delete the physical files that represent the modified tables from the Staging Area.
   Make sure not to delete the SERVICE_CONTEXT and CONTROL_TABLE files.

4. Reactivate the solution using Oracle Studio. See Activating and Deactivating Solution Workspaces.

### Staging Area Maintenance

The Staging Area files for the OracleAS CDC Adapter solution are DISAM files that store changes until the client application consumes them. When you delete old changed records they are actually only marked as deleted. New changes continue to be written to the deleted records.

In busy production sites the DISAM files can get very large, which can affect the performance of the system.

To ensure that system performance is not degraded, you should defragment the Staging Area files to better maintain the Staging Area repository. Use the following procedures and suggestions when you carry out the defragmentation of the staging area:

- Defragment the DISAM files at least once a week. The frequency can vary depending on the amount of changes in the staging area.

- In addition to defragmenting the staging area files, you should also check for corrupt DISAM files.

- You should carry out the maintenance processes when the lowest possible activity in your system occurs.

To defragment and maintain the staging area, use the DCHECK and DPACK DISAM utilities. The DCHECK utility is used to check for corruption of DISAM files and rebuild the bad indexes and the DPACK utility defragments the DISAM files and rebuilds them without the deleted records. This reduces the size of the files and ensures that the DISAM files contain only active and relevant records.

Do the following to carry out the maintenance activities:

1. Deactivate the OracleAS CDC Solution with the staging area you working with. See Activating and Deactivating Solution Workspaces.

2. Run the DCHECK utility on each file to make sure it's not corrupted. For example, at the command prompt enter the following to check the DIASM file that represents the table called **employees**.

   dcheck employees
If the file is corrupt you can use the `-b` switch to rebuild all indexes.

3. Defragment each file using the DPACK utility. For example, at the command prompt enter the following to defragment the DIASM files that represent the tables called `employees` and `salaries`.

   ```
dpack employees
   dpack salaries
   ...
   ```

4. Reactivate all solutions. See Activating and Deactivating Solution Workspaces.

**Monitoring the Change Data Capture**

After you deploy the OracleAS Change Data Capture, you can monitor its progress. Monitoring provides you with information about the OracleAS CDC adapter’s status, troubleshooting and tuning. This section contains the following topics that explain monitoring in a CDC.

- Service Context Table
- Monitoring the Status

**Service Context Table**

A control table is maintained by the event router that reports its current state and other important statistics. It can be accessed with any tool that supports SQL access.

The control table is called SERVICE_CONTEXT. This table has a single row with the following columns:

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>context</td>
<td>string (32)</td>
<td>The context value of the last change record in the most recently committed transaction. This value can be used to synchronize retrieval of transactions among different tables.</td>
</tr>
<tr>
<td>agent_context</td>
<td>string (64)</td>
<td>This is the agent context that the staging area would return to if it were to restart for whatever reason. The agent context value is calculated as follows:</td>
</tr>
<tr>
<td>status</td>
<td>string (16)</td>
<td>Staging area status. For more information, see Monitoring the Status.</td>
</tr>
<tr>
<td>sub_status</td>
<td>string (64)</td>
<td>A second level status. For more information, see Monitoring the Status.</td>
</tr>
</tbody>
</table>
The CONTROL table is also used by the event router to persist its state for purpose of recovery. This table must not be modified by the users.

### Monitoring the Status

The following table describes the status for the CDC adapters when they are running. The status is defined as a state in the SERVICE_CONTEXT table. The table describes the different statuses available for a CDC adapter.

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>status_message</td>
<td>string (80)</td>
<td>Message that is returned that describes the staging area status.</td>
</tr>
<tr>
<td>status_time</td>
<td>timestamp</td>
<td>The time that the status is updated.</td>
</tr>
<tr>
<td>completed_transactions</td>
<td>uint4</td>
<td>Number of transactions processed.</td>
</tr>
<tr>
<td>active_transactions</td>
<td>uint4</td>
<td>Number of transactions in progress (in memory, not yet committed or rolled back).</td>
</tr>
<tr>
<td>timedout_transactions</td>
<td>uint4</td>
<td>Number of transactions that have timed out (were in memory for too long, declared to have timed out and written to a file).</td>
</tr>
<tr>
<td>rollback_transactions</td>
<td>uint4</td>
<td>Number of rolled back transactions.</td>
</tr>
<tr>
<td>processed_change_events</td>
<td>uint4</td>
<td>Number of change events written out.</td>
</tr>
<tr>
<td>deleted_change_events</td>
<td>uint4</td>
<td>Number of change events deleted from change table.</td>
</tr>
<tr>
<td>bytes_written</td>
<td>uint4</td>
<td>Accumulated size in bytes of change records written.</td>
</tr>
<tr>
<td>opened_files</td>
<td>uint4</td>
<td>Current number of physically opened files by the staging area.</td>
</tr>
<tr>
<td>opened_files_virtual</td>
<td>uint4</td>
<td>Current number of logically opened files by the staging area.</td>
</tr>
<tr>
<td>memory_usage</td>
<td>uint4</td>
<td>Amount of memory currently allocated for staging.</td>
</tr>
<tr>
<td>node_id</td>
<td>uint4</td>
<td>A two-digit identifier with the same value as the nodeID config property when in multi-router mode. In regular mode, this column has no value.</td>
</tr>
<tr>
<td>last_transaction_timestamp</td>
<td>string (26)</td>
<td>The time of the last transaction.</td>
</tr>
<tr>
<td>Version</td>
<td>uint4</td>
<td>The version number for the router.</td>
</tr>
<tr>
<td>errors</td>
<td>uint4</td>
<td>Total number of errors reported.</td>
</tr>
<tr>
<td>Reduced_transactions</td>
<td>uint4</td>
<td>The number of transactions reduced to disc.</td>
</tr>
<tr>
<td>compensation_records</td>
<td>uint4</td>
<td>The number of compensation records captured.</td>
</tr>
</tbody>
</table>

The CONTROL table is also used by the event router to persist its state for purpose of recovery. This table must not be modified by the users.
### Table 5–2  SERVICE_CONTEXT Status States

<table>
<thead>
<tr>
<th>State</th>
<th>Sub State</th>
<th>State Details</th>
<th>Description</th>
</tr>
</thead>
</table>
| Active        | Processing    | ■ Reads the change events  
■ Writes the change events  
■ Reduces the timed-out transaction to disc  
■ Deletes any expired change events | The router is connected to the CDC agent and is processing or waiting for the change events. |
| Idle          |               | Wait for new change events                                                   | The router’s agent reaches the end of its journal and does not have any new change events. |
| error         | router.discWriteError | Detailed error text                                                         | This indicates that the change router operation involving writing to disk failed. The most common reason is not enough disk space. Other reasons such as permissions, wrong path, or locking can also cause this. |
|               | component.error | Detailed error text                                                         | The prefix component (agent/Router) indicates where the error happened. The error in the sub_state column identifies the error. |
| Disconnected  |               | Detailed error text                                                         | This indicates that the change router operation with the CDC agent failed and cannot be restored. |
Daemon Life-Cycle Tasks

Most of the daemon runtime tasks between Oracle Application Server and Oracle AS CDC Adapter for VSAM are carried out using Oracle Studio, which is used to monitor the daemon and server activity and control what happens to the daemon and server processes.

See Also: Appendix B, "Advanced Tuning of the Daemon" for details about the configuration settings.

This section contains the following topics:

- Starting the Daemon
- Shutting Down the Daemon
- Monitoring the Daemon During Runtime
- Daemon Logs

Starting the Daemon

The daemon is started when OracleAS Adapter for VSAM is installed. In case you have shut down the daemon, as described in Shutting Down the Daemon, you can restart the daemon as described in the following task.

Note: The daemon is started on the IBM z/OS platform. It cannot be started remotely using Oracle Studio.

Task: Starting the Daemon

Activate $INSTROOT.USERLIB(ATTDAEMN) as a started task to invoke the daemon. For example, in the SDSF screen, enter the following command:

' /s ATTDAEMN'

Where $INSTROOT is the high-level qualifier where Oracle Connect is installed.

See Also: Starting the Daemon for details about the ATTDAEMN JCL

Shutting Down the Daemon

To shut down the daemon use Oracle Studio, as follows:

1. From the Start menu, select Start, Programs, Oracle, and then select Studio.
2. Expand the Machines folder.
3. Right-click the computer defined in Setting Up the IBM z/OS Platform in Oracle Studio and select Open Runtime Perspective.

4. In the Runtime Explorer, right-click the daemon you want to shut down and select Shutdown Daemon.

Monitoring the Daemon During Runtime

Use the Runtime Manager perspective of Oracle Studio to monitor the daemon during run time.

Perform the following steps:

1. From the Start menu, select Start, Programs, Oracle, and then select Studio.
2. Right-click the computer defined in Setting Up the IBM z/OS Platform in Oracle Studio, and select Open Runtime Perspective.

You can manage the daemon by expanding the relevant node, daemon, workspace or server process, as described in the following sections.

Daemon (Computer) Options

Right-click the daemon to display the options available for it, including the ability to display the daemon log.

The following table lists the available daemon options:

<table>
<thead>
<tr>
<th>Table 5–3 Daemon Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option</strong></td>
</tr>
<tr>
<td>Edit Daemon Configuration</td>
</tr>
<tr>
<td>Status</td>
</tr>
<tr>
<td>Reload Configuration</td>
</tr>
<tr>
<td>View Log</td>
</tr>
<tr>
<td>View Events</td>
</tr>
<tr>
<td>Daemon Properties</td>
</tr>
<tr>
<td>Recycle servers</td>
</tr>
<tr>
<td>Kill servers</td>
</tr>
<tr>
<td>Shutdown Daemon</td>
</tr>
</tbody>
</table>
**Workspace Options**

Right-click a workspace to display the options available for the workspace, including the ability to display the workspace log.

The following table lists the available options:

**Table 5–4 Workspace Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rename</td>
<td>Enables changing the name of the daemon displayed in the Runtime Explorer.</td>
</tr>
<tr>
<td>Remove</td>
<td>Removes the daemon from the Runtime Explorer.</td>
</tr>
<tr>
<td>Refresh</td>
<td>Refreshes the display.</td>
</tr>
</tbody>
</table>

**Server Options**

Right-click a server to display the options available for the server, including the ability to display the server log.

The options available at the server level are listed in the following table:

**Table 5–3 Daemon Options (Cont.)**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rename</td>
<td>Enables changing the name of the daemon displayed in the Runtime Explorer.</td>
</tr>
<tr>
<td>Remove</td>
<td>Removes the daemon from the Runtime Explorer.</td>
</tr>
<tr>
<td>Refresh</td>
<td>Refreshes the display.</td>
</tr>
</tbody>
</table>

---

*Note: It is recommended to use this option with caution, as it may lead to data loss.*

**Table 5–4 Workspace Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit Workspace</td>
<td>Opens the daemon editor to enable you to reconfigure the workspace.</td>
</tr>
<tr>
<td>Configuration</td>
<td>See Also: Advanced Tuning of the Daemon for details about the configuration settings.</td>
</tr>
<tr>
<td>Status</td>
<td>Checks the status of the workspace whether it is available or not.</td>
</tr>
<tr>
<td>Reload Configuration</td>
<td>Reloads the configuration of the workspace after any changes. Any servers currently started are not affected by the changed configuration.</td>
</tr>
<tr>
<td>View Log</td>
<td>Displays the log for all servers for the workspace. For details see Daemon Logs</td>
</tr>
<tr>
<td>View Events</td>
<td>Displays the workspace events log.</td>
</tr>
<tr>
<td>Recycle Servers</td>
<td>Closes all unused servers and prepares all active servers to close when the client disconnects. New connection requests are allocated with new servers.</td>
</tr>
<tr>
<td>Kill Servers</td>
<td>Immediately closes all active and unused servers.</td>
</tr>
<tr>
<td>Note: It is recommended to use this option with caution, as it may lead to data loss.</td>
<td></td>
</tr>
<tr>
<td>Remove</td>
<td>Removes the selected workspace from the Runtime Explorer.</td>
</tr>
<tr>
<td>Disable</td>
<td>Disables the selected workspace.</td>
</tr>
<tr>
<td>Refresh</td>
<td>Refreshes the display.</td>
</tr>
</tbody>
</table>
Daemon Logs

Oracle Connect produces a number of logs that you can use to troubleshoot problems. The daemon manages the following logs:

- Daemon
- Workspace
- Server process

The Runtime Manager perspective of Oracle Studio provides a monitor for these logs as shown in the following figure:

![Daemon Logs](image)

To display the required log, do the following:

1. In Oracle Studio, Runtime perspective, right-click, expand the Daemons folder
   - If you want to view the workspace log, then expand the daemon with the workspace you want to view.
   - If you want to view the server, right-click the workspace with the server you want to view.

2. Right click the daemon, workspace, or server and select View Log.

Each log is displayed in a different tab. You can browse the different logs by clicking the tab at the bottom of the screen.
The Log Monitor

The logs display daemon, workspace, or server events as they happen. You can view the following types of logs in the monitor:

**Daemon logs**: Display activity between clients and the daemon, including clients logging in and logging out from the daemon.

**Workspace logs**: Display information about the workspace being used by the client.

**Server logs**: Display activity between clients and the server process used by that client or handle the client request.

You can change the logging level. To change the logging level, click **Properties**. The following levels of logging are available in the dialog box:

- **none**: The log displays the users that log in and out.
- **error**: The log displays the users that log in and out and any errors that have been generated.
- **debug**: The log displays the users that log in and out, any errors that have been generated, and any tracing that was configured. For information on configuring the tracing options, see **Logging and workspace General**.

You can start and stop the logging display.

- Click **Suspend** to stop collecting logging information.
- Click **Resume** to start collecting logging information.

You can remove the information displayed in the log.

To remove the information, click **Clear**.

If logging is enabled, new information will continue to be displayed. The cleared information cannot be viewed again.

Resolving Communication Errors

When Oracle Studio disconnects from the IBM z/OS computer, the computer is displayed in Oracle Studio with an X in a red circle. If this situation occurs, try to access the computer later.

The following table describes the various scenarios that may exist when Oracle Application Server disconnects from the IBM z/OS computer.
To troubleshoot client/server communication problems, you need to be familiar with the following:

- Daemon configuration settings
- Oracle Connect security
- TCP/IP subsystem. Oracle Application Server Adapter for VSAM uses TPC/IP for internal intercomputer communications.
- System details, such as the account name and password of the administrator account, the IP address of the computers involved and whether a portmapper is being used.

### Resolving Specific Errors

The following error messages relate to errors received from Oracle Connect.

**C007: Server initialization failed.**

**Cause:** The daemon failed to start its network service.

**Action:** Check the processes being run on the system to see whether another daemon or program is using the port specified in the oc4j-ra-xml file for the adapter.

**Action:** Check the TCP/IP subsystem on the current computer by trying to ping it or run FTP or Telnet to or from it.

**Action:** Check whether the daemon has privileges to use the TCP/IP services on the current computer with the port specified in the oc4j-ra-xml file for the adapter.

**C008: Setting server event handler failed.**

**Cause:** Internal error.

**Action:** Contact Oracle Support Services.

**C009: IRPCD process has been terminated by user request.**
Resolving Specific Errors

Runtime Tasks and Troubleshooting

Cause: This message is informational only. The daemon successfully shut down.
Action: No action required.

C00A: Application %s not found.
Cause: The requested workspace does not exist.
Action: Check that the workspace defined in the oc4j-ra-xml file is also defined in the daemon configuration on the IBM z/OS platform. Use the Status option in the Runtime Manager perspective.

C00B: Invalid IRPCD client context.
Cause: A non-Oracle Connect program is trying to connect to the daemon.
Action: Check the processes and kill the relevant process with a system command.

C00C: Daemon request requires a server login.
Cause: A non-Oracle Connect server or program was trying to use a daemon service reserved for Oracle Connect servers.
Action: Check the processes and kill the relevant process with a system command.

C00D: Daemon request requires a client login.
Cause: The requested daemon requires a valid client login, which was not supplied.
Action: Reissue the command and specify a username and password.
Action: Edit the user profile in Oracle Studio to specify a valid username and password for the IBM z/OS platform.
See Also: Setting Up Run-Time User Access to the IBM z/OS Platform.

C00E: Daemon request requires an administrator login.
Cause: The requested daemon service requires an administrative login.
Action: Edit the daemon security in Oracle Studio to specify a valid administrator username and password.
See Also: Daemon Security.

C00F: Anonymous client logins are not allowed.
Cause: The daemon is configured to require a valid username and password, which were not supplied.
Action: Enable anonymous client access in daemon security in Oracle Studio.
See Also: Daemon Security.
Action: Edit the user profile in Oracle Studio to specify a valid username and password for the IBM z/OS platform.
See Also: Setting Up Run-Time User Access to the IBM z/OS Platform.

C010: Anonymous server logins are not allowed.
Resolving Specific Errors

**Cause:** Internal error.
**Action:** Contact Oracle Support Services.

**C011: Client has already timed out.**
**Cause:** A server process was started on behalf of a client and the client has timed out before the server completed its startup.
**Action:** Increase the Connect timeout value for the server workspace in the workspace **General**.

**See Also:** Workspace **General**.

**C012: Invalid username/password.**
**Cause:** Invalid username/password supplied when logging on to the daemon.
**Action:** See the daemon log file for the reason that the username/password were not accepted.

**Action:** Edit the user profile in Oracle Studio to specify a valid username and password for the IBM z/OS platform.

**See Also:** Setting Up Run-Time User Access to the IBM z/OS Platform

**Action:** Make sure the daemon is started from an APF-authorized account that is allowed to check for system usernames and passwords.

**C014: Client connection limit reached - try later.**
**Cause:** The maximum number of server processes for the workspace has been reached, and none of the active servers could accept the client connection.
**Action:** Increase the value of the **Number of sub-tasks** in the workspace **Server Mode** tab.

**See Also:** Workspace **Server Mode**.

**Action:** Try running the command later.

**C015: Failed to start server process.**
**Cause:** The Oracle Connect daemon failed to start a server process or the started server failed upon starting up.

**Action:** See the daemon and server logs for the reason the server did not start. For example, you might receive a message with a reason specified in the log file similar to the following: [C015] Failed to start NAVIGATOR server process: No server account name defined for anonymous client; code: -1601: SQL code: 0

**Action:** If you use impersonation, check the user profile on the client. Also see C069.
To set impersonation: APF authorize all the steplibs in the server script on z/OS computer. For example:

```
setprog... ada622-volume adavol
CICS.CICS.SDFHEXCI - p390dx
INSTROOT.load - 111111
INSTROOT.loadaut - 111111
```

*INSTROOT* is the high level qualifier where Oracle Connect is installed.

