ORACLE®

Session id: 40174

# The Invisible Oracle:
## Deploying Oracle Database in Embedded Environments

Anuj Goel

Mughees Minhas

Oracle Corporation

ORACLE

# Why Embed?

- *Benefits for ISVs*
  - Reduced installation and management time
  - Reduced installation and management support
- *Benefits to your customers:*
  - No onsite DBA required
  - Reduced software license costs
  - Reduced maintenance cost

# What is an Embedded Database?

- *Application or device where the Oracle database is integrated into the partner's application and end-user has little or no knowledge that the Oracle database exists.*

# Embedded Database Challenges

- Embedding a database poses challenges in 3 areas:
  - Deployment: Should be easy and seamless
  - Day-to-day administration: No onsite DBA available to manage database
  - Software maintenance and support: Should be timely, simple and efficient

# Oracle 10g as Embedded Database

- Oracle 10g enables embedding by facilitating:
  - Deployment: Easy and seamless install
  - Day-to-day administration: Self-managing database
  - Software maintenance and support: Easy to patch and upgrade

# The First Challenge: Deployment

# Oracle 10g: Deployment Enhancements

- Fast lightweight install
  - Major redesign of installation process
  - Install time reduced to less than 20 minutes
  - CPU, memory, disk space consumption greatly reduced
  - Installation media optimization: Requires one CD only
- Automatic prerequisite checking
  - Exhaustive checking of prerequisites during install, e.g., physical memory, admin privileges, OS version, etc.
- Automatic post-install configuration
  - Configuration of database and auxiliary processes such as listener, EM agent, etc., so that they are automatically started and stopped with the system

# Oracle 10g Deployment

- Easy to integrate from any installation application
- Provide installation progress and status
- Flexible for partners to install only application required database components
- Silent mode de-installation
- Record mode to capture user responses in responseFile
- True silent mode installation in character mode

# How to Embed?

# Embedded Installation Steps

- Packaging for silent install
  - Use DBCA to create a template of your database you want to package
  - Use Oracle Universal Installer (OUI) in record mode to create your own responseFile
- Installing in silent mode
  - Call OUI in silent mode to install Oracle software
  - Call NETCA in silent mode to configure your Oracle Net
  - Call DBCA in silent mode to install your database

# What is DBCA?

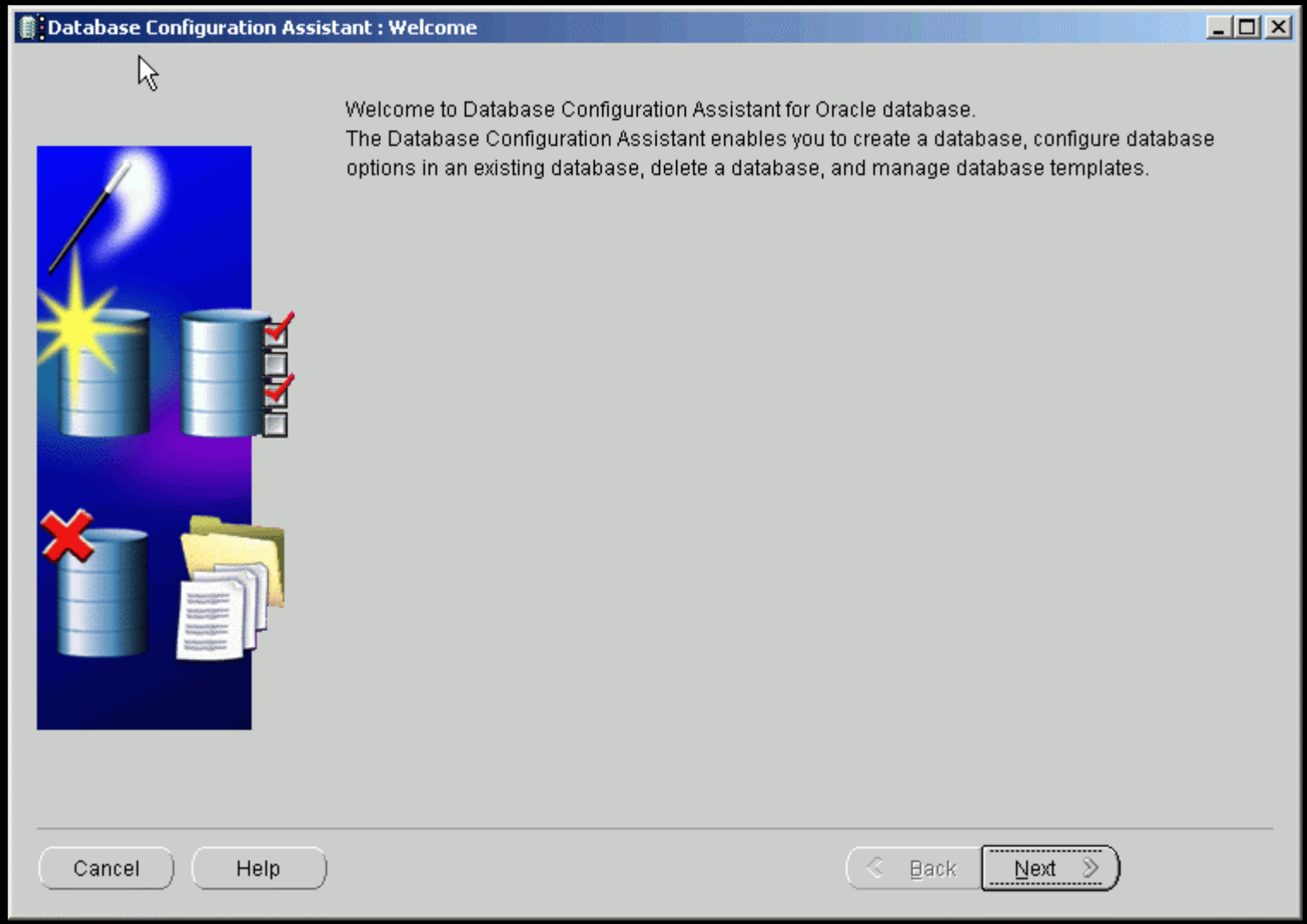
- Database Configuration Assistant (DBCA)
  - Fast creation of fully functional, ready-to-use database—under 10 minutes vs. over an hour
  - Pre-configured per Oracle standards
  - Auto-setup of common tasks, e.g., backups, health monitoring, etc.
  - Database cloning: Duplication of database
    - Type: Structure + data or structure only
    - Mode: Silent or manual

