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FactoryTalk® ProductionCentre



RELEASE 9.3 DATABASE INSTALLATION GUIDE

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Read Me First

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This guide describes how to set up and configure a database server to be used with the FactoryTalk® ProductionCentre (called FTPC hereafter) servers. To complete the installations and configurations, refer to your RDBMS documentation.

This guide assumes that the supporting network equipment and software are or can be installed. This guide does not provide installation instructions or requirements for related components, like Internet connections.

How to Use this Book

This guide was designed to be used with four other guides, available at the **Documentation** link on the FTPC software download web site:

- FactoryTalk ProductionCentre Supported Platforms Guide* for the latest supported software and hardware, as well as FTPC product interoperability.
- FactoryTalk ProductionCentre Server Installation Guide* for customers who have purchased FTPC products.

See the FTPC online knowledge base for the latest patch information, as well as troubleshooting articles.

The “[Installation Checklists](#)” on page 9 are installation workflow tables. Each step on the workflow checklist names a section and page in the book that provides instructions for performing that step, including order of operations, parameter settings, and required versions.

The text and the checklists provide cross-references to additional resources.

Organization

This book contains the following chapters and appendixes:

- Chapter 1, “Installation Checklists”** - Provides checklists for installing and configuring MS SQL Server and Oracle software.
- Chapter 2, “MS SQL Server Installation and Configuration”** - Describes installation and configuration tasks relating to MS SQL Server database server software.
- Chapter 3, “Oracle 10g Installation and Configuration,”** - Describes installation and configuration tasks relating to Oracle 10g database server software.
- Chapter 4, “Oracle 11g Installation and Configuration,”** - Describes installation and configuration tasks relating to Oracle 11g database server software.
- Chapter 5, “Database Server Performance”** - Provides configuration tips for improving performance.

Database Servers

The FTPC databases described in the following list may reside on a database server that houses other company databases or may have their own dedicated database server(s).

- FTPC production database is a transactional database that records and stores all data collected by FTPC.
- FTPC Operational Data Store (ODS) contains the historical data extracted from one or more production databases.

The configuration you choose is dependent on your site requirements. Work with either Rockwell Automation Technical Support or your Rockwell Automation Professional Services representative to determine the appropriate configuration. Please see the *FactoryTalk ProcutionCentre Product Overview* for more information on product architecture.

User Privileges

This document assumes that the individual performing this installation has sufficient expertise and privileges on the network and operating system (OS) to perform the required database configurations. For more information on database user permissions, refer to the appropriate database documentation.

For both the FTPC servers, you must create a database user with these minimum database privileges:

- Oracle** users must have the following roles and privileges:
 - ▶ CONNECT and RESOURCE Roles
 - ▶ The following System Privileges:
 - ALTER PROCEDURE (required for Oracle 10g and 11g)
 - CREATE TABLE
 - CREATE TRIGGER
 - CREATE PROCEDURE
 - CREATE VIEW
 - EXECUTE PROCEDURE (required for Oracle 10g and 11g)
 - UNLIMITED TABLESPACE
- MS SQL Server** users must have Public and db-owner Roles.

These users and how to create them are described in Chapter 2, “MS SQL Server Installation and Configuration,” Chapter 3, “Oracle 10g Installation and Configuration,” and Chapter 4, “Oracle 11g Installation and Configuration.”

Related Documents

The following table lists other available documents that are related to the database software installation.

Table 1: Related Documents

Topic	Title	Location
Required software installation and configuration	Third-party software documentation, such as <i>Oracle 10g Installation Guide for Windows</i> or <i>Overview of Installing SQL Server 2005</i>	Vendor, such as Oracle or Microsoft, web site or manual
Complete list of Supported Software	<i>FactoryTalk ProductionCentre Supported Platforms Guide</i>	Documentation link on the FTPC software download web site
Installation issues such as: <ul style="list-style-type: none"> • Performance • Security • Migration • Required patches 	Keyword: <ul style="list-style-type: none"> • Install • Performance • Security • Migrate 	FTPC online knowledge base
Changes to the Production or ODS database installation	<i>FactoryTalk ProductionCentre Release Notes</i>	FTPC home page under the Help link

Chapter

1

Installation Checklists

In this chapter

- MS SQL Server Installation and Configuration** 10
- Oracle Installation and Configuration** 11
 - Oracle 10g Checklist 11
 - Oracle 11g Checklist 11

The following installation checklists describe the workflow for the installation of MS SQL Server and Oracle database software. For instructions on FTPC Server installation and configuration, refer to the *FactoryTalk ProductionCentre Server Installation Guide*.

Each step in the checklists includes a page reference where you will find details and instructions about that step. The tables refer to supported RDBMS and operating system pairs. Review the order and the referenced pages before you begin. Use the checklist/workflow to successfully complete a database installation.

We designed the checklists to be used with the *FactoryTalk ProductionCentre Supported Platforms Guide*. For further guidance or site requirements not discussed, contact Rockwell Automation Technical Support.

MS SQL Server Installation and Configuration

The following table provides checklists for installing MS SQL Server to be used with FTPC.

Table 1-1 MS SQL Server Checklist on Windows

Done?	Step	Page
1.	Review software and hardware requirements in the <i>FactoryTalk ProductionCentre Supported Platforms Guide</i> to verify you have the supported versions and sufficient hardware. Find the Supported List at the Documentation link on the FTPC software download web site.	
2.	Review the guide “User Privileges” and verify that you have sufficient permissions and privileges.	page 7
3.	“Install the Windows Operating System”	page 15
4.	“Install MS SQL Server 2005 Database Server” or “Install MS SQL Server 2008 Database Server”	page 21
5.	“Install MS SQL Server 2005 Service Pack” or “Install MS SQL Server 2008 Service Pack”	page 20
6.	“Configure MS SQL Server Databases”	page 33
7.	Review Chapter 5, “Database Server Performance” for performance tips.	page 91

Oracle Installation and Configuration

The following tables provide a checklist for installing Oracle to be used with an FTPC installation.

Oracle 10g Checklist

Table 1-2 Oracle 10g Checklist on Windows

Done?	Step	Page
1.	Review software and hardware requirements in the <i>FactoryTalk ProductionCentre Supported Platforms Guide</i> to verify you have the supported versions and sufficient hardware. Find the guide at the Documentation link on the FTPC software download web site.	
2.	Review the guide about “User Privileges” and verify that you have sufficient permissions and privileges.	page 7
3.	“Install the Windows Operating System”	page 44
4.	“Install Oracle”	page 44
5.	“Configure Oracle Databases”	page 46
6.	Review Chapter 5, “Database Server Performance” for performance tips.	page 91

Oracle 11g Checklist

Table 1-3 Oracle 11g Checklist on Windows

Done?	Step	Page
1.	Review software and hardware requirements in the <i>FactoryTalk ProductionCentre Supported Platforms Guide</i> to verify you have the supported versions and sufficient hardware. Find the guide at the Documentation link on the FTPC software download web site.	
2.	Review the guide about “User Privileges” and verify that you have sufficient permissions and privileges.	page 7
3.	“Install the Windows Operating System”	page 60
4.	“Install Oracle”	page 60
5.	“Configure the Oracle Databases”	page 70
6.	Review Chapter 5, “Database Server Performance” for performance tips.	page 91



Chapter

2

MS SQL Server Installation and Configuration

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This chapter describes the choices during MS SQL Server product installation required by FTPC. This document also provides requirements, but not instructions, on how to create the databases that are used by FTPC. To complete the installation and configuration, refer to the MS SQL Server documentation.

We recommend that you install the Database and Application Server software on different machines. It is possible to install any combination of the software (for example, the Database and Application Server software) on the same machine, but you will experience performance degradation.

Install the Windows Operating System

When you install the MS SQL Server software on a Windows operating system, follow the database documentation instructions. Keep the following requirements in mind:

- You must install .NET Framework 3.5 service pack 1 before you install MS SQL Server.
- You must use NTFS. The FAT file system is not supported.
- The installation user must be a member of the Administrator group on the machine where you will install SQL Server.
- All servers and clients must be connected over the network using TCP/IP.

Install Required Patches

Refer to the *FactoryTalk ProductionCentre Supported Platforms Guide* for any required patches that must be installed with the Windows operating system. FTPC does not have any installation requirements.

Install MS SQL Server 2005 Database Server

NOTE: If you will be installing MS SQL Server 2005 Database Server, perform the steps in this section. If you will be installing MS SQL Server 2008 Database Server, perform the steps in “[Install MS SQL Server 2008 Database Server](#)” on page 21.

The installation steps covered in this section allow you to install a database server that can be used with FTPC. Specific steps for configuring the FTPC databases are available in “[Configure MS SQL Server Databases](#)” on page 33.

Your databases must have enough free space to meet the needs of your applications. The amount of free space you need depends on many factors, including logging settings and the number of transactions. Consult your Implementation Professional or MPS Representative to estimate how much space you need.

You will need some database information when you connect the application, administration, and reporting servers to the database. You can use the following table to record the information as you configure your database.

Property	Server Name (machine name)	Database Name	User Name	User Password
Production Database				
Historical (ODS) Database				

Follow the SQL Server documentation to install SQL Server 2005. When installing, accept all default selections except those described in the following dialogs, illustrated in [Figure 2-1](#) through [Figure 2-7](#).

Define the Installation

At the Installation Start dialog ([Figure 2-1](#)), click *Server components, tools, Books Online and samples* from the types of installations available to install.

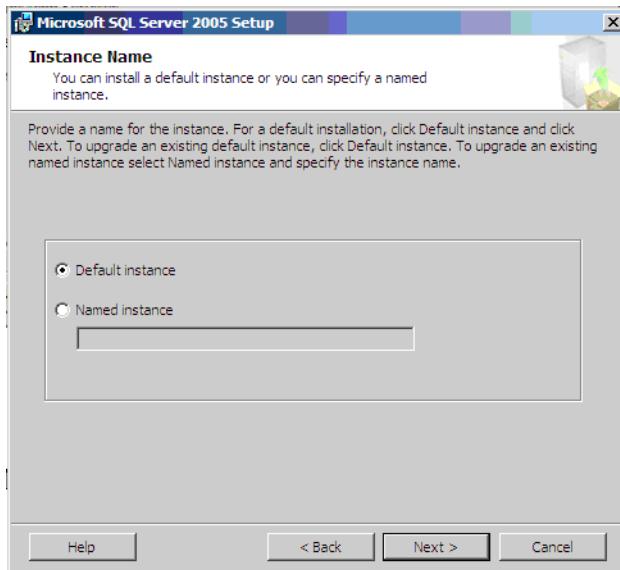
Figure 2-1: MS SQL Server Installation Type Selection



Select the Instance Name

At the Instance Name dialog (Figure 2-2), select *Default instance*, then click [Next].

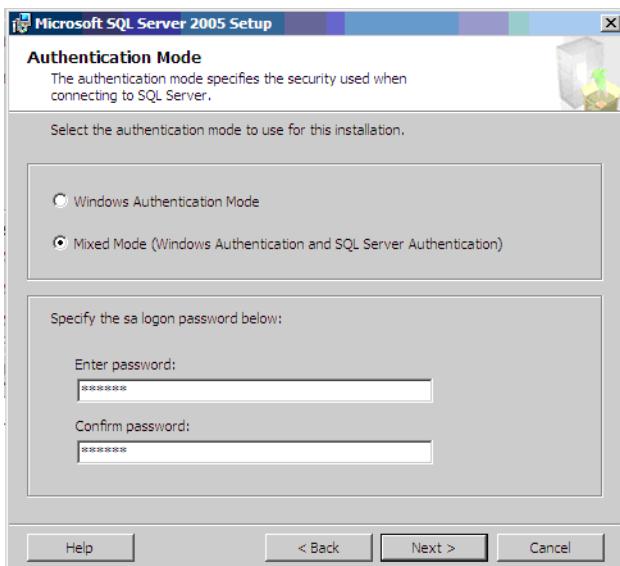
Figure 2-2: MS SQL Server Setup Selection



Select the Authentication Mode

The databases must use SQL authentication. At the Authentication Mode dialog (Figure 2-3), you **must** select *Mixed Mode* Authentication, then click [Next].

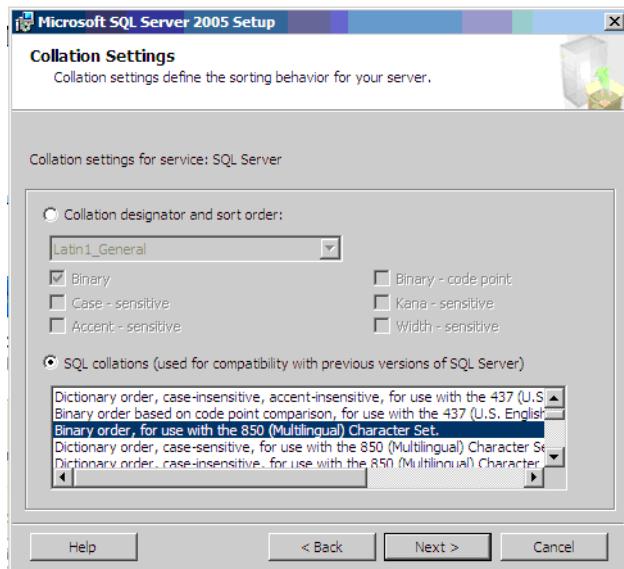
Figure 2-3: MS SQL Server Authentication Mode Selection



Select the Collation Settings

At the Collation Settings dialog (Figure 2-4), select *Binary order, for use with the 850 (Multilingual) Character Set*, then click [Next]. This provides faster searches and support of multiple languages.

Figure 2-4: MS SQL Server Collation Settings

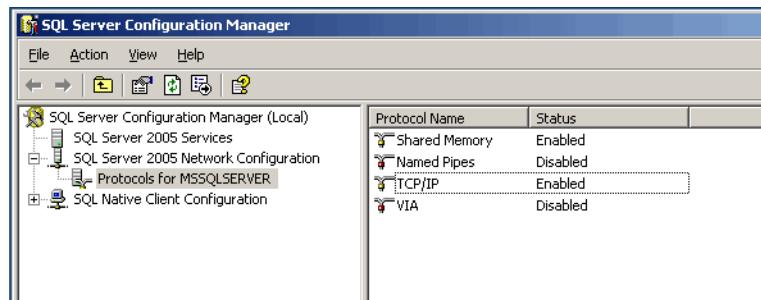


Enable TCP/IP

After installing SQL Server 2005, you must ensure that TCP/IP is enabled. By default, the only protocol enabled is shared memory. To enable TCP/IP, follow the directions below.

1. Open Start > Programs > Microsoft SQL Server 2005 > Configuration Tools > SQL Server Configuration Manager.
2. Expand SQL Server 2005 Network Configuration if it is not already expanded. Select the server for which you want to enable TCP/IP.
3. In the list of protocols, right-click on TCP/IP. Select *Enable*. The status for TCP/IP should now be *Enabled*.

Figure 2-5: Enable TCP/IP



4. Close the SQL Server Configuration Manager.

Enable OLE Automation

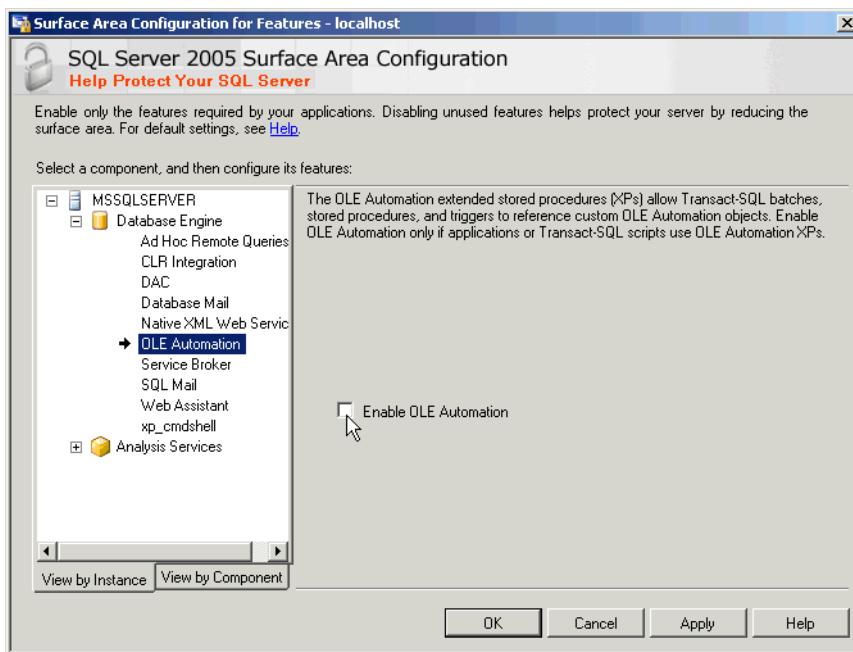
After installing SQL Server 2005, you must ensure that OLE Automation is enabled. It is disabled by default. To enable OLE Automation, follow the directions below.

1. Go to Start > Programs > Microsoft SQL Server 2005 > Configuration Tools > SQL Server Surface Area Configuration. A welcome dialog displays:

Figure 2-6: SQL Server Surface Area Configuration Tool



2. Click *Surface Area Configuration for Features*. A features configuration dialog displays.

Figure 2-7: Surface Area Configuration for Features Dialog

3. Select *OLE Automation* in the left-hand pane, and then check the *Enable OLE Automation* checkbox (see [Figure 2-7](#)).
4. Click [Apply] to save your changes, and then [OK] to close the dialog.

Migrate the Database from MS SQL Server 2000 to MS SQL Server 2005

If you will be using MS SQL Server 2005 and have existing databases in MS SQL Server 2000, you must migrate them to MS SQL Server 2005. For information on how to migrate existing databases, please refer to Microsoft's documentation. Once you have completed the migration, verify that the compatibility level is set to 90. Depending on which application server your installation is using, you will need to perform specific tasks to upgrade the database client. Read the manual specific to your server type for details.

Install MS SQL Server 2005 Service Pack

NOTE: Perform the steps in this section only if you are using MS SQL Server 2005. If you are using MS SQL Server 2008, skip this section.

Refer to the *FactoryTalk ProductionCentre Supported Platforms Guide* for the list of supported service packs that can be installed. FTPC has no requirements for the patch installation, so accept the default selections, except as required by your site.

To check if MS SQL Server 2005 Service Pack is already installed, follow the directions below:

1. From the Start menu, select Programs > Microsoft SQL Server 2005 > SQL Server Management Studio.
2. Right-click the server, and then select Properties.
3. In the General page, verify the service pack from the Version field. This number corresponds to a service pack version in a matrix on the Microsoft support website. Please refer to the Microsoft site to determine if you have the correct version.

Install MS SQL Server 2008 Database Server

NOTE: If you will be installing MS SQL Server 2008 Database Server, perform the steps in this section. If you will be installing MS SQL Server 2005 Database Server, perform the steps in “[Install MS SQL Server 2005 Database Server](#)” on page 15.

The installation steps covered in this section allow you to install a database server that can be used with FTPC. Specific steps for configuring the FTPC databases are available in “[Configure MS SQL Server Databases](#)” on page 33.

Your databases must have enough free space to meet the needs of your applications. The amount of free space you need depends on many factors, including logging settings and the number of transactions. Consult your Implementation Professional or MPS Representative to estimate how much space you need.

You will need some database information when you connect the application, administration, and reporting servers to the database. You can use the following table to record the information as you configure your database.

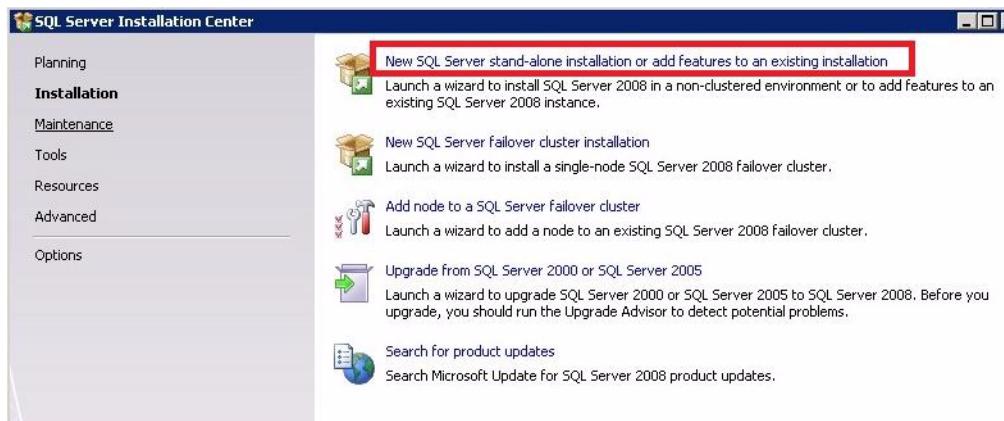
Property	Server Name (machine name)	Database Name	User Name	User Password
Production Database				
Historical (ODS) Database				

Follow the SQL Server documentation to install SQL Server 2008. When installing, accept all default selections except those described in the following dialogs, illustrated in [Figure 2-8](#) through [Figure 2-20](#).

Define the Installation

At the Installation Start dialog (Figure 2-8), click *New SQL Server stand-alone installation or add features to an existing installation* from the types of installations available to install.

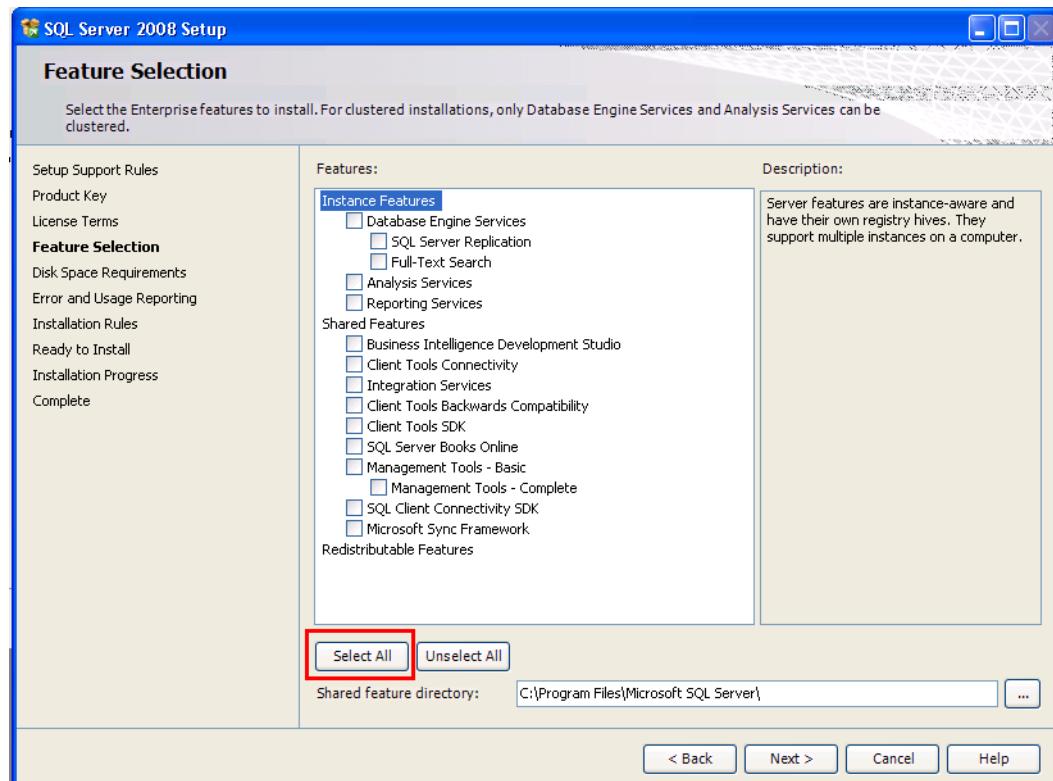
Figure 2-8: MS SQL Server Installation Type Selection



Select the Features

At the Feature Selection dialog (Figure 2-9), click [Select All] and then click Next.

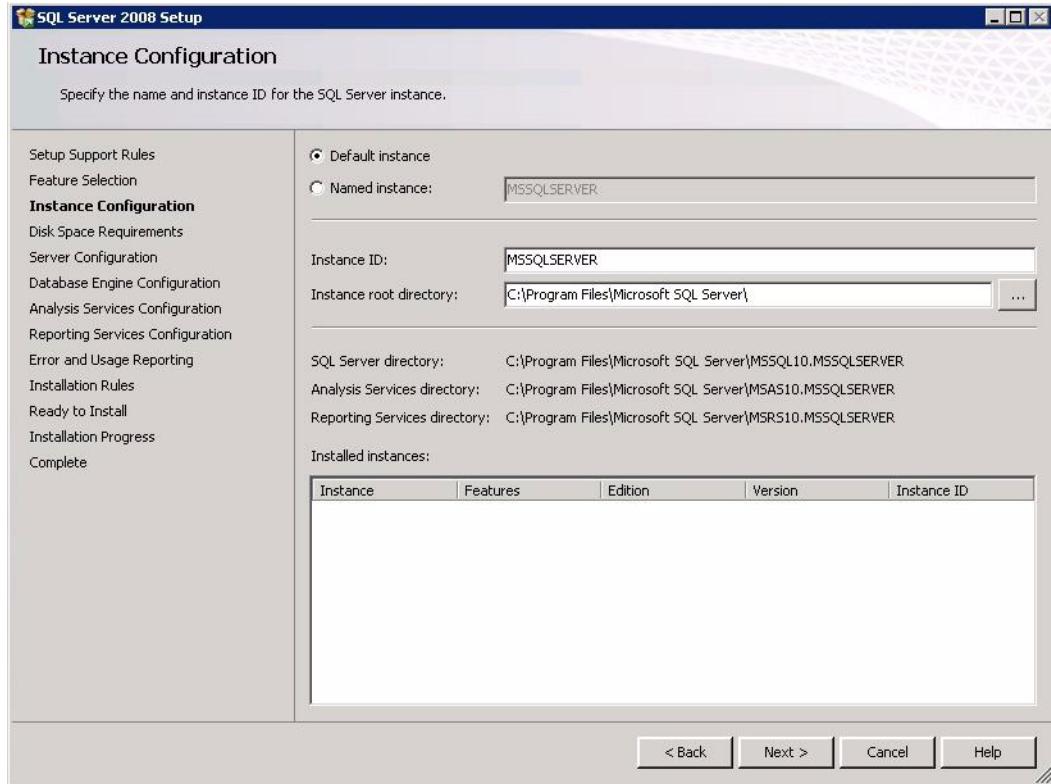
Figure 2-9: Feature Selection



Select the Instance Name

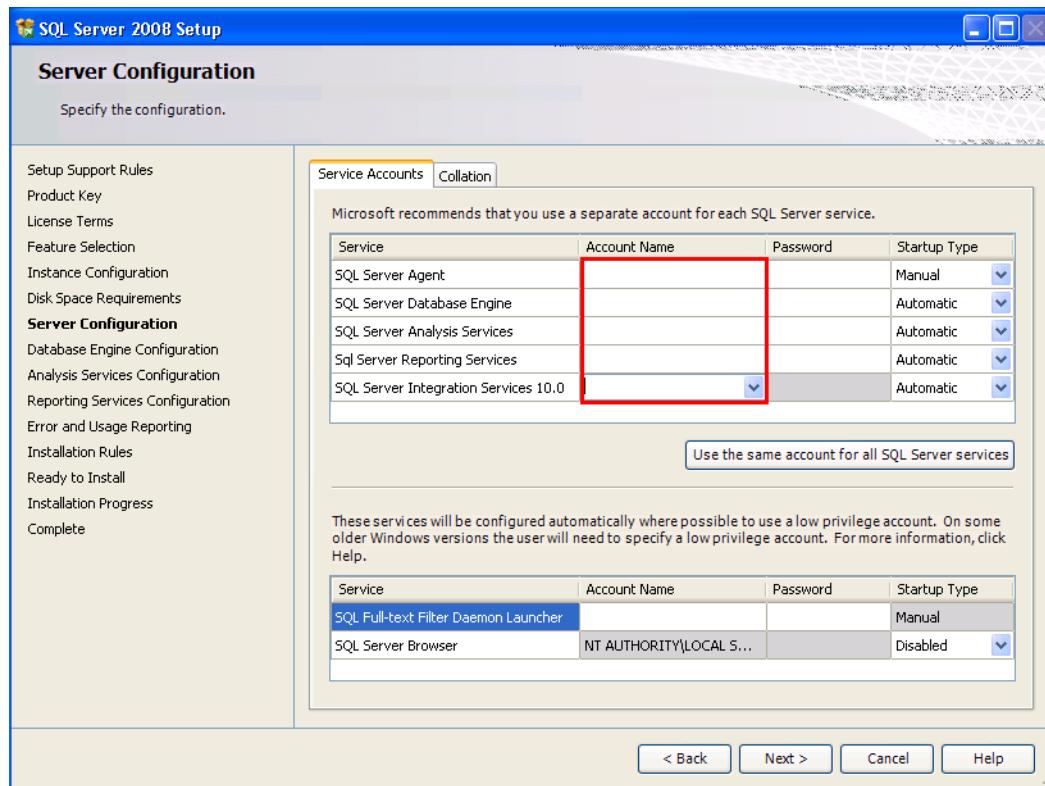
At the Instance Configuration dialog (Figure 2-10), select *Default instance*, then click [Next].

