



APPENDIX **A**

Setting Up Oracle for ISC

This appendix describes how to set up an Oracle Database 10g, Enterprise Edition Release 10.2.0.1.0 - 64 bit Production server that works with Cisco IP Solution Center (ISC). This appendix is written for database administrators who are familiar with Oracle.



Note

ISC 5.1 was tested with Oracle Database 10g, Enterprise Edition Release 10.2.0.1.0 - 64 bit Production. If you would like to use another version of Oracle, see Oracle's compatibility information.

This chapter does not cover all the details about installing and setting up this Oracle server. For the complete information, see the Oracle Installation Guide. ISC provides schema files to be loaded on an Oracle server. The ISC customer must decide on the Oracle server configuration.

This appendix contains the following sections that should be addressed in order:



1. [Prerequisites, page A-1](#)
2. [Installing Oracle, page A-2](#)
3. [Verifying and Launching Oracle, page A-3](#)
4. [Setting Up Your Oracle Files, page A-4](#)
5. [Testing Your Oracle Database Connection for Oracle User isc, page A-5](#)
6. [Load ISC Database Schema, page A-5](#)
7. [ISC Software Installation, page A-6](#)
8. [Verify ISC Installation with Oracle, page A-6](#)
9. [Configuring Oracle RAC, page A-7](#)
10. [Backup of Oracle Database, page A-8](#)

This appendix also contains a “[Troubleshooting](#)” section on [page A-8](#).

Prerequisites

ISC support for an Oracle database is for Oracle Database 10g, Enterprise Edition Release 10.2.0.1.0 - 64 bit Production. This is the version of Oracle with which ISC 5.1 was tested. If you would like to use another version, see Oracle's compatibility information.

The remaining prerequisites are as specified in the following steps:

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- Step 1** When the Oracle server is set up, the following initialization parameters should be in the database **init** file:
- `db_block_size = 8192` or larger
 - `compatible = "10.2.0"`
 - `open_cursors = 512` or larger
 - `processes = 150` or larger
- Step 2** Record the following information about the server setup. This information is needed during the ISC installation:
- Oracle server name
 - Oracle server instance identifier (SID)
-  **Note** This is specified in [Figure 2-15 on page 2-13](#).
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- database port number for client connections (default: 1521)
 - Oracle user ID and password created for ISC
-  **Note** Create an Oracle database userid and password. This is needed during ISC installation. Do not use the **system** or **sys** account for ISC data. Use a separate table space other than the system table space. See [Figure 2-16 on page 2-14](#).
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- Step 3** Before loading the ISC database schema, make sure the Oracle database has been successfully started and the database user has proper privileges. See the Oracle Administration Guide for detailed instructions about how to set up the database and manage user accounts.
- Step 4** Proceed to the section “[Installing Oracle](#).”
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Installing Oracle

The following information about an Oracle installation is just one example.

You must install Oracle before you install the Cisco IP Solution Center (ISC) software (or at least know your Oracle home directory, host machine, and Oracle Server ID), and your database and its listener must be running when you launch the ISC servers.

If you intend to use the same Oracle installation with more than one installation of the ISC servers, you must create a unique Oracle SID and Oracle tablespace for each ISC installation.

init*ORACLE_SID*.ora

This file should already exist in the `/dbs` subdirectory of your Oracle installation. (The filename contains your database’s SID in place of `ORACLE_SID`. For example, if you named your database `ISC`, this file is named `initISC.ora`.)

oratab

The `oratab` file should be located in the `/var/opt/oracle` directory on the machine on which the database is installed. It is used by Oracle's **dbstart** utility to identify your database.

The `oratab` file must contain the following line:

```
database_name:location_of_your_Oracle_executables:Y
```

If your Oracle home directory is `/oracle/10.2.0` and your database SID is `ISC`, the `oratab` entry would be as follows:

```
ISC:/oracle/10.2.0:Y
```

This file identifies the name and location of your database for the Oracle utility **dbstart** (and its companion **dbshut**). The **dbstart** utility starts Oracle; the “Y” at the end of the `oratab` entry tells the **dbstart** utility to open the database named `ISC`. (Substitute your database name for `ISC` in the sample. List the path to your Oracle installation as an absolute path, not a relative path.)

To make this happen automatically following a reboot (after a power interruption, for example), execute the **dbstart** utility from a script in the `/etc/init.d` directory on the Oracle host machine.

Verifying and Launching Oracle

Your Oracle database must be open before you can install or use the ISC software.

First, verify the Oracle processes, as described in the following section. If the processes are running, you can skip the succeeding section.

Verifying Oracle Processes

Log into the Oracle host machine and enter the following on the command line to see if the Oracle processes are running:

```
ps -ef | grep ora_
```

```
ps -ef | grep tnslnr
```

If there is no output displayed from the `ps` command, Oracle is not running.