# Use DBCA to create a template of your database you want to package

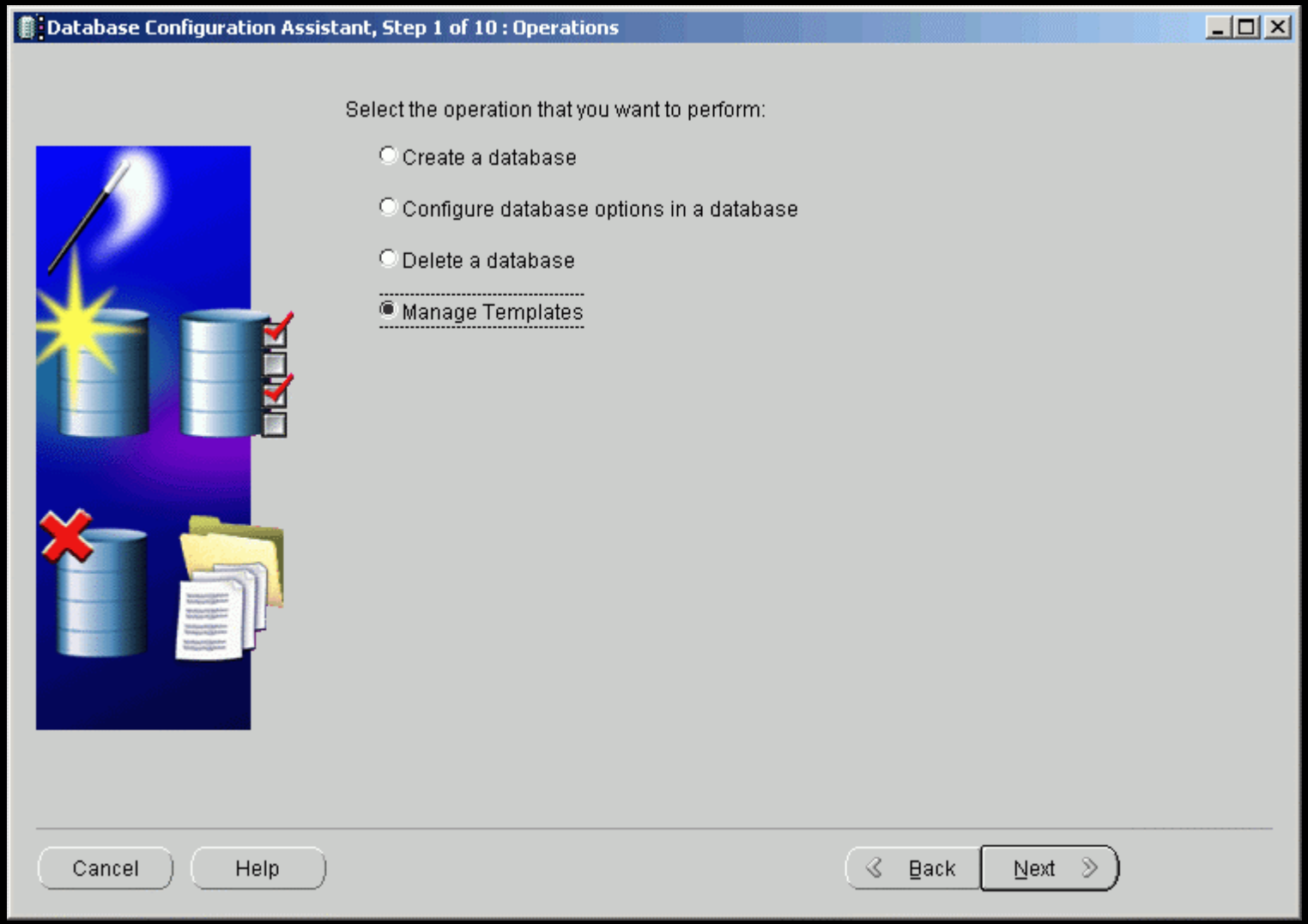
# Launch DBCA

- Call “dbca” from command line
- Or
- Program Manager / Database Configuration Assistant
- (windows only)