Figure 2-10: MS SQL Server Setup Selection



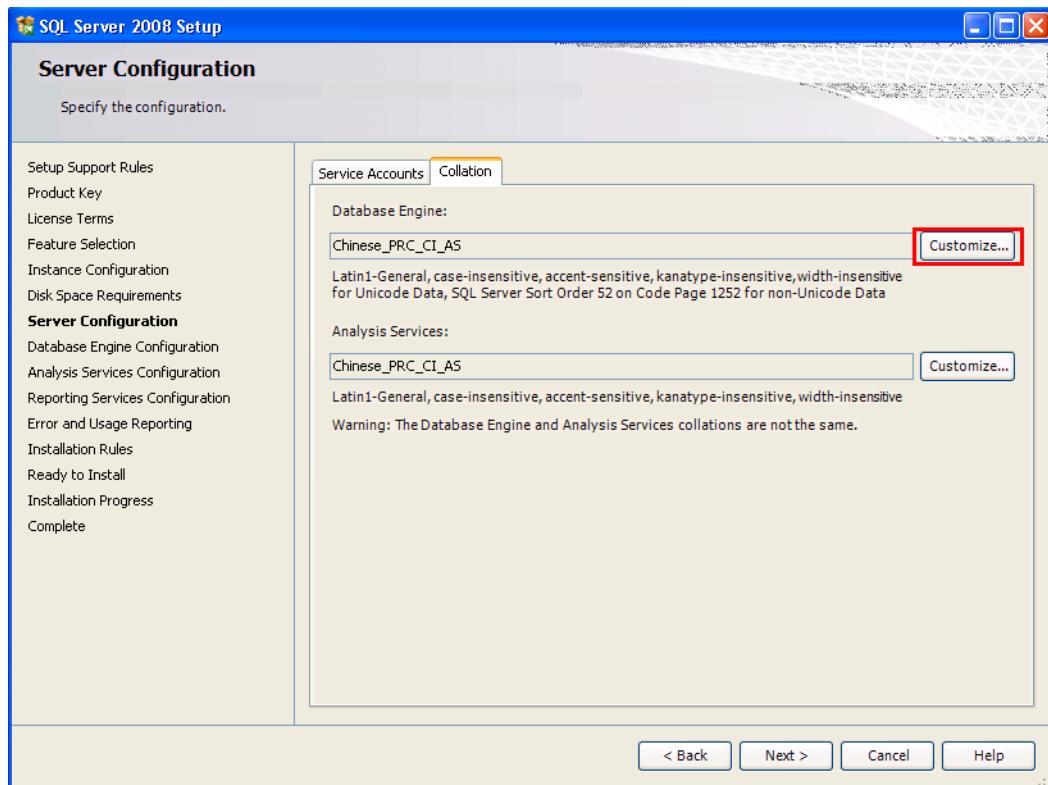
Specify the Server Configuration

In the Server Configuration dialog, under the Service Accounts tab (Figure 2-11), specify the account name for each SQL Server service.

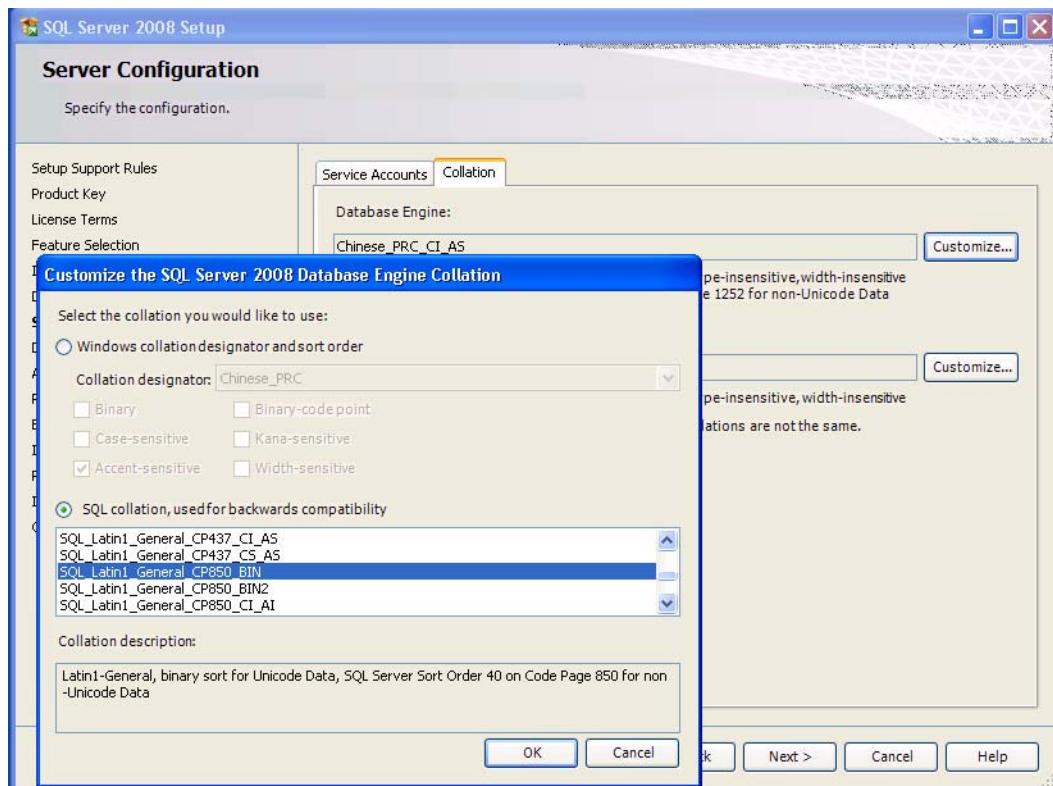
Figure 2-11: Server Configuration

Select the Collation Settings

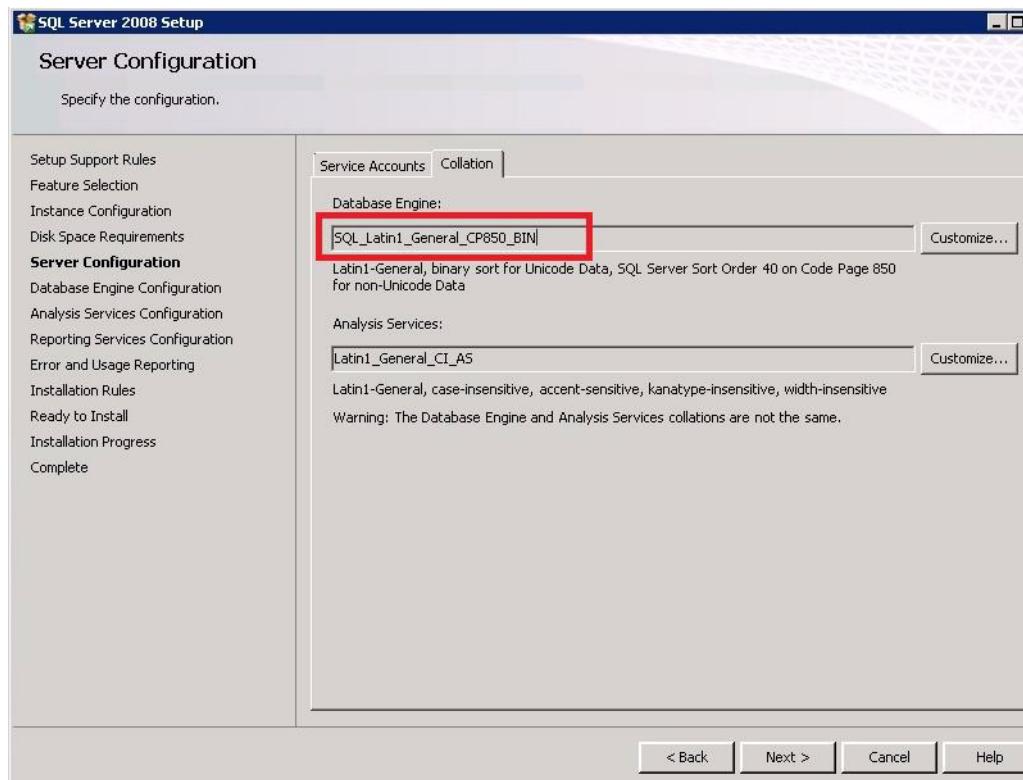
In the Server Configuration dialog, under the Collation Settings tab (Figure 2-12), click [Customize].

Figure 2-12: MS SQL Server Collation Settings

In the *Customize the SQL Server 2008 Database Engine Collation* dialog, choose the *SQL collation, used for backwards compatibility* radio button (Figure 2-13), select ***SQL_Latin1_General_CP850_BIN***, then click [OK].

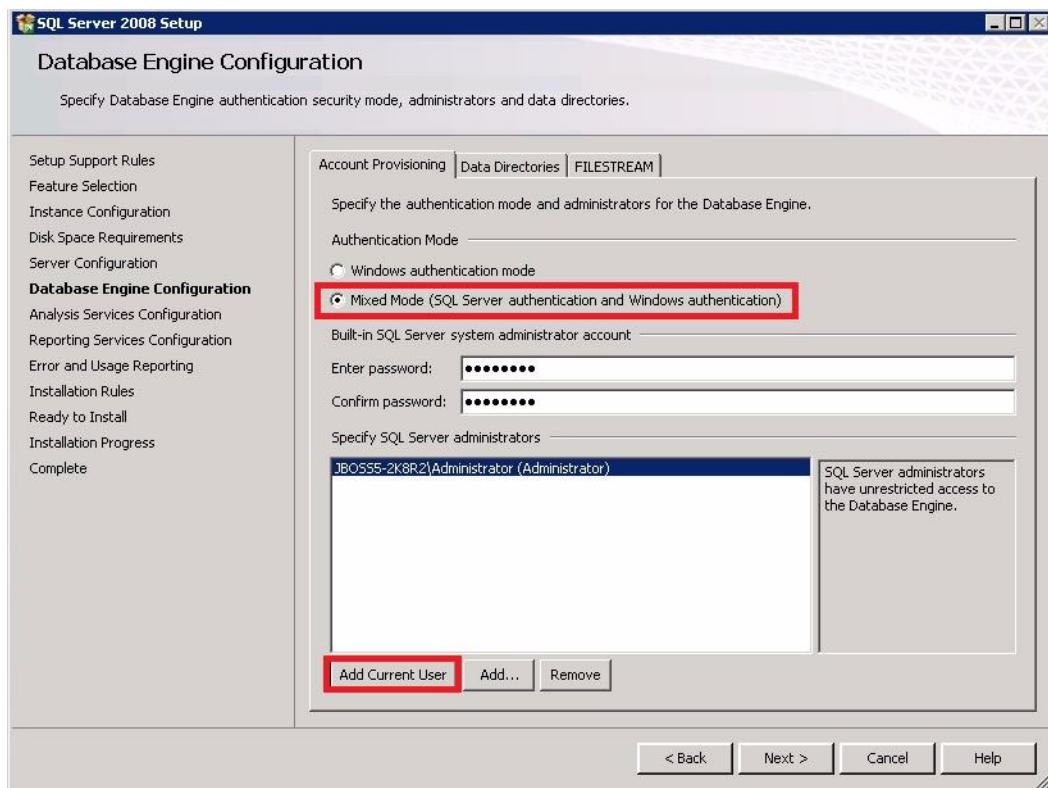
Figure 2-13: Customize the SQL Server 2008 Database Engine Collation

You are now returned to the Server Configuration dialog. Verify that *SQL_Latin1_General_CI_AS* is selected under Database Engine, ([Figure 2-14](#)) then click [Next]. This provides faster searches and support of multiple languages.

Figure 2-14: MS SQL Server Collation Settings

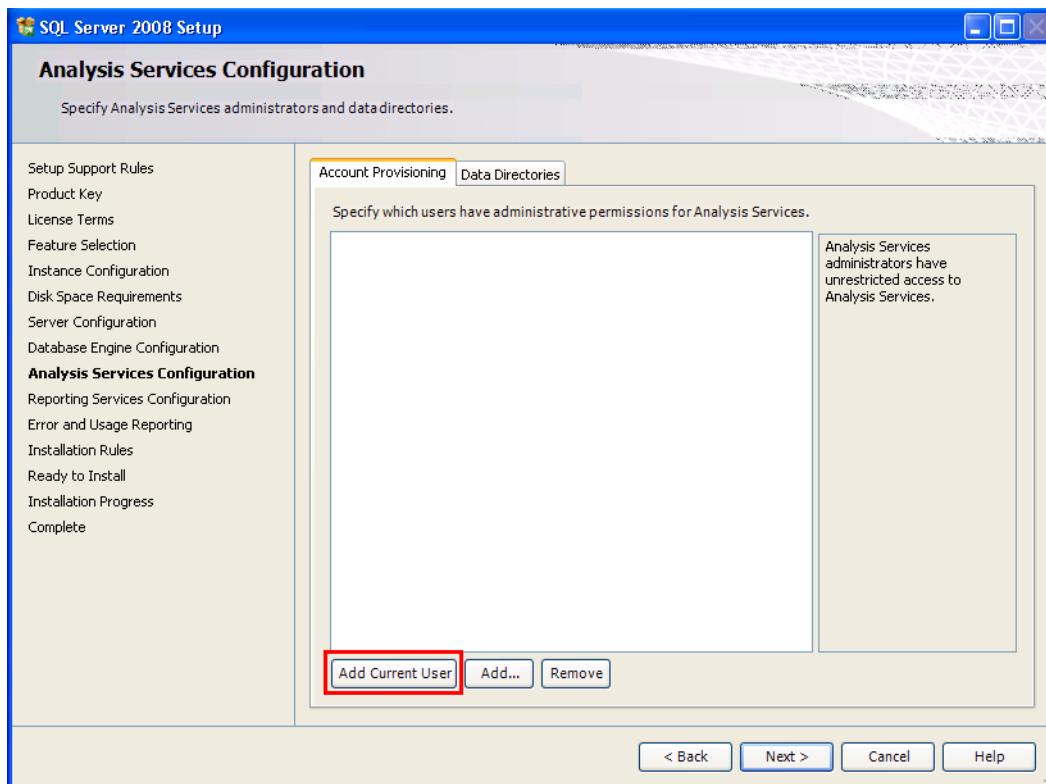
Select the Authentication Mode

The databases must use SQL authentication. At the Authentication Mode dialog (Figure 2-15), select *Mixed Mode* Authentication, click [Add Current User], then click [Next].

Figure 2-15: MS SQL Server Authentication Mode Selection

Specify the Analysis Services Administrator

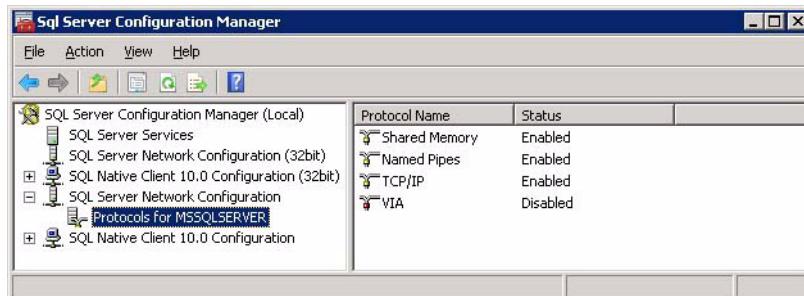
In the *Analysis Services Configuration* dialog (Figure 2-16), under the Account Provisioning tab, click [Add Current User], then click [Next]. This allows the current user to have unrestricted access to Analysis Services.

Figure 2-16: Analysis Services Configuration

Verify the TCP/IP Status

After installing SQL Server 2008, ensure that TCP/IP is enabled by performing the following steps.

1. Open Start > Programs > Microsoft SQL Server 2008 > Configuration Tools > SQL Server Configuration Manager.
2. Expand SQL Server 2008 Network Configuration if it is not already expanded. Select the server for which you want to verify that TCP/IP is enabled.
3. In the list of protocols, TCP/IP should be listed as *Enabled*.

Figure 2-17: Verify TCP/IP Status

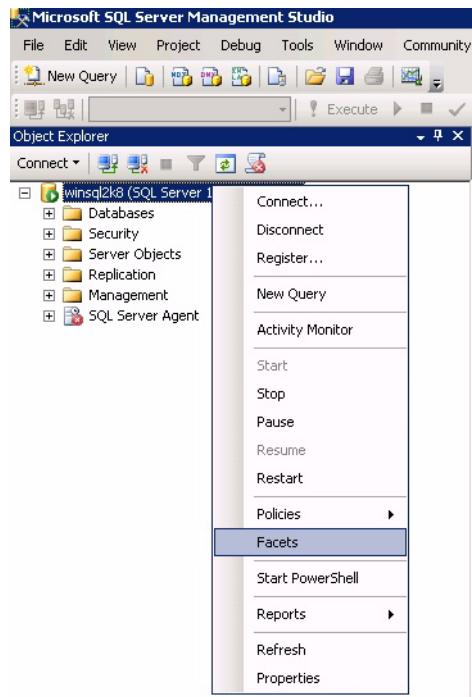
4. Close the SQL Server Configuration Manager.

Enable OLE Automation

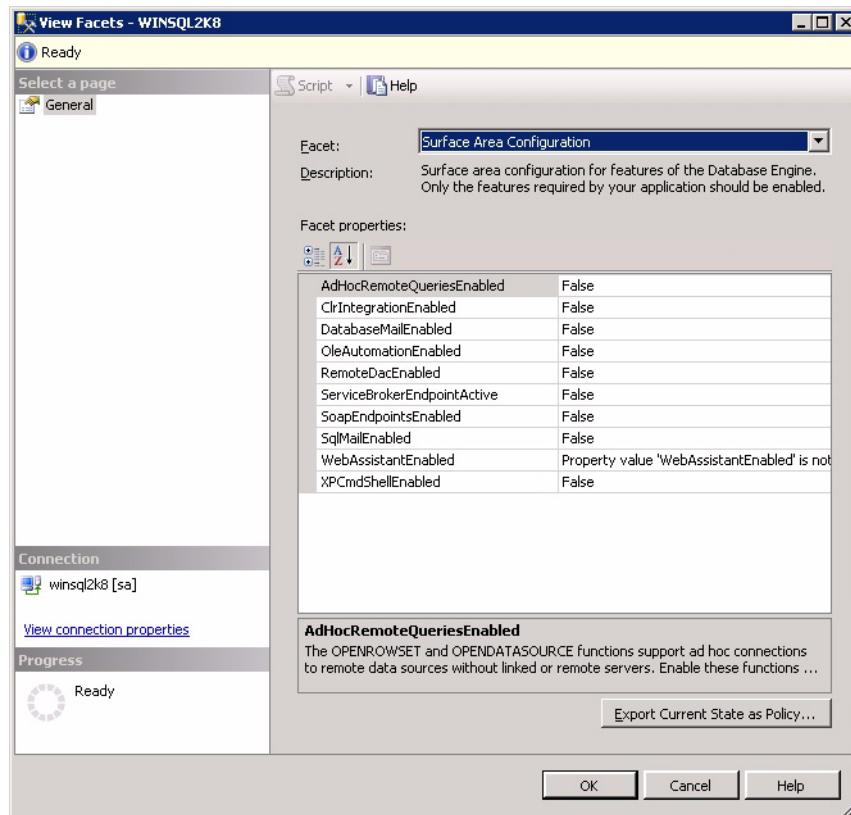
After installing SQL Server 2008, you must ensure that OLE Automation is enabled. It is disabled by default. To enable OLE Automation, follow the directions below.

1. Go to Start > Programs > Microsoft SQL Server 2008 > SQL Server Management Studio. Open SQL Server Management Studio.
2. Right-click on the instance name that you would like to configure in SQL Server management Studio and select "Facets" from the context menu to open the View Facets dialog.

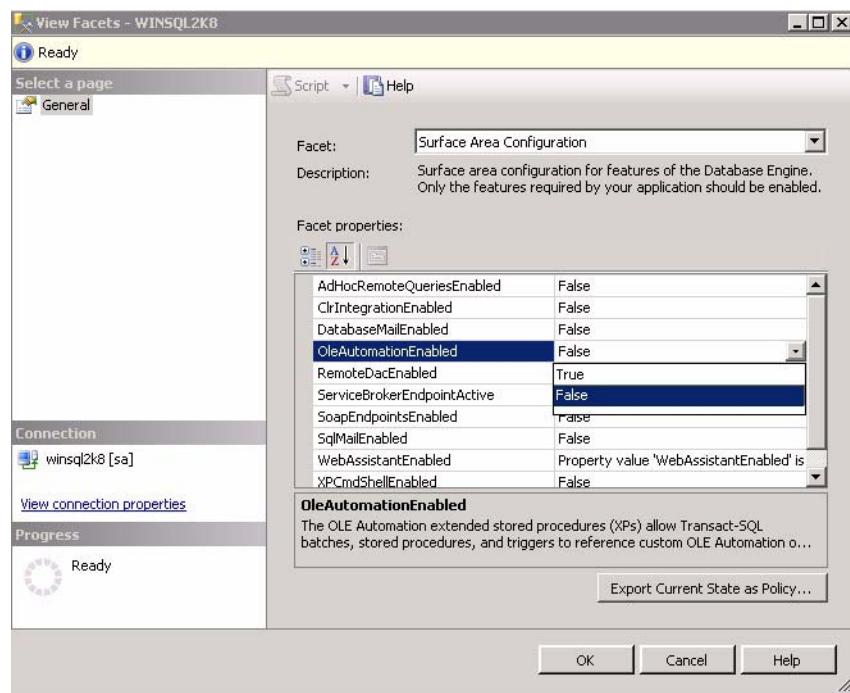
Figure 2-18: SQL Server Surface Area Configuration Tool



3. From the Facet drop-down menu, select *Surface Area Configuration* to display the properties exposed by that facet.

Figure 2-19: Surface Area Configuration for Features Dialog

4. Select *True* to enable the "OleAutomationEnabled" property from the Facet properties dialog.

Figure 2-20: Enable OleAutomation

5. Click [OK] to close the dialog.

Migrate the Database from MS SQL Server 2005 to MS SQL Server 2008

NOTE: Because MS SQL Server 2008 is supported for 64-bit machines but MS SQL Server 2005 is supported only for 32-bit machines, migration from MS SQL Server 2005 to 2008 is supported only for 32-bit machines. Please refer to the *FactoryTalk ProductionCentre Supported Platforms Guide* for more information.

If you will be using MS SQL Server 2008 and have existing databases in MS SQL Server 2005, you must migrate them to MS SQL Server 2008. For information on how to migrate existing databases, please refer to Microsoft's documentation. Once you have completed the migration, verify that the compatibility level is set to 90. Depending on which application server your installation is using, you will need to perform specific tasks to upgrade the database client. Read the manual specific to your server type for details.

Install MS SQL Server 2008 Service Pack

NOTE: Perform the steps in this section only if you are using MS SQL Server 2008. If you are using MS SQL Server 2005, skip this section.

Refer to the *FactoryTalk ProductionCentre Supported Platforms Guide* for the list of supported service packs that can be installed. FTPC has no requirements for the patch installation, so accept the default selections, except as required by your site.

To check if MS SQL Server 2008 Service Pack is already installed, follow the directions below:

1. From the Start menu, select Programs > Microsoft SQL Server 2008 > SQL Server Management Studio.
2. Right-click the server, and then select Properties.
3. In the General page, verify the service pack from the Version field. This number corresponds to a service pack version in a matrix on the Microsoft support website. Please refer to the Microsoft site to determine if you have the correct version.

Configure MS SQL Server Databases

The following sections describe MS SQL Server configuration requirements for setting up the FTPC databases. As you configure the database, record the appropriate information in the tables on p. 17 (for MS SQL Server 2005) and 36 (for MS SQL Server 2008).

While the sections in this chapter cover the requirements for setting up your database environment, [Chapter 5, “Database Server Performance”](#) discusses configuration settings that may be helpful, depending on your site requirements. Review that chapter for suggestions on increasing performance and optimizing your environment.

Create a Database User

To enable the Application and Reporting servers to connect to the databases, you must configure a user with the required permissions for all five databases.

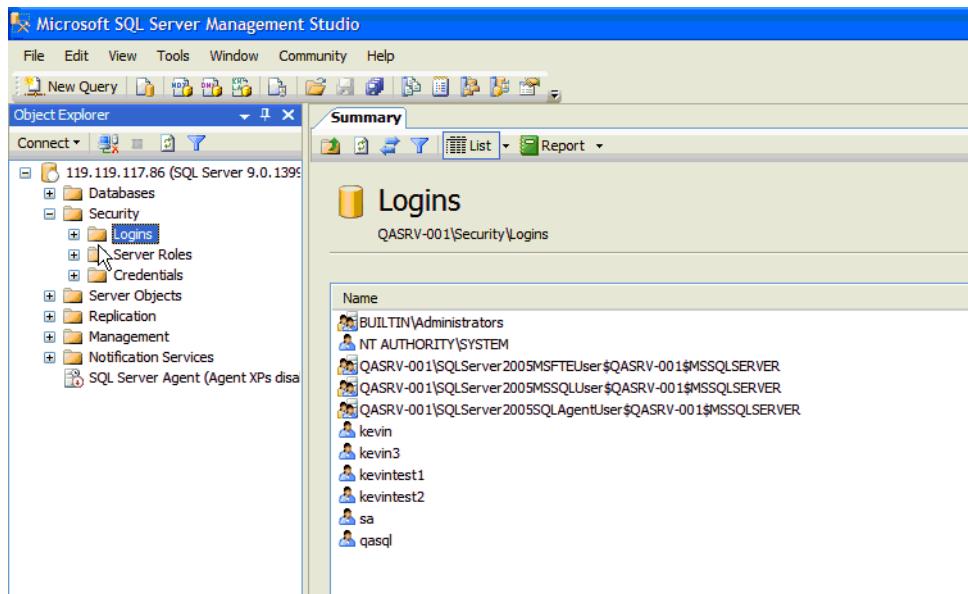
IMPORTANT: Do not create a username that starts with a number.