In the **Security** tab of the Navigator workspace, under the daemon node in the Configuration Explorer, select **Use specific workspace account** and clear the **Workspace account** field of all values.

---

**C016: Unexpected server state.**
- **Cause:** Internal error.
- **Action:** Contact Oracle Support Services.

**C017: Active daemon clients exist. Shutdown canceled.**
- **Cause:** One or more clients are still connected to the daemon.
- **Action:** Wait until all the clients log off the daemon and then retry the shutdown operation.

**C019: Request is not granted because someone else is locking it.**
- **Cause:** A request to lock a resource managed by the daemon was denied because another user has locked the resource.
- **Action:** Wait for the other user to release the resource.

**C01A: Lock %s not found.**
- **Cause:** A request to free a resource was denied because the caller did not lock that resource (for example, another user shut down the daemon you are working with).
- **Action:** Contact Oracle Support Services.

**C01B: Unexpected error in %s.**
- **Cause:** Internal error.
- **Action:** Contact Oracle Support Services.

**C01C: Cannot update configuration without _APPLICATIONS lock.**
- **Cause:** Internal error.
- **Action:** Contact Oracle Support Services.

**C01D: Need to lock the application first.**
- **Cause:** Internal error.
- **Action:** Contact Oracle Support Services.

**C01F: Cannot set configuration of a deleted application.**
- **Cause:** Internal error.
- **Action:** Contact Oracle Support Services.

**C020: Failed in looking up host name (gethostname())**
- **Cause:** Cannot connect to the remote computer.
**Action:** Check that the name specified for the computer in the oc4j-ra-xml file is correct.

**Action:** Check that a domain name server (DNS) is available to look up the host name.

**Action:** Check the TCP/IP subsystem on the computer by trying to ping it or run FTP or Telnet to or from it.

**C021: Required variable %s not found**

**Cause:** An environment variable required by the Oracle Connect server was not defined when the server started up.

**Action:** Check whether the startup script makes any changes to the environment variables used by Oracle Connect.

**Action:** Check whether the system-defined environment size is sufficiently large for Oracle Connect.

**C022: Server failed to connect and register with the daemon.**

**Cause:** An Oracle Connect server started by the daemon was not able to connect or register back with the daemon.

**Action:** Try to connect again.

**Action:** Increase the Connect timeout value for the server workspace in the Workspace General tab.

**See Also:** Workspace General.

**Action:** Check that the startup script for the workspace launches the correct version of Oracle Connect.

**Action:** Increase the value of the Set maximum number of servers and Maximum parameter for the Clients per server limit in the Workspace Server Mode tab.

**See Also:** Workspace Server Mode.

**C023: Call made to unregistered module %d.**

**Cause:** Internal error.

**Action:** Contact Oracle Support Services.

**C024: Failed to create a socket.**

**Cause:** An error occurred within the TCP/IP subsystem.

**Action:** Check whether you have sufficient system privileges.

**Action:** Check the TCP/IP subsystem on the computer by trying to ping it or run FTP or Telnet to or from it.

**C025: Failed to set socket option %s**

**Cause:** An error occurred within the TCP/IP subsystem.

**Action:** Check whether you have sufficient system privileges.

**Action:** Check the TCP/IP subsystem on the computer by trying to ping it or run FTP or Telnet to or from it.
C026: Failed to bind server to port %s
   **Cause:** An Oracle Connect server or daemon was not able to bind to the specified port.
   **Action:** Check whether another program is holding the port that was specified in the oc4j-ra-xml file for the adapter.
   **Action:** Check whether you have sufficient system privileges.

C027: Cannot create TCP service for %s
   **Cause:** An error occurred within the TCP/IP subsystem
   **Action:** Check the TCP/IP subsystem on the computer by trying to ping it or run FTP or Telnet to or from it.

C028: Unable to register (%s, %d, tcp)
   **Cause:** This error may happen when a portmapper is used (host:a) but the portmapper is not available.
   **Action:** Enable the portmapper.
   **Action:** Avoid using the portmapper (by not using :a when starting the daemon).

C029: Failed to create a server thread
   **Cause:** Internal error.
   **Action:** Contact Oracle Support Services.

C02A: Server thread failed to start
   **Cause:** Internal error.
   **Action:** Contact Oracle Support Services.

C02B: Stopping the %s server - no client
   **Cause:** A server that was started by the Oracle Connect daemon to service a client did not get a client connection request within one minute. The server terminates.
   **Action:** In most cases, the client was terminated by a user request, so no specific action is required.
   **Action:** If no client can connect to the server, it may be that the server has multiple network cards and the Oracle Connect daemon is not aware of this. In this case, start the daemon with an IP address.

C02C: Unexpected event - a termination signal intercepted
   **Cause:** Internal error.
   **Action:** Contact Oracle Support Services.

C02D: Modified transport, context unknown/lost
   **Cause:** Internal error.
   **Action:** Contact Oracle Support Services.

C02F: Corrupted arguments passed to procedure
   **Cause:** Internal error.
   **Action:** Contact Oracle Support Services.

C030: Unable to free arguments for %s() of %s
   **Cause:** Internal error.
Action: Contact Oracle Support Services.

**C031: Cannot register a non-module RPC %s**  
**Cause:** Internal error.  
**Action:** Contact Oracle Support Services.

**C032: An IRPCD program is required**  
**Cause:** Internal error.  
**Action:** Contact Oracle Support Services.

**C033: An IRPCD super-server is required for module events**  
**Cause:** Internal error.  
**Action:** Contact Oracle Support Services.

**C034: An invalid super-server module ID was specified, %d**  
**Cause:** Internal error.  
**Action:** Contact Oracle Support Services.

**C035: Out of memory**  
**Cause:** Not enough memory to service a client request.  
**Action:** Increase process memory quota or add memory to the system.

**C036: Failed to register RPC procedure module %s**  
**Cause:** Internal error.  
**Action:** Contact Oracle Support Services.

**C037: Failed to register an invalid RPC procedure number %x**  
**Cause:** Internal error.  
**Action:** Contact Oracle Support Services.

**C038: Cannot reregister RPC procedure number %x**  
**Cause:** Internal error.  
**Action:** Contact Oracle Support Services.

**C042: Remote call to %s failed; %s**  
**Cause:** Remote call to API failed.  
**Action:** Check the daemon log file.  
**Action:** If necessary, change the level of detail written to the log file to help resolve the problem.  
**See Also:** Daemon Logging.

**C043: Failed to connect to host %s; %s**  
**Cause:** The remote host is not correctly defined to Oracle Connect or is not working.  
**Action:** Check the remote computer definition in the oc4j-ra-xml file for the adapter.  
**Action:** Check that the daemon is up on the IBM z/OS platform. Use the Status option in the Runtime Manager perspective.
**Action:** Check the network connection by trying to ping the host computer or run FTP or Telnet to or from it.

**C045: Failed to create a service thread**

**Cause:** The server failed to create a thread to service a client request.

**Action:** A system or process quota limit has been exceeded. Either increase the quota or lower the **Clients per server limit** value in the Workspace **Server Mode** tab.

**See Also:** Workspace Server Mode.

**C047: %s out of memory**

**Cause:** Not enough memory was available to Oracle Connect to complete a requested operation.

**Action:** Terminate unnecessary processes running on the server.

**Action:** Add more memory to the system.

**Action:** Allow the process to use more memory.

**Action:** Limit the number of processes the daemon may start. If the demand for servers exceeds the number of available servers, clients get a message telling them the maximum number of servers has been reached and asking them to try again later.

**C066: Communication error with the server%s**

**Cause:** Connection to the Oracle Connect daemon or server failed, or an established session with a server has failed.

**Action:** Check the remote computer definition in the oc4j-ra-xml file.

**Action:** Check that the daemon is up on the IBM z/OS platform. Use the Status option in the Runtime Manager perspective.

**Action:** In case of a network problem, check the network connection by trying to ping the host computer or run ftp or telnet to or from it.

**C067: Unexpected error occurred in server function %s**

**Cause:** One of the server functions has exited with an exception (such as an abend, or an Invalid Instruction).

**Action:** Contact Oracle Support Services.

**C068: Fail to login daemon**

**Cause:** The daemon is not running on the server computer.

**Action:** Use the Status in Oracle Studio Runtime Manager perspective to check whether a daemon is running on the server.

**Action:** Have the system administrator reinstall Oracle Connect on the server.

**C069: Fail to get server**

**Cause:** The Oracle Connect daemon on the server computer could not start a server process to serve the client. A separate message provides more detail on why the server process could not start.

**Action:** There are many possible causes of this error. If the cause is not clear from the related message, see the Oracle Connect daemon log file on the server.
**Action:** The resolution to this error is highly dependent on the particular cause. The following are some typical causes and resolutions.

**Action:** Some process creation quota was exceeded. Either try again later or increase the quota or the other relevant system resources.

**Action:** The server startup script failed.

**Action:** The username given is not allowed to use the requested server. Use an authorized username.

**Action:** A limit on concurrent clients for a server has been reached. Try again later.

**Action:** If you use impersonation, check the user profile on the client. Also see C015.

**C06A: Failed to connect to server**

**Cause:** The server assigned to the client did not accept the client connection. A separate message provides more detail about why the server process did not accept the connection.

**Action:** See the daemon and server log files for the reason that the server was not available to accept its assigned client.

**C06B: Disconnecting from server**

**Cause:** A network failure, or a server computer failure or a server program failure caused the connection to abort. The currently active transaction is aborted as well.

**Action:** Oracle Connect automatically tries to reestablish a connection with a server upon the next SQL command issued against the server. Once the network or computer failure is corrected, the connection to the daemon is reestablished automatically.

**C070: Server failed to send reply to the client**

**Cause:** Server terminated unexpectedly.

**Action:** Unless the client was intentionally stopped (for example, using Control-C), contact Oracle Support Services.

**C071: Connection to server %s was disconnected. Cursors state was lost.**

**Cause:** Either a network failure, a server computer failure or a server program failure caused the connection to abort. The currently active transaction is aborted as well.

**Action:** Normally, Oracle Connect automatically tries to create a new session with the server upon the next attempt to access the server. If the network and server are accessible, the next operation should succeed. Otherwise, the network or server computer should be fixed before connection can be resumed.

**Action:** In case of a server crash not related to callable user code, contact Oracle Support Services.

**C072: Reconnect to server %s**

**Cause:** This is an informational message only. The client has reestablished its connection with the server.

**Action:** No action is required.

**C073: The parameters passed to the admin server are invalid: %s**

**Cause:** Internal error.
Action: Contact Oracle Support Services.

C074: No authorization to perform the requested operation (%s)
Cause: User/account has insufficient privileges.
Action: Grant administrative privileges to the user/account using the Administrator parameter of the Daemon or Workspace Security tabs.

See Also: Daemon Security or Workspace Security.

C075: Failed to register daemon in the TCP/IP service table
Cause: Registration of the daemon in the TCP/IP services file has failed.
Action: Check that the account running the daemon has the permissions to update the TCP/IP services file.

E001: Failed in lock/release operation
Cause: A lock or release operation of a global resource has failed. A separate message provides more details. The separate message specifies the cause of this error.
Action: There are various causes for this error, including lack of sufficient privileges or a system resource shortage.

J0006: Operation on already closed connection was requested
Cause: A request using a connection that was closed was attempted.
Action: Reopen the connection and try again.

J0028: Internal Error: Unknown XML tag %s
Cause: Internal error.
Action: Contact Oracle Support Services.

J0030: Internal Error: Method %s needs to be overwritten
Cause: Internal error.
Action: Contact Oracle Support Services.

J0031: Internal Error: Required attribute %s not found in %s verb
Cause: Internal error.
Action: Contact Oracle Support Services.

J0032: Internal Error: %s ACP object was returned instead of %s as expected
Cause: Internal error.
Action: Contact Oracle Support Services.

J0033: Internal Error: Attempt to work with closed socket
Cause: Internal error.
Action: Contact Oracle Support Services.

J0034: Internal Error: corrupted message; %s bytes read instead of %s as expected
Cause: XML sent from the client to the server has become corrupted.
Action: Check compression settings for XML transferred from the client to the server. If the setting are OK, retry sending the request from the client to the server.

J0035: Internal Error: Invalid redirection address %s returned by daemon
Cause: Internal error.
**Action:** Contact Oracle Support Services.

**J0036:** %s: %s  
**Cause:** One of the following errors was received from the server: 0 - server.internalError, 1 - client.xmlError, 2 - client.requestError, 3 - client.noActiveConnection, 4 - server.resourceLimit, 5 - server.redirect, 6 - client.noSuchResource, 7 - client.authenticationError, 8 - client.noSuchInteraction, 9 - client.noSuchConnection, 10 - server.notImplemented, 11 - server.xaProtocolError, 12 - server.xaUnknownXID, 13 - server.xaDuplicateXID, 14 - server.xaInvalidArgument, 15 - client.autogenRejected, 16 - server.xaTransactionTooFresh, 17 - server.resourceNotAvailable, 18 - client.authorizationError, 19 - server.configurationError  
**Action:** Review the server log file to determine the problem.

**J0037:** Internal Error: No ACP response when %s was expected  
**Cause:** Internal error.  
**Action:** Contact Oracle Support Services.

**J0039:** Internal Error: ACP root is not found in the XML  
**Cause:** Internal error.  
**Action:** Contact Oracle Support Services.

**J0040:** Internal Error: Input record is required for interaction %s execution  
**Cause:** Internal error.  
**Action:** Contact Oracle Support Services.

**J0048:** Invalid metadata type %s is passed to %s function  
**Cause:** A request for metadata was not fulfilled.  
**Action:** Check the validity of the request.

**J0050:** Key of the put method must be of type string  
**Cause:** In either a GET or PUT operation, the key must be a string.  
**Action:** Change the key used in the operation to a valid key.

**J0059:** Value %s is invalid for attribute %s  
**Cause:** A request for metadata was not fulfilled.  
**Action:** Check the validity of the request.

**J0068:** Value must be of type string  
**Cause:** In a PUT operation, the value must be a string.  
**Action:** Change the value used in the operation to a valid value.

**J0069:** Value must be of type MappedRecord  
**Cause:** In a PUT operation, the value must be a mapped record.  
**Action:** Change the value used in the operation to a valid value.

**J0070:** Value must be of type MappedRecord[]  
**Cause:** In a PUT operation, the value must be mapped record array.  
**Action:** Change the value used in the operation to a valid value.

**J0071:** Bad key for mapped record, #element or #element[] is required  
**Cause:** In a PUT operation, the value must be mapped record array.
Action: Change the key used in the record to a valid key.

J0072: Value must be of type Object[]
    Cause: In a PUT operation, the value must be mapped record array.
    Action: Change the value used in the operation to a valid value.

J0078: In nonpersistent connection and the nonkeep alive encryption is not supported - ignored
    Cause: Encryption is not supported for nonpersistent connections.
    Action: There is no action to take. This warning can be ignored.

J0079: Invalid argument passed to %s - Argument: %s, Value: %s
    Cause: The value pass.
    Action: Change the argument used to a number.
Resolving Specific Errors
Oracle Connect includes a number of tuning parameters that can improve performance. Specifically, the daemon can be configured to optimize communication between the IBM z/OS platform and a client. In addition, the binding environment can be tuned to optimize the request handling.

This section contains the following topics:

- Configuring the Daemon for High Availability
- Configuring a Binding Environment
- Migration Considerations
- Security Considerations
- Transaction Support

### Configuring the Daemon for High Availability

The daemon workspace is responsible for allocating server processes to clients. You can configure a workspace to use a pool of server processes so that a server process is always available for a client request.

Use Oracle Studio to maintain the daemon and the daemon workspace parameters to control the allocation of server processes and their management in a pool.

You can also have a number of daemon workspace configurations. This lets you create individual workspaces for use with different adapters.

### Adding a New Daemon Workspace Configuration

Use Oracle Studio to add a new daemon configuration. You can set up different daemon configurations for different situations.

Carry out the following to add a new daemon workspace configuration:

1. From the Start menu, select Programs, Oracle, and then select Studio.
2. In the Design Perspective Configuration view, expand the Machines folder and then expand the machine where you want to add the workspace.
3. Expand the Daemons folder. The daemon available on this computer are listed.
4. Right-click IRPCD and select New Workspace. The New Daemon Workspace screen is displayed.
5. Enter a name for the new workspace and then enter a description, if desired.

6. Select whether to use default settings or copy the properties of an existing workspace.

   To copy the properties of an existing workspace, click the Browse button and select the workspace from which you want to copy the properties.

7. Click Next. The Select Scenario screen is displayed.

8. Select Application Server using connection pooling and click Next.

9. Continue through the wizard, entering the required values for the workspace.

10. Click Finish.

The workspace is displayed under the IRPCD daemon node.

**Editing the Workspace**

You edit a workspace by using the tabs described in the following table:

<table>
<thead>
<tr>
<th>Table 6–1 Workspace Properties tabs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tab</strong></td>
</tr>
<tr>
<td>General</td>
</tr>
<tr>
<td>Server Mode</td>
</tr>
<tr>
<td>Security</td>
</tr>
</tbody>
</table>

Use Oracle Studio to access these tabs, as follows:

1. From the Start menu, select Programs, Oracle, and then select Studio.

2. In the Design perspective Configuration view, expand the Machines folder and then expand the machine where you want to edit the workspace.

3. Expand the Daemons node. The daemon configurations available on this computer are listed.

4. Expand the IRPCD node. The daemon workspaces are listed.

5. Right-click the required workspace and select Open.

6. Select the tab that contains the information you want to edit. For full details of the tabs and the fields in these tabs, see Workspaces.

7. After editing the workspace, click Save.

**Configuring the Server Mode**

The server mode dictates how the daemon starts up new processes. The daemon supports the following server modes:
■ **singleClient**: Each client receives a dedicated server process. The account in which a server process runs is determined either by the client login information or by the specific server workspace.

This mode enables servers to run under a particular user account and isolates clients from each other (because each receives its own process). However, this server mode incurs a high overhead due to process startup times and may use a lot of server resources (because it requires as many server processes as concurrent clients).

■ **multiClient**: Clients share a server process and are processed serially. This mode has low overhead because the server processes are already initialized. However, because clients share the same process, they may impact one another, especially if they issue lengthy queries.

The number of clients that share a process is determined by the Clients per server limit (the maximum number of concurrent clients a server process for the current workspace accepts).

■ **reusable**: This is an extension of the single client mode. Once the client processing finishes, the server process does not die and can be used by another client, reducing startup times and application startup overhead.