If Oracle is running and the listener process is running, you should see something similar to the following:

```
oracle  328  1  0  14:25:18  0:00 ora_pmon_ISC
oracle  328  1  0  14:25:18  0:00 ora_dbwr_ISC
oracle  328  1  0  14:25:18  0:00 ora_lgwr_ISC
oracle  328  1  0  14:25:18  0:00 ora_ckpt_ISC
oracle  328  1  0  14:25:18  0:00 ora_smon_ISC
oracle  328  1  0  14:25:18  0:00 ora_reco_ISC
oracle  328  1  0  14:25:18  0:00 ora_wmon_ISC
oracle  328  1  0  14:25:18  0:00 tnslnr LISTENER -inherit
```

These are the Oracle processes currently running (your output might not match this list exactly, depending on which Oracle components are installed).

Launching Oracle and Opening Your Database

Your Oracle database must be open before you can install or use the ISC software.

If Oracle is not currently running, you must use the startup utilities located in the `/bin` subdirectory of your Oracle installation.

To open your database, you must be logged into the Oracle host workstation under the Oracle administrator (DBA) user ID; you then locate your `$ORACLE_HOME/bin` subdirectory.

On the command line, enter the following:

dbstart

The `dbstart` script starts the database identified in the `oratab` file. If the database starts successfully, you should see several lines of output, including the following:

```
SQL> Connected to an idle instance.
SQL> ORACLE instance started.
```

...and ending with the following:

```
Server Manager Complete.
Database "ISC" warm started.
```

If the listener process is not running, you must also start that process. On the command line, enter the following:

lsnrctl start

You should see several lines of output as the process is invoked, then you should see output similar to the following:

```
Services Summary...
   ISC      has 1 Service handler(s)
```

The command completed successfully.

Setting Up Your Oracle Files

To configure your database to work with the ISC software, you must create a tablespace and configure several files.

You must be logged into the Oracle host using the user ID (such as `oracle`) created during the Oracle installation procedure.

Oracle Tablespace Requirements

You must create an Oracle tablespace for your ISC tables.

To create the tablespace, Oracle must be running and your database must be open.

Log into the Oracle host using the `oracle` user ID. Identify (or create) the directory where your ISC data should be stored, and grant write permission to the `oracle` user ID. Be sure your `ORACLE_SID` and `ORACLE_HOME` environment variables are set correctly, then launch the Oracle utility `sqlplus`, which is located in the `$ORACLE_HOME/bin` directory.

At the SQL prompt, enter the following on the command line:

```
connect / as sysdba;
CREATE TABLESPACE ISC_DAT
DATAFILE '/your_data_directory/ISC_DAT_01.dbf' size 500M
autoextend on
next 50M
maxsize unlimited;
```

The data directory you specify must already exist. The `TABLESPACE` and `DATAFILE` names are arbitrary. You can use any names that help you keep track of which files are associated with which database. The only requirement is that the name given to the tablespace at the time of its creation (`ISC_DAT` in the example) must be the same as the default tablespace listed when you create the `isc` user account.

The `autoextend` option allows ORACLE to automatically extend your data file. The maximum size of the data file is limited only by the available space on the file's disk.

isc Oracle User Account

While `sqlplus` is still running, create an `isc` user account using your `ISC_DAT` tablespace as follows:

```
CREATE USER isc IDENTIFIED BY cisco
DEFAULT TABLESPACE ISC_DAT;
GRANT CONNECT TO isc;
GRANT RESOURCE TO isc;
```

You should use this user and password when entering Oracle information in the script `isc.configure`.

Testing Your Oracle Database Connection for Oracle User isc

When you have configured your database and listener file, enter the following (for the Oracle user `isc` and for the database named `ISC`) on the command line:

```
sqlplus <username>/<password>
```

`<username>` is a database username (in our previous example, we used `isc`).

`<password>` is a database password (in our previous example, we used `cisco`).

If your system is set up properly (and your Oracle database is running), you should see a message advising you that you are connected to Oracle. Enter `quit` on the command line to exit the database.

Load ISC Database Schema

Before installing the ISC software, load the ISC database schema on the Oracle server, as follows:

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- Step 1** Mount the ISC CD on the Oracle server machine or `cd` to the ISC directory if you downloaded ISC from the web.

- Step 2** Copy the `schema.tar` file from the ISC product CD or the ISC directory to a temporary directory on the Oracle server.
- Step 3** Extract the `createOracleDB.sql` among other SQL files:
`tar xvf schema.tar`
- Step 4** Change to the `ddl/5.1` directory that contains the `createOracleDB.sql` file:
`cd ddl/5.1`
- Step 5** Set up the environment to run SQLPLUS, and then run the `sqlplus` command:
`sqlplus <username>/<userid>`
- Step 6** At the `SQL>` prompt, enter `start createOracleDB;`
- Step 7** At the next `SQL>` prompt, enter `exit;`
- Step 8** Examine the `oracle.log` log file. If no Oracle errors exist (prefix `ORA-` or `SP2-`), the schema loading succeeded.
- Step 9** Proceed to the section “ISC Software Installation.”
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ISC Software Installation

Do the following:

- Step 1** Follow the `custom` install instructions in [Chapter 2, “Installing and Logging In to ISC,”](#) section [Installing ISC Overview, page 2-2](#), and log in, as explained in the section [Logging In for the First Time, page 2-23](#).
- Step 2** Proceed to the section “Verify ISC Installation with Oracle”.
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Verify ISC Installation with Oracle

To verify the ISC installation with Oracle, do the following:

- Step 1** Run `sqlplus <oracle_id>/<oracle_password>` on the Oracle server.
- Step 2** From the `SQL>` prompt, run `select host_name from vpsc_host;`
 This command returns the installed ISC host name.
- Step 3** Log in to the ISC server.
- Step 4** Check the file `/opt/isc-5.1/etc/vpsc.properties` and make sure that the `<oracle server>` and `<ORACLE_SID>` are correct in the following entry in the file:
`repository.persistence.url=jdbc:oracle:thin:@<oracle server>:<ORACLE_SID>`

- Step 5** Execute the schema verification script to verify the repository schema version, as follows:
- ```
cd /opt/isc-5.1/bin
source vpnenv.csh (or for sh or ksh, . vpnenv.sh)
./checkSchemaVer.sh <oracle_id>/<oracle_password>
```
- where: *<oracle\_id>* is the ISC userid in the Oracle database and *<oracle\_password>* is its password.
- Step 6** The output from the script should be “Current schema version = 5.1”. If that is not the output from the script, ISC might not have been installed properly or the ISC repository might not have been upgraded successfully.

## Configuring Oracle RAC

In addition to having already installed ISC and followed the steps required to configure an Oracle server, you must follow these steps when using Oracle Real Application Clusters (RAC). ISC does not support client load balancing with Oracle RAC.



### Note

A limitation of Oracle RAC is that any uncommitted transactions made during an instance or node failure and recovery period are lost. The recovery of these transactions is not supported. For this reason, the behavior of tasks that are running at the time as an instance or node fail over is undetermined. These tasks should be redeployed.

In case of a failure, for more information see the Oracle RAC documentation for database instance recovery time details.

- Step 1** Verify that the new Oracle RAC servers are available and have an ISC tablespace with user configured. If you need help setting this up, see the [“Verify ISC Installation with Oracle” section on page 6](#).
- Step 2** Modify `$ISC_HOME/etc/install.cfg` to have the correct values for the following parameters:
- **db\_server**
  - **db\_url**—A sample URL is `jdbc:oracle:thin:@//Virtual IP:<port>/globalSID`, where *<port>* is the port number, which defaults to **1521**.
  - **db\_driver**
  - **db\_usr**
  - **db\_pwd**
- Run `applycfg.sh` to apply these changes.
- Step 3** Source the environment. For example, for the C shell:
- ```
source vpnenv.csh
```
- Step 4** Prepopulate the database user name and password into the database
- ```
execjava.sh com.cisco.vpnsc.common.BootStrapHelper put repository <oracle username>
<oracle password>
```
- Step 5** If running, use the `stopall` command to stop ISC.

- Step 6** Verify that the value for the DCPL property watchdog/server/dbpoller/connectionextend is still set to the default: 5. See Appendix C, “DCPL Properties,” in the *Cisco IP Solution Center Infrastructure Reference, 5.1*.
- Step 7** To update the database with the changes, enter:
- ```
startdb
initdb.sh
```
- Step 8** Use `stopall` to stop the database.
- Step 9** Source the environment. For example, for the C shell:
- ```
source vpenv.csh
```
- Step 10** Then `startwd` to start ISC.
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## Backup of Oracle Database

See [Appendix C, “Backup and Restore of ISC Repository and Standby System.”](#)

## Troubleshooting

This section lists Oracle database-related trouble shooting tips based on the following error messages:

- **ORA-01631: max # extents (4096) reached in table xyz**

If you receive this message, it is typically an Oracle server storage configuration issue. This problem occurs when the tablespace for ISC exceeds the limit set by the database configuration. To prevent this, plan proper storage before ISC is set up. If this problem occurs, increase the initial or next extent, increase the growth percentage (such as, PCT\_INCREASE), or reset the number of max extents (can be unlimited). The ISC data must be exported and imported to the tablespace with the new tablespace parameters.

- **Unable to contact Rbac Manager**

If you receive this message on ISC and are unable to log in, this might be because ISC cannot connect to the Oracle database. To avoid this situation, increase the number of Oracle server processes.

- **Cannot log into Inventory Manager or Topology Manager**

If you cannot log into the Inventory Manager or Topology Manager, verify that the Oracle hostname is accessible from a client machine, either by DNS or a host file.

- **Resynchronize ISC with new or updated Oracle ID and password**

If the Oracle ID and password change after the ISC installation, you must execute the following:

- execjava.sh com.cisco.vpnsc.common.BootStrapHelper put repository <oracle\_id>  
<oracle\_password>
- update etc/spe/cns.properties and modify these two properties:  
DataAccess.principal.1 <oracle\_id>  
DataAccess.credentials.1 <oracle\_password>