In SQL Server Management Studio, follow the steps below to create a new user and password with the following properties:

1. Open SQL Server Management Studio.

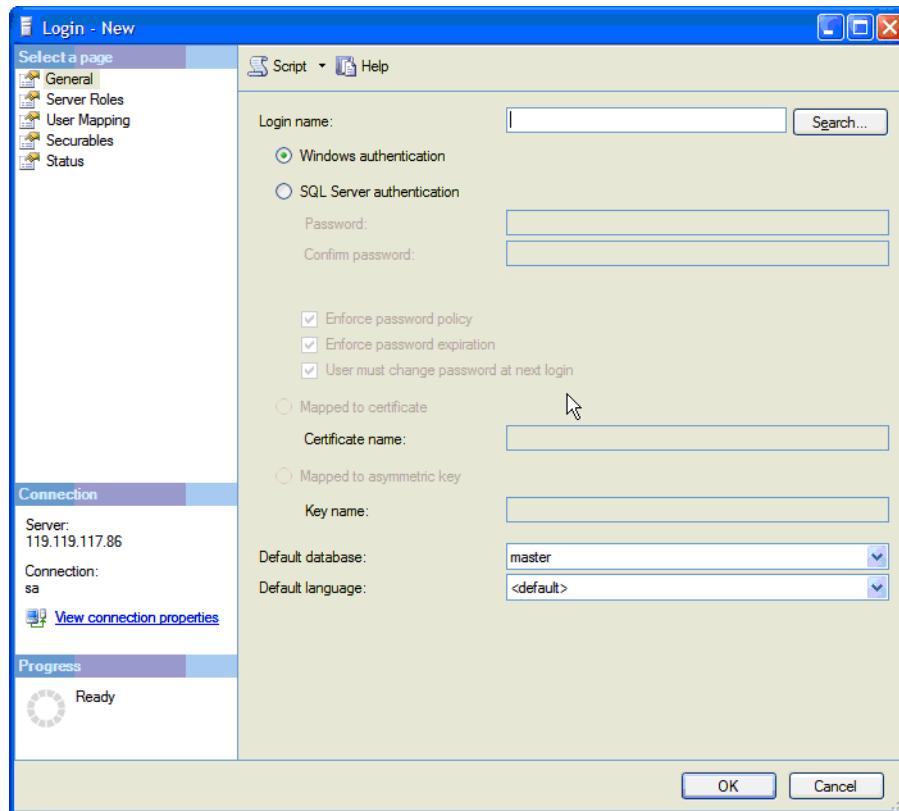
2. In the Object Explorer, expand your server. Open Security.

Figure 2-21: Microsoft SQL Server Management Studio

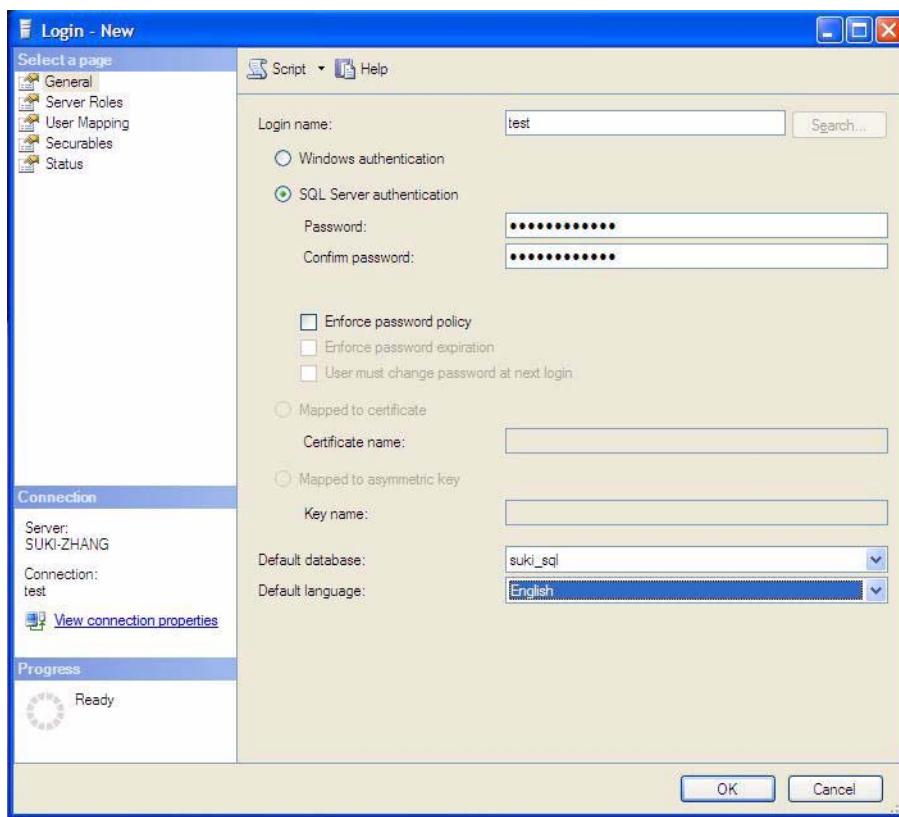


3. Right-click Logins, and select *New Login*.

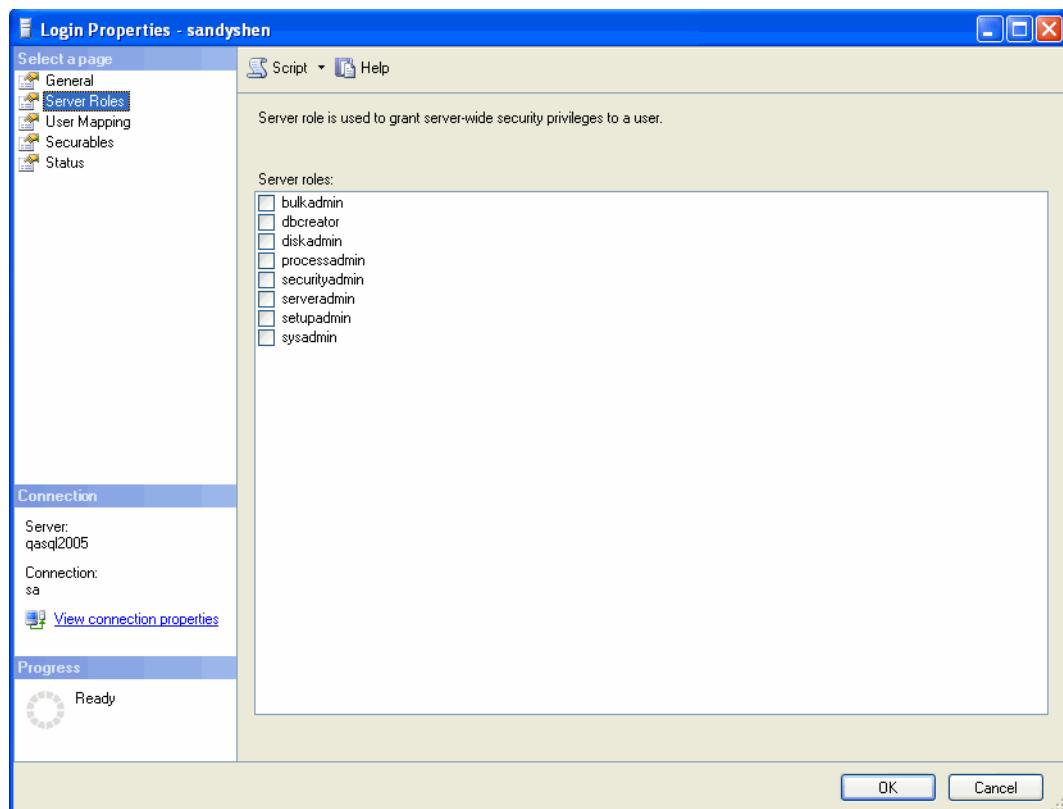
Figure 2-22: General Tab



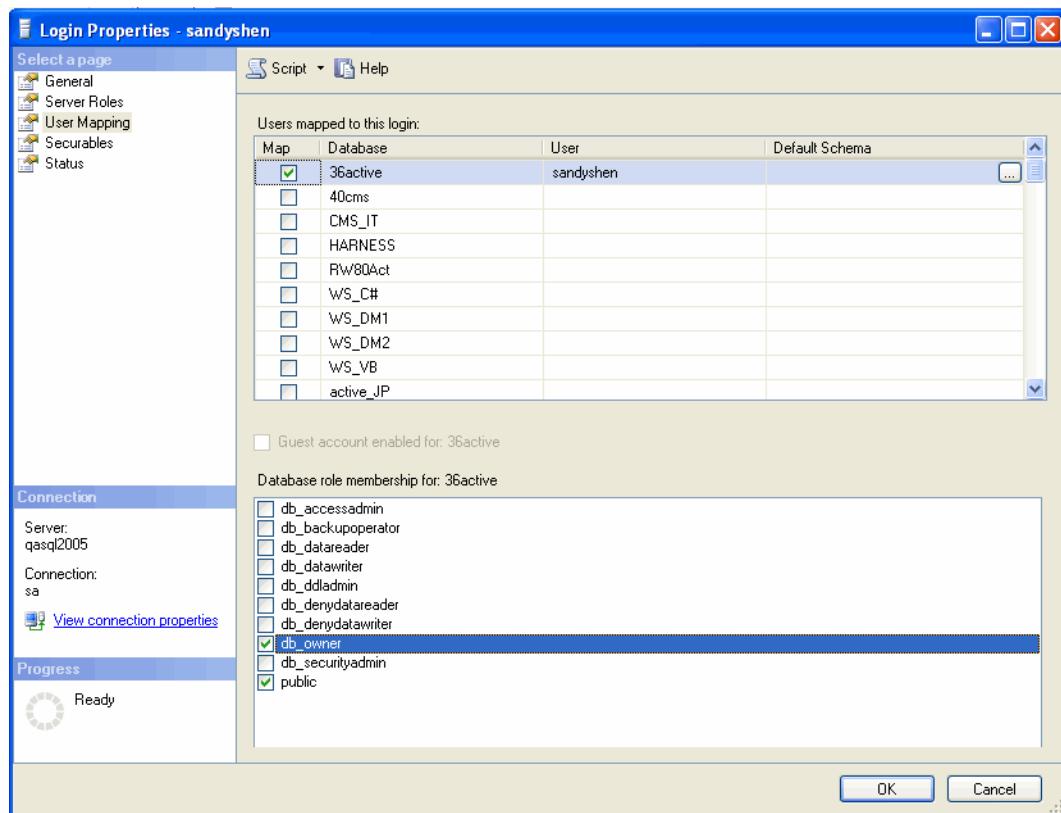
4. Enter the login name, and select *SQL Server authentication*.

Figure 2-23: Create New Login

5. Enter a password, select the Default database, and click [OK].
6. Right-click the user you just created and select Properties.
7. In the Login Properties page, select the Server Roles page.
8. In the Server Roles page, set a user role of sysadmin. The database user must be a sysadmin until after the databases are initialized. In the Object Explorer, select Server Roles.

Figure 2-24: Server Roles

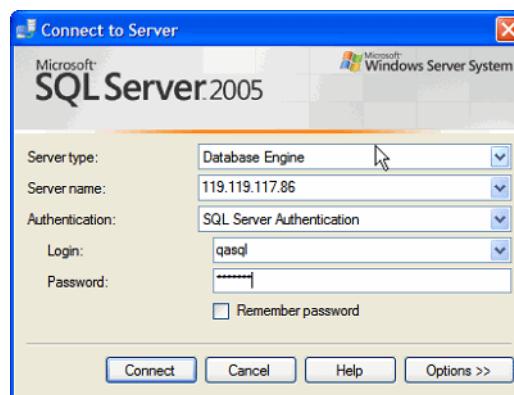
9. In the *User Mapping* page, select the user(s) you want mapped to this login. Migrations also require the System Administrator role. If sysadmin is removed, make sure db-owner is selected.

Figure 2-25: User Mapping

Create the FactoryTalk ProductionCentre Databases

Edit the SQL Server Registration Properties to log into SQL Server Management Studio as the user you just created. To do so, follow the steps below.

1. First select File > Disconnect Object Explorer, then select File > Connect Object Explorer.
2. Use the user and password you just created to log in to MS SQL Server Management Studio.

Figure 2-26: Connect to Server

3. Follow SQL Server procedures to create the necessary databases (either a Production database or both Production and Historical databases) with initial sizes that meet the size and growth requirements for your site, as listed in the table that follows.

IMPORTANT: Do not create a database with a name that starts with a number.

Once you determine the initial size for your database, set the database to grow automatically in increments that are appropriate for your environment.

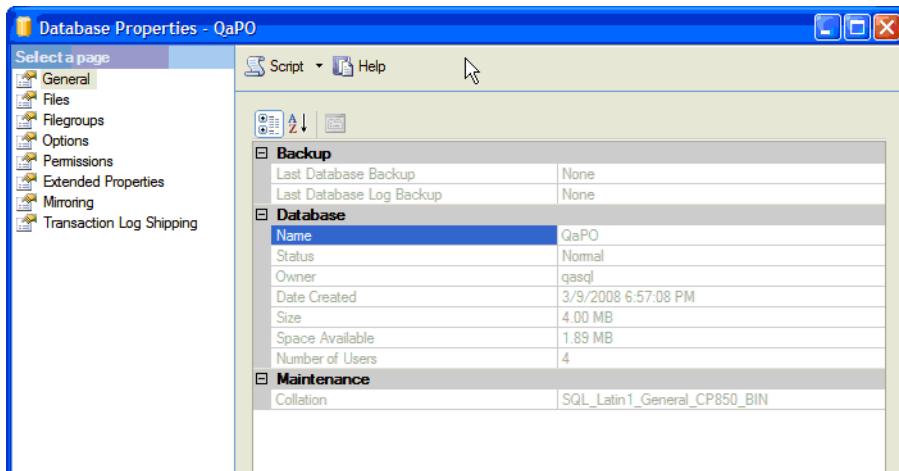
Database	Size
Production	300 MB or greater ^a
Historical (ODS)	300 MB or greater

^aDepending on your site requirements, you may need to specify a larger size, such as 1 GB, for the database. Also, if you are using the FTPC Object Revision History feature, the database requires double the tablespace size of an application that does not use this feature.

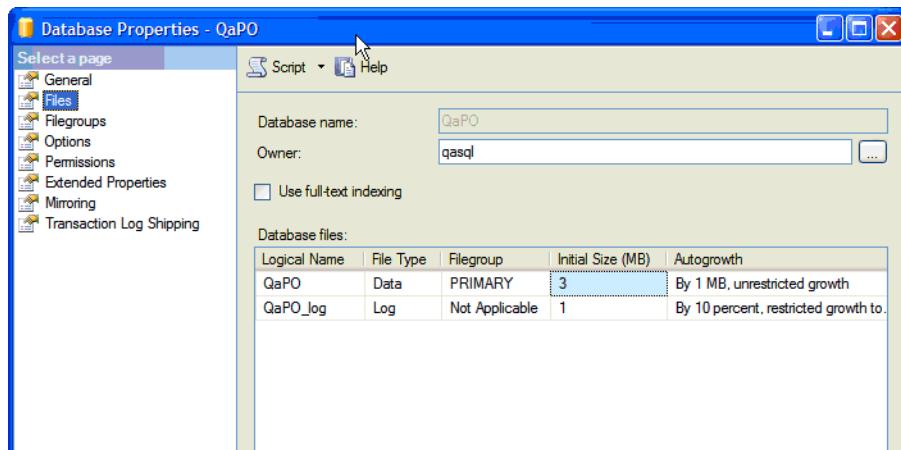
For each of the databases you just created, follow the directions below:

1. Right click the database and select [Properties].

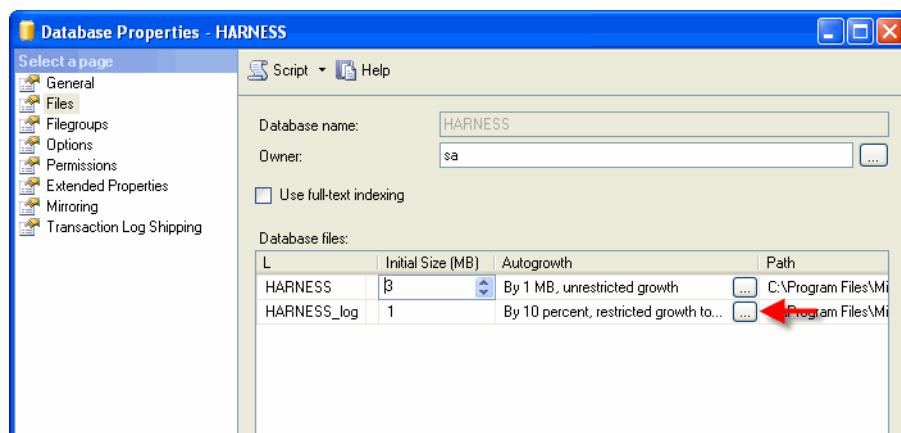
Figure 2-27: Database Properties



2. In the Database Properties dialog, select the Files tab.

Figure 2-28: Configure Database File Properties

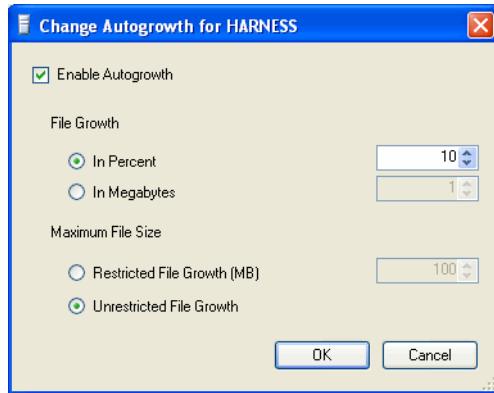
3. In the Files page, click the [...] button as shown in [Figure 2-29](#) to access the dialog to modify your autogrowth settings.

Figure 2-29: Database Properties

When the Change Autogrowth dialog appears, set the following properties:

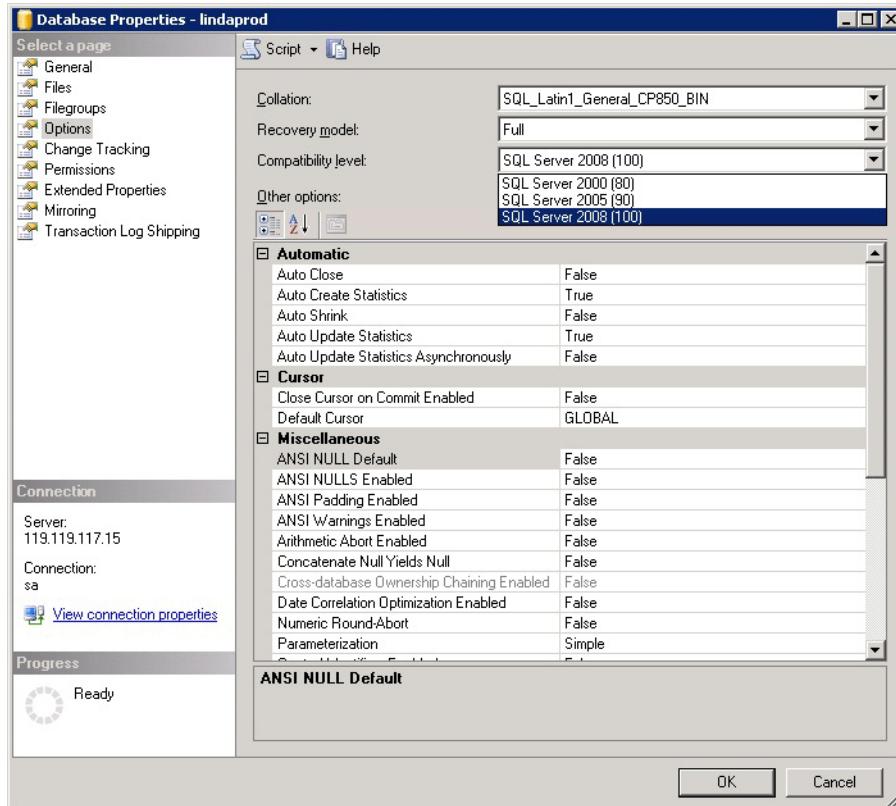
- Check the “Enable Autogrowth” checkbox.
- File Growth: select the “In Percent” radio button.
- Set the increment to 10.

Set the maximum file size to “Unrestricted Growth.”

Figure 2-30: Change Autogrowth Dialog

Once you have finished setting the database properties, you must set the compatibility level to 80 or 90. To do this, follow the directions below.

1. In the Object Explorer, locate the databases you created in the previous sections. Right-click on each database in turn and select Properties.
2. In the *Database Properties* screen, set the Compatibility Level property to either SQL Server 2005(90) or SQL Server 2008(100). The FTPC code base is compatible with both options.

Figure 2-31: Set the Compatibility Level

3. Click [OK] to save the configuration and close SQL Management Studio.

Enable the READ_COMMITTED_SNAPSHOT Option

Enabling the READ_COMMITTED_SNAPSHOT option increases the SQL database engine's ability to allow multiple transactions to run at the same time with a reduced chance of deadlocks. Before you enable this option, make sure that your database is not being used by any other process (for example, migration or other queries).

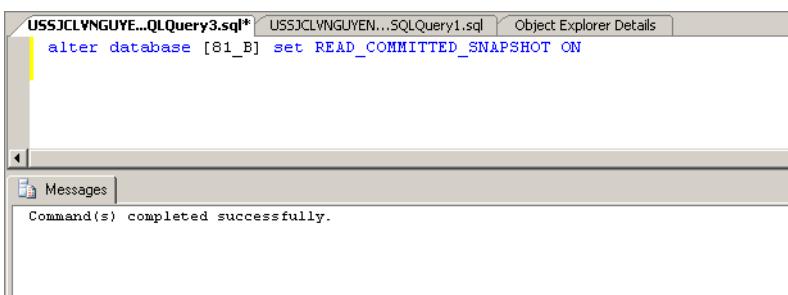
1. In the Object Explorer, locate the databases you created in the previous sections. Right-click on each database in turn, and select New Query.
2. Run the following command:

```
alter database <database_name> set READ_COMMITTED_SNAPSHOT ON
```

where *<database_name>* is the name of the database you selected. If your database name starts with a number, enclose the database name in square brackets. For example:

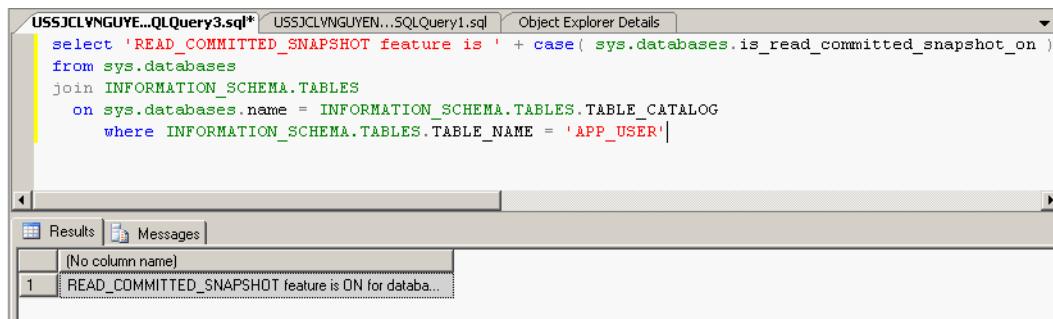
```
alter database [81_B] set READ_COMMITTED_SNAPSHOT ON
```

Figure 2-32: Enable the READ_COMMITTED_SNAPSHOT Option



3. To verify that the READ_COMMITTED_SNAPSHOT feature has been enabled on the current database, run the following command:

```
select 'READ_COMMITTED_SNAPSHOT feature is ' + case( sys.databases.is_read_committed_snapshot_on ) when 1 then 'ON' else 'OFF' end + ' for database "' + INFORMATION_SCHEMA.TABLES.TABLE_CATALOG + '"'
from sys.databases
join INFORMATION_SCHEMA.TABLES
on sys.databases.name = INFORMATION_SCHEMA.TABLES.TABLE_CATALOG
where INFORMATION_SCHEMA.TABLES.TABLE_NAME = 'APP_USER'
```

Figure 2-33: Verify the READ_COMMITTED_SNAPSHOT Option

```
USSJCLVNGUYE...SQLQuery3.sql* USSJCLVNGUYE...SQLQuery1.sql Object Explorer Details
select 'READ_COMMITTED_SNAPSHOT feature is ' + case( sys.databases.is_read_committed_snapshot_on )
from sys.databases
join INFORMATION_SCHEMA.TABLES
on sys.databases.name = INFORMATION_SCHEMA.TABLES.TABLE_CATALOG
where INFORMATION_SCHEMA.TABLES.TABLE_NAME = 'APP_USER'

Results | Messages
[No column name]
1 | READ_COMMITTED_SNAPSHOT feature is ON for database...
```

Configure Optional SQL Filegroups

FTPC Administrator provides a database Reorganization tool that will allow you to assign logical groups of tables (e.g., fast growing, slow growing, indexes, etc.) to tablespaces that you create in the database(s) for this purpose. If you will use this feature, you can create the filegroups now, then after installation of the Administration Server, assign them to logical groups. Refer to the *FactoryTalk ProductionCentre Administrator User's Guide* for more information about assigning tables to logical groups.



Chapter

3

Oracle 10g Installation and Configuration

In this chapter

- **Install the Windows Operating System 44**
 - Install Required Patches 44
- **Install Oracle 44**
 - Select the Setup Type 45
 - Select Configuration Option 46
- **Configure Oracle Databases 46**
 - Create the Database Instance 47
 - Configure the Database Environment 49
 - Create the Tablespace 53
 - Create User 55
 - Consider Optional Tablespace Configuration 57
 - Create a Local Net Service Name 57

This chapter describes the choices required by FTPC products during an Oracle 10g product installation. This document also provides requirements, but not instructions, on how to create the databases that are used by FTPC. To complete the installation and configuration, refer to your Oracle documentation.

Oracle can run on any platform supported by Oracle, but the FTPC installer must be run on a Windows machine. See the installation documentation from your software provider regarding non-Windows database installations.

Install the Windows Operating System

If you will be installing the Oracle software on a Windows operating system, follow the database documentation instructions. Keep the following requirements in mind:

- You must use NTFS. The FAT filesystem is not supported.
- The installation user must be a member of the Administrator group on the machine where you will install Oracle.
- All servers and clients must be connected over the network using TCP/IP.

Install Required Patches

Refer to the *FactoryTalk ProductionCentre Supported Platforms Guide* for any required patches that must be installed with the Windows operating system.

Install Oracle

IMPORTANT: An Oracle DBA should perform the Oracle Server installation and configuration.

The installation steps covered in this section apply to installations when working with FTPC. Specific steps for configuring the FTPC databases are available in “[Configure Oracle Databases](#)” on page 46.

Your databases must have enough free space to meet the needs of your applications. The amount of free space you need depends on many factors, including logging settings and the number of transactions. Consult Rockwell Automation Customer Support to estimate how much space you need.

You must be logged in as an Administrative user. See “[User Privileges](#)” on page 7 for user privilege information.

We recommend that you install the database, application server, and reporting server software on different machines. It is possible to install any combination of

the software, such as the database and application server software, on the same machine, but you will experience performance degradation.

You will need some database information when you connect the application and reporting servers to the database. You can use the following table to record the information as you configure your database.