This mode does not have the high overhead of single client mode because the servers are already initialized. However, this server mode may use a lot of server resources (because it requires as many server processes as concurrent clients).

The other modes can be set so that the server processes are reusable by setting the number of times a process can be reused with the `Reuse limit` value (the maximum number of times a particular server process can be reused or how many clients it can serve before it is retired). Reuse of servers enhances performance because it eliminates the need to repeat initializations. However, reuse runs a risk of higher memory leakage over time. The default value for the `Reuse limit` field is `None`, indicating that no reuse limit is enforced.

Set the server mode in the **Server Mode** tab of the daemon workspace editor as shown in the following figure:
When using any of the server modes you can specify a pool of server processes. These server processes are started when the daemon starts and are maintained in a pool. The server processes are available for use by new client requests from the pool, saving initialization time. Instead of starting a new server process each time one is requested by a client, the client receives a process immediately from the pool of available processes. When the client finishes processing, this server process either dies, or if reusable servers have been specified, it is returned to the pool.

You set up a pool of server processes by specifying the following parameters in the Server Mode tab.

- **Port Range**: Select the range for specific firewall ports through which you access the workspace. Determines the range of ports available for this workspace when starting server processes. Use this option when you want to control the port number, so that Oracle Connect can be accessed through a firewall.

  Enter the port range in the following fields:
  - **From**: Enter the highest numbered port in the range
  - **To**: Enter the lowest numbered port in the range
  - **Use Default Port Range**: Select this to use the port range that is defined in the daemon.

- **Maximum number of server processes**: Enter the maximum number of server processes that can run at the same time.

- **Limit server reuse**: Select this if you want to limit the number of servers that can be reused. If this is selected, the **Reuse limit** parameter is available.

  If **Limit server reuse** is selected, in the field next to the check box, enter the maximum number of times a server can be reused. Select the maximum of clients accepted in a server process.
A one-client server can be reused after its (single) client has disconnected. Reuse of servers enhances startup performance because it avoids the need to repeat initialization.

This parameter is not available if the Limit server reuse parameter is not selected.

This parameter is not available if the server mode value is `singleClient`.

- **Limit Concurrent clients per server**: Select this to limit the number of clients that a server can accept for the current workspace process.

  If this is not selected, the number of clients is unlimited.

  If `Limit concurrent clients per server` is selected, in the field next to the check box, enter the maximum number of clients that a server process for the current workspace accepts. The default for this field is `None`, indicating that the number of clients for each server is unlimited. This field is available if the server mode value is `multiClient` or `multiThreaded`.

- **Specify Server Priority**: Set the priority for servers. For example, a workspace for applications with online transaction processing can be assigned a higher priority than a workspace that requires only query processing. The lower the number, the higher the priority. For example, workspaces with a priority of 1 are given a higher priority than workspaces with a priority of 2.

  **Note**: This is unavailable if `Use default server priority` is selected.

- **Use default server priority**: Sets the priority to 0. There is no specific priority for this workspace. Clear this check box to set a priority in the Specify Server Priority parameter.

- **Keep when daemon ends**: Select this to kill all servers started by that daemon when a daemon is shutdown, even if they are active. Select this if you want the servers for the workspace to remain active, even after the daemon has been shut down. If selected, it is the responsibility of the system operator or manager to ensure that the servers are eventually killed. This must be done at the system level.

- **Number of prestarted servers in pool**: The number of server processes that are prestarted for this workspace when the daemon starts up. These are available for use by new client processes with minimal initialization time. Instead of starting a new server process each time one is requested by a client, the daemon immediately allocates (to the client) a server from a pool of available servers. When the number of available server processes drops lower than the value specified in the Minimum number of available servers field, the daemon again starts server processes until the specified number of available servers is reached. The default for this parameter is 0, meaning that no servers are prestarted for this workspace.

- **Number of spare servers**: The minimum number of server processes in the prestarted server’s pool before the Oracle Connect daemon resumes creating new server processes (up to the number specified in the Initial number of servers field value, described earlier). If this parameter is set to a value greater than the Initial number of servers field value, the daemon considers the value to be the same as the value specified in the Initial number of servers field. In this case, a new server process is started and added to the pool each time a server process is removed from the pool and allocated to a client. The default for this parameter is 0, which means that new servers are created only when there are no other available servers.

- **Number of sub-tasks**: The number of sub-tasks for a server that are prestarted for this workspace when the daemon starts up. In addition to setting up a pool of server processes as described earlier, you can set additional server processes as
sub-tasks by specifying this parameter. If you set 10 servers and 10 prestarted sub-tasks then 100 tasks are started (10 sub-tasks for each process).

## Configuring a Binding Environment

Each binding configuration includes the following information:

- Environment settings, which are used to configure the environment used by any of the adapters defined in the binding.
- Application adapters on the current computer.

To configure environment settings in Oracle Studio, perform the following steps:

1. From the **Start** menu, select **Programs, Oracle**, and then select **Studio**.
2. In the Design perspective Configuration view, expand the **Machine** folder, then expand the machine where you want to configure the binding.
3. Expand the **Bindings** folder. The binding available on this computer are listed.
4. Right-click **NAV** and select **Open**.
5. In the **Environment** tab, edit the environment settings as needed. To edit an environment setting, expand the property category and click the value to edit.

The binding **Environment** tab is shown in the following figure:

![The binding Properties tab](image.png)

The binding environment is divided into the following categories:

- **Debug**
- **General**
- **Language**
The following table lists the parameters that define debugging and logging operations:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACX trace</td>
<td>Select this for the input xml sent to the back-end adapter and the output xml returned by the back-end adapter to be written to the log.</td>
</tr>
<tr>
<td>GDB Trace</td>
<td>This parameter is not applicable for use with OracleAS CDC Adapter for VSAM.</td>
</tr>
<tr>
<td>General trace</td>
<td>Select this to log general trace information. The default writes only error messages to the log.</td>
</tr>
<tr>
<td>Query warnings</td>
<td>This parameter is not applicable for use with OracleAS CDC Adapter for VSAM.</td>
</tr>
<tr>
<td>Add timestamp to traced events</td>
<td>Select this to add a timestamp on each event row in the log.</td>
</tr>
<tr>
<td>Query processor trace</td>
<td>This parameter is not applicable for use with OracleAS CDC Adapter for VSAM.</td>
</tr>
<tr>
<td>Binary XML Log Level</td>
<td>Select the binary XML log level from the list. The following logging levels are available:</td>
</tr>
<tr>
<td>Log file</td>
<td>The high-level qualifier of the log file for messages. The following type of message are written to the log:</td>
</tr>
<tr>
<td>Trace Directory</td>
<td>This parameter is not applicable for use with OracleAS CDC Adapter for VSAM.</td>
</tr>
<tr>
<td>Optimizer trace</td>
<td>This parameter is not applicable for use with OracleAS CDC Adapter for VSAM.</td>
</tr>
</tbody>
</table>
General

The following table lists the parameters that define various operations the directory where temporary files are written.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nav Utility Editor</td>
<td>This parameter is not applicable for use with OracleAS Adapter for VSAM.</td>
</tr>
<tr>
<td>Temporary directory</td>
<td>The directory where temporary files are written, including the temporary files created for use by hash joins and for sorting files. The default is the current high-level qualifier.</td>
</tr>
</tbody>
</table>
| Year 2000 policy     | Determines the way 2-digit years are converted into 4-digit years. When the parameter year2000Policy is not set, or when it is set to a value outside the range of values defined for the policy, as described in the following paragraphs, a default value of 5 and the Sliding Base Year policy is used. Two policies are provided:  
  - Fixed Base Year: year2000Policy is set to a value greater than, or equal to 1900. In this case, the value of year2000Policy is the first 4-digit year after 1900 that can be represented by a 2-digit year. For example, if year2000Policy is set to 1905, the years 2000->2004 will be represented by 00->04. All other 2 digits will map to 19xx.  
  - This solution is most required if there is live data at the low end (close to the year 1900), which the user wants to keep with the current 2-digit format.  
  - The user will probably change the base date only after ensuring that these old dates have been deleted from the data source.  
  - Sliding Base Year: year2000Policy is set to a positive value less than 100. In this case, the value of year2000Policy represents the number of years ahead of the current year that can be represented by a 2-digit number. With each passing year the earliest year that can be represented by a 2-digit number changes to a year later. |
| Cache buffer size    | Enter the number of bytes to be used for a memory buffer on a client machine, which is used by the Oracle Connect client/server to store read-ahead data. The default is 200000. |

Language

The following table lists the parameters that define globalization support:
Configuring a Binding Environment

### Modeling

The modeling parameters are not applicable with OracleAS CDC Adapter for VSAM.

### ODBC

The odbc parameters are not applicable for use with OracleAS CDC Adapter for VSAM.

### OLEDB

The oledb parameters are not applicable for use with OracleAS CDC Adapter for VSAM.

### Optimizer

The following parameters enable you to customize the performance:

**Optimizer goal**: The optimization policy. Select one of the following from the list to the right:

- **none** (default): All row optimization is used.
- **first**: First row optimization is performed based on the assumption that the results produced by the query are used as the rows are retrieved. The query optimizer uses a strategy that retrieves the first rows as fast as possible, which might result in a slower overall time to retrieve all the rows.
- **all**: Optimization is performed based on the assumption that the results produced by the query are used after all the rows have been retrieved. The query optimizer uses a strategy that retrieves all the rows as fast as possible, which might result in a slower time to retrieve the first few rows.

Aggregate queries automatically use all row optimization, regardless of the value of this parameter.

All other optimizer parameters are not applicable for use with the OracleAS CDC Adapter for VSAM.

---

**Table 6–4  Language Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>Identifies the application language. A default codepage is selected based on the value specified for this parameter. See also: Appendix F, &quot;Globalization Settings&quot;.</td>
</tr>
<tr>
<td>Code Page</td>
<td>For use with globalization support to identify the codepage for the workspace. See also: Appendix F, &quot;Globalization Settings&quot;.</td>
</tr>
</tbody>
</table>
| NLS String | Specifies the codepage used by a field whose data type is defined as nlsString. Use this for a field whose codepage is other than that of the computer codepage. This parameter includes the following values:  
  - The name of the codepage.  
  - Whether the character set reads from right to left (as in middle eastern character sets).  
  The default is false. |

---
Parallel Processing

This following list shows the parallel processing properties. The parallel processing properties control how parallel processes are handled in the binding.

<table>
<thead>
<tr>
<th>Table 6–5 Parallel Processing Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>Disable threads</td>
</tr>
<tr>
<td>■ Disable threaded read ahead (QP)</td>
</tr>
<tr>
<td>■ Disable query read ahead (QP)</td>
</tr>
<tr>
<td>■ ODBC async execution property to enable ODBC asynchronous execution</td>
</tr>
<tr>
<td>■ Disable QP parallel execution</td>
</tr>
<tr>
<td>■ Hash parallelism</td>
</tr>
</tbody>
</table>

Query Processor

The following table lists the parameters that enable you to fine tune how queries are processed:

<table>
<thead>
<tr>
<th>Table 6–6 Query Processor Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>Disable command reuse</td>
</tr>
<tr>
<td>Disable DS property cache</td>
</tr>
<tr>
<td>Disable insert parameterization</td>
</tr>
<tr>
<td>Disable metadata caching</td>
</tr>
<tr>
<td>Disable query parameterization</td>
</tr>
<tr>
<td>Disable row mark field fetch</td>
</tr>
<tr>
<td>Compile after load</td>
</tr>
</tbody>
</table>
### Table 6–6  (Cont.) Query Processor Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Ignore segments bind failure**                   | This property determines how Oracle Connect responds when the execution of one of the segments of a segmented data source fails:  
  - Select this to Log a message and continue execution. This is the default setting.  
  - Clear the check box to Log a message and stop execution. By default, this property is selected. If you want to stop execution after sending a message, clear this check box. |
| **Prompt database-user password**                   | Select this to configure Oracle Connect to prompt the user for security information when accessing a data source. |
| **Use alternate qualifier**                        | Select this to use the @ symbol instead of a colon (:) when connecting to multiple data sources. |
| **Use table filter expression**                    | Select this to enable the use of tables that have filter expressions specified in their metadata. |
| **Write empty string as null**                     | Select this to replace empty strings in a SET clause of an UPDATE statement or in a VALUES list of an INSERT statement with null values. |
| **Optimistic for update**                          | Select this to use optimistic locking as the default locking behavior on queries with a FOR UPDATE clause. |
| **Disable compilation cache**                      | Select this to disable saving successfully compiled statements in the cache. |
| **Maximum SQL cache**                              | Enter the maximum number of SQL queries that can be stored in cache memory. This property’s value is ignored if **Disable compilation cache** is selected. The default is 3. |
| **First tree extensions**                          | Enter the maximum size allowed for an SQL query after compilation. The default is 150. |
| **Maximum columns in parsing**                     | Enter the maximum number of columns that a query can reference. The default is 500. |
| **Maximum segmented database threads**             | Enter the maximum number of open threads allowed, when working with segmented databases. |
| **Minimum number of parameters allocated**         | Enter the minimum number of parameters that can be used in a query. |
| **Continuous query retry interval**                | Enter the number of seconds that the query processor waits before executing a query again, when no records are returned. The default is 2. |
| **Continuous query timeout**                       | Enter the number of seconds that the query processor will continue to issue queries, when no records are returned. The default is 3600 (one hour), which indicates that after an hour without new messages the continuous query will end. Enter 0 to indicate that there is no timeout and the continuos query will not end automatically. |
| **Continuous query prefix**                        | Enter a prefix to replace the $$ prefix that is used to identify the continuous query special columns. For example, if you enter ##, then the continuous query alias is ‘##StreamPosition’ and the control command alias is ‘##ControlCommand’. |
### Table 6–6 (Cont.) Query Processor Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arithmetic fixed precision</td>
<td>Enter an integer determine the precision scale factor for floating decimal position. The default is 0, which indicates that the exact arithmetic function is not used. When the value is set to a small positive integer, the special precise floating point arithmetic is used in the query processor. The value determines the precision scale factor (for example, a value of 2 indicates two digits decimal precision). Setting this parameter can be done at a workspace level and it affects all queries running in that workspace with no change to the query or to the underlying data source. The query processor ADD(), SUBTRACT() and SUM() functions that currently use double arithmetic for both floating and decimal types will use this logic. When the value is set to the default, 0, the exact arithmetic function is not used. This property is used to set the Exact Arithmetic function. The <code>qpArithmeticFixedPrecision</code> property is an integer value that determines the fixed precision the Oracle Connect query processor uses for precise floating point arithmetic. It is used to create an accurate result when using the SUM function. Because floating point datatypes are not accurate their results over time does not correspond to the expected arithmetic sum. In other words, in the floating point representation, values such as 0.7 cannot be represented precisely. If there are eight precision digits, there is usually imprecision in the least significant digit so the number is actually approximately 0.699999995. The <code>qpArithmeticFixedPrecision</code> property corrects this imprecision by using an exact floating point.</td>
</tr>
<tr>
<td>Parser depth</td>
<td>The maximum depth of the expression tree. The default is 500.</td>
</tr>
<tr>
<td>Token size</td>
<td>Enter the maximum length of a string in an SQL query. The minimum value is 64. The default value is 350.</td>
</tr>
<tr>
<td>Insert from select commit rate</td>
<td>Enter the commit rate to use when executing an INSERT-FROM-SELECT operation. If a value more than 0 is entered, a commit is performed automatically after inserting the indicated number of rows. For example, if the value is 5, a commit is performed every time 5 rows are inserted.</td>
</tr>
<tr>
<td>Disable SQS cache</td>
<td>Select this to always read compiled Oracle Connect procedures and views from a disk. In this case, they are not saved in the cache.</td>
</tr>
<tr>
<td>Procedures cache size</td>
<td>Enter the number of stored queries created with a CREATE PROCEDURE statement that can be kept in cache memory. This property’s value is ignored if Disable SQS cache size is selected.</td>
</tr>
</tbody>
</table>
| Expose XML fields          | Expose XML fields: Select this to display data returned for a query as XML, representing the true structure of the result. This is useful when querying a data source table that contains arrays or variants.  
  - **XML field name:** Enter the name used in a query to indicate that the data is returned as XML, instead of the keyword XML. This is available only if Expose XML fields is selected. |
Transactions

The following table lists the parameters that define transaction support:

<table>
<thead>
<tr>
<th>Table 6–7 Transaction Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>Transaction extended logging</td>
</tr>
<tr>
<td>Commit on destroy</td>
</tr>
<tr>
<td>Disable 2PC</td>
</tr>
<tr>
<td>User commit confirm table</td>
</tr>
<tr>
<td>Transaction log file</td>
</tr>
<tr>
<td>Recovery delay</td>
</tr>
<tr>
<td>Time limit</td>
</tr>
</tbody>
</table>

Conversions

Select one:

- **No conversion**: Select this if you want all transactions to remain as sent. This is selected by default
- **Convert all to distributed**: Select this to convert all simple transactions into distributed transactions.
- **Convert all to simple**: Select this to convert all distributed transactions into simple transactions.