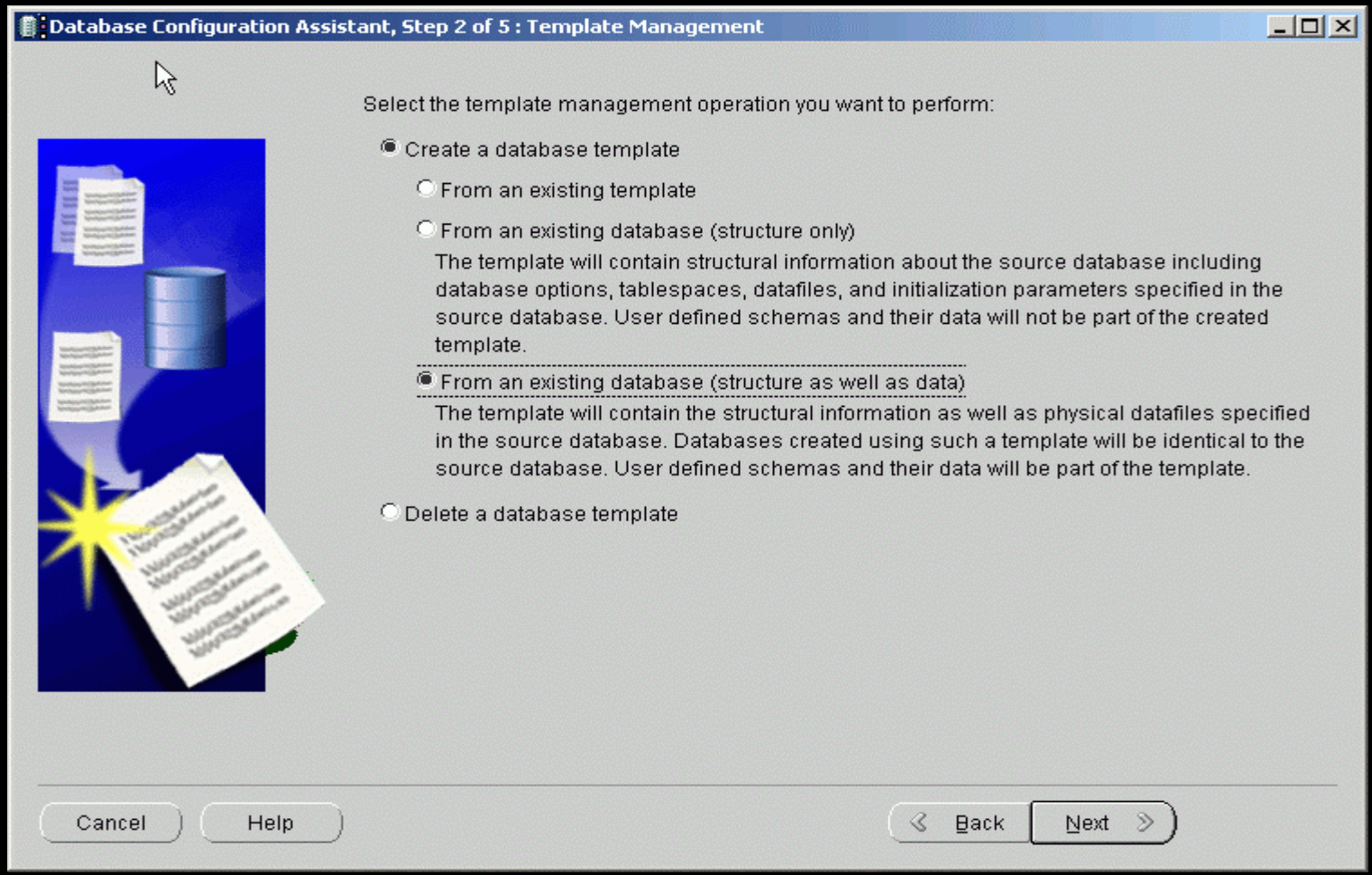
# Click ‘Next’ on Welcome