Table 3-1 Oracle Database Information

Properties	Production Database	Historical (ODS) Database
Server Host Name		
SID		
Listener Port		
Tablespace Name		
User Name		
User Password		
Local Net Service Name		

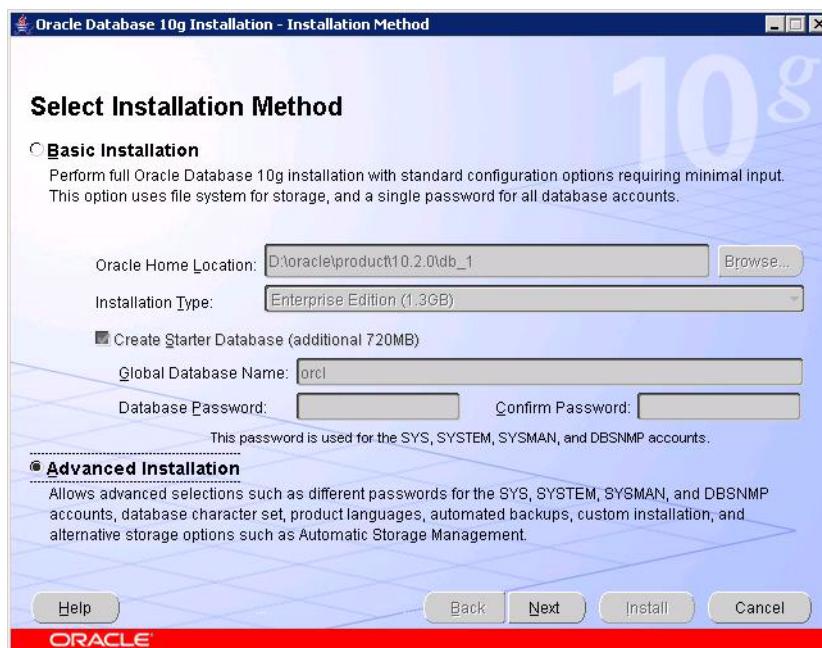
Note: Oracle System Identifier is also called database instance Service Name.

This document does **not** describe all the steps required to install Oracle. See your Oracle documentation for complete installation instructions.

Select the Setup Type

- At the Installation Method dialog, select Advanced Installation.

Figure 3-1: Oracle Installation Method

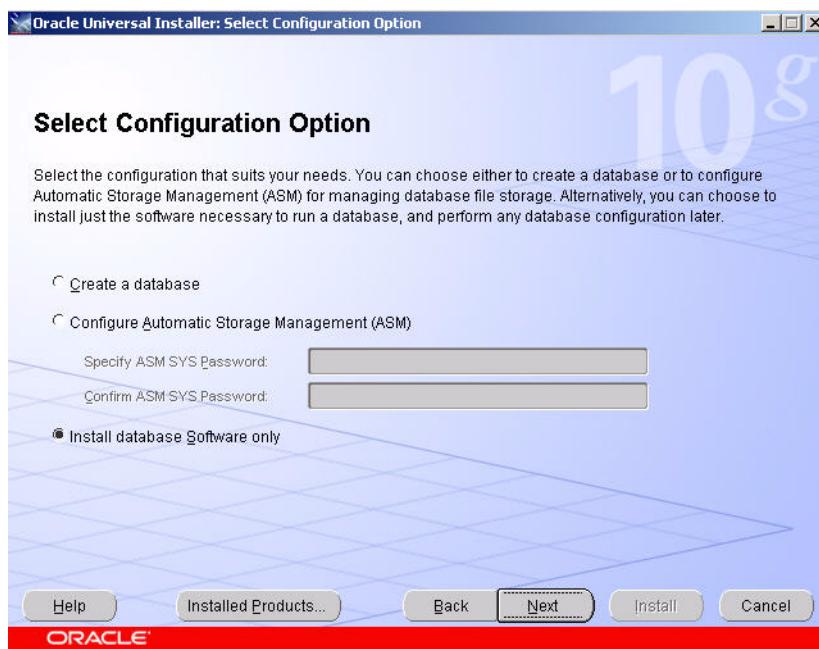


- At the Setup Type dialog, select *Enterprise Edition*.

Select Configuration Option

In the Select Configuration Option dialog, select *Install database software only*.

Figure 3-2: Oracle Configuration Option



Configure Oracle Databases

The following sections describe the configuration dialogs and settings required for configuring the FTPC databases. As you configure the databases, record the appropriate information in “[Oracle Database Information](#)” on page 45.

While the sections in this chapter cover the requirements for setting up your database environment, [Chapter 5, “Database Server Performance”](#) discusses configuration settings that may be helpful for optimizing your environment, depending on your site requirements. Review that chapter for suggestions on increasing performance.

The configuration steps that affect FTPC databases are described in detail in the following sections:

- “[Create the Database Instance](#)” on page 47
- “[Configure the Database Environment](#)” on page 49
- “[Create the Tablespace](#)” on page 53
- “[Create User](#)” on page 55
- “[Consider Optional Tablespace Configuration](#)” on page 57
- “[Create a Local Net Service Name](#)” on page 57

Create the Database Instance

When you create the database instance on the database server, FTPC requires the settings described in the following section. You must complete the database instance with settings determined by your site requirements.

IMPORTANT: Do not create a database with a name that starts with a number.

Use an Oracle tool to create a new database instance(s) with the following properties. We have used example paths and dialogs from the Database Configuration Assistant.

Select the Database Features

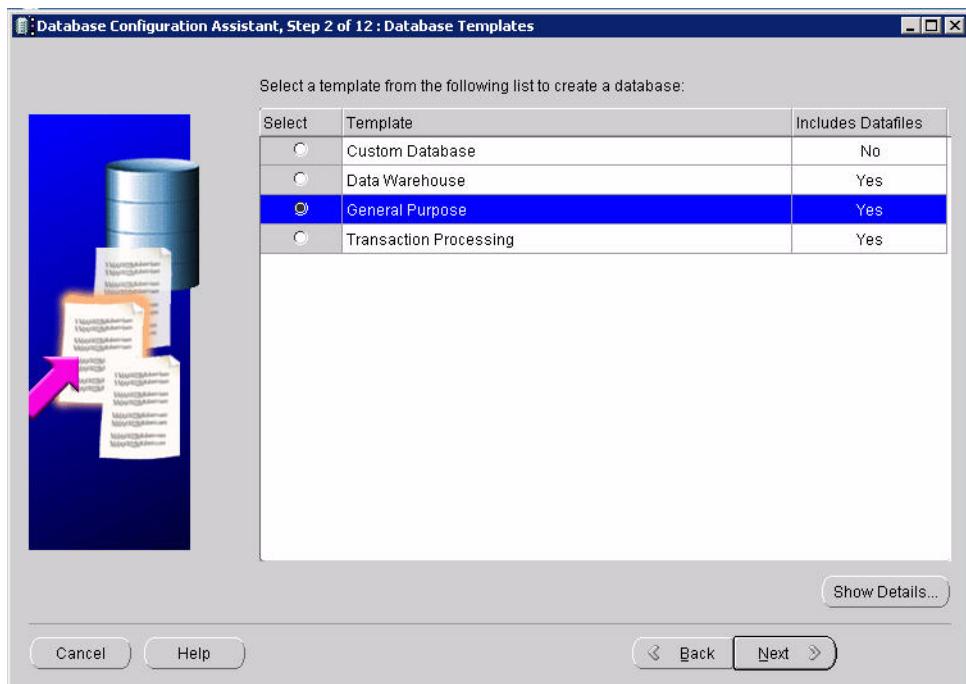
FTPC does not require any specific features listed in the Database Features dialog. Install any features required by your site.

Select the Database Template

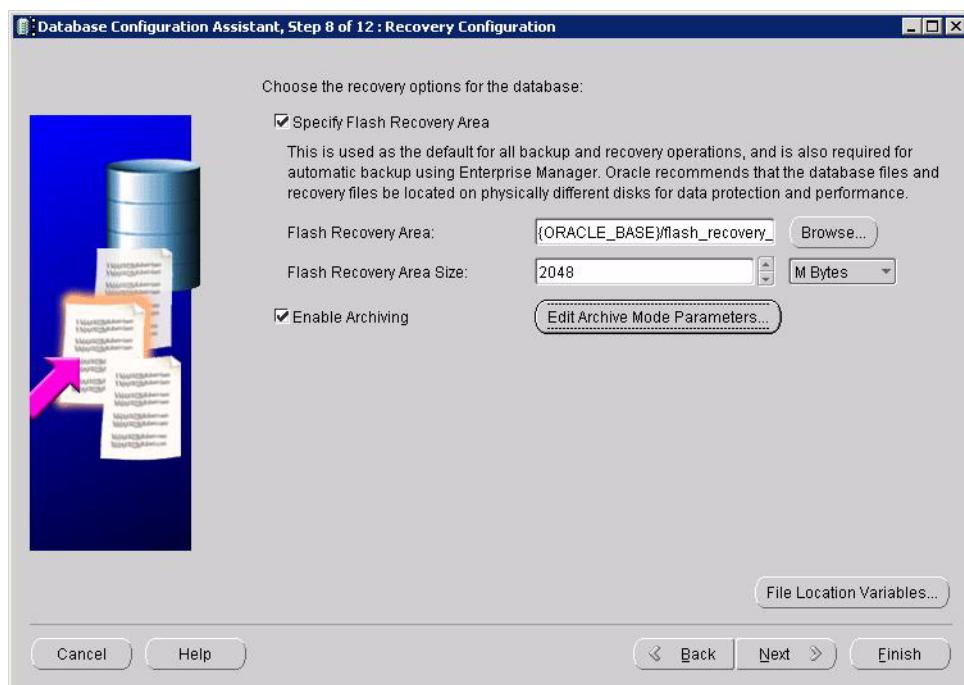
Select any of the database templates or select New Database to create your own. FTPC does not require a specific selection, but whether or not you select a template affects how you create the database in “[Create the Database](#)” on page 51.

Remember which template you select because you will want to pick the matching selection in “[Select the Database Memory](#)” on page 49.

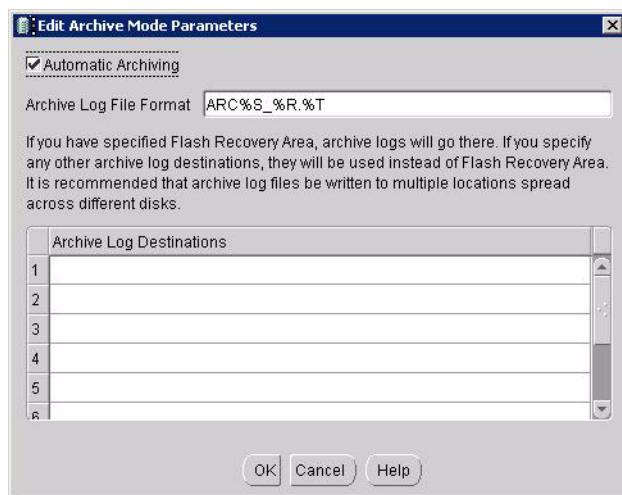
NOTE: Rockwell Automation recommends Transaction Processing for the Production database and Data Warehouse for the ODS database.

Figure 3-3: Database Template Selection**Set Recovery Configuration**

1. In the Recovery Configuration dialog, check “Enable Archiving.”

Figure 3-4: Oracle Configuration Assistant: Recovery Configuration Dialog

2. If you want to configure the location of your log files, click [Edit Archive Mode Parameters] and enter the archive log location(s).

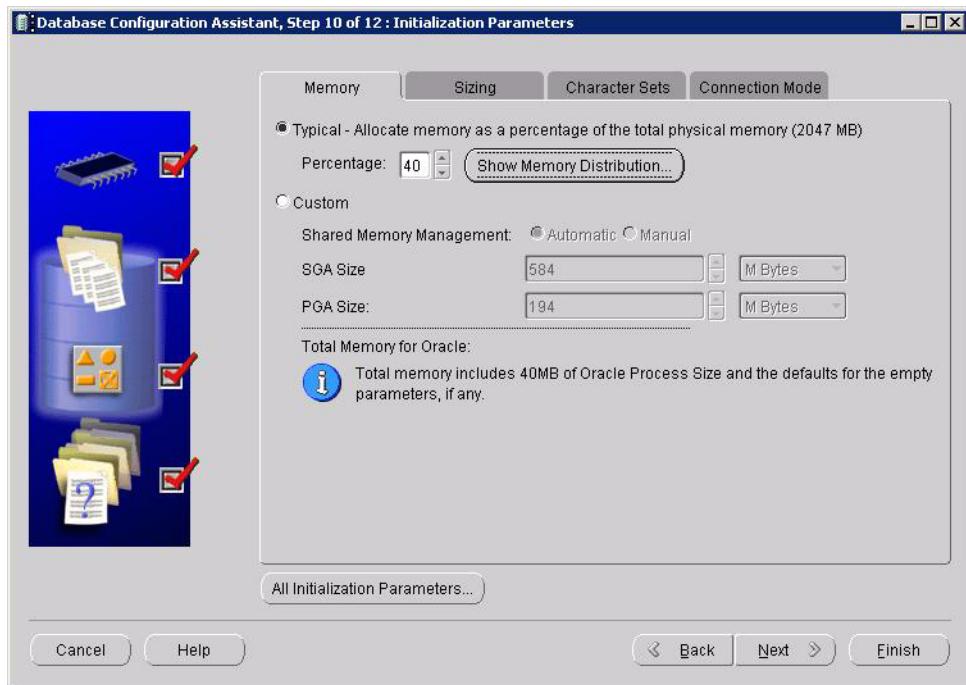
Figure 3-5: Edit Archive Mode Parameters Dialog

Select the Database Memory

In the Database Configuration Assistant: Initialization Parameters screen, Memory tab, customize the database configuration or select one of the following typical configurations for the database. Be sure this selection corresponds to the template you chose in “[Select the Database Template](#)” on page 47.

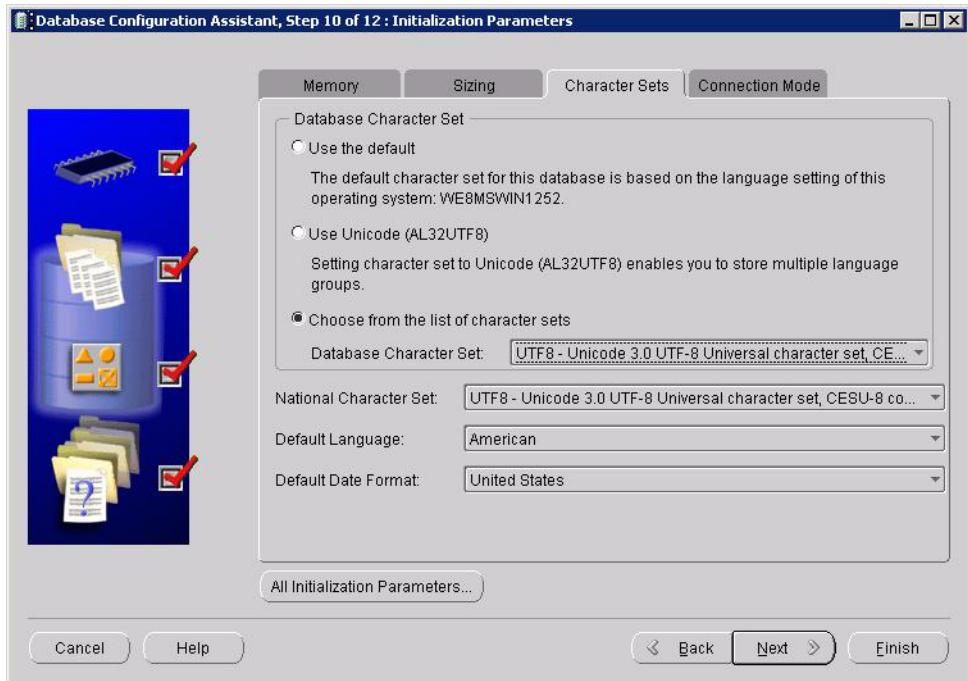
Configure the Database Environment

To configure your database instances to use the appropriate processing, select the *Typical* configuration and enter the memory percentage that is required for your environment.

Figure 3-6: Memory Allocation

Select the Character Set

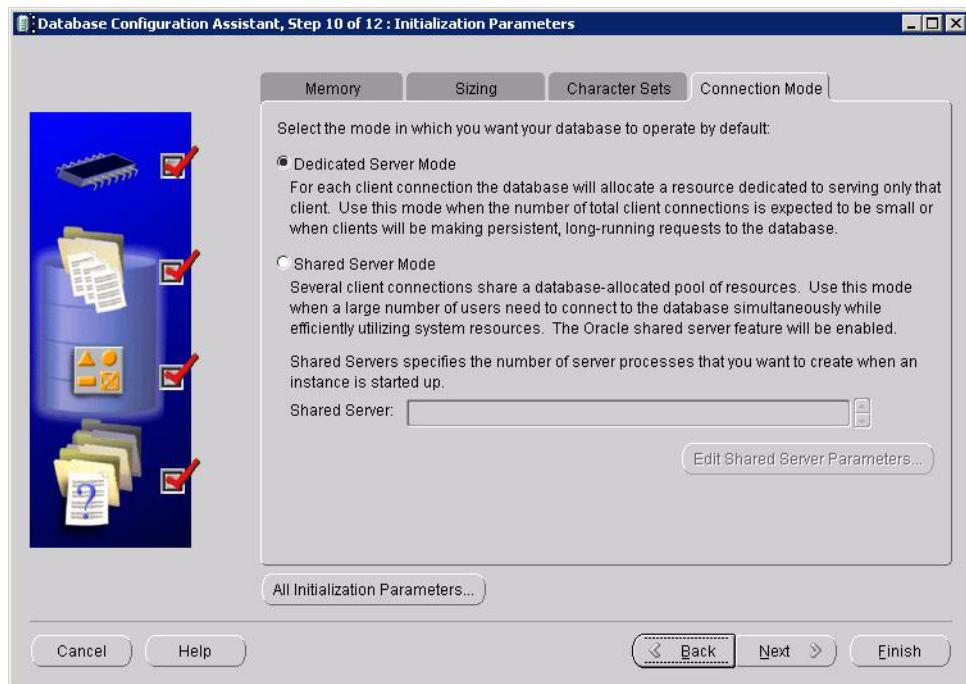
In the Database Configuration Assistant: Initialization Parameters dialog, Character Sets tab, select *UTF8* for both the List of Character Sets and National Character Sets attributes, as shown in Fig. 3-7.

Figure 3-7: Oracle Database Configuration Assistant: Database Information

Select the Connection Mode

In the Initialization Parameters dialog, select *Dedicated Server Mode*.

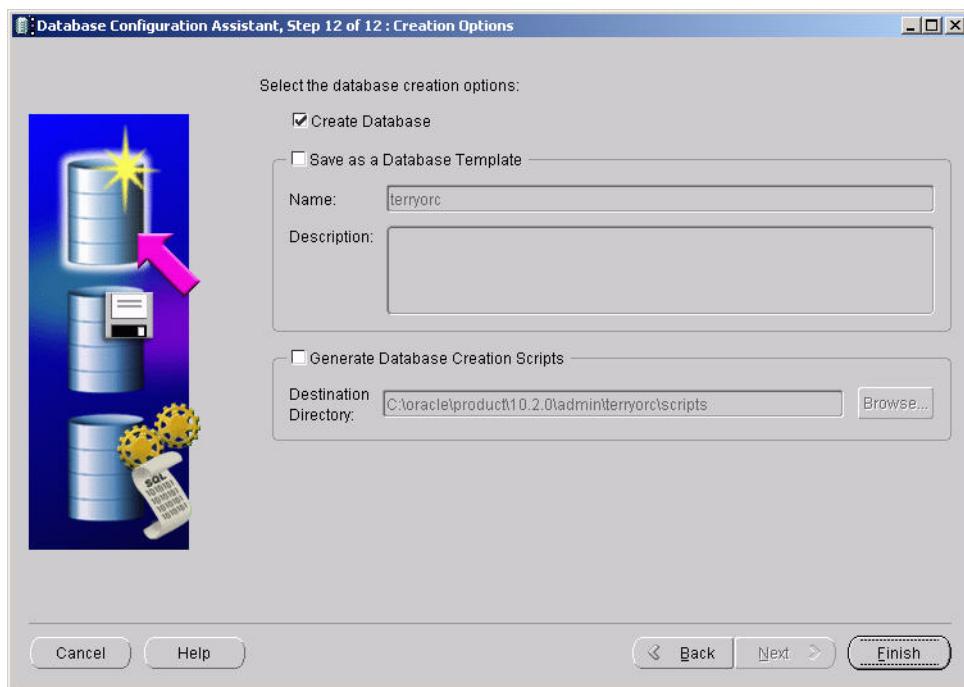
Figure 3-8: Database Mode



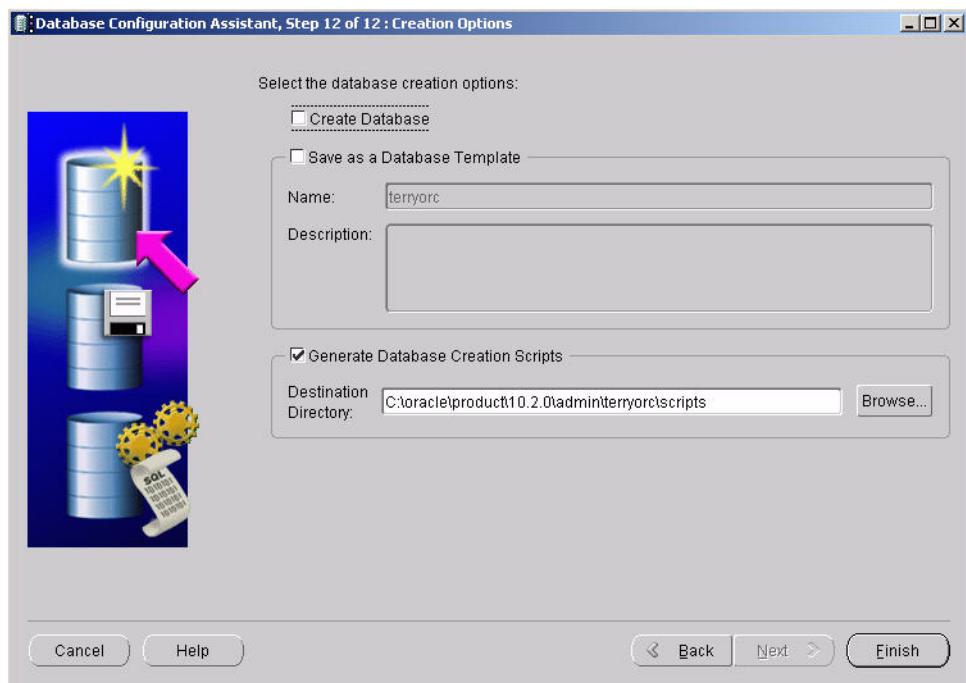
Create the Database

Once the database is configured, perform one of the following, depending on whether you selected a database template or created your own in “[Select the Database Template](#)” on page 47:

- ❑ If you selected a database template, check the Create Database checkbox, and then click [Finish], as shown in [Figure 3-9](#).

Figure 3-9: Oracle Creation Assistant: Creation Options

- ❑ If you did not select a database template, you must run database scripts to manually create the database. Do not create the database from the Oracle Creation Assistant.
 - a. Uncheck the Create Database checkbox, as shown in Fig. 3-10.
 - b. Check Generate Database Creation Scripts.
 - c. Enter or browse for a destination directory, and then click [Finish].

Figure 3-10: Manually Create Database

- d. After creation, run the script,
`\oracle\admin\<database_name>\scripts\<database_name>.bat`, from the command line.

NOTE: After the database is created, make sure that the TNS Listener is created as well. If it has not been created, create it now. See your Oracle documentation for details.

Create the Tablespace

This section describes only those steps in which FTPC requires specific settings, not all configuration steps.

IMPORTANT: The configuration options involve decisions best made by your Oracle DBA. The person performing the configuration must have DBA privileges on the database server.

TIP: You can create separate tablespaces for different databases and then place them on separate drives for better performance.

Use an Oracle tool to create FTPC tablespaces with the size properties listed in [Table 3-1 on page 45](#). Once you determine the initial size for your tablespace, set

the tablespace to grow automatically in increments that are appropriate for your environment.

IMPORTANT: Do not create a tablespace name that starts with a number.

Table 3-2 Database Type and Size Requirements

Database	Size
Production	A minimum of 300 MB ^{ab}
Historical (ODS)	A minimum of 300 MB ^a

^aThe database will grow from here as the production data is gathered.

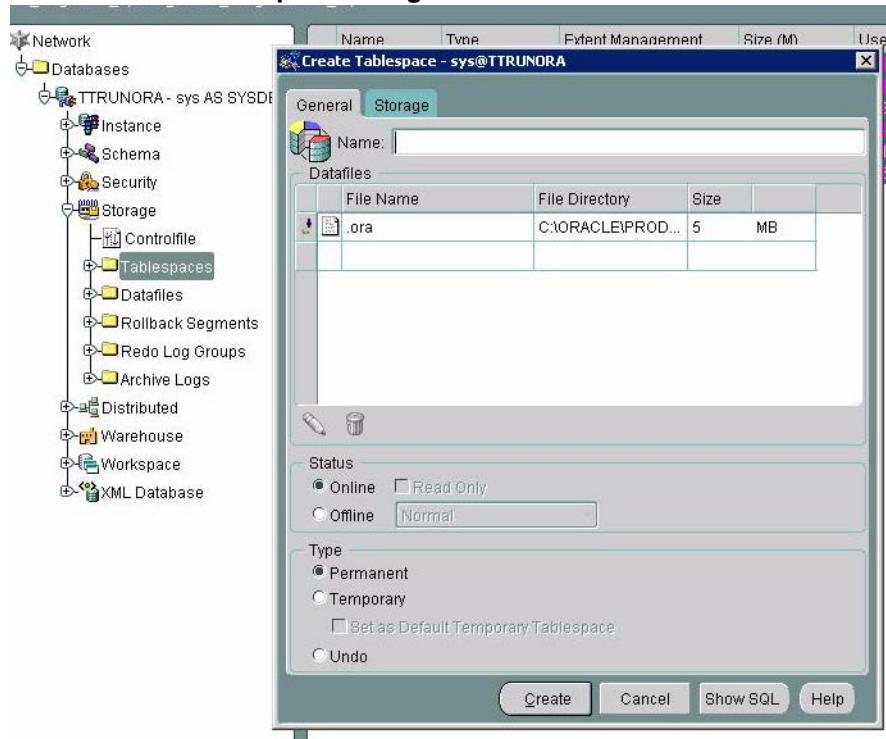
^bDepending on your site requirements, you may need to specify a larger size, such as 1 GB, for the database. If you are also using the FTPC Object Revision History feature, the database requires double the tablespace size of an application that does not use this feature.

In addition to the initial sizes, set the following properties for each database when creating the tablespaces. We have used example paths and dialogs from the Enterprise Manager Console.

1. In the Create Tablespace dialog, General tab:

Status: Check *Online* (the default).