Tuning

The following table lists the parameters that define the tuning:

<table>
<thead>
<tr>
<th>Table 6–8 Tuning Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>Dsm maximum buffer size</td>
</tr>
</tbody>
</table>
### Table 6–8 (Cont.) Tuning Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dsm maximum Sort buffer size</td>
<td>Enter the maximum size of the sort buffers. Use this parameter instead of dsmMaxBufferSize for sorts only. The default value is 1000000 bytes.</td>
</tr>
<tr>
<td>Dsm middle buffer size</td>
<td>Enter the maximum size of the index cache. This cache is not used for hash joins and lookup joins. The default value is 100000 bytes.</td>
</tr>
<tr>
<td>File pool size</td>
<td>Enter the maximum number of files that can be opened in the file pool. The default is 10.</td>
</tr>
<tr>
<td>File pool size per file</td>
<td>Enter the size of the file in the pool. The default is 3.</td>
</tr>
<tr>
<td>File close on transaction</td>
<td>Select this if you want the File Pool to close when a transaction is committed.</td>
</tr>
<tr>
<td>Use global file pool</td>
<td>Select this to use a global file pool is. When the workspace server mode parameter is set to multiClient or reusable, this parameter also indicates whether the file pool closes upon the client disconnection.</td>
</tr>
<tr>
<td>Hash buffer size</td>
<td>Enter the amount of cache memory that is available for each hash join or lookup join. The default is 1000000 bytes.</td>
</tr>
<tr>
<td>Hash max open files</td>
<td>Enter the maximum number of files that a query can open at one time for use when performing hash joins. The number assigned to this parameter must not exceed the system maximum. The default is set to 90 files. <strong>Note:</strong> The hash join optimization strategy results in a number of files being opened to perform the join. The larger the table size, the more files are opened. By adjusting this parameter you can disable hash joins on very large tables, while allowing hash joins for small tables.</td>
</tr>
<tr>
<td>Hash primary extent size</td>
<td>Enter the primary extent size.</td>
</tr>
<tr>
<td>Hash secondary extent size</td>
<td>Enter the secondary extent size.</td>
</tr>
<tr>
<td>Hash enable RO</td>
<td>Select this for the QP to store the first hash bucket in memory instead of a sequential file.</td>
</tr>
<tr>
<td>COM maximum XML in memory</td>
<td>Specifies the maximum size of an XML document held in memory. The default is 65535 bytes.</td>
</tr>
<tr>
<td>COM maximum XML size</td>
<td>Specifies the maximum size of an XML document passed to another computer. The default is 65535 bytes. <strong>Note:</strong> When you increase this value for this property, you may need to increase the value for the Maximum XML in memory property in the daemon. For more information on daemons, see Control.</td>
</tr>
<tr>
<td>COM XML transport buffer size</td>
<td>Enter the maximum size of the internal communications buffer. The default value (−1) indicates there is no size limit.</td>
</tr>
</tbody>
</table>

**XML**

The following table lists the parameters that define XML support:

### Table 6–9 XML Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM maximum XML in memory</td>
<td>Specifies the maximum size of an XML document held in memory. The default is 65535 bytes.</td>
</tr>
<tr>
<td>COM maximum XML size</td>
<td>Specifies the maximum size of an XML document passed to another computer. The default is 65535 bytes. <strong>Note:</strong> When you increase this value for this property, you may need to increase the value for the Maximum XML in memory property in the daemon. For more information on daemons, see Control.</td>
</tr>
<tr>
<td>COM XML transport buffer size</td>
<td>Enter the maximum size of the internal communications buffer. The default value (−1) indicates there is no size limit.</td>
</tr>
</tbody>
</table>
Migration Considerations

You can migrate an adapter configuration from one platform to another. The configuration information is stored in the Oracle Connect repository on the source platform and is exported to an XML file which can then be imported to the target platform.

Note that when migrating a configuration, any file names and paths that are specific to the source platform must be changed to valid files on the target platform.

To migrate an adapter configuration using Oracle Studio, perform the following steps:

1. From the Start menu, select Programs, Oracle, and then select Studio.
2. In the Design perspective, Configuration view, expand the Machines folder.
3. Right-click the required computer, and select Export XML definitions.
4. In the File name field, type the path and name of the XML file where the XML representation of the computer and its complete configuration is stored.
5. Edit any paths in the XML definition to the paths required on the target platform. For example, the setting for the serverLogFile parameter may require changing, depending on the platform.
6. Set up the target platform in Oracle Studio in the same way you set up the source platform, as described in Setting Up the IBM z/OS Platform in Oracle Studio.
7. In the Configuration Explorer, right-click the target computer and select Import XML definitions.
8. Import the XML file to the target platform.

Security Considerations

Oracle Connect works within the confines of the platform security system. For example, on an z/OS computer with RACF installed, and with the workspace server mode set to multi-tasking, a RACROUTE VERIFY is performed for each task in the address space, according to the client connection.

In addition, Oracle Connect provides the following security:

- A binary XML encryption mechanism, which is activated as follows:
  1. The client’s first message to the server includes a pre-defined shared key, including the key name and value in the connection string. The server gets

---

**Table 6-9 (Cont.) XML Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XML date format</td>
<td>Enter the date format to use for XML. The options are:</td>
</tr>
<tr>
<td></td>
<td>- ISO (the default): The date format is: YY-MM-DDThh:mm:ss [.ss..]</td>
</tr>
<tr>
<td></td>
<td>- ODBC: The date format is: YYYY-MM-DD HH:MM:SS [.NNN...]</td>
</tr>
<tr>
<td>Replace invalid XML</td>
<td>Select this to replace invalid XML characters with a ‘?’ . This property is used for diagnostic and troubleshooting purposes.</td>
</tr>
<tr>
<td>characters</td>
<td></td>
</tr>
<tr>
<td>XML trim char columns</td>
<td>Select this to enable padded spaces to be trimmed from XML string columns when the record format is fixed. By default this is selected, and padded spaces are trimmed for fixed size character columns. If you do not want this behavior, clear this check box.</td>
</tr>
</tbody>
</table>
the key value for the key name passed from the client from the native object store (NOS).

2. The server generates a random 128-bit RC4 session key which is returned encrypted to the client, using the shared key. If no predefined shared key is provided, then a predefined, hardcoded key is used (this key is hardcoded on the client and on the server).

3. Passwords are always encrypted when passed over the wire, using an RC4, 128-bit session key, regardless of whether the entire session is encrypted or not.

4. If a predefined shared key was provided, then the entire session is encrypted. Otherwise, only the password exchange is encrypted (using the hardcoded key).

- **Credentials:** Passwords and usernames exchanged over the network are encrypted using a pre-defined, hardcoded, 128-bit RC4 session key.
- **Design Time:** Security within Oracle Studio to grant access to Oracle Studio itself and to grant access to computers, user profiles and workspaces.
- **Run time:** Security used to access VSAM, including controlling the daemon for the access.

### Setting Design Time Security

Setting design time security is described in the following sections:

- Securing access to Oracle Studio is described in [Setting Password Access to Oracle Studio](#).
- Securing rights to configure a computer in Oracle Studio is described in [Specifying Users with Administrative Rights](#).
- Securing access to user profiles is accomplished by right-clicking the relevant user profile in Oracle Studio and selecting Change Master Password. In the dialog box that is displayed, specify a password that must be provided in the future to edit the specific user profile.
- Securing access to workspaces is accomplished by right-clicking the relevant workspace in Oracle Studio and selecting Set Authorization. In the dialog box that is displayed, specify a valid user and password that must be provided in the future to edit the specific workspace.

### Setting Run Time Security

During run time, security considerations are implemented as follows:

- When the client request accesses the legacy platform through the daemon, either anonymous access is allowed or a valid user name and password must be provided for the computer in the user profile. The `userName` and `password` properties in the J2CA 1.5 VSAM adapter are used at this stage to access the daemon.

---

**Note:** The user name used to access the daemon must also be the name of a user profile used.
■ Access by the client must be through a valid port, according to the port range entered in the Server section of the workspace Server Mode tab in Oracle Studio. For more information, see the explanation of the workspace Server Mode.

   **Note:** Access to the legacy platform through a firewall using the NAT protocol is specified when the computer is added to Oracle Studio.

■ To be allocated a server process, the client must be granted anonymous access to the workspace or be listed in the Authorized Workspace Users section of the workspace Security tab in Oracle Studio. For more information see the explanation of the workspace Security tab.

■ The ability to run commands on the daemon, such as starting or stopping a daemon or ending server processes is available only to administrators who have been registered in Oracle Connect as a daemon administrator. A client is registered as a valid daemon administrator in the Administrator privileges section of the daemon Security tab in Oracle Studio. For more information, see explanation of the daemon Security tab.

   **Note:** You can also specify administrators who can run commands only at the level of the workspace. Select these administrators in the workspace Security tab, as described in the explanation of the workspace Security.

---

**Transaction Support**

OracleAS CDC Adapter for VSAM supports global transactions and can fully participate in a distributed transaction if you access the VSAM data under CICS.

   **Note:** To use OracleAS CDC Adapter for VSAM with global transactions, you must have RRS installed and configured.

To work with global transactions, select Convert all to distributed in the Transaction section of the binding environmental properties. See Transactions in the Configuring a Binding Environment section.

To use global transactions capability to access data on the z/OS computer, define every library in the ATTSRVR JCL as an APF-authorized library.

To define a DSN as APF-authorized, in the SDSF screen, enter the following command:

```bash
/*/setprog apf,add,dsn=instroot.library,volume=ac002
```

Where ac002 is the volume where you installed Oracle Connect and INSTROOT is the high level qualifier where Oracle Connect is installed.

If the Oracle Connect installation volume is managed by SMS, when defining APF-authorization, then enter the following command in the SDSF screen:

```bash
/*/setprog apf,add,dsn=instroot.library,SMS
```

Make sure that the library is APF-authorized, even after an IPL (restart) of the computer.
If RRS is not running, then OracleAS Adapter for VSAM can participate in a distributed transaction, as the only one-phase commit resource, if you enter the keyword NORRS, as shown in the Transaction log file property. The Transaction log file property is in the Transactions section in Configuring a Binding Environment.

**Note:** If a no log file is entered, then the format for the Transaction log file parameter when RRS is not running is: ,NORRS.
Advanced Tuning of the Metadata

Oracle Studio enables you to define outbound adapter interactions. In addition, Oracle Studio defines input and output structures used for these interactions. The interactions and input and output structures are maintained as metadata by Oracle Studio in the Metadata tab of the Design perspective.

This appendix contains the following sections:
- Metadata for the VSAM Data Source
- Adapter Metadata

Metadata for the VSAM Data Source

Using Oracle Studio, perform the following steps to maintain the metadata for the VSAM data source:

1. From the Start menu, select Programs, Oracle, and then select Studio.
2. Expand the Machines folder, then expand the machine with the metadata you are working with.
3. Expand the Bindings folder.
4. Expand the NAV binding.
5. Expand the Data sources folder to display the data sources.
6. Right-click the VSAM data source and select Show Metadata View to display the Metadata view.
7. Right-click the table you want to view in the Metadata Explorer and select Edit.

The metadata editor opens, displaying the General tab, with general table details. The following tabs are used to view and edit the metadata:
- General Tab
- Columns Tab
- Indexes Tab
- Statistics Tab
- Advanced Tab

General Tab

Use the General tab to maintain information about the whole table, such as the table name and the way the table is organized.
The **General** tab is shown in the following figure:

*Figure A–1  The General Tab*

![Figure A–1  The General Tab](image)

The **General** tab comprises fields, as listed in the following table:

*Table A–1  General Tab Components*

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>An optional description of the table.</td>
</tr>
<tr>
<td>Table Properties</td>
<td>The name of the file that contains the table. You must enter the full path</td>
</tr>
<tr>
<td></td>
<td>and include the file extension for the file. For example, D: \COBOL\orders.cob. You can click Browse and browse to find and enter the location of the table file. Note: Do not enter the file extension for DIASM or CIASM files.</td>
</tr>
</tbody>
</table>
Use the Columns tab to specify metadata that describe the table columns. The tab is divided into the following:

- **Column Definition Section**
- **Column Properties**
The **Columns** tab is shown in the following figure:

**Figure A–2 The Columns Tab**

![Columns Tab](image)

**Column Definition Section**

The top section of this tab lets you define the columns in the source data. You can click in any row (which represents a column in the data base table) to edit the information. The following table describes this section.

**Table A–2 Metadata Column Tab Definitions**

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>The name of the column</td>
</tr>
<tr>
<td>Data type</td>
<td>The data type of the column. Selecting this field displays a drop-down box listing the possible data types.</td>
</tr>
<tr>
<td>Size</td>
<td>The size of the column</td>
</tr>
<tr>
<td>Scale</td>
<td>The information entered in this field depends on the data type: For decimal data types, this is the number of digits to the right of the decimal place. This number must not be greater than the number of digits. The default value is 0. For scaled data types, this is the total number of digits. The number must be negative.</td>
</tr>
</tbody>
</table>
The buttons on the right side of the tab are used to manipulate the data in this section of the tab. The following table describes how you can move around in this section.

### Table A–3 Definition Section Buttons

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert</td>
<td>Inserts a column to the table. You can insert a new column. If the table has arrays, you can add a new child column.</td>
</tr>
<tr>
<td>Up</td>
<td>Moves your selection to the column directly above where the currently selected column.</td>
</tr>
<tr>
<td>Down</td>
<td>Moves your selection to the column directly below where the currently selected column.</td>
</tr>
<tr>
<td>Rename</td>
<td>Lets you rename the selected column.</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes the selected column.</td>
</tr>
<tr>
<td>Find</td>
<td>Click this button to open a list of all columns in the database. Select a column and click OK to select it in the table.</td>
</tr>
</tbody>
</table>

### Column Properties

You can change the property value by clicking in the Value column. Follow these steps for displaying the column properties.

#### To display the column properties

- Select a column from the Column Definition (top) section.

  The properties for the column are displayed at the bottom of the tab.
The following table shows some of the properties available for selected columns.

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alias</td>
<td>A name used to replace the default virtual table name for an array. Virtual table names are created by adding the array name to the record name. When an array includes another array the name of the nested array is the name of the record and the parent array and the nested array. When the default generated virtual table name is too long, use an Alias to replace the long name.</td>
</tr>
<tr>
<td>Autoincrement</td>
<td>The current field is updated automatically by the data source during an INSERT statement and is not explicitly defined in the INSERT statement. The INSERT statement should include an explicit list of values. This attribute is used for fields such as an order number field whose value is incremental each time a new order is entered to the data source.</td>
</tr>
<tr>
<td>Comment</td>
<td>A short note or description about the column.</td>
</tr>
<tr>
<td>DB command</td>
<td>VSAM specific commands for the column. The information displayed is generated automatically when the metadata is generated and should not be modified.</td>
</tr>
<tr>
<td>Empty value</td>
<td>The value for the field in an insert operation, when a value is not specified.</td>
</tr>
<tr>
<td>Explicit Select</td>
<td>When true, the current field is not returned when you execute a SELECT * FROM... statement. To return this field, you must explicitly ask for it in a query, for example, SELECT NATION_ID, Syskey FROM NATION where Syskey is a field defined with Explicit Select. You cannot use an asterisk (*) in a query where you want to retrieve a field defined with the Explicit Select value.</td>
</tr>
<tr>
<td>Hidden</td>
<td>The current field is hidden from users. The field is not displayed when a DESCRIBE statement is executed on the table.</td>
</tr>
<tr>
<td>Non Selectable</td>
<td>When true, the current field is never returned when you execute an SQL statement. The field is displayed when a DESCRIBE statement is executed on the table.</td>
</tr>
<tr>
<td>Non Updateable</td>
<td>If true, the current field cannot be updated.</td>
</tr>
<tr>
<td>Nullable</td>
<td>This value allows the current field to contain NULL values.</td>
</tr>
<tr>
<td>Null value</td>
<td>The null value for the field during an insert operation, when a value is not specified.</td>
</tr>
<tr>
<td>Chapter of</td>
<td>This property shows that the set member field is a chapter of an owner field. A value for this property must be used when accessing a set member as a chapter in an ADO application. This property is used for DBMS metadata.</td>
</tr>
<tr>
<td>OnBit</td>
<td>The position of the bit in a BIT field and the starting bit in a BITS field.</td>
</tr>
<tr>
<td>Subfield of</td>
<td>The value is generated automatically when you generate metadata from VSAM data that includes a superdescriptor based on a subfield. A field is created to base this index on, set to the offset specified as the value of the Subfield start field. If no value is entered in the Subfield start field, the subfield is set by default to an offset of 1.</td>
</tr>
<tr>
<td>Subfield start</td>
<td>The offset within the parent field where a subfield starts.</td>
</tr>
</tbody>
</table>
Indexes Tab

Use the **Indexes** tab to specify metadata describing the indexes of a table.

---

**Note:** The Indexes tab contains information only if the **Organization** field in the Table tab is set to **Index**.

---

The **Indexes** tab is shown in the following figure:

**Figure A–3 The Indexes Tab**

This tab has two sections. The first section lets you define the index keys for the columns in the table. The bottom of the tab lists the properties for each of the columns at the top.

The following sections describe the **Indexes** tab:

- **Table Information**
- **Properties**

**Table Information**

The following table describes the fields for the top part of the tab, which defines the indexes used for the table.
The buttons on the right side of the tab are used to manipulate the data in this section of the tab. The following table describes how you can move around in this section.

Table A–5 Indexes Tab Components

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>The names of existing indexes for the current table.</td>
</tr>
<tr>
<td>Order</td>
<td>The ordering of the rows retrieved by the index.</td>
</tr>
<tr>
<td>DB Command</td>
<td>VSAM-specific commands for the index. The information displayed is generated automatically when the metadata is generated and should not be modified.</td>
</tr>
</tbody>
</table>

Table A–6 Index Definition Buttons

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert</td>
<td>Inserts an index to the table.</td>
</tr>
<tr>
<td>Rename Index</td>
<td>Lets you rename the selected index.</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes the selected index.</td>
</tr>
</tbody>
</table>

Properties
You can index properties for each index column. Follow these steps for displaying the properties for each index.

To display the index properties
- Select a column from the Index Definitions (top) section.

The properties for the column are displayed at the bottom of the tab.

This properties displayed at the bottom of the tab describe the index or segment. The properties available depend on the data source.
Statistics Tab

Use the Statistics tab to update metadata statistics for a table. The Statistics tab is shown in the following figure:

Figure A–4  The Statistics tab

The Statistics tab has three sections. The following tables describe each section.

Table A–7  Table Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rows</td>
<td>Enter or use arrows to select the approximate number of rows in the table. If the value is -1, then the number of rows in the table is unknown (a value was not supplied and the update statistics utility was not run to update the value). A value of 0 indicates that this table is empty.</td>
</tr>
</tbody>
</table>
| Blocks | Enter or use arrows to select the approximate number of blocks in the table.  
**Note:** If neither the number of rows nor the number of blocks is specified for a table, queries over the table might be executed in a nonoptimal manner. |

Use the Columns group box to specify cardinality for each of the columns in the table:
Use the Indexes group box to specify cardinality for the columns in each of the indexes in the table:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indexes and segments</td>
<td>The indexes and segments in the table.</td>
</tr>
<tr>
<td>Cardinality</td>
<td>The number of distinct key values in the index. If the value is -1, then the number of distinct key values in the index is unknown (a value was not supplied and the update statistics utility was not run to update the value). A value of 0 indicates that there are no distinct key values in the index.</td>
</tr>
</tbody>
</table>

Generating Statistics

Click **Update** in the **Statistics** tab to generate updated statistics for the table. The Update Statistics screen is displayed, as shown in the following figure:

![The Update Statistics screen](image)

The following tables list the fields that are used to update statistics:

The **Type** section lets you edit the following:
The Resolution section lets you specify the statistical information returned:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated</td>
<td>An estimation of the amount of statistical information returned.</td>
</tr>
<tr>
<td>Estimated with rows</td>
<td>An estimation of the amount of statistical information returned. The estimate includes an estimation of the number of rows in the table. Specify the number in the text box. This number is used to shorten the time to produce the statistics, assuming that the value specified here is the correct value, or close to the correct value.</td>
</tr>
<tr>
<td>Exact</td>
<td>The exact statistical information returned. Note that this can be a lengthy task and can lead to disk space problems with large tables.</td>
</tr>
</tbody>
</table>

Table A–11 Resolution Components

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default</td>
<td>Only information about the table and indexes is collected.</td>
</tr>
<tr>
<td></td>
<td>Information for partial indexes and columns is not collected.</td>
</tr>
<tr>
<td>All columns and indexes</td>
<td>Information about the table, indexes, partial indexes and columns is collected.</td>
</tr>
<tr>
<td>Select columns and indexes</td>
<td>Enables you to select the columns and indexes for which you want to collect statistics. In the enabled list of columns or indexes, left click those columns you want included (you can use shift-click and control-click to select a number of columns or indexes).</td>
</tr>
</tbody>
</table>

Advanced Tab

The Advanced tab lets you enter information about the virtual view policy for arrays. These parameters are valid only if you are using virtual array views. You configure virtual array views in the Modeling section when Configuring a Binding Environment.
The configurations made in this editor are for the selected table, only. The same parameters are configured on the data source level in the data source editor.