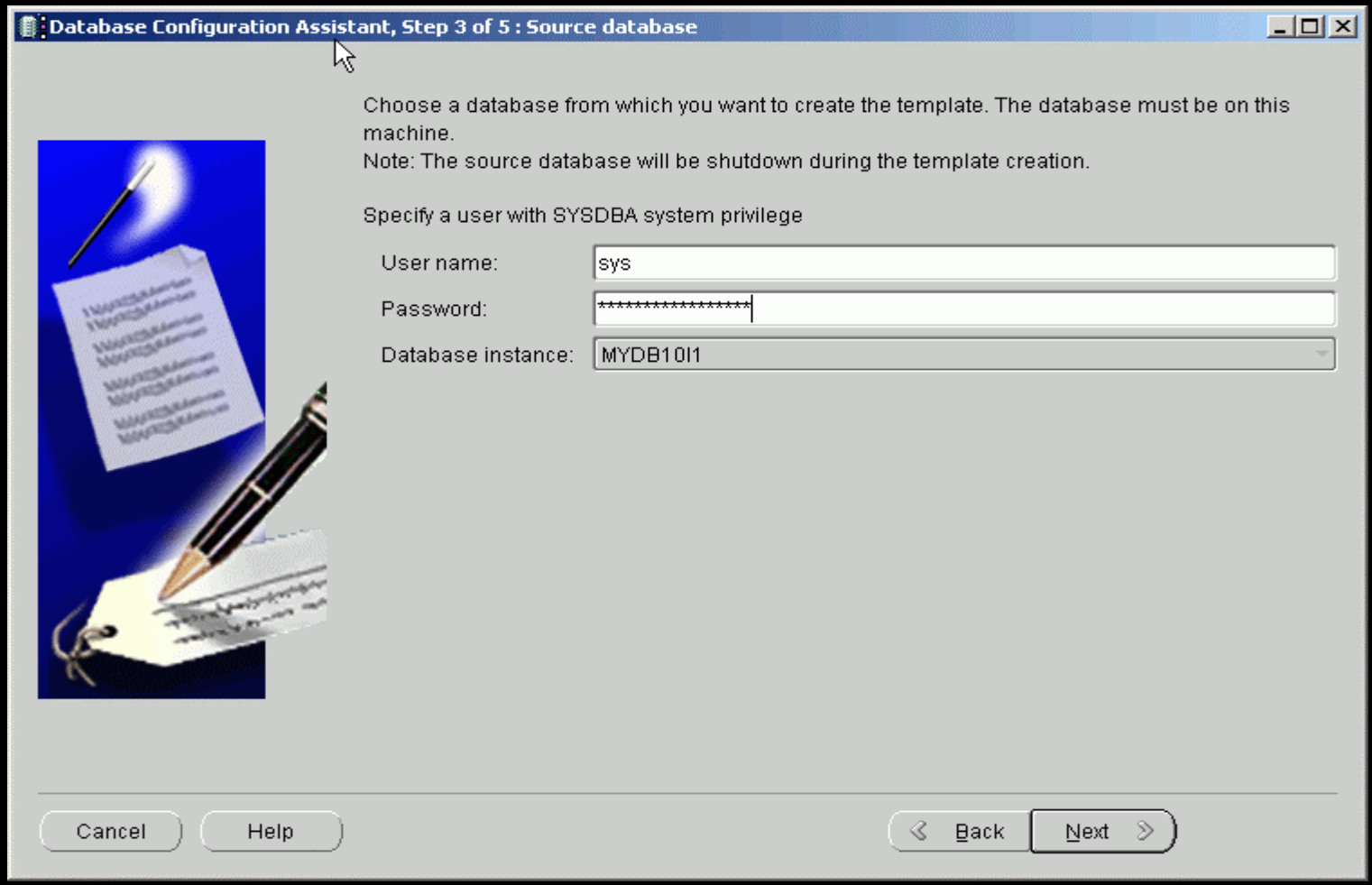
# Select ‘Manage Templates’