Figure 3-11: Create Tablespace dialog > General tab

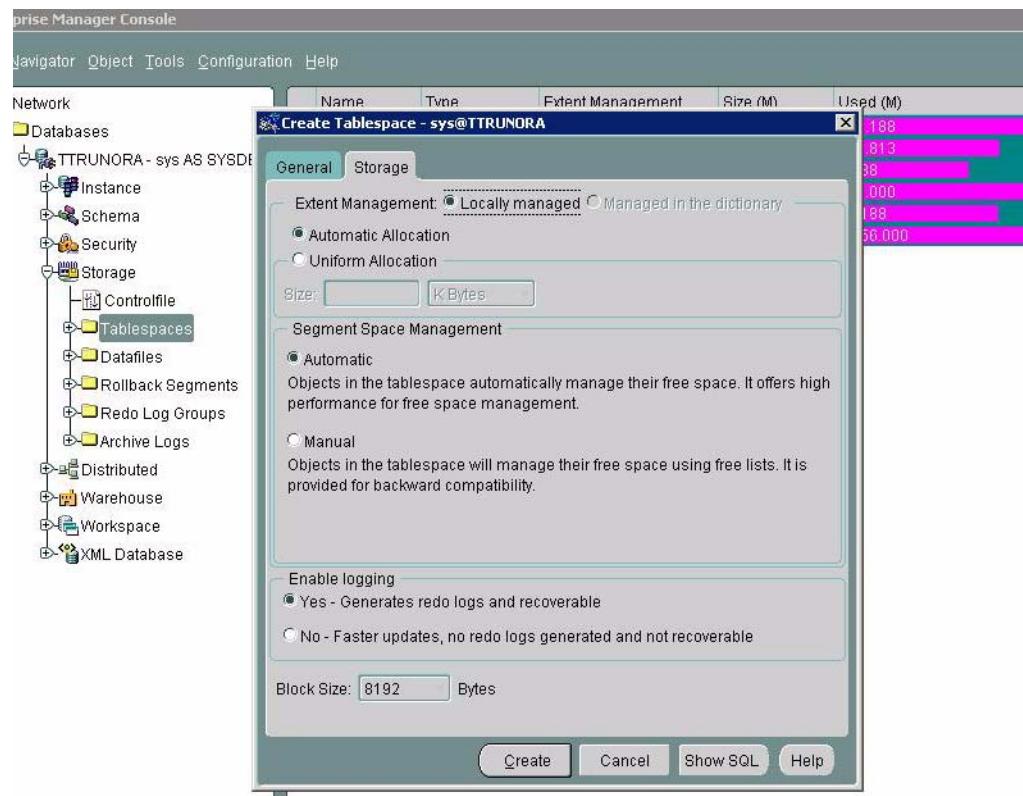


- 2.** In the Create Tablespace dialog, Storage tab, make the following selections:

- ▶ Check *Locally managed*.
- ▶ Check *Automatic Allocation*.

Note that the Object Revision History feature populates the audit tables and requires double the tablespace of an application that does not use this feature. See the *Configuring Database Logging* topic in the *FactoryTalk ProductionCentre Administrator User's Guide* for more information about logging options.

Figure 3-12: Create Tablespace > Storage tab



- 3.** Complete the configuration with your site requirements. FTPC has no other specific requirements.

Create User

The following section describes only the configuration steps that FTPC has specific requirements for.

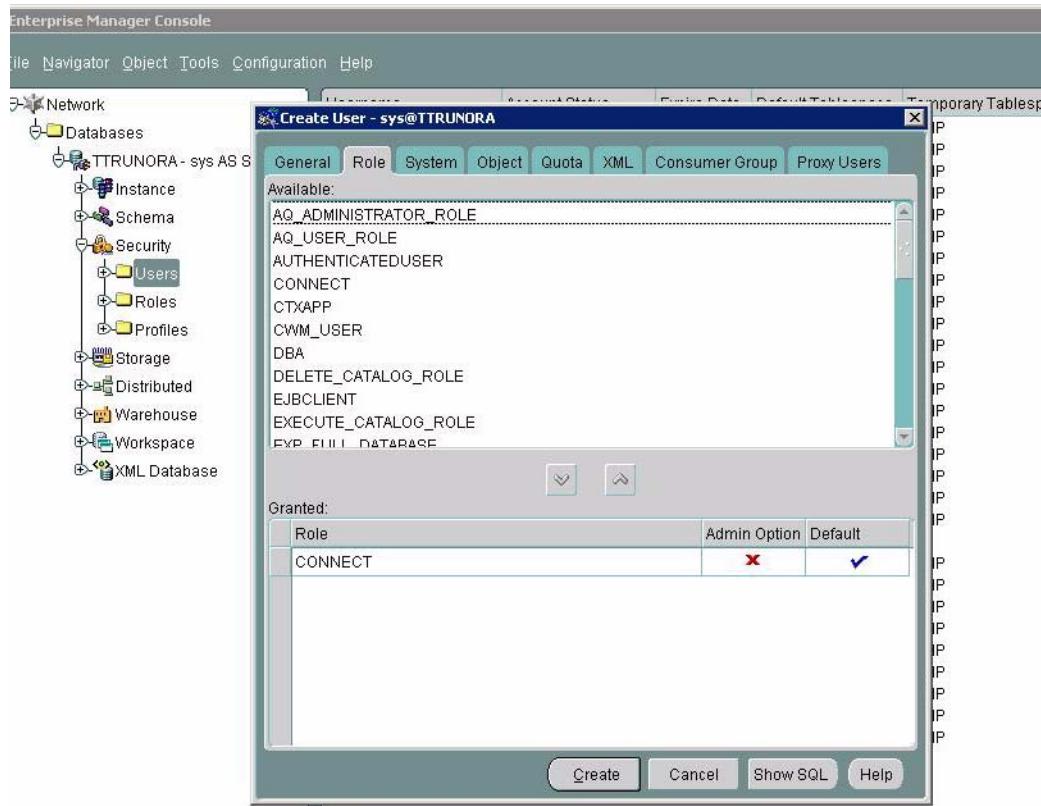
Create a user that allows the application and reporting servers to connect to the database server. The following settings enable the application and reporting servers to perform properly. Your site requirements determine the settings for all other properties.

IMPORTANT: Do not create a user that starts with a number.

Using Enterprise Manager Console, create a user with the following roles and privileges:

- In the Create User > General tab, perform the following:
 - ▶ Authentication: Select *Password*.
 - ▶ Status: Check *Unlocked*.
 - ▶ TableSpace: Specify the required table space for the user.
- In the Create User > Role tab, perform the following:
 - ▶ Select *Resource*.
 - ❖ FTPC has no requirement for the Admin Option privilege.
 - ❖ Grant the Default privilege to the *Resource* role.
 - ▶ Select *Connect*.
 - ❖ FTPC has no requirement for the Admin Option privilege.
 - ❖ Grant the Default privilege to the *Connect* role.

Figure 3-13: Enterprise Manager Console: Create User > Role tab



- In the Create User > System Privileges tab, perform the following:

- ▶ Grant the user the ALTER PROCEDURE system privilege.
 - ▶ Grant the user the CREATE TRIGGER system privilege.
 - ▶ Grant the user the CREATE TABLE system privilege.
 - ▶ Grant the user the CREATE PROCEDURE system privilege.
 - ▶ Grant the user the CREATE VIEW system privilege.
 - ▶ Grant the user the EXECUTE PROCEDURE system privilege.
 - ▶ Grant the user the UNLIMITED TABLESPACE system privilege.
- You must complete the user configuration. FTPC has no other specific requirements.

Consider Optional Tablespace Configuration

Consider the following information when you set up your tablespaces. When you export a snapshot from one database to another, you can ease the process by using identical tablespace names. For example, when you export your Production database snapshot to your development database, the process is easier if both databases are named MyProduction.

FTPC Administrator provide a database reorganization tool that allows you to assign logical groups of tables (e.g., fast growing, slow growing, indexes, etc.) to tablespaces that you create in the database(s) for this purpose. You can create the tablespaces now, and then after installation, assign them to logical groups. Refer to the *FactoryTalk ProductionCentre Administrator User's Guide* for more information.

Create a Local Net Service Name

You will need a local net service name for the application and reporting servers to connect to the database. You can follow your conventions for the name. Record the Local Net Service name in [Table 3-1 on page 45](#) for your reference.

Chapter

4

Oracle 11g Installation and Configuration

In this chapter

- **Install the Windows Operating System 60**
 - Install Required Patches 60
- **Install Oracle 60**
 - Installing the Database Software 61
- **Configure the Oracle Databases 70**
 - Configure a Listener 71
 - Create a Database 74
 - Create the Tablespaces 82
 - Create the User 86
 - Consider Optional Tablespace Configuration 90
 - Create a Local Net Service Name 90

This chapter describes the choices required by FTPC during an Oracle 11g product installation. This document also provides requirements, but not instructions, on how to create the databases that are used by FTPC. To complete the installation and configuration, refer to your Oracle documentation.

Oracle can run on any platform supported by Oracle, but the FTPC installer must be run on a Windows machine. See the installation documentation from your software provider regarding non-Windows database installations.

Install the Windows Operating System

If you will be installing the Oracle software on a Windows operating system, follow the database documentation instructions. Keep the following requirements in mind:

- You must use NTFS. The FAT filesystem is not supported.
- The installation user must be a member of the Administrator group on the machine where you will install Oracle.
- All servers and clients must be connected over the network using TCP/IP.

Install Required Patches

Refer to the *FactoryTalk ProductionCentre Supported Platforms Guide* for any required patches that must be installed with the Windows operating system.

Install Oracle

IMPORTANT: An Oracle DBA should perform the Oracle Server installation and configuration.

The installation steps covered in this section apply to installations when working with FTPC. Specific steps for configuring the FTPC databases are available in “[Configure the Oracle Databases](#)” on page 70.

Your databases must have enough free space to meet the needs of your applications. The amount of free space you need depends on many factors, including logging settings and the number of transactions. Consult Rockwell Automation Customer Support to estimate how much space you need.

You must be logged in as an Administrative user. See “[User Privileges](#)” on page 7 for user privilege information.

We recommend that you install the database, application server, and reporting server software on different machines. It is possible to install any combination of

the software, such as the database and application server software, on the same machine, but you will experience performance degradation.

You will need some database information when you connect the application and reporting servers to the database. You can use the following table to record the information as you configure your database.

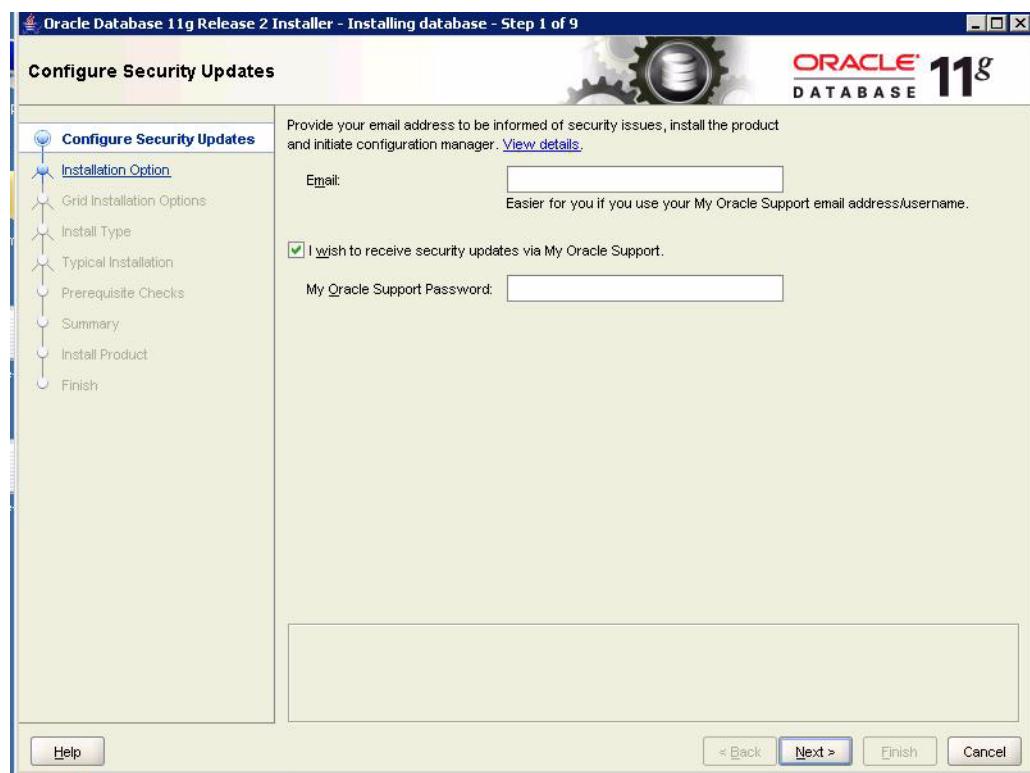
Table 4-1 Oracle Database Information

Properties	Production Database	Historical (ODS) Database
Server Host Name		
SID		
Listener Port		
Tablespace Name		
User Name		
User Password		
Local Net Service Name		
Note: Oracle System Identifier is also called database instance Service Name.		

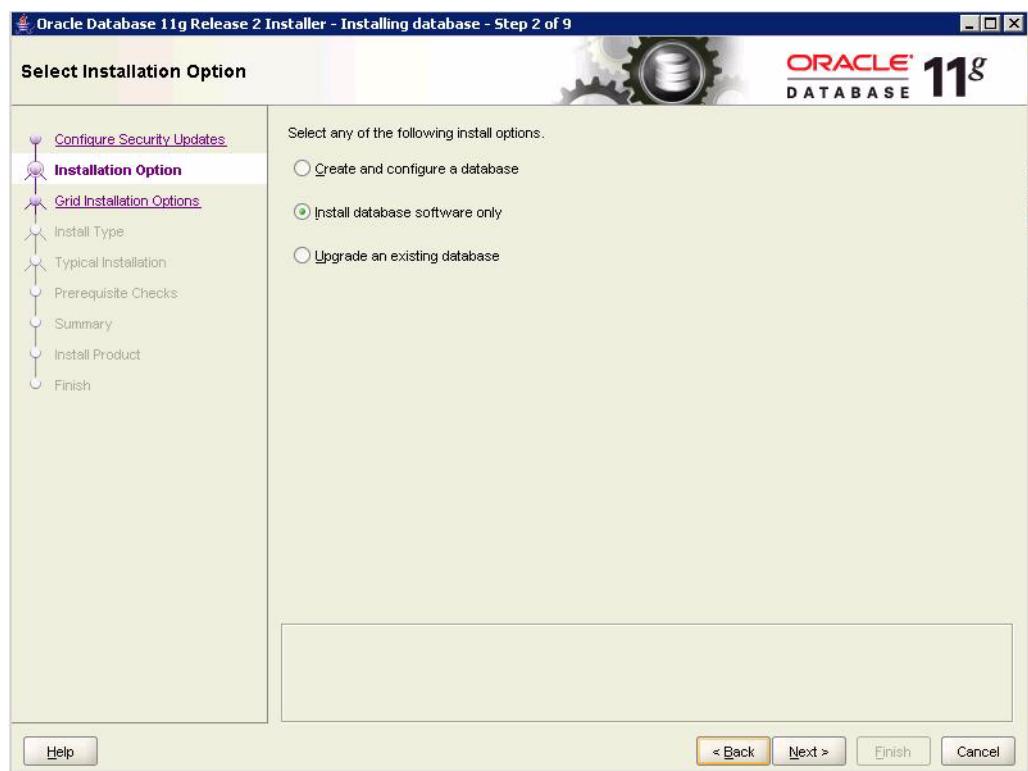
This document does **not** describe all the steps required to install Oracle. See your Oracle documentation for complete installation instructions.

Installing the Database Software

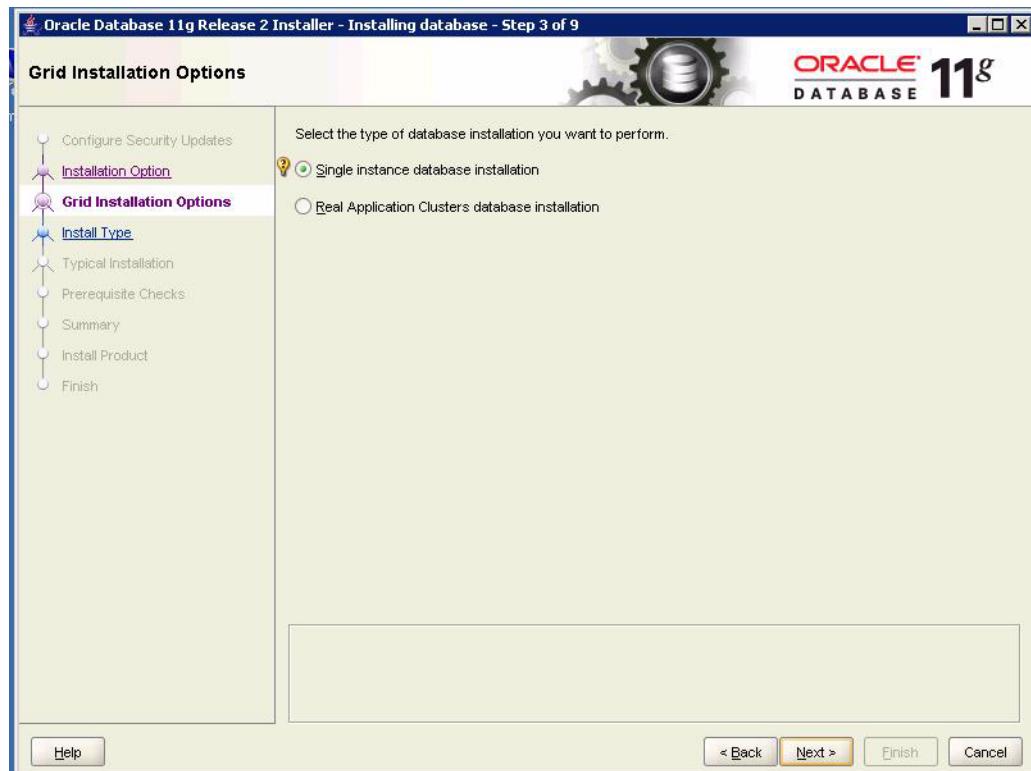
1. In the Configure Security Updates dialog, provide your email address in the space provided, and click [Next]. If you wish to receive security updates via My Oracle Support, click the checkbox provided, and enter your Oracle support password.

Figure 4-1: Configure Security Updates

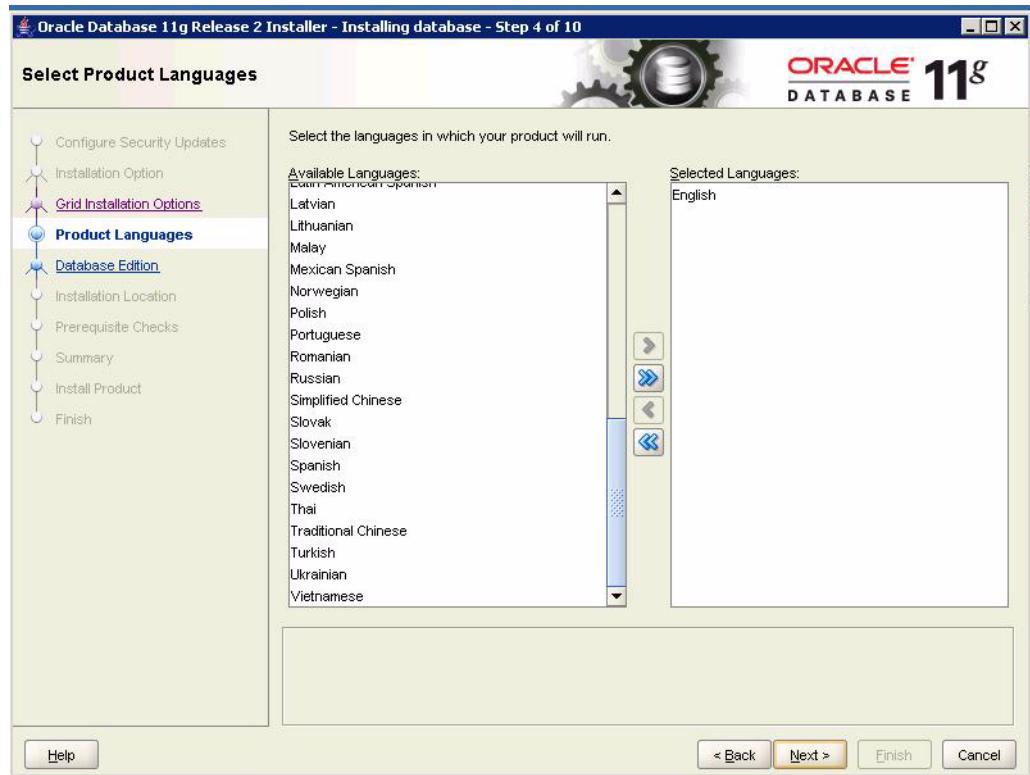
2. In the Select Installation Option dialog, select *Install database software only* and click [Next].

Figure 4-2: Oracle Installation Option

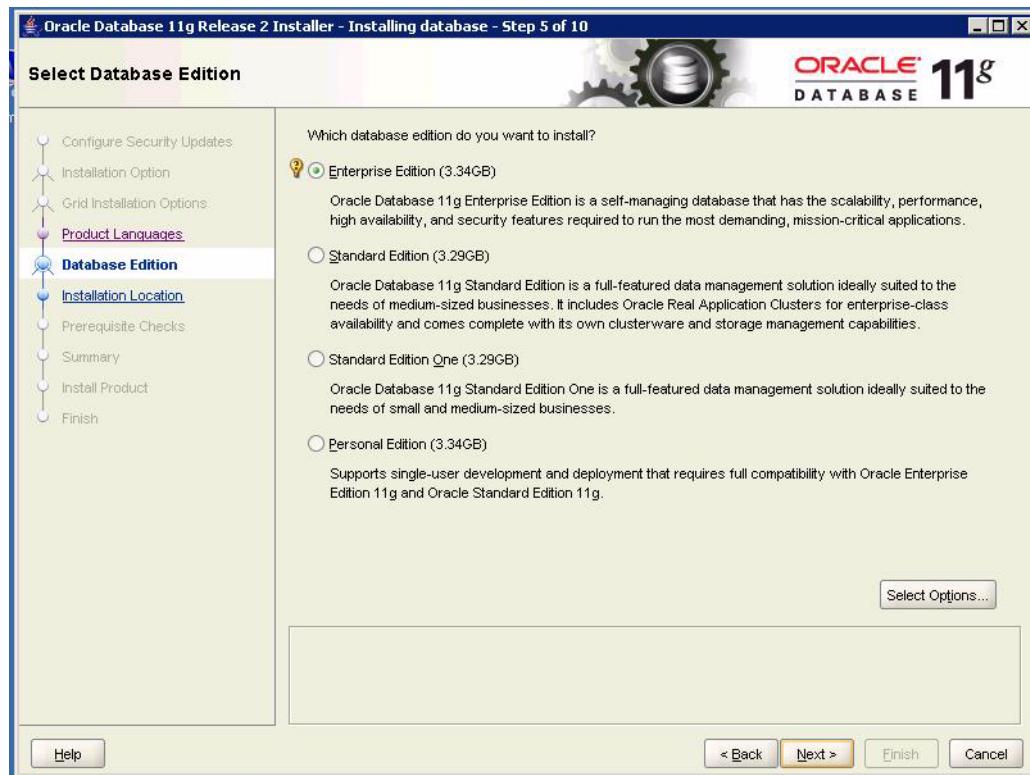
3. At the Grid Installation Options dialog, select *Single instance database installation*, then click [Next].

Figure 4-3: Grid Installation Options

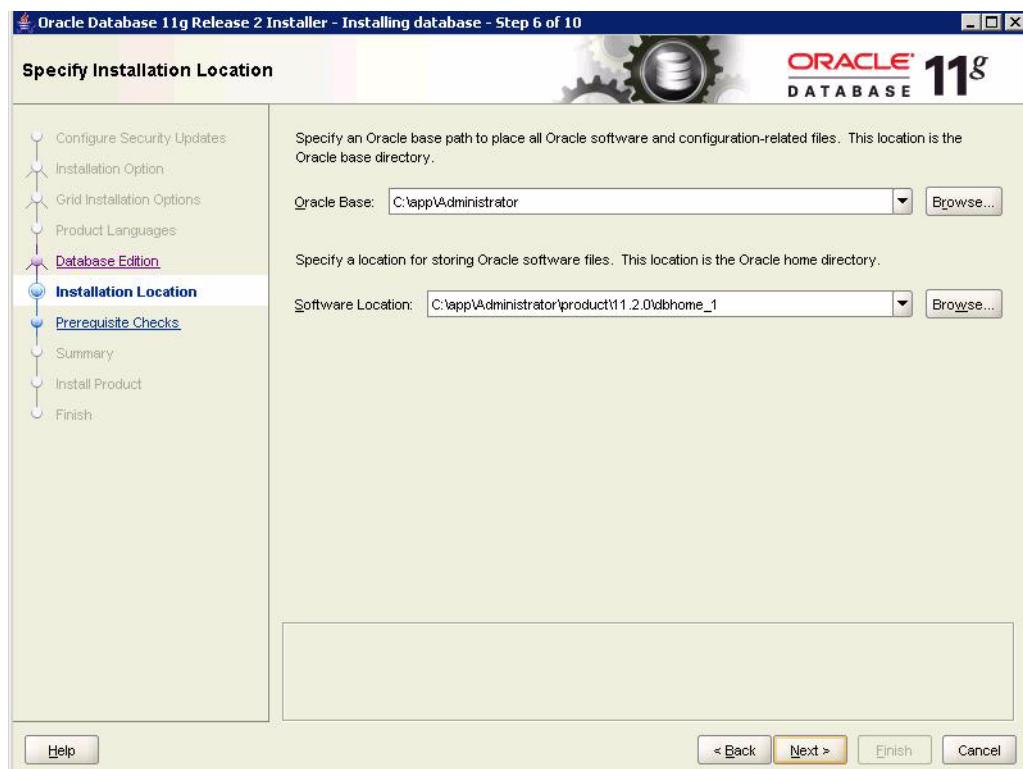
4. In the Select Product Languages dialog, select the language(s) you want your product to run in, then click [Next].

Figure 4-4: Select Product Languages

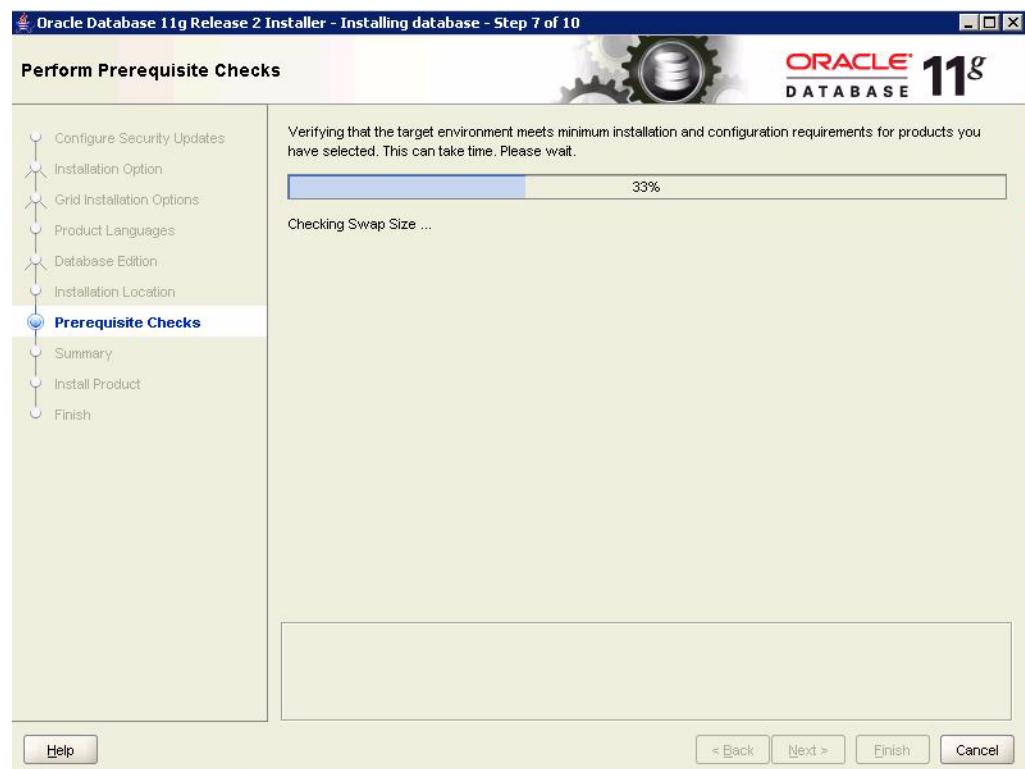
5. In the Select Database Edition dialog, choose the radio button for the database edition you wish to install and click [Next].