Figure A–6  Data Source Metadata Advanced Tab

Enter the following information in this tab:

- **Generate sequential view**: Select this to map non-relational files to a single table.
- **Generate virtual views**: Select this to have individual tables created for each array in the non-relational file.
- **Include row number column**: Select one of the following:
  - **true**: Select true, to include a column that specifies the row number in the virtual or sequential view. This is true for this table only, even in the data source is not configured to include the row number column.
  - **false**: Select false, to not include a column that specifies the row number in the virtual or sequential view for this table even if the data source is configured to include the row number column.
  - **default**: Select default to use the default data source behavior for this parameter.

For information on how to configure these parameters for the data source, see Configuring the Data Source Driver Advanced Properties.

- **Inherit all parent columns**: Select one of the following:
Adapter Metadata

Use Oracle Studio to maintain the metadata for the CDC Queue adapter in your staging area.

1. From the Start menu, select Programs, Oracle, and then select Studio.
2. Expand the Machines folder, then expand the machine with your staging area.
3. Expand the Bindings folder.
4. Expand the binding for your CDC staging area (with the _sa suffix).
5. Expand the Adapters folder to display the adapters list.
6. Right-click the CDC Queue adapter for your solution, and select Show Metadata View to open the Metadata view.

You can create and edit the following adapter metadata properties:

- **Adapter Metadata General Properties**: Enter and edit information about the adapter, such as the adapter name and the way in which you connect to the adapter. You make these changes in the Design perspective, Metadata view.
- **Adapter Metadata Interactions**: Enter details of an interaction. The interaction Advanced tab is displayed for some adapters only, such as the Database adapter and includes more details about the interaction.
- **Adapter Metadata Schema Records**: The input and output record structure for a record in the adapter definition.

**Adapter Metadata General Properties**

You can enter and edit information about the adapter, such as the adapter name and the way in which you connect to the adapter. You make these changes in the Design perspective, Metadata view. The following describes how to open the Adapter General Properties editor.

1. In Oracle Studio Design perspective, Metadata view, expand the Adapters folder.
2. Right-click the adapter that you want to edit, and select Open.

The General properties editor is displayed.

The Adapter General Properties editor is shown in the following figure:
The **General** properties are listed in the following table:

**Table A–12  General tab Components**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Specifies an identifying description of the adapter.</td>
</tr>
<tr>
<td>Authentication mechanism</td>
<td>Specifies the authentication to access the adapter. The available mechanisms are:</td>
</tr>
<tr>
<td></td>
<td>■ kerbv5</td>
</tr>
<tr>
<td></td>
<td>■ none</td>
</tr>
<tr>
<td></td>
<td>■ basic password</td>
</tr>
<tr>
<td>Max request size</td>
<td>Specifies the maximum size in bytes for an XML request or reply. Larger messages are rejected with an error.</td>
</tr>
<tr>
<td>Max active connections</td>
<td>Specifies the maximum number of simultaneous connections for an adapter (per process).</td>
</tr>
<tr>
<td>Max idle timeout</td>
<td>Specifies the maximum time, in seconds, that an active connection can stay idle. After that time, the connection is closed.</td>
</tr>
<tr>
<td>Adapter Specifications</td>
<td>Specifies the adapter-specific properties for an interaction. The CDC Queue adapter does not have any adapter-specific properties.</td>
</tr>
</tbody>
</table>
Adapter Metadata Interactions

The Adapter Metadata Interactions editor defines an interaction and its input and output definitions. The following describes how to open the Adapter Metadata editor.

1. In Oracle Studio Design perspective, Metadata view, expand the **Adapters** folder.
2. Expand the adapter with the interaction that you want to edit.
3. Expand the **Adapter** folder.
4. Right-click the adapter you want to edit and select **Open**.

   The Adapter Metadata Interactions editor is displayed.

The Adapter Metadata Interactions editor is shown in the following figure:

*Figure A–8  Adapter Metadata Interactions*

The Adapter Metadata Interaction properties are listed in the following table:

*Table A–13  Interaction General tab Components*

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Provides a descriptive identifier for the interaction.</td>
</tr>
</tbody>
</table>
**Table A–13 (Cont.) Interaction General tab Components**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td>Determines the interaction mode. The following interaction modes are available:</td>
</tr>
<tr>
<td></td>
<td>■ sync-send-receive: The interaction sends a request and expects to receive a response.</td>
</tr>
<tr>
<td></td>
<td>■ sync-send: The interaction sends a request and does not expect to receive a response.</td>
</tr>
<tr>
<td></td>
<td>■ sync-receive: The interaction expects to receive a response.</td>
</tr>
<tr>
<td>Input record</td>
<td>Identifies an input record.</td>
</tr>
<tr>
<td>Output record</td>
<td>Identifies an output record for the results of an interaction.</td>
</tr>
<tr>
<td>Interaction Specific Parameters</td>
<td>Specific properties for the interaction. When an Interaction Advanced tab is used, this section is not displayed. The parameters shown are for a Legacy Plug Adapter.</td>
</tr>
</tbody>
</table>

**Interaction Advanced Tab**

In the Adapter Metadata Interactions editor, click **Advanced** at the bottom of the editor to open the Interaction **Advanced** tab. Use this to enter advanced details for the interaction or to create interaction manually.

The following figure shows the Interactions **Advanced** tab.
This tab has three sections.

The **SQL Statement** section lets you build any valid SQL statement. Use the tabs to select the tables and statement types and build a statement. When you select **Enable manual query editing**, you can manually enter a valid SQL statement at the bottom of the screen.

The **Interaction Properties** section lets you select any of the following:

- **Pass Through**: Select this to pass a query directly to the VSAM data.
- **Reuse compiled query**: Select this to save query objects created in the previous execution to the cache. This allows the objects to be reused.
- **Fail on no rows returned**: Select this if you want the system to return an error if no rows are selected.
- **Encoding**: Select one of the following from the list:
  - **base64**: Select this for base 64 encoding
The **Parameters** section lets you create parameters to use for the interaction. To create a parameter, click **Add**. Enter a name in the dialog box and click **OK**. The parameter is entered in the list. You can edit the following properties for each parameter you create. Click in the corresponding cell to edit the properties.

- **Name**: The name of the parameter. This is automatically entered when you create a new parameter. You can click in the cell to change this parameter.

- **Type**: The type of parameter. Select one of the following types from the list:
  - **string**
  - **number**
  - **timestamp**
  - **binary**
  - **xml**

- **Nullable**: Select True or False to determine whether the parameter can be nullable.

- **Default**: Enter a default value for the parameter, which is used if the parameter attribute is missing in the input record.

---

**Notes:**

- If a field is not nullable and a default value is not supplied in the schema part of the Adapter Definition, an error occurs if the parameter attribute is missing in the input record.

- The parameters must be entered in the same order as they are used in the SQL statement.

---

**Adapter Metadata Schema Records**

The Adapter Metadata Schema Records editor defines the general details of the input and output record structures for the interaction. The following describes how to open the Adapter Metadata Schema Records editor:

1. In Oracle Studio Design perspective, Metadata view, expand the **Adapters** folder.
2. Expand the adapter with the schema records that you want to edit.
3. Expand the **Schemas**.
4. Right-click the schema you want to edit and select **Open**.

The Adapter Metadata Schema Records editor is displayed.
The Adapter Metadata Schema Records editor is shown in the following figure:

*Figure A–10  Adapter Metadata Schema Records*

The Adapter Metadata Schema Records properties are listed in the following tables:

*Table A–14  Schema Record Tab*

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fields list</td>
<td>Defines the single data item within a record. This section has a table with the following three columns:</td>
</tr>
<tr>
<td></td>
<td>■ Name: The name of the field</td>
</tr>
<tr>
<td></td>
<td>■ Type: The data type of the field. See the Valid Data Types table for a list of the valid data types.</td>
</tr>
<tr>
<td></td>
<td>■ Length: The size of the field including a null terminator, when the data type supports null termination (such as the string data type).</td>
</tr>
<tr>
<td>Specifications</td>
<td>Defines specific field properties. To display the properties, select the specific field in the Fields list.</td>
</tr>
</tbody>
</table>

The following table describes the valid data types that can be used when defining these specifications in the Schema Record editor.

*Table A–15  Valid Data Types*

<table>
<thead>
<tr>
<th>Binary</th>
<th>Boolean</th>
<th>Byte</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Double</td>
<td>Enum</td>
</tr>
</tbody>
</table>
You can also edit the adapter metadata by viewing its XML schema. The following describes how to open the adapter metadata XML editor:

1. In Oracle Studio Design perspective, Metadata view, expand the **Adapters** folder.
2. Right-click the adapter that you want to edit, and select **Open as XML**.

   The adapter XML editor is displayed in the Design view.

The adapter XML editor is shown in the following figure:

**Figure A–11  Adapter Metadata XML Editor**

For information on how to edit the properties in the XML editor Design view, see **Editing XML Files in Oracle Studio**.

See **CDC Queue Adapter Properties** for an explanation of the attributes for the CDC Queue adapter that you should edit.
Advanced Tuning of the Daemon

The daemon configuration is managed using Oracle Studio. Daemon configuration is divided into the following groups:

- Control
- Logging
- Security
- Workspaces

Control

Using the Control tab for the daemon, you define various daemon control options. The Daemon Control tab is accessed as follows:

1. From the Start menu, select Programs, Oracle, and then select Studio.
2. From the Design perspective Configuration view expand the Machines folder.
3. Right-click the computer and select Open Runtime Perspective.
4. Right-click the required daemon in the Runtime Explorer and select Edit Daemon Configuration. The Control tab for the daemon is displayed in the editor.
5. After making changes to the daemon, right-click the daemon and select Reload Configuration.

Note: You can also change daemon settings using the Configuration Explorer, by selecting a computer and scrolling the list to the required daemon. Right-click the daemon and select Edit Daemon.

Changes made to the daemon configuration are only implemented after the configuration is reloaded using the Reload Configuration option in the Runtime Manager perspective.

The Control tab is shown in the following figure:
The following table shows the parameters that can be set in the **Control** tab:

### Table 6–10 Daemon Control tab Components

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daemon IP Address</td>
<td>Enter the IP address of the machine(s) where the daemon is listening. If no IP address is entered, the daemon will listen on all available IP addresses.</td>
</tr>
<tr>
<td>Daemon port</td>
<td>Enter the port where the daemon is listening. If no port is entered, the daemon listens on all available ports.</td>
</tr>
<tr>
<td>Automatically recover from failure</td>
<td>The daemon restarts automatically if it fails for any reason (any error that causes the daemon process to terminate, such as network process lost or the CPU running the daemon crashes and the backup daemon is defined on another CPU). All available and unconnected servers are terminated and any connected servers are marked and terminated on release. Also the backup starts a backup for itself. The backup appends a new log file to the log of the original daemon, adding a line indicating that a backup daemon was started.</td>
</tr>
<tr>
<td>Maximum XML request size</td>
<td>The maximum number of bytes that the daemon handles for an XML document.</td>
</tr>
<tr>
<td>Default language</td>
<td>The language that the daemon supports. This setting is used when working with a client with a code page different from the server code page.</td>
</tr>
<tr>
<td>Maximum XML in memory</td>
<td>The maximum amount of space reserved for the XML in memory.</td>
</tr>
</tbody>
</table>
Logging Advanced Tuning of the Daemon

Using the **Logging** tab, you define the daemon log file settings, the log file structure and the location where the log is saved. In addition, use it to define the data that is logged and traced in the file.

The following describes how to open the **Logging** tab.

1. From the Start menu, select **Programs, Oracle**, and then select **Studio**.
2. From the Design perspective Configuration view expand the **Machines** folder.
3. Right-click a computer and select **Open Runtime Perspective**.
4. Right-click the daemon in the Runtime Explorer and select **Edit Daemon Configuration**.
5. Click the **Logging** tab.
6. After making changes to the daemon, right-click the daemon and select **Reload Configuration**.

### Table 6–10 (Cont.) Daemon Control tab Components

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call timeout</td>
<td>The timeout period for short calls for all daemons. The definition of a short call is a call that should be completed in a few seconds. For example, most calls to a database such as <code>DESCRIBE</code> should be completed in a few seconds as opposed to call like a <code>GETROWS</code> call, which can take a long time. In heavily loaded or otherwise slow systems, even short calls such as calls to open a file, may take a significant amount of time. If a short call takes more than the specified time to complete, then the connection is stopped. The default value for this parameter is 60 seconds. Values of less than 60 seconds are considered to be 60 seconds. Specifying the timeout in a workspace overrides the value set in this field for that workspace.</td>
</tr>
</tbody>
</table>
| Connect timeout  | The time the client waits for a daemon server to start. If the daemon server does not start within this period, then the client is notified that the server did not respond. The value specified for this parameter serves as the default timeout for all the workspaces listed in the daemon configuration. The default value for this parameter is 60 seconds. **Notes:**
- Entering the timeout in a workspace overrides the value set in this field for that workspace.
- Even if the XML source does not list this parameter in the workspace section, the workspace gets it using the default value. If you want to prevent a workspace from using the default value, you must enter a value of zero for this parameter in the workspace section. |
| Client idle timeout | The maximum amount of time any daemon client may be idle before the connection with the server is closed. Specifying the timeout in a Workspace overrides this setting for that workspace. |
Logging

**Note:** You can also change daemon settings using the Configuration Explorer, by selecting a computer and scrolling the list to the required daemon. Right-click the daemon and select **Edit Daemon**.

Changes made to the daemon configuration are only implemented after the configuration is reloaded using the **Reload Configuration** option in the Runtime Manager perspective.

7. Right-click the daemon and select **Recycle Servers**. Any servers in the connection pool are closed and new servers start with the new configuration.

The **Logging** tab for the daemon is shown in the following figure:

![The Logging tab](image)

The **Daemon Logging** tab comprises fields, as listed in the following table:

### Table 6–11 Daemon Logging tab Components

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daemon log file location</td>
<td>Specifies the daemon produces its log data. The full path must be specified.</td>
</tr>
<tr>
<td>Server log filename format</td>
<td>Defines the name and location of the server log file. The field must specify the full path name. If no directory information is provided for the log file, then it will be located in the login directory of the account running Oracle Connect workstation.</td>
</tr>
<tr>
<td>Daemon operations</td>
<td>Select this to log all of the daemon operations.</td>
</tr>
</tbody>
</table>
The following tokens can appear in the log file template and will be replaced accordingly:

- %A: workspace name
- %D: date (yymmdd)
- %I: instance number of the given workspace server
- %L: server account login directory
- %P: server process ID
- %T: time (hhmmss)
- %U: server account name (username)

For example, %L/server_%A%I.log may produce a log file such as: /usr/smith/server_sales15.log.

The default log file template is %L/server_%A%I.log.

### Security

The following Security tab for the daemon is used to:

- Grant administration rights for the daemon.
Determine access to the computer.

The following shows how to open the Daemon Security tab:

1. From the Start menu, select Programs, Oracle, and then select Studio.
2. From the Design perspective Configuration view expand the Machines folder.
3. Right-click the computer and select Open Runtime Perspective.
4. Right-click the daemon in the Runtime Explorer and select Edit Daemon Configuration.
5. Click the Security tab.
6. After making changes to the daemon, right-click the daemon and select Reload Configuration.

---

**Note:** You can also change daemon settings using the Configuration Explorer, by selecting a computer and scrolling the list to the required daemon. Right-click the daemon and select Edit Daemon.

Changes made to the daemon configuration are not implemented. They are only implemented after the configuration is reloaded using the Reload Configuration option in the Runtime Manager.

---

7. Right-click the daemon and select Recycle servers. Any servers in the connection pool are closed and new servers start with the new configuration.

The Daemon Security tab is shown in the following figure:

![Figure 6–5  The Daemon Security tab](image)

The **Daemon Security** tab comprises fields, as listed in the following table:
A daemon can include a number of workspaces. A workspace defines the server processes and environment that are used for the communication between the client and the server for the duration of the client request. Each workspace has its own definition. The workspace definition is divided into the following groups:

- **General**
- **Server Mode**
- **Security**

### General

Using the **General** tab, you enter general information about the features that control the operation of the workspace, such as the server type, the command procedure used to start the workspace and the binding configuration associated with this workspace.

Do the following to open the **General** tab:

1. From the **Start** menu, select **Programs, Oracle**, and then select **Studio**.
2. From the Design perspective Configuration view, expand the **Machines** folder.
3. Right-click a computer and select **Open Runtime Perspective**.

4. Expand the Daemons node to display the workspaces in the Runtime Explorer.

5. Right-click the workspace and select **Edit Workspace Configuration**. The **General** tab opens.

6. After making changes to the workspace, right-click the daemon and select **Reload Configuration**.

   **Note:** You can also change daemon settings using the Configuration Explorer, by selecting a computer and scrolling the list to the required daemon. Right-click the daemon and select **Edit Daemon**.

   Changes made to the daemon configuration are not implemented. They are only implemented after the configuration is reloaded using the **Reload Configuration** option in the Runtime Manager.

7. Right-click the daemon and select **Recycle Servers**. Any servers in the connection pool are closed and new servers start with the new configuration.

The **General** tab is shown in the following figure:

**Figure 6–6 The General tab**

![General tab](image)

The **General** tab comprises fields, as listed in the following table:

**Table 6–13 General Tab Components**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Info</td>
<td></td>
</tr>
</tbody>
</table>
**Workspaces**

**Advanced Tuning of the Daemon**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workspace name</td>
<td>The name used to identify the workspace.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The default configuration includes the default Navigator workspace. This workspace is automatically used if a workspace is not specified as part of the connection settings.</td>
</tr>
<tr>
<td>Description</td>
<td>A description of the workspace.</td>
</tr>
<tr>
<td>Startup script</td>
<td>The full path name of the script that starts the workspace server processes. The script specified here must always activate the <code>nav_login</code> procedure and then run the server program (svc). If you do not specify the directory, the startup procedure is taken from the directory where the daemon resides. Oracle Connect includes a default startup script, which it is recommended to use.</td>
</tr>
<tr>
<td>Server type</td>
<td>This field is not applicable for use with OracleAS Adapters for VSAM.</td>
</tr>
<tr>
<td>Workspace binding name</td>
<td>This field is not applicable for use with OracleAS Adapters for VSAM.</td>
</tr>
<tr>
<td>Timeout parameters</td>
<td>The time the client waits for the workspace server to start. If the workspace server does not start within this period, then the client is notified that the server did not respond. Specifying the timeout here overrides the default setting, specified in the Control section.</td>
</tr>
<tr>
<td></td>
<td><strong>See Also:</strong> Control for details about the Daemon Control section.</td>
</tr>
<tr>
<td>Client idle timeout</td>
<td>The maximum amount of time a workspace client can be idle before the connection with the server is closed.</td>
</tr>
<tr>
<td>Connect timeout</td>
<td>The time the client waits for a workspace server to start. If the workspace server does not start within this period, then the client is notified that the server did not respond.</td>
</tr>
<tr>
<td>Call timeout</td>
<td>The timeout period for <em>short</em> calls for all daemons. The definition of a short call is a call that should be completed in a few seconds. For example, most calls to a database such as <code>DESCRIBE</code> should be completed in a few seconds as opposed to call like a <code>GETROWS</code> call, which can take a long time. In heavily loaded or otherwise slow systems, even short calls such as calls to open a file, may take a significant amount of time. If a short call takes more than the specified time to complete, then the connection is stopped. The default value for this parameter is 60 seconds. Values of less than 60 seconds are considered to be 60 seconds. Specifying the timeout in a workspace overrides the value set in this field for that workspace.</td>
</tr>
</tbody>
</table>

**Logging and Trace Options**

---

*Table 6–13 (Cont.) General Tab Components*
Specific log file format

Defines the name and location of the server log file if you want the data written to a file instead of SYSOUT for the server process. The parameter must specify the name and the high level qualifier. The following tokens can appear in the log file template and will be replaced accordingly:

- %A: workspace name
- %D: date (ymmd)
- %I: instance number of the given workspace server
- %L: server account’s login directory
- %P: server’s process ID
- %T: time (hhmms)
- %U: server’s account name (username)

Trace options

Specifies the type of tracing to be performed. The following tracing options are available:

- **No timeout**: Select this to disable the standard RPC timeouts, setting them to a long duration (approximately an hour) to facilitate debugging.
- **Call trace**: Select this to generate a message in the server log file for each RPC function called. This is useful for troubleshooting the server.
- **RPC trace**: Select this to enable debugging messages on the server.
- **Sockets**: Select this to generate a message in the server log file for each socket operation. This is useful for troubleshooting client/server communication - providing a detailed trace of every client/server communication.
- **Extended RPC trace**: Select this to generate a verbose message in the server log file for each low-level RPC function called. This is useful for troubleshooting the server.
- **System trace**: Select this to generate operating system-specific tracing.
- **Timing**: Select this to generate a timestamp for every entry to the server log file.

Query governing restrictions

Max number of rows in a table that can be read

Select the maximum number of table rows that are read in a query. When the number of rows read from a table exceeds the number stated the query returns an error.

Max number of rows allowed in a table before scan is rejected

Select the maximum number of table rows that can be scanned. This parameter has different behavior for query optimization and execution.

- For query optimization, the value set is compared to the table cardinality. If the cardinality is greater than the value, the scan strategy is ignored as a possible strategy (unless it is the only available strategy).
- For query execution, a scan is limited to the value set. When the number of rows scanned exceeds the number entered, the query returns an error.
Server Mode

The Server Mode tab lets you configure the features that control the operation of the servers started up by the workspace and allocated to clients.

For example, you can configure the workspace to start up a number of servers for future use, prior to any client request, instead of starting each server when a request is received from a client.

Do the following to open the Server Mode tab:

1. From the Start menu, select Programs, Oracle, and then select Studio.
2. From the Design Perspective Configuration view, expand the Machines folder.
3. Right-click the computer and select Open Runtime Perspective.
4. Expand the Daemons node to display the workspaces in the Runtime Explorer.
5. Right-click the workspace and select Edit Workspace Configuration.
6. Click the Server Mode tab.
7. After making changes to the workspace, right-click the daemon and select Reload Configuration.

---

Notes:

- You can also change daemon settings using the Configuration Explorer, by selecting a computer and scrolling the list to the required daemon. Right-click the daemon and select Edit Daemon.

- Changes made to the daemon configuration are not implemented. They are only implemented after the configuration is reloaded using the Reload Configuration option in the Runtime Manager.

---

8. Right-click the daemon and select Recycle Servers. Any servers in the connection pool are closed and new servers start with the new configuration.

The Server Mode tab is shown in the following figure:
Figure 6–7  The Server Mode tab

![Server Mode Tab](image)

The **Server Mode** tab has the following fields:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workspace server mode</td>
<td></td>
</tr>
<tr>
<td>Port range from</td>
<td>6</td>
</tr>
<tr>
<td>Port range to</td>
<td>0</td>
</tr>
<tr>
<td>Maximum number of server processes</td>
<td>0</td>
</tr>
<tr>
<td>Limit server reuse</td>
<td>59</td>
</tr>
<tr>
<td>Limit concurrent clients per server</td>
<td>0</td>
</tr>
<tr>
<td>Specify server priority</td>
<td>0</td>
</tr>
<tr>
<td>Keep when domain ends</td>
<td></td>
</tr>
<tr>
<td>Number of prestared servers in pool</td>
<td>0</td>
</tr>
<tr>
<td>Number of spare servers</td>
<td>0</td>
</tr>
<tr>
<td>Prestared server pool limit</td>
<td>0</td>
</tr>
<tr>
<td>Number of tasks O/S or O/S specific</td>
<td>0</td>
</tr>
</tbody>
</table>
### Table 6–14 Server Mode Tab Components

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workspace server mode</td>
<td>Specifies the type of new server processes that the daemon starts up. The daemon supports the following server modes:</td>
</tr>
<tr>
<td></td>
<td>■ singleClient: Each client receives a dedicated server process. The account in which a server process runs is determined either by the client login information or by the specific server workspace. This mode enables servers to run under a particular user account and isolates clients from each other, as each receives its own process. However, this server mode incurs a high overhead due to process startup times and can use a lot of server resources as it requires as many server processes as concurrent clients.</td>
</tr>
<tr>
<td></td>
<td>■ multiClient: Clients share a server process and are processed serially. This mode has low overhead because the server processes are already initialized. However, because clients share the same process, they can impact one another, especially if they issue lengthy queries. The number of clients that share a process is determined by the Clients per server limit field.</td>
</tr>
<tr>
<td></td>
<td>■ multiThreaded: This mode is not applicable for use with OracleAS Adapter for VSAM.</td>
</tr>
<tr>
<td></td>
<td>■ reusable: An extension of single-client mode. Once the client processing finishes, the server process does not die and can be used by another client, reducing startup times and application startup overhead. This mode does not have the high overhead of single-client mode because the servers are already initialized. However, this server mode can use a lot of server resources as it requires as many server processes as concurrent clients.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The other modes can be set so that the server processes are reusable. The number of times a process can be reused is controlled by the Reuse limit field value.</td>
</tr>
<tr>
<td>Reuse limit</td>
<td>Sets the maximum number of times a particular server can be reused. A one-client server can be reused after its (single) client has disconnected. Reuse of servers enhances startup performance because it avoids the need to repeat initialization. The default for this field is none (0), indicating that server reuse is unlimited. This parameter is disabled only if the server mode value is singleClient.</td>
</tr>
<tr>
<td>Clients per server limit</td>
<td>Sets the maximum number of clients a server process for the current workspace accepts. The default for this field is none (0), indicating that the number of clients for each server is unlimited. This field is enabled only if the server mode value is multiClient or multiThreaded.</td>
</tr>
</tbody>
</table>
The Server availability field specifies the number of servers in a pool of servers, available to be assigned to a client.

The following options are available:

- **Initial number of servers**: The number of server processes that are prestarted for this workspace when the daemon starts up. When the number of available server processes drops lower than the value specified in the Minimum number field, the daemon again starts server processes until this number of available server processes is reached. The default for this field is 0.

- **Minimum number**: The minimum number of server processes in the prestarted pool before the daemon resumes creating new server processes (to the value specified in the Initial number of servers field). If this field is set to a value higher than the Initial number of servers field, the daemon uses the value specified in the Initial number of servers field. The default for this field is 0.

- **Keep when daemon ends**: When a daemon is shutdown, all the servers started by that daemon are also killed, even if they are active. Set this field to true if you want the servers for the workspace to remain active, even after the daemon has been shut down. If this field is set to true, it is the responsibility of the system operator or manager to ensure that the servers are eventually killed. This must be done at the system level.

- **Set maximum number of servers**: The maximum number of available server processes. Once this number is reached, no new nonactive server processes are created for the particular workspace. For example, if a number of server processes are released at the same time, so that there are more available server processes than specified by this field, the additional server processes higher than this value are terminated. The default for this field is zero, meaning that there is no maximum.

### Port range

The Port range field determines the range of ports available for this workspace when starting server processes. Use this option when you want to control the port number, so that Oracle Connect can be accessed through a firewall.

Enter the port range in the following fields:

- **From**: enter the lowest numbered port in the range.
- **To**: Enter the highest numbered port in the range.

### Use default port range

Select this to use the port range that is defined in the daemon. This is defined in the Port range for servers field in the daemon Control tab.

### Maximum number of server processes

Enter the maximum number of server processes that can run at the same time.

### Limit server reuse

Select this if you want to limit the number of servers that can be reused. If this is selected, the Reuse limit parameter is available.

### Table 6–14 (Cont.) Server Mode Tab Components

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server availability</td>
<td>Specifies the number of servers in a pool of servers, available to be assigned to a client.</td>
</tr>
<tr>
<td>Port range</td>
<td>Determines the range of ports available for this workspace when starting server processes. Use this option when you want to control the port number, so that Oracle Connect can be accessed through a firewall.</td>
</tr>
<tr>
<td>Use default port range</td>
<td>Select this to use the port range that is defined in the daemon. This is defined in the Port range for servers field in the daemon Control tab.</td>
</tr>
<tr>
<td>Maximum number of server processes</td>
<td>Enter the maximum number of server processes that can run at the same time.</td>
</tr>
<tr>
<td>Limit server reuse</td>
<td>Select this if you want to limit the number of servers that can be reused. If this is selected, the Reuse limit parameter is available.</td>
</tr>
</tbody>
</table>
If Limit server reuse is selected, in the field next to the check box, enter the maximum number of times a server can be reused. Select the maximum of clients accepted in a server process.

A one-client server can be reused after its (single) client has disconnected. Reuse of servers enhances startup performance because it avoids the need to repeat initialization.

This parameter is not available if the Limit server reuse parameter is not selected.

This parameter is not available if the server mode value is singleClient.

Limit concurrent clients per server

Select this to limit the number of clients that a server can accept for the current workspace process.

If this is not selected, the number of clients is unlimited.

If Limit concurrent clients per server is selected, in the field next to the check box, enter the maximum number of clients that a server process for the current workspace accepts. The default for this field is None, indicating that the number of clients for each server is unlimited. This field is available if the server mode value is multiClient or multiThreaded.

Specify Server Priority

Set the priority for servers. For example, a workspace for applications with online transaction processing can be assigned a higher priority than a workspace that requires only query processing. The lower the number, the higher the priority. For example, workspaces with a priority of 1 are given a higher priority than workspaces with a priority of 2.

Note: This is unavailable if Use default server priority is selected.

Use default server priority

Sets the priority to 0. There is no specific priority for this workspace. Clear this check box to set a priority in the Specify server priority parameter.

Keep when daemon ends

Select this to kill all servers started by that daemon when a daemon is shutdown, even if they are active. Select this if you want the servers for the workspace to remain active, even after the daemon has been shut down. If selected, it is the responsibility of the system operator or manager to ensure that the servers are eventually killed. This must be done at the system level.

Server Provisioning

Number of prestarted servers in pool

Initial number of servers: The number of server processes that are prestarted for this workspace when the daemon starts up. When the number of available server processes drops lower than the value specified in the Minimum number field, the daemon again starts server processes until this number of available server processes is reached. The default for this field is 0.
The Security tab lets you configure the security level for a workspace. This lets you set the security options for the workspace only. The Security tab is used to:

- Grant administration rights for the workspace
- Determine access to the workspace by a client

Do the following to open the Security tab:

1. From the Start menu, select Programs, Oracle, and then select Studio.
2. From the Design Perspective Configuration view, expand the Machines folder.
3. Right-click the computer and select Open Runtime Perspective.
4. Expand the Daemons node to display the workspaces in the Runtime Explorer.
5. Right-click the workspace and select Edit Workspace Configuration.
6. Click the Security tab.
7. After making changes to the workspace, right-click the daemon and select Reload Configuration.

### Table 6–14 (Cont.) Server Mode Tab Components

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of spare servers</td>
<td>The minimum number of server processes in the prestarted pool before the daemon resumes creating new server processes (to the value specified in the Initial number of servers field). If this field is set to a value higher than the initial number of servers field, the daemon uses the value specified in the Initial number of servers field. The default for this field is 0.</td>
</tr>
<tr>
<td>Prestarted server pool limit</td>
<td>The maximum number of available server processes. Once this number is reached, no new nonactive server processes are created for the particular workspace. For example, if a number of server processes are released at the same time, so that there are more available server processes than specified by this field, the additional server processes higher than this value are terminated. The default for this field is zero, meaning that there is no maximum.</td>
</tr>
<tr>
<td>Resource limitations</td>
<td></td>
</tr>
<tr>
<td>Number of sub-tasks</td>
<td>The number of sub-tasks for a server that are prestarted for this workspace when the daemon starts up. In addition to setting up a pool of server processes as described earlier, you can set additional server processes as sub-tasks by specifying this parameter. If you set 10 servers and 10 prestarted sub-tasks then 100 tasks are started (10 sub-tasks for each process).</td>
</tr>
</tbody>
</table>
8. Right-click the daemon and select **Recycle Servers**. Any servers in the connection pool are closed and new servers start with the new configuration.

The **Security** tab is shown in the following figure:

*Figure 6–8 The Security tab*

The **Security** tab has the following fields:

---

Notes:

- You can also change daemon settings using the Configuration Explorer, by selecting a computer and scrolling the list to the required daemon. Right-click the daemon and select **Edit Daemon**.
- Changes made to the daemon configuration are not implemented. They are only implemented after the configuration is reloaded using the **Reload Configuration** option in the Runtime Manager.
### Table 6–15 Security Tab

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Server Account</strong></td>
<td>This section defines the users (accounts) allowed to access the workspace, firewall access ports, workspace account, and anonymous login permissions.</td>
</tr>
<tr>
<td>Use specific workspace account</td>
<td>Select this if you want to define the operating system account used for the workspace. If selected, enter the name of the workspace account in the <strong>workspace account</strong> field. If not selected, the account name that was provided by the client is used.</td>
</tr>
<tr>
<td>Allow anonymous clients to use this workspace</td>
<td>Select this if you want to allow this workspace to be invoked without authentication. If selected, enter the name of the workspace account in the <strong>Server account to use with anonymous clients</strong> field.</td>
</tr>
<tr>
<td>Authorized Workspace users</td>
<td>Indicate which users have permission to use the workspace. Select one of the following:</td>
</tr>
<tr>
<td></td>
<td>■ <strong>All users</strong>: Any user who has logged on to the daemon may use the workspace</td>
</tr>
<tr>
<td></td>
<td>■ <strong>Selected users only</strong>: Select this to allow only users (or accounts) with specific permission to use the workspace. When this is selected, add the names of users (or accounts) and groups that can be use the workspace in the field below.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: If no user is specified, any user who has logged on to the daemon may use the workspace.</td>
</tr>
<tr>
<td>Authorized Administrators</td>
<td>Identifies the users (accounts) with administrator privileges. Select one of the following:</td>
</tr>
<tr>
<td></td>
<td>■ <strong>All users</strong>: Indicates that anyone can access the workspace and change the settings.</td>
</tr>
<tr>
<td></td>
<td>■ <strong>Selected users only</strong>: Select this to allow only users (or accounts) with specific permission to be administrators. When this is selected, add the names of users (or accounts) and groups that can be workspace administrators.</td>
</tr>
<tr>
<td></td>
<td>If no user is specified, any user who has logged on to the daemon may administrator this workspace.</td>
</tr>
</tbody>
</table>
The OracleAS CDC Adapter for VSAM has a number of configuration properties. You can edit the properties in Oracle Studio after Setting Up a Change Data Capture with the OracleAS CDC Adapter for VSAM. This chapter describes the configuration properties and how to edit them. It contains the following sections:

- Editing Properties in Oracle Studio
- Configuration Properties
- Access to Change Events
- Transaction Support
- Security

Editing Properties in Oracle Studio

After you create the OracleAS CDC solution, you can also edit the properties. The solution creates two adapters, the adapter and the CDC Queue adapter. The adapter is created on the server machine and the CDC Queue adapter is created on the staging area machine. For more information, see Setting up a Change Data Capture in Oracle Studio.

Editing the OracleAS CDC Adapter Properties

To edit the CDC adapter properties, open the Oracle Studio Design perspective and find the binding for the CDC solution on the server machine. Then open the adapter, which contains the name of the CDC solution with the suffix _ag added to it. Changes to adapter properties are reset when the CDC solution is redeployed, therefore these changes must be reapplied following solution deployment. For information on deploying a solution, see Deploying a Change Data Capture.

Do the following to edit the CDC adapter properties.

1. From the Start menu, select Programs, Oracle, and then select Studio.
2. Expand the Machines folder.
3. Expand the server machine that you created when Setting up a Change Data Capture in Oracle Studio.
4. Expand the Bindings folder, and then expand the binding the name of the CDC solution with the suffix _ag added to it.
5. Expand the Adapter folder.
6. Right-click the adapter the adapter with the name of the solution and the suffix _ag and select Open.