Figure 4-5: Select Database Edition

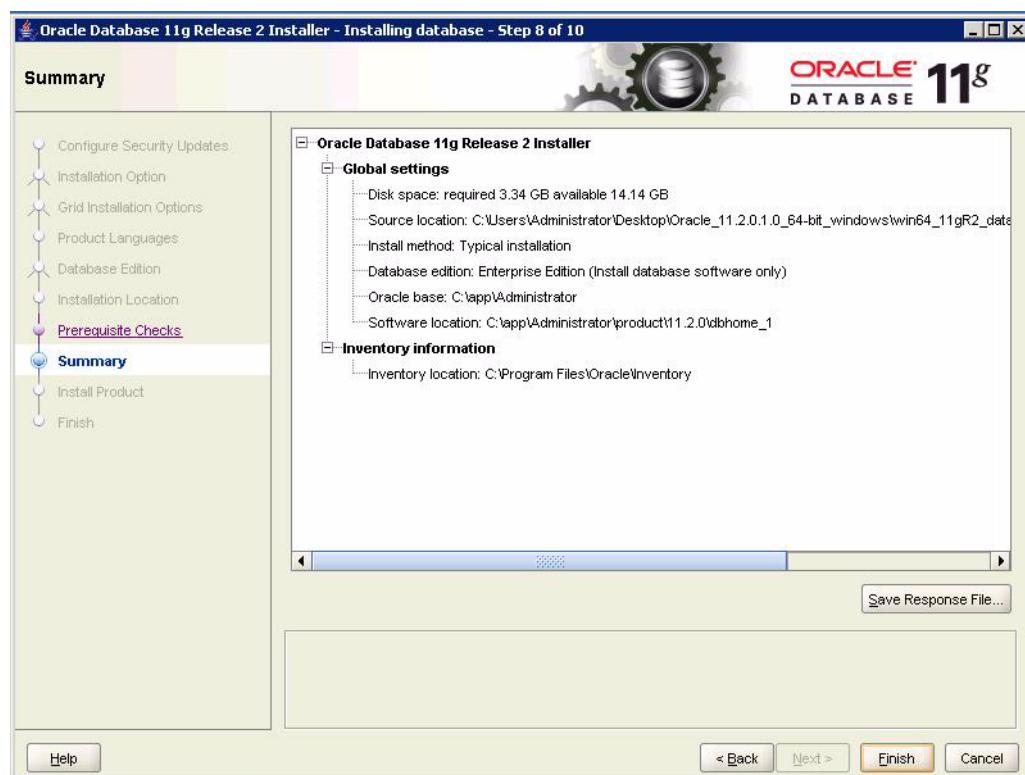
6. In the Specify Installation Location dialog, enter the directory where you want to place all Oracle software and configuration-related files, then click [Next].

Figure 4-6: Specify the Installation Location

The system verifies that the target environment meets the minimum installation and configuration requirements for the products you selected. This may take several minutes to complete.

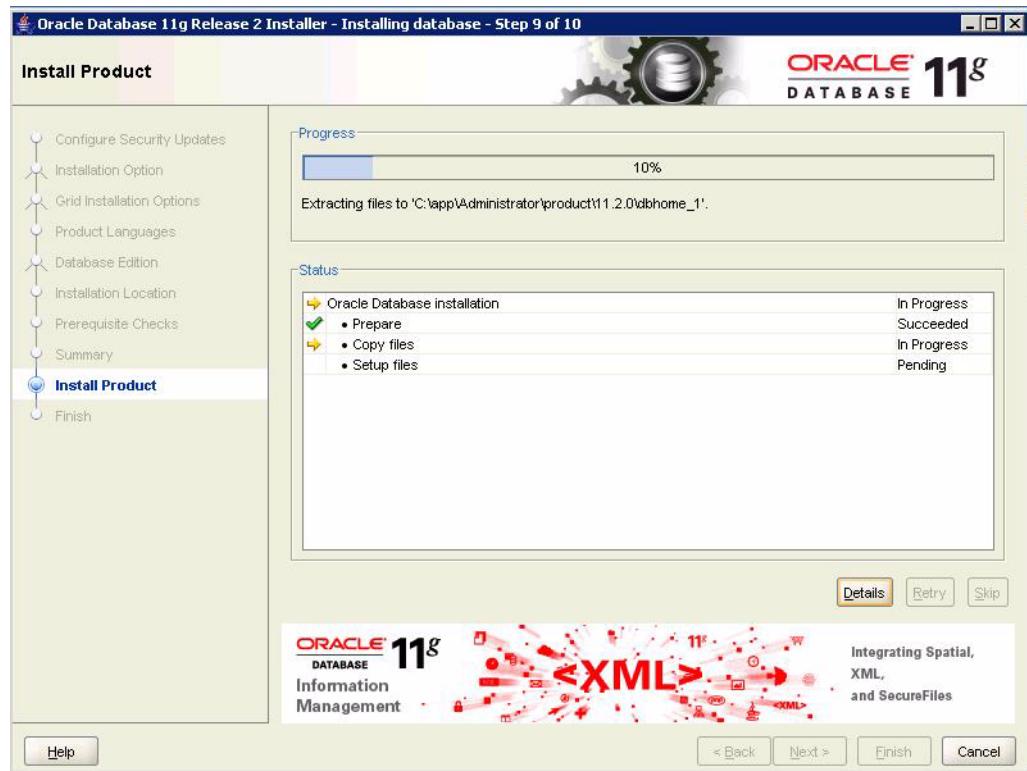
Figure 4-7: Perform Prerequisite Checks

7. In the Summary dialog, click [Finish] to complete the installation.

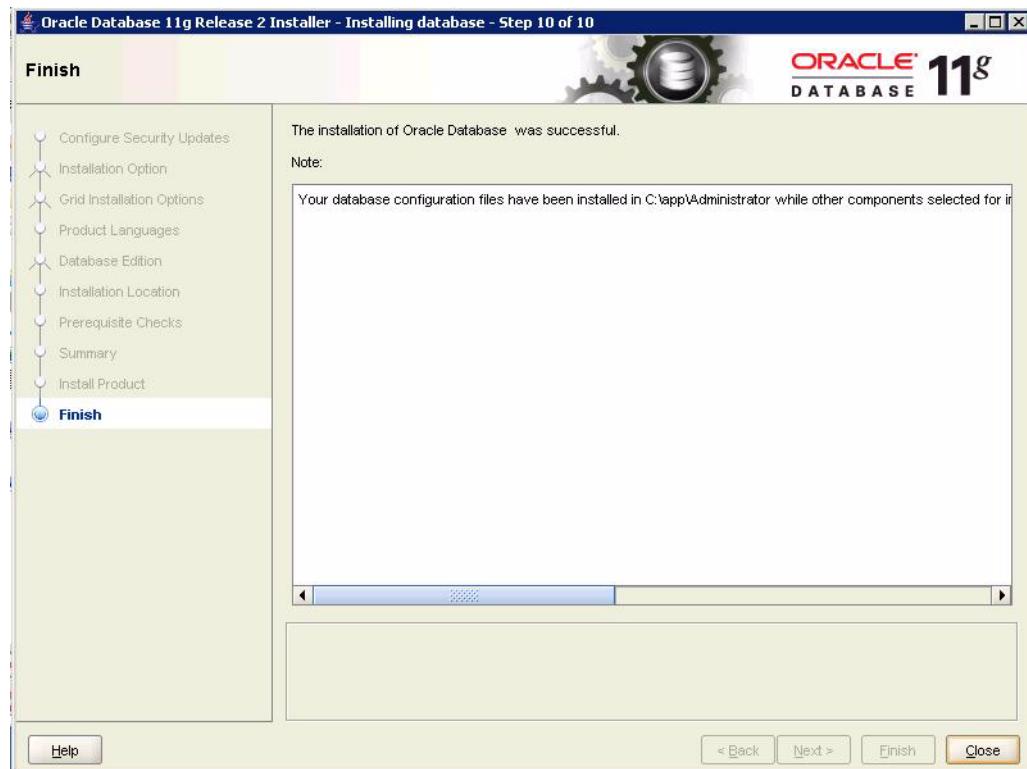
Figure 4-8: Summary

The database is installed. This may take some time to complete.

Figure 4-9: Install Product



8. If the database installation was successful, the Finish dialog appears. Click [Close] to finish the installation process.

Figure 4-10: Database Installation Complete

Configure the Oracle Databases

The following sections describe the configuration dialogs and settings required for configuring the FTPC databases. As you configure the databases, record the appropriate information in “[Oracle Database Information](#)” on page 61.

While the sections in this chapter cover the requirements for setting up your database environment, [Chapter 5, “Database Server Performance”](#) discusses configuration settings that may be helpful for optimizing your environment, depending on your site requirements. Review that chapter for suggestions on increasing performance.

The configuration steps that affect FTPC databases are described in detail in the following sections:

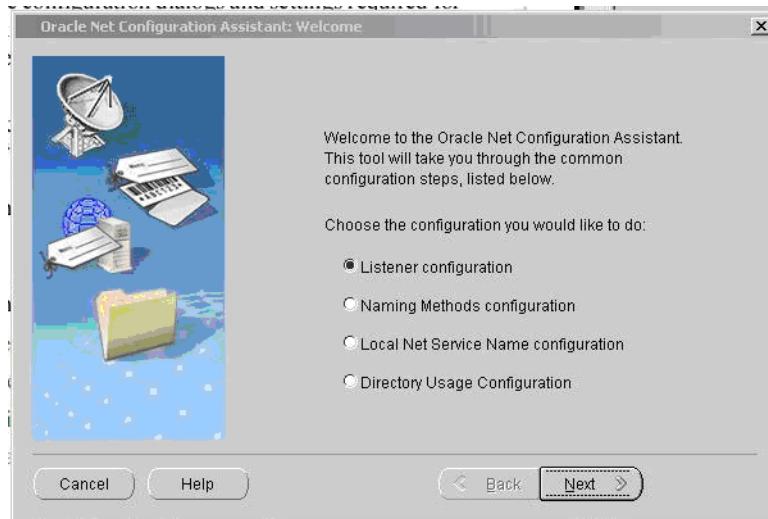
- “[Configure a Listener](#)” on page 71
- “[Create a Database](#)” on page 74
- “[Create the Tablespaces](#)” on page 82
- “[Create the User](#)” on page 86
- “[Consider Optional Tablespace Configuration](#)” on page 90
- “[Create a Local Net Service Name](#)” on page 90

Configure a Listener

Before you create your database, you must configure a listener. To do so, run Net Configuration Assistant by navigating to Start > <*Oracle_home*> > Configuration and Migration Tools > Net Configuration Assistant where <*Oracle_home*> is the directory location you specified in [step 6 on page 66](#).

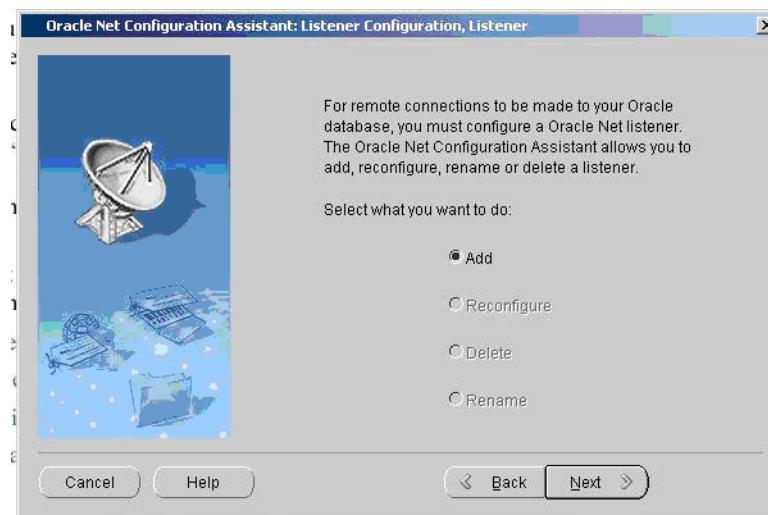
1. In the Net Configuration Assistant, choose **Listener configuration** and click [Next].

Figure 4-11: Listener Configuration Assistant Welcome

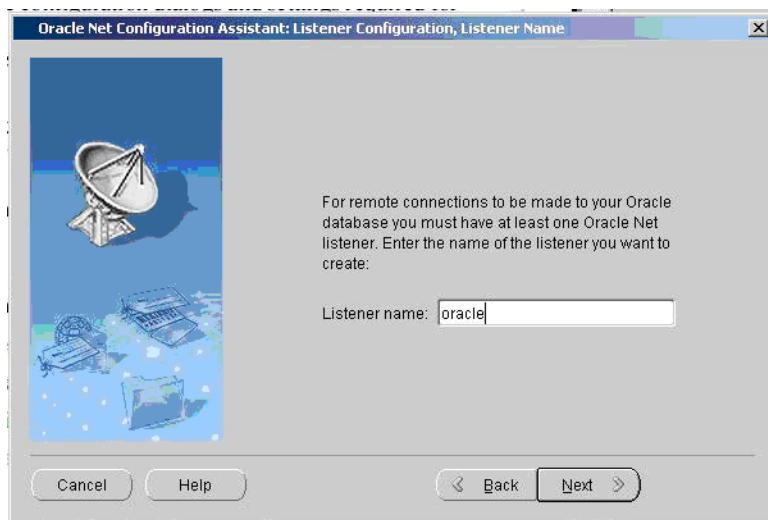


2. Select **Add** and click [Next].

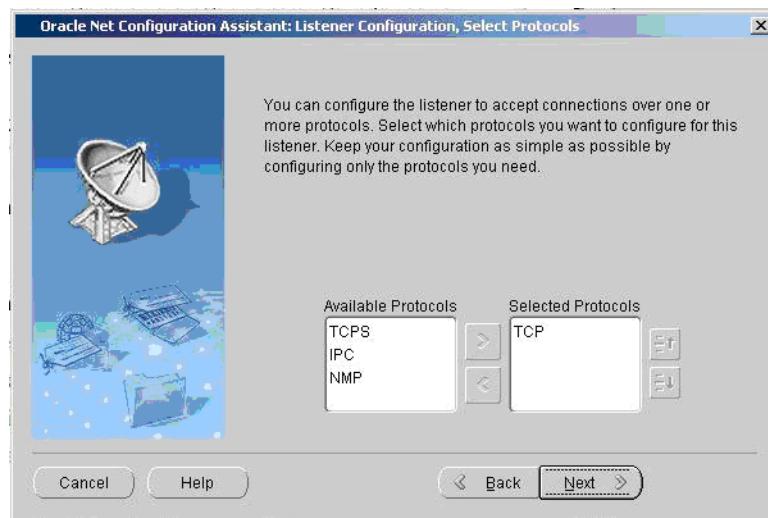
Figure 4-12: Select Type of Task



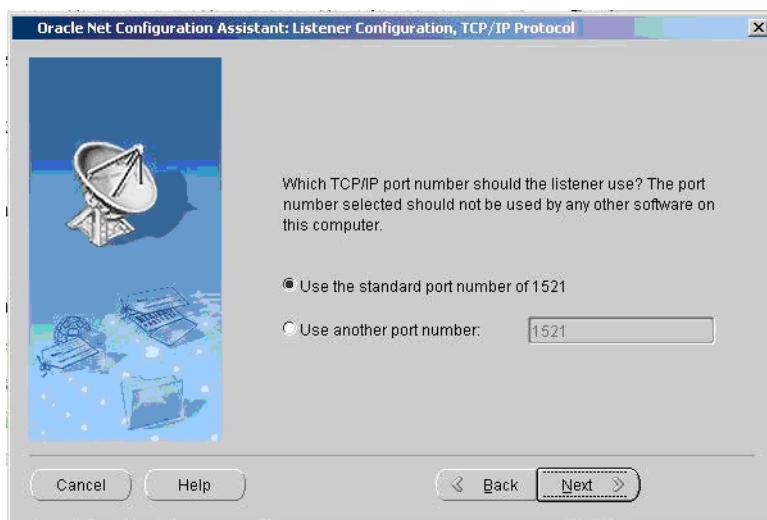
3. Enter a name for your listener, and click [Next].

Figure 4-13: Name Your Listener

4. Click [Next] to accept the defaults.

Figure 4-14: Select Listener Protocols

5. Click [Next] to accept the standard port number of 1521.

Figure 4-15: Listener Configuration, TCP/IP Protocol

- 6.** You have now finished configuring a listener. Select *No* to avoid configuring another listener, then click [Next].

Figure 4-16: Finish Configuring a Listener

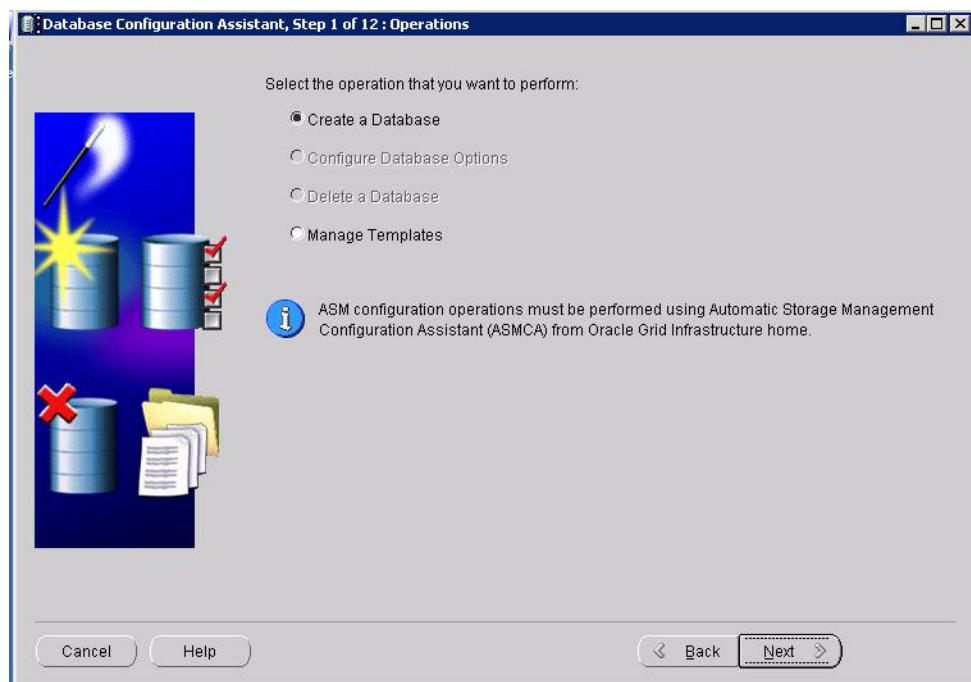
- 7.** Exit the Oracle Net Configuration Assistant by clicking [Cancel].

Figure 4-17: Exit the Oracle Net Configuration Assistant

Create a Database

To create a database, perform the following instructions.

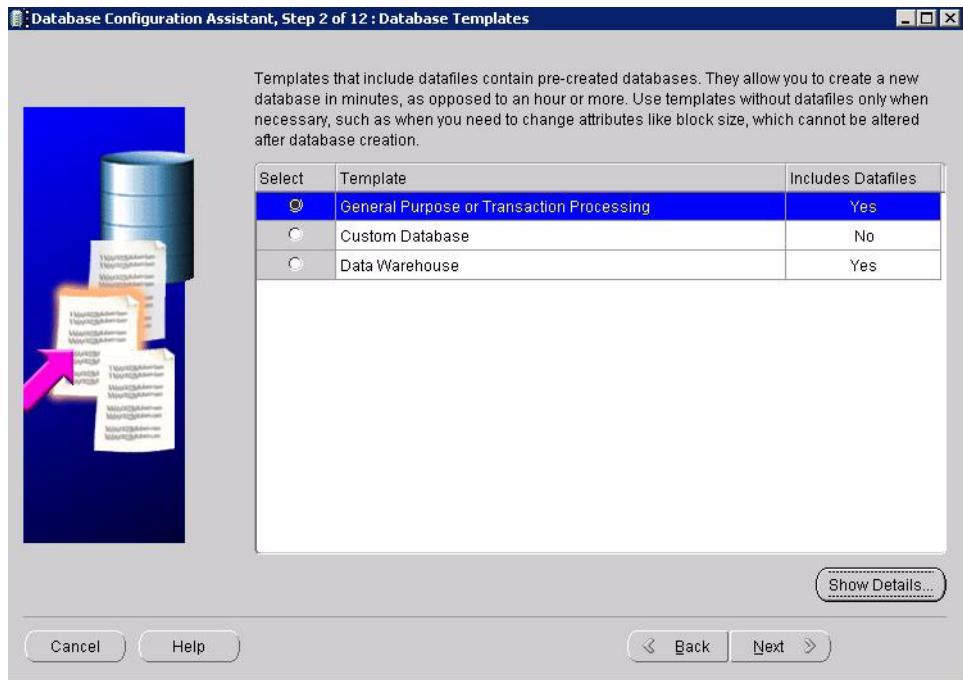
1. Navigate to All Programs > <*Oracle_home*> > Configuration and Migration Tools > Database Configuration Assistant where <*Oracle_home*> is the directory location you specified in [step 6 on page 66](#). Select the “Create a Database” radio button and click [Next].

Figure 4-18: Create a Database

2. Select a database template and click [Next].

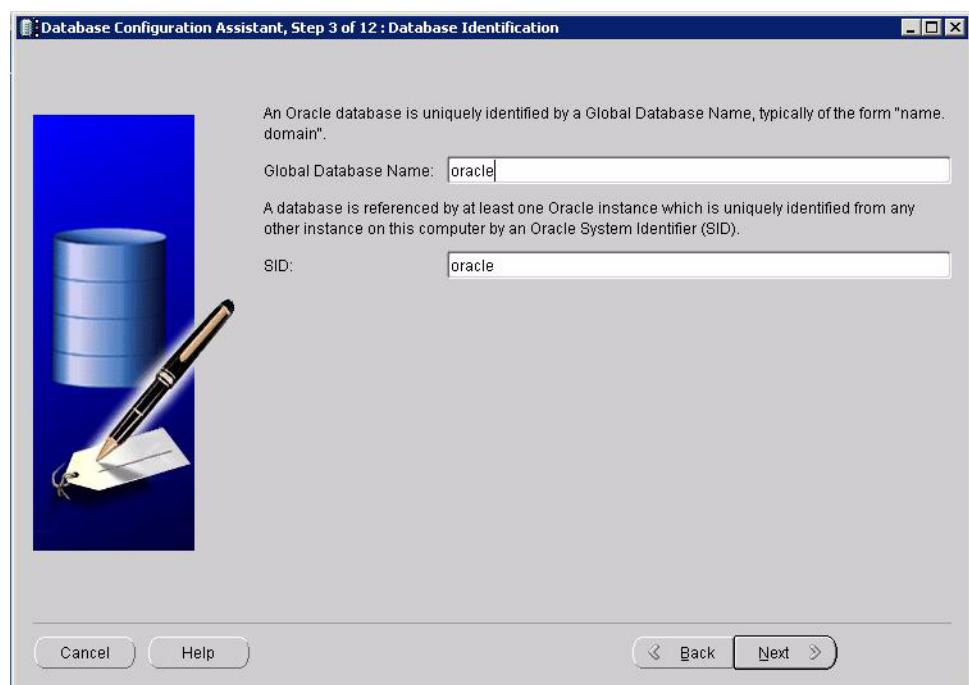
NOTE: Rockwell Automation recommends *General Purpose* or *Transaction Processing* for the Production database and *Data Warehouse* for the ODS database.

Figure 4-19: Select a Database Template



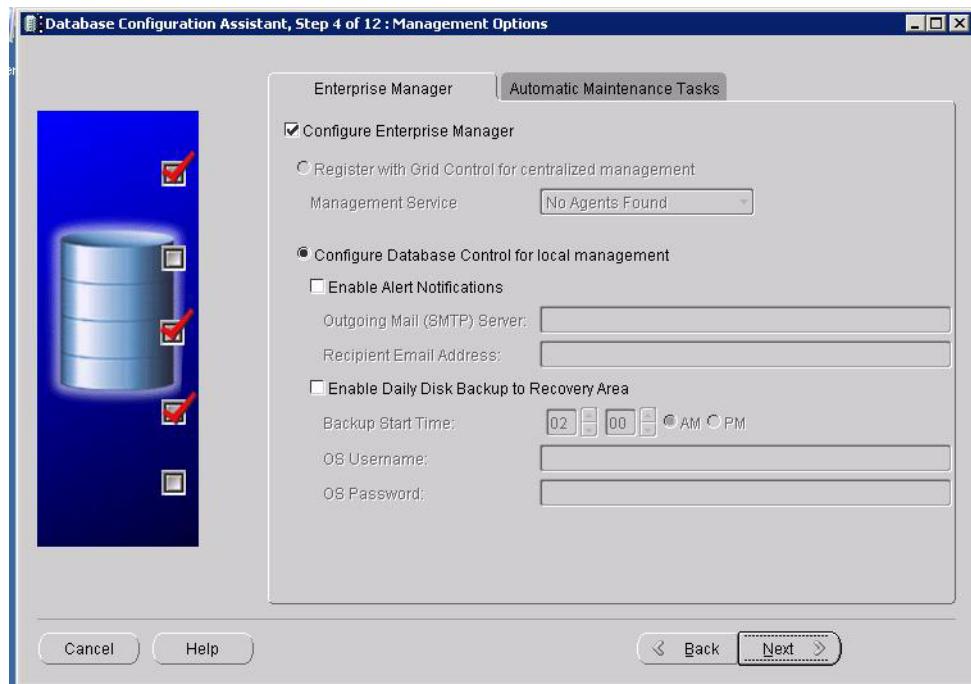
3. Enter a Global Database Name and SID, and click [Next].

Figure 4-20: Database Identification



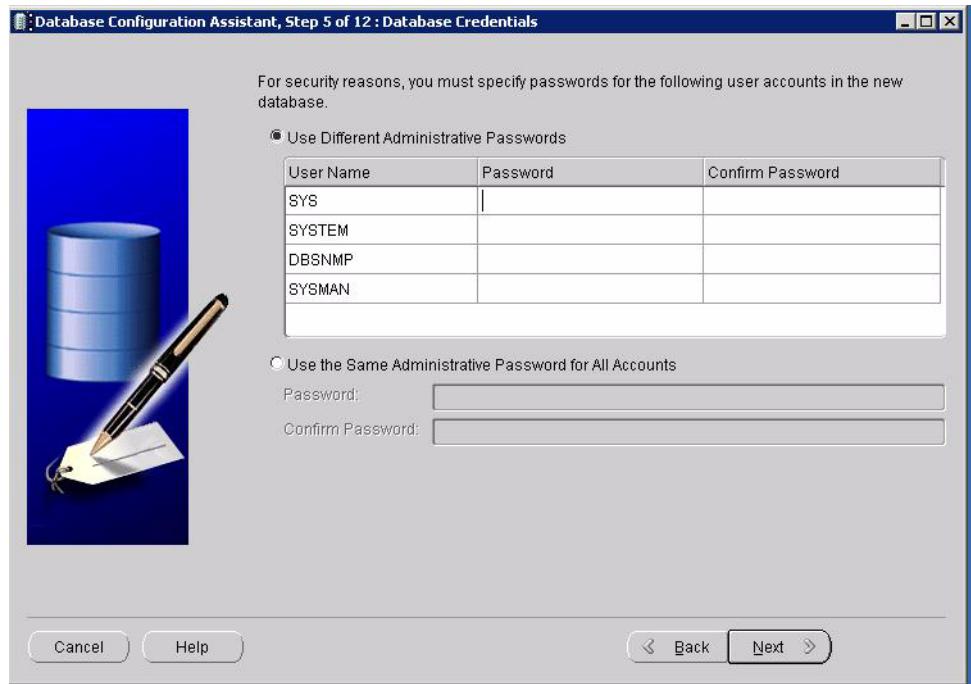
4. In Management Options, click [Next].