The adapter configuration editor opens in the editor, which displays the properties for the adapter.

7. Edit the adapter parameters as required.

See OracleAS CDC Adapter Configuration Properties for a description of the properties.

Configuration Properties

This section describes the configuration properties for the OracleAS CDC Adapter for VSAM. You can edit the properties using Oracle Studio. The OracleAS CDC Adapter for VSAM has the following types of properties:

- CDC Logger Properties
- CDC$PARM Properties (VSAM Batch Only)
- OracleAS CDC Adapter Configuration Properties
- Change Router Properties
- Referential Integrity Considerations

CDC Logger Properties

LoggerName: the name of the MVS logstream used for the data capture.

CDC$PARM Properties (VSAM Batch Only)

CDC$PARM is the name of DD card that defines a QSAM data set or PDS member that contains the parameters for the JRNAD exit and Logical Transaction Management. For more information on the creation and syntax, see Configuring the Logger (VSAM Batch Only).

Note: The Oracle Connect CDC VSAM Batch solution automatically sets its own JRNAD user exit routine during the open process of a VSAM cluster (if another JRNAD exit has been already in use, the solution cannot work).

Make changes to the corresponding jobs to:

- Provide the OracleAS CDC Adapter for VSAM Batch hook for automatic JRNAD definition
- Manage Logical Transactions (see Logical Transaction Manager)

Table 6–16 CD$PARM Values

<table>
<thead>
<tr>
<th>Name</th>
<th>Valid Values</th>
<th>Default</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEFORE_IMAGE</td>
<td>YES/NO</td>
<td>YES</td>
<td>Write before image to logstream</td>
</tr>
<tr>
<td>BLOCKING</td>
<td>YES/NO</td>
<td>YES</td>
<td>Use blocking write</td>
</tr>
<tr>
<td>DEBUG</td>
<td>OFF/ON</td>
<td>OFF</td>
<td>Print debug info using WTO</td>
</tr>
</tbody>
</table>
OracleAS CDC Adapter Configuration Properties

This section describes the common configuration properties for Oracle CDC adapters and the change router configuration properties, which is located on the staging area machine.

To edit the CDC adapter properties, open the Oracle Studio Design perspective and find the binding for the CDC solution you created. The binding contains the name of the CDC solution with the suffix _ag added to it. Open the adapter with the name of the solution and the suffix _ag to edit the properties. For information on how to edit adapter properties in Oracle Studio, see Editing the OracleAS CDC Adapter Properties. Changes to adapter properties are reset when the CDC solution is redeployed, therefore these changes must be reapplied following solution deployment.

See the following topics for a description of the configuration properties:

■ CDC Queue Adapter Properties
■ Common CDC Adapter Properties

CDC Queue Adapter Properties

The CDC Queue adapter is a data base adapter that is found in the staging area. It is created automatically when Setting up a Change Data Capture in Oracle Studio. It has three properties:

■ connectString
■ defaultDatasource
■ multipleResults

To ensure that the queue adapter works properly with your CDC solution, do not change the values for these properties.

<table>
<thead>
<tr>
<th>Name</th>
<th>Valid Values</th>
<th>Default</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSNAME</td>
<td>*/&lt;cluster name&gt; *</td>
<td>VSAM cluster that should be captured; An asterisk (*) indicates that all the VSAM clusters opened with Oracle JRNAD should be captured. Each DSNAME defines only one cluster. You may provide up to 50 clusters.</td>
<td></td>
</tr>
<tr>
<td>ERROR</td>
<td>IGNORE/ABEND ABEND</td>
<td>When IGNORE is used, most abnormal situations cause a warning message and the process terminates.</td>
<td></td>
</tr>
<tr>
<td>LOGICAL TRANSACTION</td>
<td>YES/NO YES</td>
<td>Allows the use of the Logical Transaction Manager</td>
<td></td>
</tr>
<tr>
<td>LOGSTREAM</td>
<td>&lt;Logstream name&gt; Oracle.VSA_MTBCH</td>
<td>The name of the used MVS logstream</td>
<td></td>
</tr>
<tr>
<td>OPER</td>
<td>UPD/DEL/INS All</td>
<td>Defines the type of operations that are written to the logstream.</td>
<td></td>
</tr>
<tr>
<td>SHOW_DUMMY_RECORDS</td>
<td>OFF/ON OFF</td>
<td>Ignore dummy records used for empty KSDS cluster access.</td>
<td></td>
</tr>
<tr>
<td>SYNC_WRITE</td>
<td>YES/NO YES</td>
<td>Use synchronize logstream write.</td>
<td></td>
</tr>
</tbody>
</table>
The CDC Queue adapter may have additional properties that can be viewed in the adapter’s XML schema. For information on how to view the XML, see Adapter Metadata XML.

The following property, which is viewed in the XML only can be edited:

- **maxRecords**: The maximum number of records that can be returned.

For information on how to edit XML records in Oracle Studio, see Advanced Tuning of the Metadata.

**Common CDC Adapter Properties**

The following table describes the common configuration properties for Oracle CDC adapters. The OracleAS CDC Adapter for VSAM uses only these properties.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>datasource</td>
<td>string</td>
<td></td>
<td>The name of the data source for the OracleAS CDC adapter.</td>
</tr>
<tr>
<td>routers</td>
<td></td>
<td></td>
<td>A list of users who can connect to the adapter and get change events from it for processing. If no routers are specified, any valid user for the workspace can get change events from the Oracle Connect adapter. To add the list of users in Oracle Studio, expand the router property then right-click users. A new entry called Item(#) is added to the Property column. In the Value column, enter the User Name for this router.</td>
</tr>
<tr>
<td>retryInterval</td>
<td>int</td>
<td>2</td>
<td>The polling interval for the database journal. When no events are received in the database journal, the adapter waits for the amount of time (in seconds) that is indicated for this property.</td>
</tr>
<tr>
<td>getTransactionInfo</td>
<td>boolean</td>
<td>true</td>
<td>When set to true, transaction information (begin, commit, rollback) is returned.</td>
</tr>
<tr>
<td>getBeforeImage</td>
<td>boolean</td>
<td>false</td>
<td>When true, before image information is returned.</td>
</tr>
<tr>
<td>realTime</td>
<td>boolean</td>
<td>true</td>
<td>When true, this reduces latency in getting change events, however it also increases the polling of the database journal. The change router asks for N events from the adapter. If the adapter finds fewer than N events in the database journal and realTime is true, these events are immediately returned to the change router. If realTime is false, the adapter polls the journal again after waiting for the number of seconds indicated in the retryInterval.</td>
</tr>
</tbody>
</table>
The following table describes the SQL-based change event router configuration parameters.

To edit the router properties, open the Oracle Studio Design perspective and find the binding for the CDC solution you created. The binding contains the name of the CDC solution with the suffix `_router` added to it. Open the adapter with the name of the solution and the suffix `_router` to edit the properties. For information on how to edit adapter properties in Oracle Studio, see Editing the OracleAS CDC Adapter Properties.

### Change Router Properties

The following table describes the SQL-based change event router configuration parameters.

To edit the router properties, open the Oracle Studio Design perspective and find the binding for the CDC solution you created. The binding contains the name of the CDC solution with the suffix `_router` added to it. Open the adapter with the name of the solution and the suffix `_router` to edit the properties. For information on how to edit adapter properties in Oracle Studio, see Editing the OracleAS CDC Adapter Properties.

#### Table 6–18 Change Router Configuration Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>logLevel</td>
<td>string</td>
<td></td>
<td>The logging level. The following are the available log levels:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- none</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- api</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- internalCalls</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- info</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- debug</td>
</tr>
<tr>
<td>checkTimeoutEveryNEvents</td>
<td>int</td>
<td>100</td>
<td>The number of events that occur before the CDC adapter checks the timeout value. For example, if this property is set to 100, the adapter will check the timeout value after 100 events have taken place. If the amount of time set in the timeout property is past, the adapter will timeout.</td>
</tr>
<tr>
<td>cdcDatasource</td>
<td>string</td>
<td></td>
<td>The OracleAS Change Data Source.</td>
</tr>
<tr>
<td>eliminateUncommittedChanges</td>
<td>Boolean</td>
<td>false</td>
<td>When set to true, only committed change records are moved to the Change Table. If false, all change records are moved to the change tables (in which case, memory usage is minimal) hence the change table may contain rolled back data. For most adapters, following the RI considerations (see Referential Integrity Considerations) results in rolled-back changes eliminated naturally by means of compensating change records generated by the adapter in case of a rollback. Consult the respective CDC adapter documentation for details.</td>
</tr>
</tbody>
</table>
### Table 6–18 (Cont.) Change Router Configuration Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eventExpirationHours</td>
<td>int</td>
<td>48</td>
<td>Indicates how long change records are kept in change tables within the staging area. After the indicated time, change records are deleted. You can set a value between 0 and 50000. A value of 0 means that the records are never deleted. A value of 1 indicates that the records are kept for one hour.</td>
</tr>
<tr>
<td>logLevel</td>
<td>enum</td>
<td></td>
<td>The logging level for the router. The following are the available log levels: none, api, internalCalls, info, debug.</td>
</tr>
<tr>
<td>maxDeletedEventsInBatch</td>
<td>int</td>
<td>500</td>
<td>Controls how many expired change records are delete in a single pass. This number may need to be lowered in some rare cases in order to reduce latency when a large number of change events is continuously being received.</td>
</tr>
<tr>
<td>maxOpenfiles</td>
<td>int</td>
<td>200</td>
<td>Controls the number of physical files opened by the router.</td>
</tr>
<tr>
<td>maxTransactionMemory</td>
<td>int</td>
<td>1000</td>
<td>Specifies how much memory can be stored in memory per transaction before it is off-loaded to disk. This number should be higher than the average transaction size so that the slower-than-memory disk is not used too often.</td>
</tr>
<tr>
<td>maxStagingMemory</td>
<td>int</td>
<td>10000</td>
<td>Specifies how much memory in total can be used for storing active transactions (ones that have not yet committed or rolled back).</td>
</tr>
<tr>
<td>sourceEventQueue</td>
<td>Structure</td>
<td></td>
<td>Connection information to the OracleAS CDC adapter.</td>
</tr>
<tr>
<td>server</td>
<td>string</td>
<td></td>
<td></td>
</tr>
<tr>
<td>workspace</td>
<td>string</td>
<td></td>
<td></td>
</tr>
<tr>
<td>adapter</td>
<td>string</td>
<td></td>
<td></td>
</tr>
<tr>
<td>eventWait</td>
<td>int</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>maxEventsAsBlocks</td>
<td>int</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>reconnectWait</td>
<td>int</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>fixedNat</td>
<td>boolean</td>
<td>false</td>
<td></td>
</tr>
</tbody>
</table>
### Table 6–18 (Cont.) Change Router Configuration Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>stagingDirectory</td>
<td>string</td>
<td></td>
<td>Specifies the directory where the staging area change files will be stored. This directory also stores off-loaded transactions as well as timed-out transactions and error files.</td>
</tr>
<tr>
<td>transactionTimeout</td>
<td>int (in seconds)</td>
<td>3600</td>
<td>Specifies how long a transaction can be active without getting new events. This parameter should be set according to the corresponding setting of the captured database. In particular, this setting must not be lower than the database’s transaction time-out setting as this may lead to the loss of transactions.</td>
</tr>
<tr>
<td>useType</td>
<td>enum</td>
<td>sqlBbasis Cdc</td>
<td>This parameter must be set to this value.</td>
</tr>
<tr>
<td>routers</td>
<td></td>
<td></td>
<td>A list of users who can connect to the change event router and get change events from it for processing. If no routers are specified, any valid Oracle Connect user for the workspace may get change events from the adapter. To add the list of users in Oracle Studio, expand the router property then right-click users. A new entry called Item(#) is added to the Property column. In the Value column, enter the User Name for this router.</td>
</tr>
<tr>
<td>senders</td>
<td></td>
<td></td>
<td>A list of users who can connect to the change event router and send change events to it for processing. If no routers are specified, any valid Oracle Connect user for the workspace may get change events from the adapter. To add the list of users in Oracle Studio, expand the sender property then right-click users. A new entry called Item(#) is added to the Property column. In the Value column, enter the User Name for this router.</td>
</tr>
<tr>
<td>subscribeAgentLog</td>
<td>Boolean</td>
<td>False</td>
<td>When set to true, the change router writes the contents of the OracleAS CDC adapter’s log into its own log. Do not set this property to true if the logLevel property is set to debug because the large amount of information that is sent in this mode will cause performance delays.</td>
</tr>
<tr>
<td>nodeID</td>
<td>string</td>
<td></td>
<td>ID for a node when using multi-router mode. Each node represents a router.</td>
</tr>
</tbody>
</table>
Referential Integrity Considerations

Some related tables have referential integrity (RI) constraints enforced on them. For example, with OrderHeader and OrderLines one cannot have OrderLines without an associated OrderHeader.

When processing change events by the table (which is how an OracleAS CDC works) as opposed to by transaction, referential integrity cannot be maintained properly. For example, when first handling all OrderHeader records and then all OrderLines records then a deleted OrderHeader may be applied long before the required delete of the associated OrderLines records.

In order to reduce the potential referential integrity to a known time frame after which referential integrity is restored, a somewhat different process is needed (compared with Reading the Change Tables').

A special SYNC_POINTS table should be added to maintain a common sync-point for use with multiple related tables. The table is defined as follows:

### Table 6–19  SYNC_POINTS Table Structure

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>application_name</td>
<td>string (64)</td>
<td>The application for which the processing is done.</td>
</tr>
<tr>
<td>table_name</td>
<td>string (64)</td>
<td>The name of the synchronization point</td>
</tr>
<tr>
<td>context</td>
<td>String (32)</td>
<td>A stream position that can be safely used as an upper bound for event retrieval of all related tables</td>
</tr>
</tbody>
</table>

This table’s primary unique key is the concatenation of application_name + sync_name. The use of this table is not mandatory but it is part of the recommended use pattern of SQL-based CDC.

The SYNC_POINTS table is created with the following definition (where filename is changed into an actual path):

```xml
<?xml version='1.0' encoding='UTF-8'?>
<navobj>
  <table name='SYNC_POINTS' 
    fileName='<staging-directory-path>SYNC_POINTS' organization='index'>
    <fields>
      <field name='application_name' datatype='string' size='64'/>
      <field name='table_name' datatype='string' size='64'/>
      <field name='context' datatype='string' size='32'/>
    </fields>
  </table>
</navobj>
```
The following procedure describes how to ensure RI is regained at the end of a group of ETL rounds. It is an extension of the procedure described earlier for consuming change records. Here we assume that tables T1, T2 and T3 are related with RI constraints and that A is the application we are working under.

**To create a stream position**

1. This is a one-time setup step aimed to create a stream position record for T [1/2/3] + A in the STREAM_POSITIONS table. The following SQL statement creates that record:

   - insert into STREAM_POSITIONS values ('A', 'T1', '');
   - insert into STREAM_POSITIONS values ('A', 'T2', '');
   - insert into STREAM_POSITIONS values ('A', 'T3', '');

2. This step is performed at the beginning of a group of ETL rounds processing (that is before starting to process change events for T1, T2 and T3). The goal here is to get a shared sync point for retrieval of T1, T2 and T3. This is done by sampling the ‘context’ column of the SERVICE_CONTEXT table. This value is the stream position of the last change record in the most recently committed transaction. This is done as follows:

   - insert into SYNC_POINTS
     select 'A' application_name, 'T123' sync_name, context from SERVICE_CONTEXT;

   Here, T123 is the name chosen for the synchronization [points of tables T1, T2, and T3.

3. This step is where change data is actually read. It occurs on each ETL round.

   - select n.* from T t, STREAM_POSITIONS sp, SYNC_POINTS sy where
     sp.application_name = 'A' and
     sp.table_name = 'T' and
     sy.application_name = sp.application_name and
     sy.sync_name = 'T123' and
     n.context > sp.context and n.context <= sy.context order by n.context;

   Note that “n.context <= sy.context” is used because the context represents a change record to be processed and processing should include the change record associated with sy.context, too.

   This query retrieves change records starting from just after the last handled change record but stopping at a common sync point. “n. *” can be replaced with an explicit list of columns, however it is important that the ‘context’ column must be selected as this is the change record stream position which is required for the next step.

   This step occurs at the end of each ETL round once all change records were retrieved and processed for a table Ti. Let’s assume that the value of the ‘context’
column of the last change record was ‘C’. This value needs to be stored back into the STREAM_POSITION table for the next ETL round. This is done with:

```
update STREAM_POSITIONS set context='C' where application_name 'A' and table_name = 'Ti';
```

This value can be stored more frequently during the ETL process as needed. The general guideline is that once change record data has been committed to the target database, the stream position should be updated as well.

## Access to Change Events

Changes are captured and maintained in a change table. The table contains the original table columns and CDC header columns. The header columns are described in the following table:

<table>
<thead>
<tr>
<th>Table 6–20</th>
<th>Header Columns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column Name</td>
<td>Description</td>
</tr>
<tr>
<td>context</td>
<td>The change record stream position in the staging area. The column is defined as primary unique index. It is a 32-bytes string with the following structure: &lt;yyyymmdd&gt;T&lt;hhmmss&gt;.&lt;nnnn&gt;&lt;cccccc&gt;</td>
</tr>
<tr>
<td>operation</td>
<td>This column lists the operations available for the CDC adapter. The available operations are:</td>
</tr>
<tr>
<td>transactionID</td>
<td>The operation’s transaction ID.</td>
</tr>
<tr>
<td>terminalID</td>
<td>The terminal ID that originated the change.</td>
</tr>
<tr>
<td>taskID</td>
<td>The task ID originating the change.</td>
</tr>
</tbody>
</table>

Where:
- `<yyyymmdd>T<hhmmss>` is the commit processing timestamp as generated in the staging area when starting to process the Commit event.
- `<nnnn>` is a unique number to differentiate between transactions committed during the same second (up to 99,999 are assumed).
- `<cccccc>` is a counter for the change events in the transaction making every stream position unique (up to 9,999,999 are assumed).
- INSERT
- DELETE
- **DELETALL** (available in cases where a COBOL output file is opened in CLEAN ALL mode and an event with a DELETETALL operation is initiated)
- UPDATE
- BEFOREIMAGE
- COMMIT
- ROLLBACK
The data portion is an exact copy of the back-end table layout.

Each change in the journal is captured as an event with the following format:

```xml
<event name='table_name' timestamp='...'>
  <table_name>
    <header ...></header>
    <data ...></data>
  </table_name>
</event>
```

### Transaction Support

The OracleAS CDC Adapter for VSAM supports transactions in their CICS boundaries.

For the OracleAS CDC Adapter for VSAM Batch, there are two types of transaction management:

- **Single Program Transaction Manager**
- **Logical Transaction Manager**

#### Single Program Transaction Manager

By default, changes that are made by a single program (PGM) are designated as a transaction. In this case, the OracleAS CDC Adapter for VSAM Batch hook sets its own LE termination routine to get the program severity and user return codes.

The return codes determine whether the transaction is terminated with COMMIT or ROLLBACK. By default, any severity code less than 2 and any return code less than or equal to 4 (that is a warning return code or a successful return code) result in COMMIT. All other values result in ROLLBACK. Use the CDC agent properties...
commitMaxTerminationSeverityCode and commitMaxTerminationUserCode to adjust the default behavior.

**Logical Transaction Manager**

It is common practice to set up nightly batch jobs to update VSAM clusters to ensure consistency. This is done by maintaining a copy of the VSAM data before the job is run and restoring the previous copy if the batch job is terminated abnormally for any reason. This practice can be viewed as an implementation of a logical transaction that ensures that an entire batch job runs as a single unit of work.

With a OracleAS CDC Adapter for VSAM Batch solution, it is important to maintain the same work unit. This means that the changes should not be delivered to the client application until the entire logical transaction successfully completes. Failure to maintain such a work unit may result in inconsistencies between the VSAM data, that was restored to the original version, and the change consumer.

The ATYLTRAN program, which is supplied with the OracleAS CDC Adapter for VSAM provides complete control over the transactional boundaries of captured changes. ATYLTRAN should be called as a separate STEP when:

- The logical transaction is started
- The logical transaction is terminated using both COMMIT and ROLLBACK
- The logical transaction is delayed (and should be continued later in another JOB)
- The logical transaction continued in another JOB

ATYLTRAN receives the following parameters:

- The logical transaction operation:
  
  **BEGIN**: Indicates a new logical transaction. If a logical transaction with the same name exists, the old transaction is terminated using ROLLBACK.
  
  **COMMIT**
  
  **ROLLBACK**: Terminates the logical transaction
  
  **CONTINUE**: The default. This should be used at the end of each JOB that does not terminate the current logical transaction, and at the beginning of each JOB that continues a logical transaction initiated by another JOB.

- The logical transaction name:

  By default, the **BEGIN** operation initiates single job logical transaction with the same name as the JOB. If the logical transaction is continued to another JOB, or the transaction name is changed, the transaction name must be provided explicitly with the **BEGIN** operation. The same name should be provided with the **CONTINUE** operation at the beginning of the other JOB to continue the transaction.

  The transaction name can be up to 15 characters long.

**Security**

The OracleAS CDC Adapter for VSAM adapter connects to the MVS logstream with an authorization level of **READ**. The **DFSFLGX0** user exit connects to the logstream with an authorization level of **WRITE**. To determine the proper security authorizations see the **MVS Auth Assm Services Reference ENF-IXG IBM manual**.
Notes:

To access a logstream in an application with a READ authorization level, set the READ access to RESOURCE(<logstream name>) in SAF class CLASS(LOGSTRM).

To update a logstream in a program with a WRITE authorization level, set the ALTER access to RESOURCE(<logstream name>) in SAF class CLASS(LOGSTRM).
Back-end Adapter Data Type Support

The OracleAS CDC Adapter for VSAM supports a number of data types that are used when defining metadata in Oracle Studio. The data types are mapped from the COBOL data types during the import procedure.

Note: The mapping of data types between the OracleAS CDC Adapter for VSAM and Oracle Application Server is performed internally by Oracle Connect.

Data Type Mapping

The COBOL data type COMP, in the table is an abbreviation for, and synonymous with, COMPUTATIONAL. Square brackets ([ ]) denote optional qualifiers for some COBOL compilers, which may not be allowed for other COBOL compilers.

Table 6–21 Data Type Mapping: COBOL and Oracle Connect Back-end Adapter

<table>
<thead>
<tr>
<th>COBOL Data Type</th>
<th>Oracle Connect Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINARY (with fractional data)</td>
<td>string</td>
</tr>
<tr>
<td>BINARY (without fractional data)</td>
<td>int</td>
</tr>
<tr>
<td>COMP (with fractional data)</td>
<td>string</td>
</tr>
<tr>
<td>COMP (without fractional data)</td>
<td>int</td>
</tr>
<tr>
<td>COMP-2</td>
<td>double</td>
</tr>
<tr>
<td>COMP-3</td>
<td>string</td>
</tr>
<tr>
<td>COMP-4 (with fractional data)</td>
<td>string</td>
</tr>
<tr>
<td>COMP-4 (without fractional data)</td>
<td>int</td>
</tr>
<tr>
<td>COMP-5 (with fractional data)</td>
<td>string</td>
</tr>
<tr>
<td>COMP-5 (without fractional data)</td>
<td>int</td>
</tr>
<tr>
<td>COMP-X (with fractional data)</td>
<td>string</td>
</tr>
<tr>
<td>COMP-X (without fractional data)</td>
<td>int</td>
</tr>
<tr>
<td>INDEX</td>
<td>int</td>
</tr>
<tr>
<td>[SIGN [IS]] LEADING</td>
<td>string</td>
</tr>
<tr>
<td>[SIGN [IS]] LEADING SEPARATE [CHARACTER]</td>
<td>string</td>
</tr>
<tr>
<td>NATIVE-2</td>
<td>int</td>
</tr>
<tr>
<td>COBOL Data Type</td>
<td>Oracle Connect Data Type</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>NATIVE-4</td>
<td>int</td>
</tr>
<tr>
<td>NATIVE-8</td>
<td>string</td>
</tr>
<tr>
<td>PACKED-DECIMAL</td>
<td>string</td>
</tr>
<tr>
<td>POINTER</td>
<td>int</td>
</tr>
<tr>
<td>[SIGN [IS]] TRAILING</td>
<td>string</td>
</tr>
<tr>
<td>[SIGN [IS]] TRAILING SEPARATE [CHARACTER]</td>
<td>string</td>
</tr>
</tbody>
</table>
Editing XML Files in Oracle Studio

In many cases you must manually edit the metadata to configure parts of a solution or composition. Metadata is created in XML format. You define aspects of a solution by changing the values of the elements and attributes of the XML files that belong to the solution. Oracle Studio provides a graphical interface where you can define the various aspects of a solution. This interface lets you make changes easily without having to manually edit the XML file.

Preparing to Edit XML Files in Oracle Studio

You can edit XML files for the following items in Oracle Studio:

- Machines
- Bindings
- Daemons
- Users

When you open an XML file, a graphical representation of the file is opened in the editor. The editor displays the elements and attributes in the file in the first column and their corresponding values in the second column. Each entry has an icon that indicates whether the entry is an element or an attribute. Click the Source tab to view the file in its native format. The following figure is an example of the editor’s view of an XML file.

Figure 6–9 XML Graphical Display
Do the following to edit an XML file in Oracle Studio

1. In the Design perspective, open the Navigator view.
2. In the Navigator view, find the item with the XML file that you want to edit. This can be a machine, binding, daemon, or user.
3. Right-click the item and select **Open as XML**. A graphical list of the file’s elements and attributes opens in the editor.
4. Find the element or attribute (property) that you want to change.
5. Click in the right column next to the property you are changing and edit or add the value.
6. Save the file, then select it again in the Project Explorer and press F5 to refresh. The XML file is updated automatically.

### Making Changes to the XML File

You can also make the following changes to XML files in Oracle Studio:

- **Remove Objects**
- **Add DTD Information**
- **Edit Namespaces**
- **Add Elements and Attributes**
- **Replace an Element**

### Remove Objects

You can delete an element, attribute, or other object from the XML file.

Do the following to remove an object

1. Right-click an object from the list in the editor.
2. Select **Remove**.

### Add DTD Information

You can add DTD information to an element or attribute.

Do the following to add DTD Information

1. Right-click an element or attribute and select **Add DTD Information**. The Add DTD Information dialog box opens.
2. Enter the information requested in the dialog box. The following table describes the Add DTD Information dialog box.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root element name</td>
<td>The name of the XML root element.</td>
</tr>
<tr>
<td>Public ID</td>
<td>The value in this field is the Public Identifier. It is used to associate the XML file (using an XML catalog entry) with a DTD file by providing a hint to the XML processor.</td>
</tr>
<tr>
<td></td>
<td>Click <strong>Browse</strong> to select an XML catalog entry from a list. An XML Catalog entry contains two parts, a Key (which represents a DTD or XML schema) and a URI (which contains information about a DTD or XML schema's location). Select the catalog entry you want to associate with your XML file.</td>
</tr>
<tr>
<td>System ID</td>
<td>The value in this field is the DTD the XML file is associated with. The XML processor will try to use the Public ID to locate the DTD, and if this fails, it will use the System ID to find it.</td>
</tr>
<tr>
<td></td>
<td>Click <strong>Browse</strong> to select a system ID. You can do this in two ways:</td>
</tr>
<tr>
<td></td>
<td>- Select the file from the workbench. In this case, update the with the import dialog box.</td>
</tr>
<tr>
<td></td>
<td>- Select an XML catalog entry.</td>
</tr>
</tbody>
</table>

3. Save the file, then select it again in the Project Explorer and press F5 to refresh. The XML file is updated automatically.

### Edit Namespaces

You can make changes to the namespaces associated with an element or attribute.

Do the following to edit namespaces

1. Right-click an element or attribute and select **Edit namespaces**. The Edit Schema Information dialog box opens.
2. Click on one of the buttons to make any changes to this information.

Do the following to add a new namespace

1. From the Schema Information dialog box, click **Add**.

2. The Add Namespace Definitions dialog box opens. Select one of the following:

   - **Select from registered namespaces.** This selection is available when the dialog box opens. Select from the list of registered namespaces and then click **OK**. If no registered namespaces are available, the list is empty.

   - **Specify new namespace.** Enter the information described in the following table:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefix</td>
<td>The prefix is added to all qualified elements and attributes in the XML file.</td>
</tr>
<tr>
<td>Namespace Name</td>
<td>The namespace of the XML file.</td>
</tr>
</tbody>
</table>
   | Location Hint       | The location of the XML schema of the XML file. An XML Catalog ID or a URI can be entered in this field. Click **Browse** to search for the schema you want. You can this in two ways:
   |                     | Select the schema from the workbench. In this case, update the with the import dialog box. |
   |                     | Select an XML catalog entry. The **Namespace Name** and **Prefix** fields are be filled with the appropriate values from the schema (you must leave the fields blank for this to occur). |
   |                     | **Note:** If you are creating an XML file from an XML schema, you cannot change the Namespace Name or Location Hint values. |

**To edit a namespace**

1. From the Schema Information dialog box, click **Edit**.

2. Enter the information in the fields.
Add Elements and Attributes

You can add additional elements and attributes to the XML file.

Do the following to add Elements and Attributes

1. Right-click an element.
2. Select one of the following:
   - Add Attribute to add an attribute under the selected element.
   - Add Child to add another element under the selected element
   - Add Before to add another element above the selected element
   - Add After to add another element below the selected element

3. Provide a name for the element or attribute if required. You may also be able to select the element from a submenu. The element or attribute will be added to the file.

4. Save the file, then select it again in the Project Explorer and press F5 to refresh. The XML file is updated automatically.

Replace an Element

You can replace an element with another legal element.

Do the following to replace an element

1. Right-click an element from the list in the editor.
2. Select Replace with.
3. Select an element from the submenu. Only legal elements are available.
4. The original element is replaced with the selected element.
The OracleAS CDC Adapter for VSAM provides the globalization support for the following languages:

- Arabic
- English (the default)
- French
- German
- Greek
- Hebrew
- Italian
- Japanese
- Korean
- Portuguese
- Simple Chinese
- Spanish
- Traditional Chinese
- Turkish

This appendix describes how to define the language support.

**Defining the Language and Codepage**

The language and codepage parameters are accessed from the computer where Oracle Studio is installed.

Perform the following steps to define the required language and codepage:

1. From the **Start** menu, select **Programs, Oracle**, and then select **Studio**.
2. In the Design perspective **Configuration** view, expand the **Machines** folder.
3. Expand the machine for which you want to set the language.
4. Expand the Bindings folder and right-click the **NAV** binding.
5. Select **Open**.
6. Expand the **Language Settings** and do the following:
From the **Language** list, select the NLS supported language to use in this binding. Valid values are listed in the Language Name column of **NLS Language Codes** table.

From the **Codepage** list, select the codepage that you want to use with this language. The code pages available are determined by the Language that is selected. If you have additional code pages available, you can manually enter them in this field.

**Note:** If you change the language, the code page will also change. Check to be sure that you want to use the selected code page with the language you selected.

If no codepage is selected, the default codepage for the selected language is used.

From the **NLS string** list, select the NLS string for this language and code page. The NLS strings available are determined by the code page that is selected. If you have additional NLS strings available, you can manually enter them in this field.

The codepage is used by a field with a data type defined as `nlsString`. This parameter is used for a field with a codepage that is different than the machine’s codepage. This property includes values for the name of the codepage and whether the character set reads from right to left (as in middle-eastern character sets).

For example, the following specifies a Japanese EUC 16-bit codepage:

```html
<misc nlsString="JA16EUC,false"/>
```

7. Save the change. New servers will use the language selected.

The following table lists the codepages:

<table>
<thead>
<tr>
<th>Language Name</th>
<th>Language Code</th>
<th>Windows Default</th>
<th>ASCII Platforms (Default)</th>
<th>EBCDIC Platforms (Default)</th>
<th>Alternative Codepages (EBCDIC based unless noted otherwise)</th>
</tr>
</thead>
<tbody>
<tr>
<td>English UK</td>
<td>ENUK</td>
<td>Windows-1252</td>
<td>ISO-8859-15</td>
<td>IBM1146</td>
<td>IBM285, IBM037, IBM500, IBM1140, IBM1148, IBM1047, ISO-8859-1 (ASCII based)</td>
</tr>
</tbody>
</table>
### Table 6–24  (Cont.) NLS Language Codes

<table>
<thead>
<tr>
<th>Language Name</th>
<th>Language Code</th>
<th>Windows Default</th>
<th>ASCII Platforms (Default)</th>
<th>EBCDIC Platforms (Default)</th>
<th>Alternative Codepages (EBCDIC based unless noted otherwise)</th>
</tr>
</thead>
<tbody>
<tr>
<td>French</td>
<td>FRE</td>
<td>Windows-125 2</td>
<td>ISO-8859-15</td>
<td>IBM1147</td>
<td>IBM297, IBM037, IBM500, IBM1140, IBM1148, IBM1047, ISO-8859-1 (ASCII based)</td>
</tr>
<tr>
<td>Latin International</td>
<td>LAT</td>
<td>Windows-125 2</td>
<td>ISO-8859-15</td>
<td>IBM1148</td>
<td>IBM500, IBM037, IBM1140, IBM1047, ISO-8859-1 (ASCII based)</td>
</tr>
<tr>
<td>Spanish</td>
<td>SPA</td>
<td>Windows-125 2</td>
<td>ISO-8859-15</td>
<td>IBM1145</td>
<td>IBM284, IBM037, IBM500, IBM1140, IBM1148, IBM1047, ISO-8859-1 (ASCII based)</td>
</tr>
<tr>
<td>German</td>
<td>GER</td>
<td>Windows-125 2</td>
<td>ISO-8859-15</td>
<td>IBM1141</td>
<td>IBM273, IBM037, IBM500, IBM1140, IBM1148, IBM1047, ISO-8859-1 (ASCII based)</td>
</tr>
<tr>
<td>Portuguese</td>
<td>POR</td>
<td>Windows-125 2</td>
<td>ISO-8859-15</td>
<td>IBM1140</td>
<td>IBM037, IBM500, IBM1148, IBM1047, ISO-8859-1 (ASCII based)</td>
</tr>
<tr>
<td>Italian</td>
<td>ITL</td>
<td>Windows-125 2</td>
<td>ISO-8859-15</td>
<td>IBM1144</td>
<td>IBM280, IBM037, IBM500, IBM1140, IBM1148, IBM1047, ISO-8859-1 (ASCII based)</td>
</tr>
<tr>
<td>Greek</td>
<td>GRK</td>
<td>Windows-125 3</td>
<td>ISO-8859-7</td>
<td>IBM875</td>
<td>-</td>
</tr>
<tr>
<td>Russian¹</td>
<td>RUS</td>
<td>Windows-125 1</td>
<td>ISO-8859-5</td>
<td>IBM1154</td>
<td>IBM1025</td>
</tr>
<tr>
<td>Language Name</td>
<td>Language Code</td>
<td>Windows Default</td>
<td>ASCII Platforms (Default)</td>
<td>EBCDIC Platforms (Default)</td>
<td>Alternative Codepages (EBCDIC based unless noted otherwise)</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------</td>
<td>------------------</td>
<td>---------------------------</td>
<td>----------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>Turkish</td>
<td>TUR</td>
<td>Windows-1254</td>
<td>ISO-8859-9</td>
<td>IBM1155</td>
<td>IBM1026</td>
</tr>
<tr>
<td>Hebrew</td>
<td>HEB</td>
<td>Windows-1255</td>
<td>ISO-8859-8</td>
<td>IBM424</td>
<td>IBM 862</td>
</tr>
<tr>
<td>Arabic</td>
<td>ARA</td>
<td>Windows-1256</td>
<td>ISO-8859-6</td>
<td>IBM420</td>
<td></td>
</tr>
<tr>
<td>Chinese - Simplified</td>
<td>SCHI</td>
<td>GBK</td>
<td>GBK</td>
<td>IBM935</td>
<td>-</td>
</tr>
<tr>
<td>Chinese - Traditional</td>
<td>TCHI</td>
<td>BIG5</td>
<td>BIG5</td>
<td>IBM937</td>
<td>-</td>
</tr>
<tr>
<td>Korean</td>
<td>KOR</td>
<td>MS949</td>
<td>EUC-KR</td>
<td>IBM933</td>
<td>MS949</td>
</tr>
</tbody>
</table>

1. Russian users who use ANSI 1251 Cyrillic as their Windows codepage must edit the RUS.TXT file and compile it to RUS.CP using the NAV_UTIL CODEPAGE.

2. To work with solutions in Oracle Studio, when using Turkish, add the -nl en switch to the Target path in the Oracle Studio shortcut properties. For example: "C:\Program Files\Oracle\Studio1\studio.exe -nl en"
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