Figure 4-21: Management Options



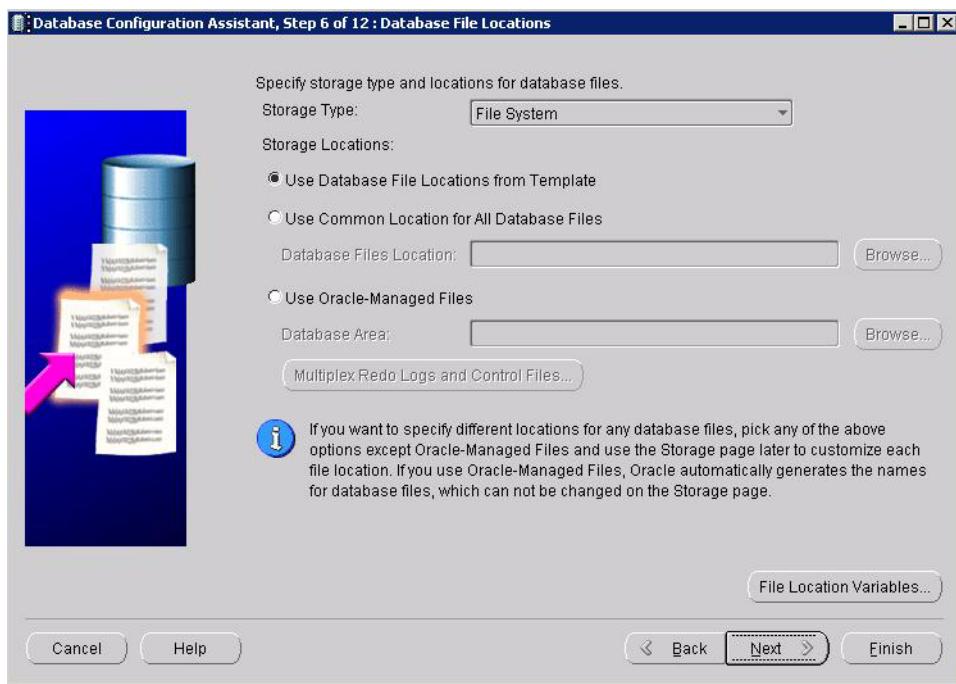
5. In the Database Credentials dialog, set your administrative passwords based on your organization's IT policy and click [Next]. Note these passwords, as you will need them for future steps.

Figure 4-22: Database Credentials



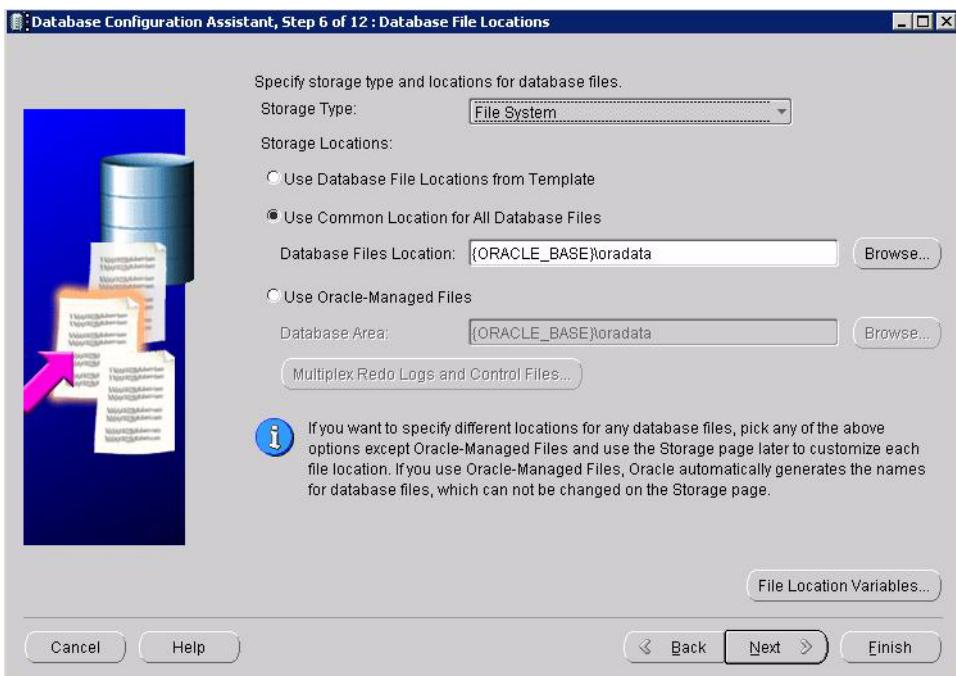
6. In the Database File Locations dialog, select the storage type you would like to use for the database and click [Next].

Figure 4-23: Storage Options



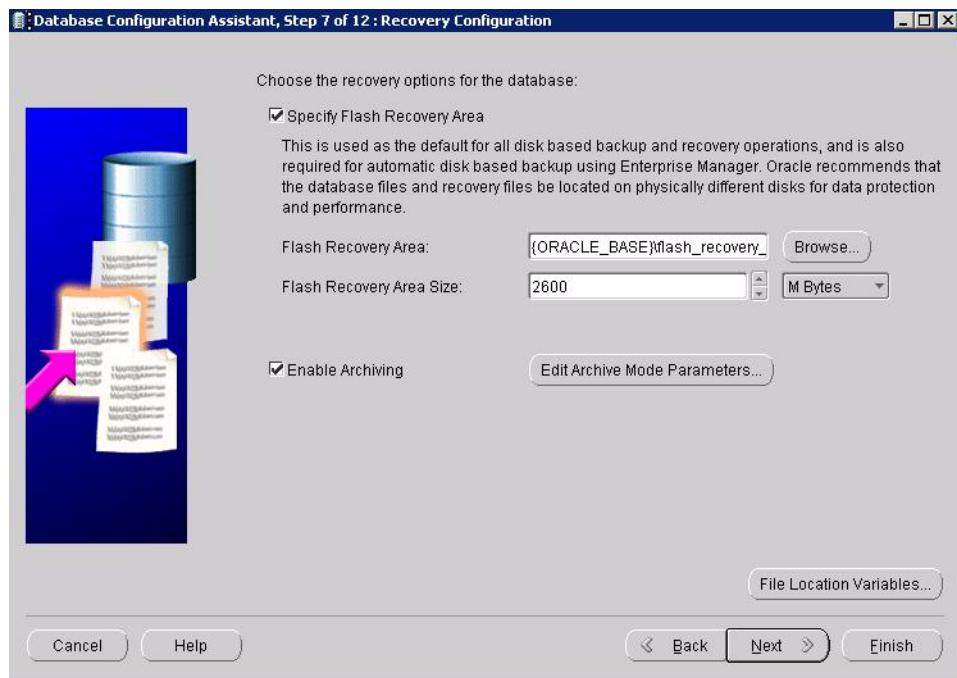
7. If you selected File System in the previous dialog, specify the location where the database files are to be created. Click [Next].

Figure 4-24: Database File Locations



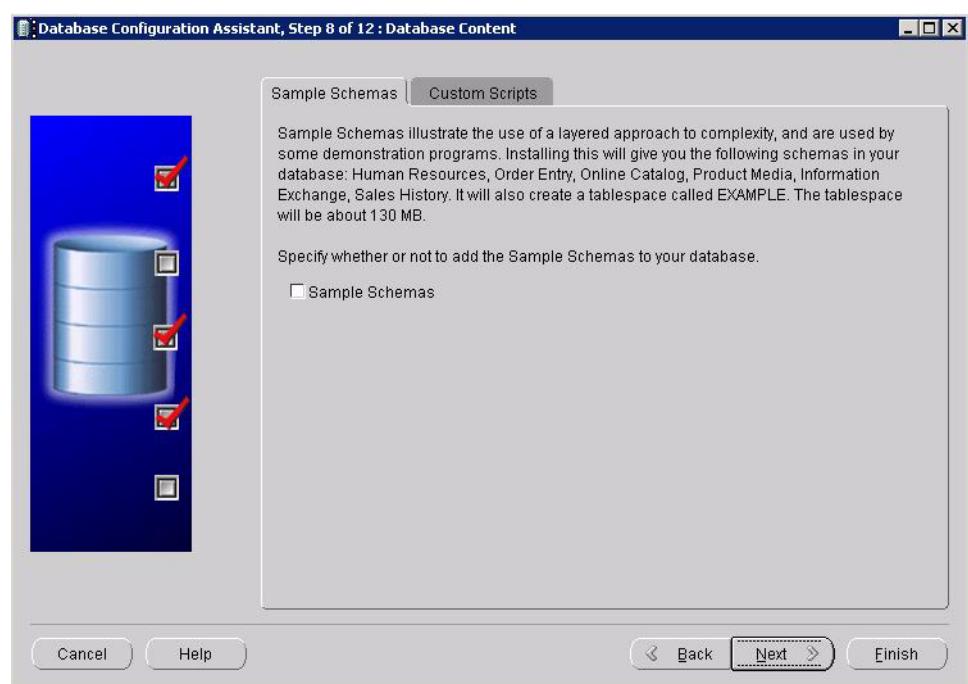
8. In the Recovery Configuration dialog, specify the recovery options you want for the database, then click [Next]. We recommend that you enable archiving.

Figure 4-25: Recovery Configuration



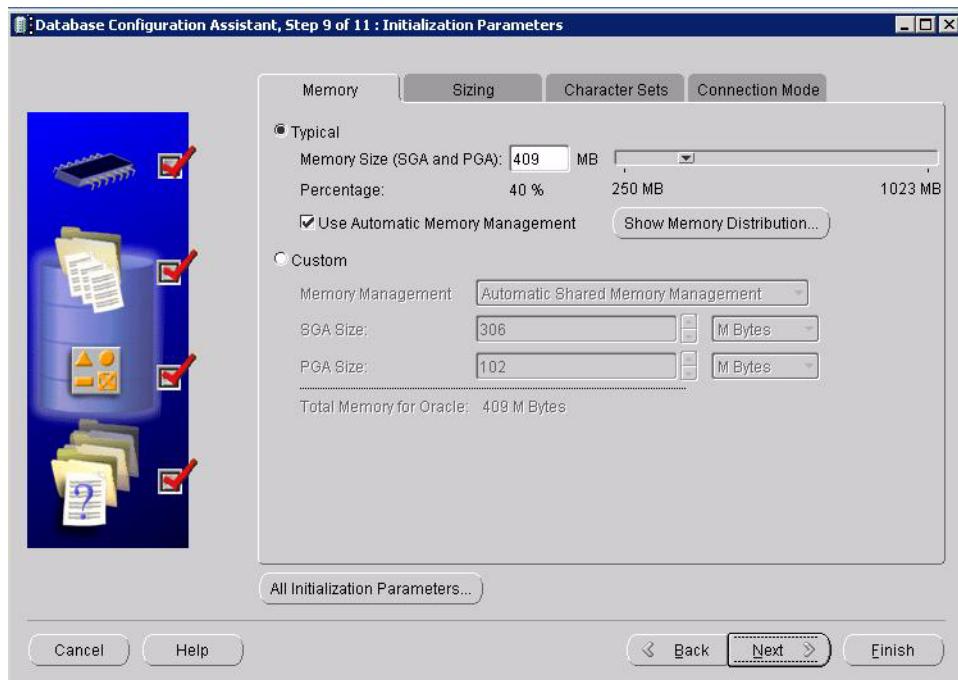
9. In the Database Content dialog, click [Next].

Figure 4-26: Database Content

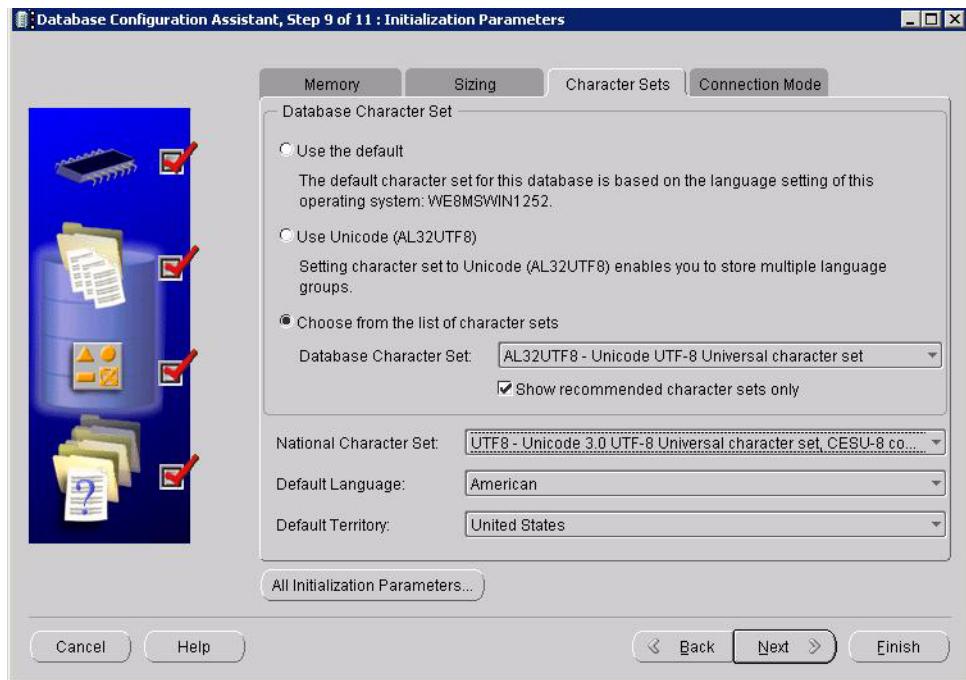


10. In the Initialization Parameters dialog, select the configuration of your choice or take the recommended settings, then choose the Character Sets tab.

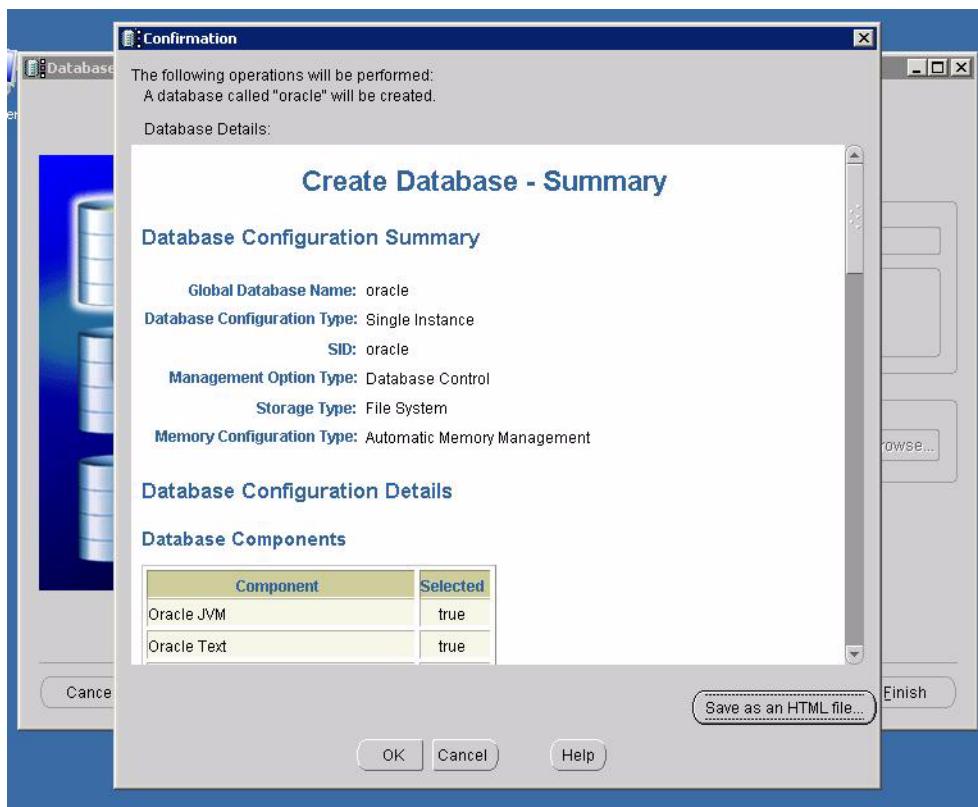
Figure 4-27: Initialization Parameters



11. Select the *Choose from the list of character sets* radio button. Ensure that **AL32UTF8 - Unicode UTF - 8 Universal character set** is selected, that **National Character Set** has “**UTF8 - Unicode 3.0 UTF-8 Universal character set, CESU-8 co...**” selected, then click [Finish].

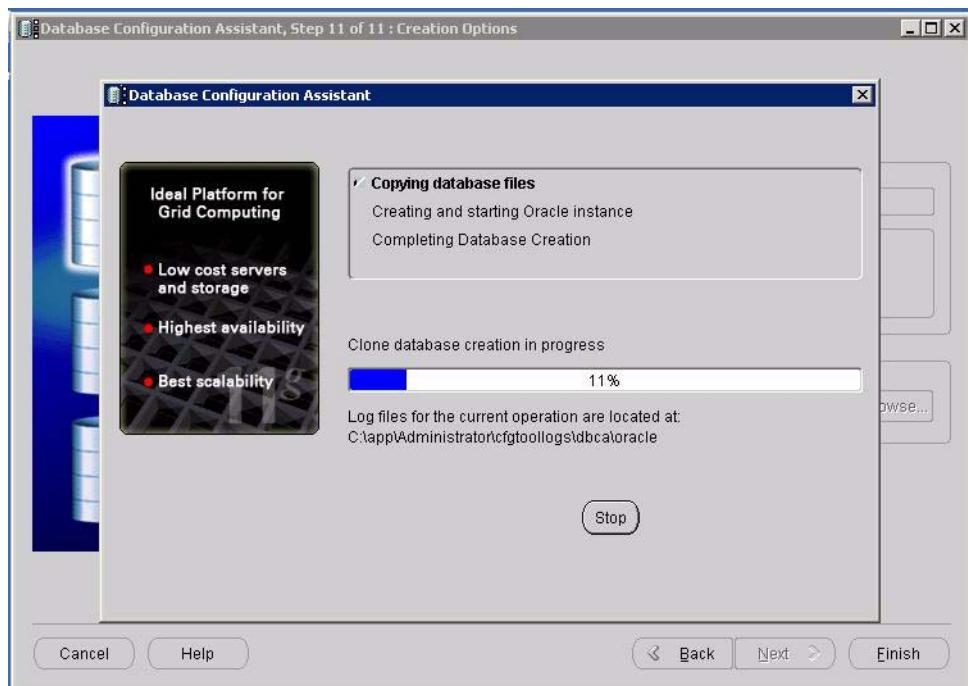
Figure 4-28: Character Sets

12. In the Confirmation dialog, click [OK].

Figure 4-29: Database Creation Confirmation

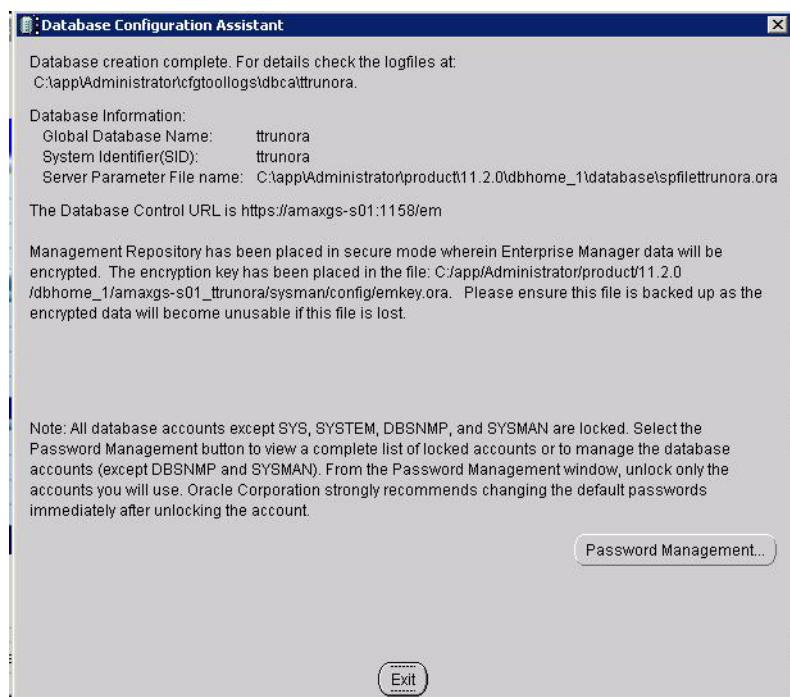
The database configuration assistant creates a database with the configuration parameters you specified.

Figure 4-30: Database Configuration Assistant



- When the database creation is complete, the following screen appears. Note the Database Control URL, as you will need it for future steps. Click [Exit] to exit the database configuration assistant.

Figure 4-31: Database Creation Complete



Create the Tablespaces

You must now create the tablespaces in the database you just created. To do so, perform the following steps.

1. In a web browser, enter the Database Control URL you noted earlier and log on as SYSTEM, with the corresponding password.

Figure 4-32: Database Control Login Page

ORACLE Enterprise Manager 11g
Database Control
Login

* User Name
 * Password
 Connect As Normal

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 Unauthorized access is strictly prohibited.

2. Select the Server tab and then, under the Storage heading, select *Tablespaces*.

Figure 4-33: Server Tab

ORACLE Enterprise Manager 11g
Database Control

Database Instance: oracle

Home Performance Availability **Server** Schema Data Movement Software and Support

Storage
[Control Files](#)
[Tablespaces](#)
[Temporary Tablespace Groups](#)
[Datafiles](#)
[Rollback Segments](#)
[Redo Log Groups](#)
[Archive Logs](#)
[Migrate to ASM](#)
[Make Tablespace Locally Managed](#)

Database Configuration
[Memory Advisors](#)
[Automatic Undo Management](#)
[Initialization Parameters](#)
[View Database Feature Usage](#)

Statistics Management
[Automatic Workload Repository](#)
[AWR Baselines](#)

Resource Manager
[Getting Started](#)
[Consumer Groups](#)
[Consumer Group Mappings](#)
[Plans](#)
[Settings](#)
[Statistics](#)

Query Optimizer
[Manage Optimizer Statistics](#)
[SQL Plan Control](#)

Change Database
[Add Instance](#)
[Delete Instance](#)

Enterprise Manager Administration
[Enterprise Manager Users](#)
[Notification Schedule](#)

Related Links
[Answers](#)
[Advisors Central](#)

3. In the Tablespaces screen, click [Create].

Figure 4-34: Create a Tablespace

The screenshot shows the Oracle Enterprise Manager 11g Database Control interface. The top navigation bar includes links for Setup, Preferences, Help, Logout, and Database. The main title is 'ORACLE Enterprise Manager 11g Database Control'. Below the title, it says 'Database Instance: oracle > Tablespaces' and 'Logged in As SYSTEM'. A search bar at the top right has 'Object Type: Tablespace' selected. The main content area is titled 'Tablespaces' and contains a table showing the following data:

Select	Name	Allocated Size (MB)	Space Used (MB)	Allocated Space Used(%)	Allocated Free Space(MB)	Status	Datafiles	Type	Extent Management	Segment Management
<input checked="" type="radio"/>	SYSAUX	579.9	552.2	95.2	27.6	✓	1	PERMANENT LOCAL	AUTO	
<input type="radio"/>	SYSTEM	690.0	681.6	98.8	8.4	✓	1	PERMANENT LOCAL	MANUAL	
<input type="radio"/>	TEMP	27.0	1.0	3.7	26.0	✓	1	TEMPORARY LOCAL	MANUAL	
<input type="radio"/>	UNDOTBS1	70.0	69.5	99.3	0.5	✓	1	UNDO LOCAL	MANUAL	
<input type="radio"/>	USERS	5.0	0.4	8.8	4.6	✓	1	PERMANENT LOCAL	AUTO	

Below the table, there are summary statistics: Total Allocated Size (MB) 1,371.9, Total Used (MB) 1,304.7, and Total Allocated Free Space (MB) 67.1. There are also status indicators: ✓ Online, ✘ Offline, and ⓘ Read Only.

4. Give the tablespace a name and click [Add] to add one or more files.

Figure 4-35: Give the Tablespace a Name

Information
Modification to the datafile will not take effect until you click "OK" button.

General **Storage**

* Name

Extent Management	Type	Status
<input checked="" type="radio"/> Locally Managed <input type="radio"/> Dictionary Managed	<input checked="" type="radio"/> Permanent <input type="checkbox"/> Set as default permanent tablespace <input type="checkbox"/> Encryption Encryption Options <input type="radio"/> Temporary <input type="checkbox"/> Set as default temporary tablespace <input type="radio"/> Undo Undo Retention Guarantee <input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Read Write <input type="radio"/> Read Only <input type="radio"/> Offline

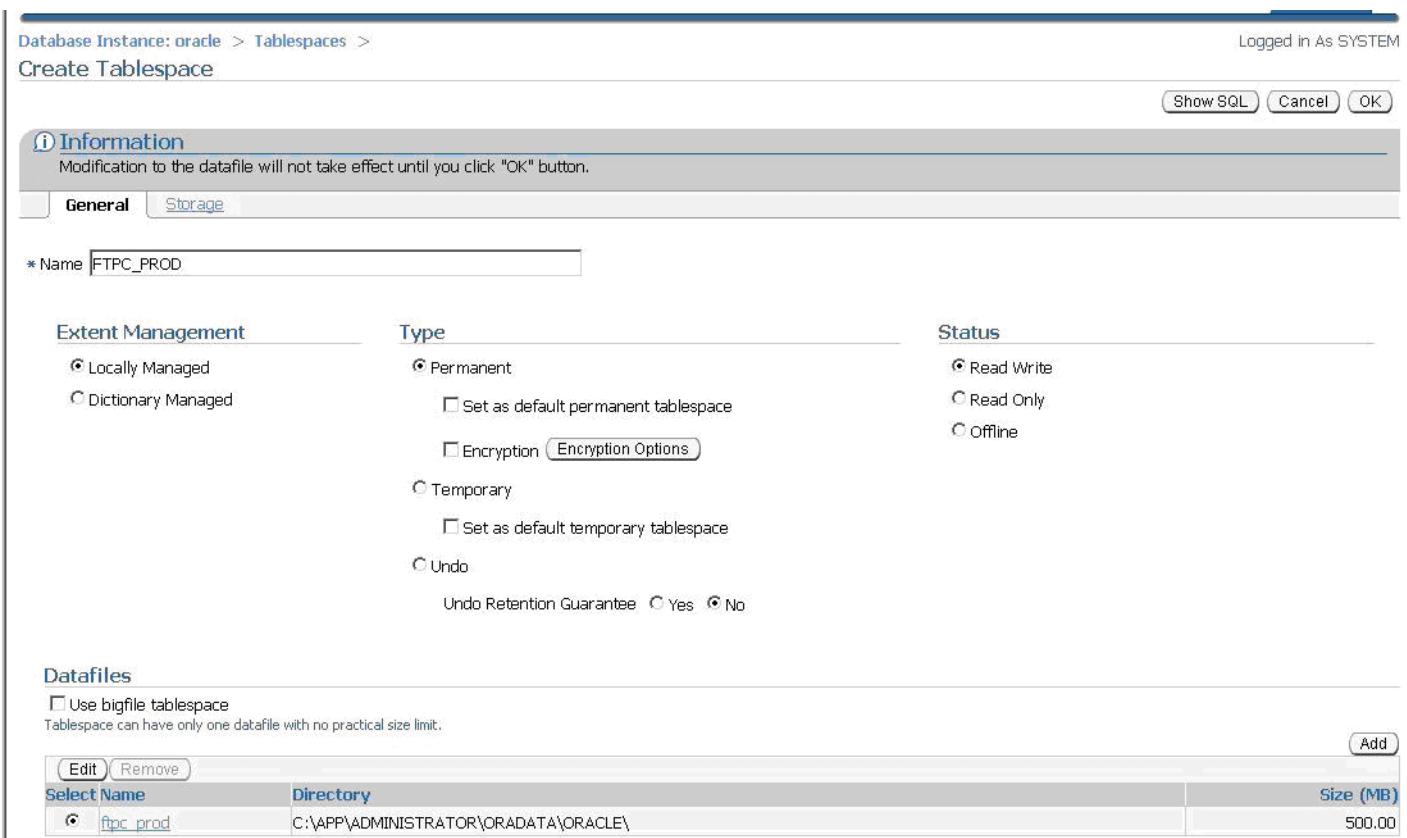
Datafiles
 Use bigfile tablespace
 Tablespace can have only one datafile with no practical size limit.

Select	Name	Directory	Size (MB)
Edit Remove	<input checked="" type="radio"/> ftpc_prod	C:\APP\ADMINISTRATOR\ORADATA\ORACLE\	500.00

5. Specify the details for the file. Your values will depend on the needs of your particular application. We recommend setting the initial size and increment size as large as possible. Click [Continue].

Figure 4-36: Specify Your Tablespace's Details

6. You are returned to this screen. Click [OK] to create the tablespace. This may take a while, depending on the size of the file.

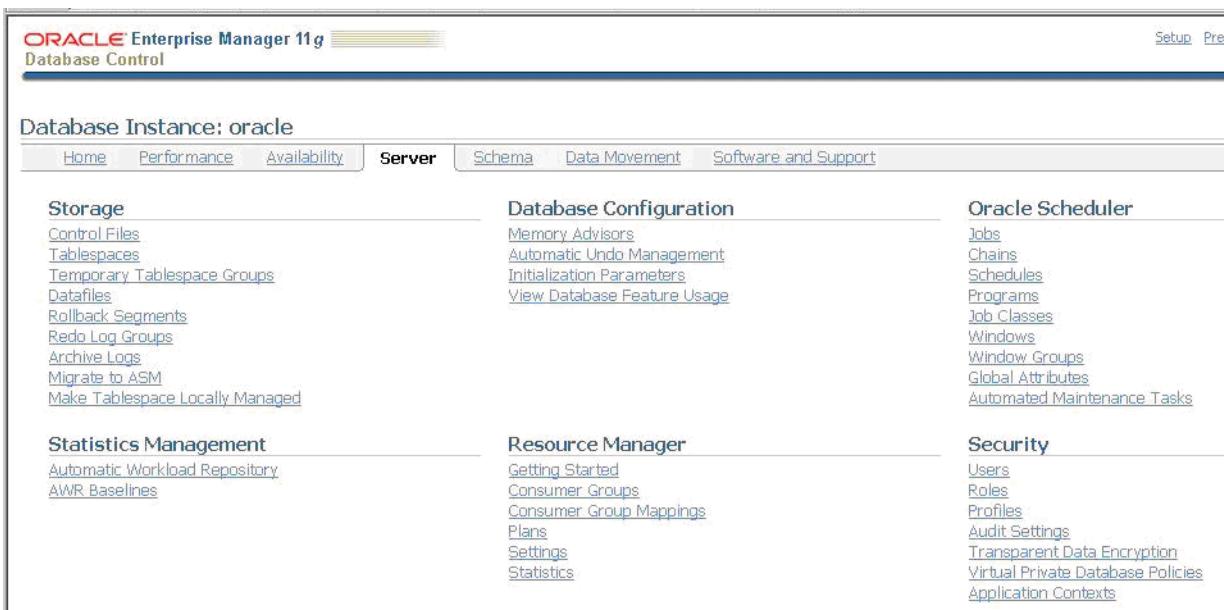
Figure 4-37: Start Tablespace Creation

- When the tablespace creation is finished, click *Database Instance:oracle* at the top left corner. You have now finished creating your tablespace.

Create the User

You must now create the user. To do so, perform the following instructions.

- From the Server tab, under the Security heading, click *Users*.

Figure 4-38: Create User

2. Click [Create].

Figure 4-39: Create New User

The screenshot shows the 'Users' list page in Oracle Enterprise Manager. The top navigation bar includes 'Setup', 'Preferences', 'Help', 'Logout', and a 'Database' button. Below it, the 'Database Instance: oracle >' and 'Logged in As SYSTEM' are displayed. The 'Users' section has a 'Search' field and a 'Selection Mode' dropdown set to 'Single'. A toolbar at the top of the table includes 'Edit', 'View', 'Delete', 'Actions', 'Create Like', and 'Go'. The table columns are 'Select', 'UserName', 'Account Status', 'Expiration Date', 'Default Tablespace', 'Temporary Tablespace', 'Profile', and 'Created'. The data rows are:

Select	UserName	Account Status	Expiration Date	Default Tablespace	Temporary Tablespace	Profile	Created
<input checked="" type="radio"/>	ANONYMOUS	EXPIRED & LOCKED	Jan 28, 2010 3:16:21 PM PST	SYS AUX	TEMP	DEFAULT	Oct 15, 2007 10:36:34 AM PDT
<input type="radio"/>	APEX_PUBLIC_USER	EXPIRED & LOCKED	Jan 28, 2010 3:16:21 PM PST	USERS	TEMP	DEFAULT	Oct 15, 2007 11:06:44 AM PDT
<input type="radio"/>	CTXSYS	EXPIRED & LOCKED	Jan 28, 2010 3:16:21 PM PST	SYS AUX	TEMP	DEFAULT	Oct 15, 2007 10:35:40 AM PDT

3. In the Create User screen, under the General tab, enter the following information and click [OK].

- Name: Enter a name for the user.
- Enter Password: Enter a password for the user.
- Confirm password: Confirm the password.
- Default Tablespace: Set this value to the tablespace you just created.

- Temporary Tablespace: You can accept TEMP, the default temporary tablespace, or choose another tablespace.

Figure 4-40: Enter User Information

The screenshot shows the Oracle Enterprise Manager 11g Database Control interface. The title bar reads "ORACLE Enterprise Manager 11g Database Control". The top menu bar includes "Setup", "Preferences", "Help", "Logout", and "Database". A status bar at the top right says "Logged in As SYSTEM". The main area is titled "Database Instance: oracle > Users > Create User". Below this, there are tabs for "General", "Roles", "System Privileges", "Object Privileges", "Quotas", "Consumer Group Privileges", and "Proxy Users". The "General" tab is selected. The form fields include:

- * Name: ftpc_prod
- Profile: DEFAULT
- Authentication: Password
- * Enter Password: [REDACTED]
- * Confirm Password: [REDACTED]
- For Password choice, the role is authorized via password.
- Expire Password now
- Default Tablespace: FTPC_PROD
- Temporary Tablespace: TEMP
- Status: Locked Unlocked

 There are also "Show SQL", "Cancel", and "OK" buttons at the top right of the dialog.

4. From the User List, select the user you just created and click [Edit].

Figure 4-41: User List

Select	UserName	Account Status	Expiration Date	Default Tablespace	Temporary Tablespace	Profile	Created
<input checked="" type="radio"/>	ANONYMOUS	EXPIRED & LOCKED	Jan 28, 2010 3:16:21 PM PST	SYSAUX	TEMP	DEFAULT	Oct 15, 2007 10:36 PDT
<input type="radio"/>	APEX_PUBLIC_USER	EXPIRED & LOCKED	Jan 28, 2010 3:16:21 PM PST	USERS	TEMP	DEFAULT	Oct 15, 2007 11:06 PDT
<input type="radio"/>	CTXSYS	EXPIRED & LOCKED	Jan 28, 2010 3:16:21 PM PST	SYSAUX	TEMP	DEFAULT	Oct 15, 2007 10:35 PDT
<input type="radio"/>	DBSNMP	OPEN	Jul 27, 2010 3:18:08 PM PDT	SYSAUX	TEMP	MONITORING_PROFILE	Oct 15, 2007 10:23 PDT
<input type="radio"/>	DIP	EXPIRED & LOCKED		USERS	TEMP	DEFAULT	Oct 15, 2007 10:11 PDT
<input type="radio"/>	EXFSYS	EXPIRED & LOCKED	Jan 28, 2010 3:16:21 PM PST	SYSAUX	TEMP	DEFAULT	Oct 15, 2007 10:35 PDT
<input type="radio"/>	FLOWS_030000	EXPIRED & LOCKED	Jan 28, 2010 3:16:21 PM PST	SYSAUX	TEMP	DEFAULT	Oct 15, 2007 11:06 PDT
<input type="radio"/>	FLOWS_FILES	EXPIRED & LOCKED	Jan 28, 2010 3:16:21 PM PST	SYSAUX	TEMP	DEFAULT	Oct 15, 2007 11:06 PDT
<input type="radio"/>	FTPC_PROD	OPEN	Jul 27, 2010 3:46:32 PM PDT	FTPC_PROD	TEMP	DEFAULT	Jan 28, 2010 3:46:32 PDT

5. Select the Roles tab. Click [Edit List] and add 'resource' so that both Connect and Resource are listed. Click [Apply].

Figure 4-42: Configure Roles

Role	Admin Option	Default
CONNECT	<input type="checkbox"/>	<input checked="" type="checkbox"/>
RESOURCE	<input type="checkbox"/>	<input checked="" type="checkbox"/>

6. Select the System Privileges tab. Click [Edit List], make sure the following privileges are on the list, then click [Apply].

- ALTER PROCEDURE system privilege
- CREATE TRIGGER system privilege

- CREATE TABLE system privilege
- CREATE PROCEDURE system privilege
- CREATE VIEW system privilege
- EXECUTE PROCEDURE system privilege
- UNLIMITED TABLESPACE system privilege

Figure 4-43: Set System Privileges

System Privilege	Admin Option
ALTER PROCEDURE	<input type="checkbox"/>
CREATE PROCEDURE	<input type="checkbox"/>
CREATE TABLE	<input type="checkbox"/>
CREATE TRIGGER	<input type="checkbox"/>
CREATE VIEW	<input type="checkbox"/>
EXECUTE PROCEDURE	<input type="checkbox"/>
UNLIMITED TABLESPACE	<input type="checkbox"/>

You have now finished creating your user.

Consider Optional Tablespace Configuration

Consider the following information when you set up your tablespaces. When you export a snapshot from one database to another, you can ease the process by using identical tablespace names. For example, when you export your Production database snapshot to your development database, the process is easier if both databases are named MyProduction. FTPC Administrator provides a database reorganization tool that allows you to assign logical groups of tables (e.g., fast growing, slow growing, indexes, etc.) to tablespaces that you create in the database(s) for this purpose. You can create the tablespaces now, and then after installation, assign them to logical groups. Refer to the *FactoryTalk ProductionCentre Administrator User's Guide* for more information.

Create a Local Net Service Name

You will need a local net service name for the application and reporting servers to connect to the database. You can follow your conventions for the name. Record the Local Net Service name in [Table 4-1 on page 61](#) for your reference.

Chapter

5

Database Server Performance

In this chapter

- Assessing Hardware Requirements 92**
 - Scaling 92
 - RAID 92
 - Maximizing Database Resources 93
- Monitoring Database Resources 95**
 - Indexing 96
 - Configuring Separate Databases 96
- Configuring Microsoft SQL Server RDBMS 96**
 - Analyzing Statistics 96
 - Setting SQL Server Priority 97
 - Setting the Parallelism Parameter 97
 - Using NOLOCK 97
- Configuring Oracle RDBMS 98**
 - Analyzing Statistics 98
 - Preventing Errors Caused by Network Problems 98
 - Using Oracle Cost-Based Optimizer 99

This chapter provides guidelines that apply to database server installations and can help optimize performance of installations within the described cases. Many sections refer to FTPC knowledge base, where you will find details and technical information.

Assessing Hardware Requirements

Rockwell Automation has performed various benchmark tests to reach the recommended minimum hardware requirements, based on basic FTPC transactions. Review the *FactoryTalk ProductionCentre Supported Platforms Guide* for these requirements when you assess your site requirements. The following sections discuss additional hardware options that may improve performance.

Scaling

Planning ahead for the database is very important. Since the database is the repository of all the information, it is not possible to balance the load, so as the load increases, the only options are increasing efficiency or increasing capacity.

If the load of the machine is beyond capacity, you can try to make the server more efficient. If the size or complexity of the query response overloads the CPU, indexing, optimizing queries, or purging the database to make it smaller will help alleviate complexity and length of existing queries. If the problem is I/O bound, upgrading the drive subsystem may help.

The next options are to upgrade to a more powerful machine or place the databases on different machines. Both solutions require downtime. If there is a lot of contention on the database and the slowdown is not due to overloading the CPUs, getting a more powerful machine may not improve performance. Contention may be resolved by making sure each database, such as the ODS and Production databases, is on a separate machine. Splitting the databases will take some of the pressure off the machines.

See the FTPC knowledge base article 103 for additional information.

RAID

We recommend that the more active database servers, like the Production database server, have a RAID 1 for the operating system, which is mirrored. In addition separate the data files and transaction log files onto two additional volumes. Ideally, these two extra volumes are RAID 1+0, although that is not a requirement.

We recommend that in situations where performance of the database does not impact production, such as with the historical (ODS) database servers, you use a RAID 5.

Depending on the application, different RAID configurations and stripe sizes are more efficient. For example, RAID 5 has less disk space overhead, but is slower than mirroring. Mirroring requires 100% overhead, but is much faster. Also, large stripe sizes allow large files to be written quickly, but waste disk space when writing small files. Make sure that you understand the different readings from your monitoring, then work with your System Administrator to accurately and efficiently identify the source of any problems.

See the FTPC knowledge base article 319 for additional information.

Maximizing Database Resources

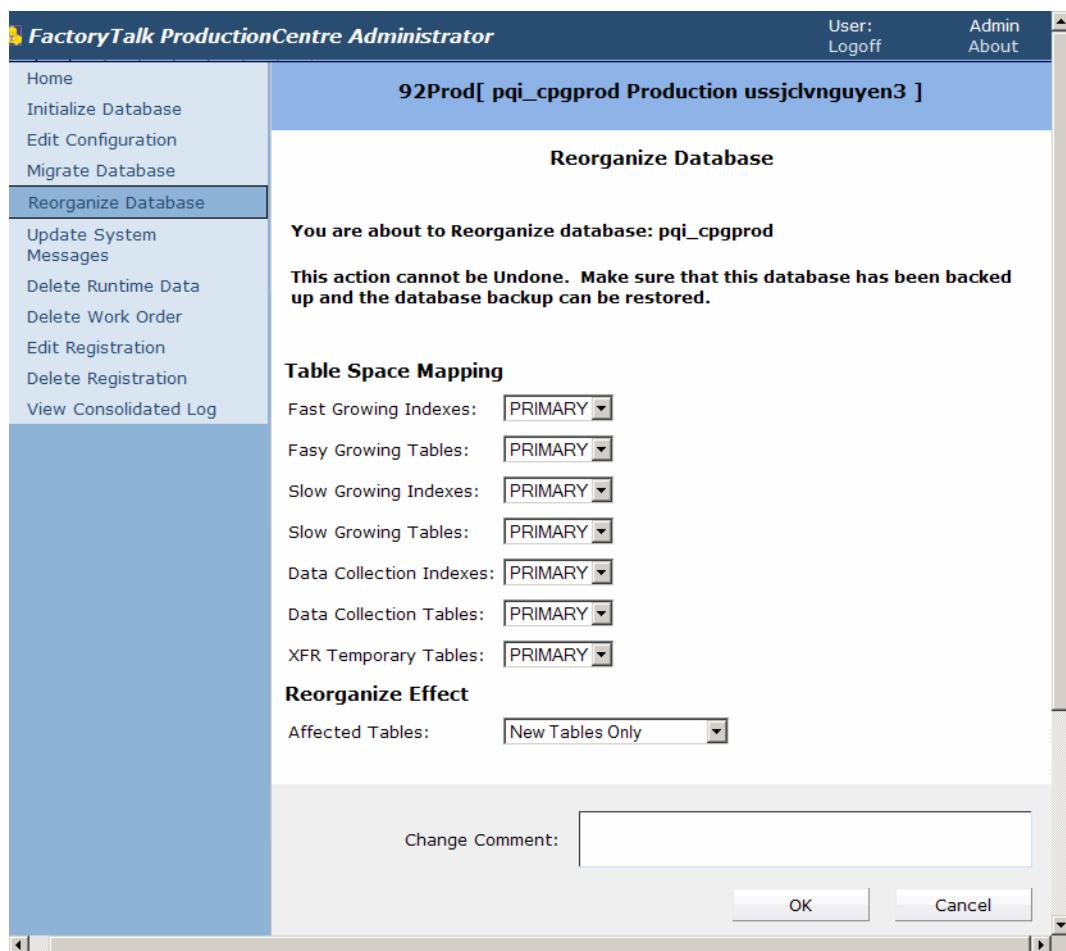
Especially if you have a large, high-volume database server, we recommend putting the temp database, the log files, and the data files onto three separate drive volumes to maximize the resources. If only two drive volumes are available, separate the temp database and log files from the data files. If more drive volumes are available, then we recommend that you use FTPC Administrator's *Reorganize* feature to separate data from indexes.

Physical separation of the three different types of files SQL uses (temp, log, and data) can minimize traffic congestion.

For more information, see SQL Server 2005 books online at <http://www.microsoft.com/sql/techinfo/productdoc/2005/books.asp>.

Using the Reorganize Feature

By using the FTPC Administrator table reorganization utility with the tablespaces, you can define the extent size to work with table growth speed. You can use this wizard during initialization or later, after installation and configuration. Figure 5-1 shows the mapping of the tablespaces to the table and index groups.

Figure 5-1: Table and Index Mapping Screen

Separate each function to correspond to the table and index groups shown in Figure 5-1. For example, place the indexes on their own volume, separate from the logs and data, then assign the Fast and Slow growing indexes to that volume.

FTPC supports automatic allocation for tablespace storage and autoextend on the datafiles.

Table 5-1 compares the settings for slow- and fast-growing indexes and tables.

Table 5-1 Default Storage Clause

Table Type	Settings
Slow-growing indexes and tables	Initial = 16KB Next = 64KB Minextents = 1 Maxextents = unlimited PCTincrease = 0
Fast-growing indexes and tables	Initial = 64KB Next = 512KB Minextents = 1 Maxextents = unlimited PCTincrease = 0

Here is an example scenario:

You know that your unit table will rapidly produce quantities of data and will grow fast, while your route table will generate far less data and can grow slowly. Here is how you can use that information when you configure your database installation.

1. When you create the tablespaces for your Production database, create one named Fast-growing with the recommended growth settings from [Table 5-1](#).
2. Create an additional tablespace named Slow-growing with the settings from [Table 5-1](#).
3. After installing FTPC and connecting to the Production database, open the Reorganize Database link.
4. The Reorganize Database page enables you to group your tables and indexes as fast- or slow-growing, as shown in [Fig. 5-1](#).
 - ▶ Select your Fast-growing table in the Fast Growing Tables list.
 - ▶ Select your Slow-growing table in the Slow Growing Tables list.
 You can designate which tablespace houses the fast- or slow-growing tables, but FTPC (middleware) decides which tables are fast- or slow-growing.
5. Click [Next] to complete the wizard.
The wizard enables you to re-map your indexes.
6. Click [Next] through the screens to complete the wizard and commit the changes.

Monitoring Database Resources

We recommend that you monitor database deadlocks. Deadlocks may indicate that too many resources are accessing your database at the same time. If this is the

case, work with your Database Administrator to characterize the problem and try to balance database requests. Some examples of problems and solutions if this occurs are:

- If reports are being run frequently, it might help to reduce the frequency with which they are run.
- If deadlocks occur during a time of high system load, change the time of day that non-critical reports are run to a period of lower system load.

Indexing

Indexing your databases makes selects faster, but may slow down inserts, deletes, and updates. Using this principle, index appropriately, but do not index everything. For example, avoid indexing *date* data types, but do index *integer* data types. The following scenario illustrates using a filter and an indexed attribute:

If you use a UnitFilter to filter on *uda_0 = 'supplier part number'*, then you should have an index on *uda_0* or the filter will have to scan the whole table.

Configuring Separate Databases

FTPC installations do not require separation of the various databases but supports the configuration when appropriate for the anticipated load.

FTPC supports the following configurations:

- Separate database server machines for production and historical (ODS).
- Separate databases on a single server.

Configuring Microsoft SQL Server RDBMS

The following sections describe areas that can be modified to improve database performance.

Analyzing Statistics

Database statistics enable the database to create efficient plans for responding to queries. Microsoft SQL Server updates statistics dynamically.

The *Auto create statistics* and *Auto update statistics* default settings collect statistics. We recommend using these services for all databases.

IMPORTANT: Statistics that contain a space in their name are not supported. If a statistic name contains a space, then migration will fail.

Unlike Oracle, where you must run a scheduled task to update statistics, SQL Server will estimate statistics as it goes. There are times where manually updating statistics becomes necessary, for example, to update statistics after a large purge of the database.

We recommend that database statistics be updated periodically to avoid deadlocks in the databases that rely on the auto create/update statistics.

See the FTPC knowledge base article 391 for additional information.

Setting SQL Server Priority

When you configure your SQL Server databases, we recommend that you **do not** select *Boost SQL Server Priority*. This setting may cause erratic behavior.

Setting the Parallelism Parameter

For your Production database, which uses Online Transactional Processing (OLTP), we recommend you set the parallelism parameter to a value of 1. This setting minimizes performance loss by preventing any one query from allocating resources from all available processors.

The default setting, *use all available processors*, instructs SQL server to allocate more resources to larger queries. This could make the Production databases available to large reporting queries that will consume large amounts of resources. This may cause stations on the factory floor to slow down because the setting ignores the importance of the smaller shop floor queries when there is a large reporting query.

If your other databases, such as ODS, are on different servers and have no effect on production, the default setting works well.

Using NOLOCK

When using SQL statements with `getArrayDatafrom...()` methods or with ODBC directly you can use the NOLOCK option, which requests that SQL Server ignore locks on tables and records and read directly from the tables. The NOLOCK only applies to the single statement, so you do not need to alter the entire connection's isolation level. This option is only available with *select* statements.

Refer to Microsoft documentation on "NOLOCK" for additional information.

The `getArrayDatafrom...()` method connects to retrieve the query from the database, and disconnects once it has retrieved the record set. Additional information on this method may be found in the Process Designer API Help.

See the FTPC knowledge base article 92 for more information.

Configuring Oracle RDBMS

The following instructions should only be performed by an experienced Oracle Database Administrator. If you have detailed questions about the Oracle parameters described, contact Oracle Technical Support. If you have questions about the information presented here, contact Rockwell Automation Customer Support.

Analyzing Statistics

Because Oracle does not automatically collect statistics, as MS SQL does, one way to automate frequent statistic collection is to run a scripted service. Rockwell Automation Customer Support maintains a knowledge base article that includes sample script for creating an automatic database job. Search for *kbperformance*.

IMPORTANT: Statistics that contain a space in their name are not supported. If a statistic name contains a space, then migration will fail.

For information about using statistics for cost-based planning, refer to “[Using Oracle Cost-Based Optimizer](#)” on page 99.

Set the Cursor_Sharing Parameter

The cursor_sharing instance parameter can reduce parse time for certain applications by sharing compiled statements when different applications use the same statements.

For best results, set the cursor_sharing parameter to SIMILAR. Oracle treats the parameter as follows:

- ❑ If multiple applications are using identical compiled statements, the parameter acts like the FORCE parameter, which shares the compiled statements between those applications that use the statements.
- ❑ If multiple applications are using similar but not identical statements, the cursor_sharing parameter uses variables to still share the compiled statements.

Refer to the Oracle documentation for more information about the cursor_sharing parameter.

Preventing Errors Caused by Network Problems

Network problems or normal network timeouts can cause certain Oracle errors. There are several different methods of preventing the errors, described below.

- ❑ Configure the Oracle Listener to listen at multiple ports. Use an Oracle utility, such as Oracle Net Configuration Assistant, to do this or change 'listener.ora' to have an additional port. For example:

```
LISTENER =
  (DESCRIPTION_LIST =
    (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP) (HOST =
      qanimo) (PORT = 1521)))
    (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP) (HOST =
      qanimo) (PORT = 1523)))
  )
```

- ❑ If configuring the listener to have additional ports does not prevent the problem, try the following suggested by Oracle:
 - ▶ Create a PROTOCOL.ORA in <oracle_home>/network/admin on the server side. Add one line: TCP.NODELAY=YES, then stop and restart the listener. This will turn on persistent tcp buffer flushing. Be aware this can create some additional network traffic, but should not cause significant problems.
 - ▶ Edit SQLNET.ORA, usually located in <oracle_home>/network/admin. Either remove the sqlnet.expire_time or set it to some value like 30 (the units for this value are minutes), then stop and restart the listener for the change to take effect. This will either turn off dead connection detection (DCD) or will increase the time to 30 minutes before the connection can be marked for deletion. Sometimes the performance monitor will mark connections as idle even though they are waiting for data. To work around the problem, either set the value high enough that most queries will return before that time has passed or do not use DCD.
 - ▶ Edit SQLNET.ORA, usually located in <oracle_home>/network/admin. Add the line BREAK_POLL_SKIP and set to any numeric value (the units of this value are seconds), then stop and restart the listener. The higher the value the less frequently BREAK_POLL_SKIP is checked. Again, this is a server-side setting.
 - ▶ Edit SQLNET.ORA, usually located in <oracle_home>/network/admin. Add the line DISABLE_OOB=ON, then stop and restart the listener. Again, this is a server side parameter. This will disable out-of-band breaks.

Using Oracle Cost-Based Optimizer

For best performance, use Oracle's cost-based optimizer facility for FTPC, rather than rule-based. The default optimizer mode is *CHOOSE*, which enables the facility to use cost-based planning, if recent database statistics are available. If there are no statistics, the optimizer defaults to rule-based analysis, which may

result in poor performance. For information about obtaining statistics, refer to “[Analyzing Statistics](#)” on page 98.

The available modes are:

- choose (default): if statistics are available, optimizer chooses cost-based analysis. If no statistics are available, optimizer chooses rule-based analysis.
- rule: the optimizer uses a rule-based approach, regardless of the presence of statistics.
- three cost-based modes:
 - ▶ first_rows_n: the optimizer uses a cost-based approach, regardless of the presence of statistics.
 - ▶ first_rows: the optimizer uses a mix of costs and heuristics (set by Oracle) to find a best plan for fast delivery of the first few rows.
 - ▶ all_rows: the optimizer uses a cost-based approach, regardless of the presence of statistics and optimizes with a goal of minimum resource use to complete the entire statement.

See your Oracle documentation for more information about optimizer mode.

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