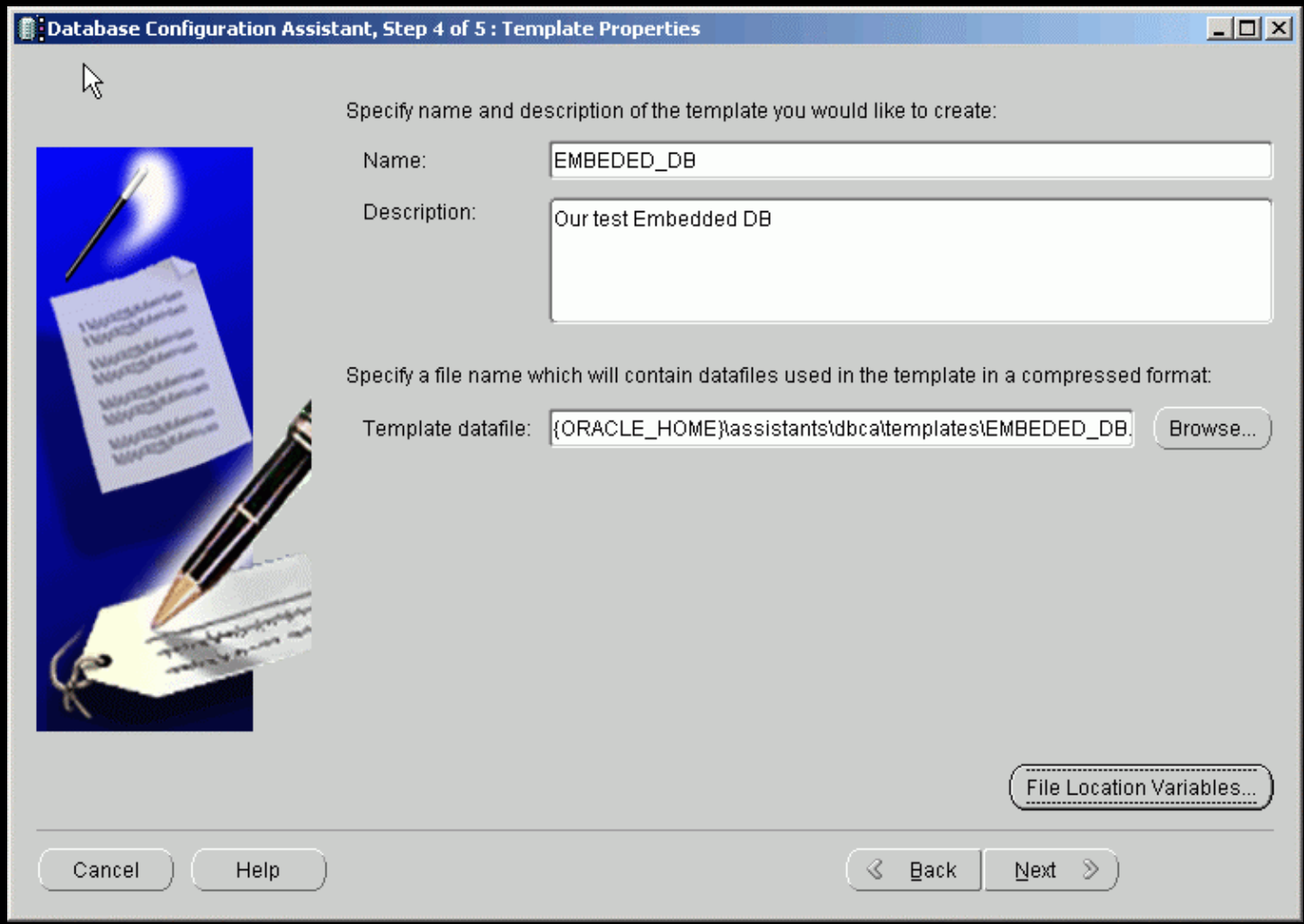
# Select ‘From an existing database (structure as well as data)’



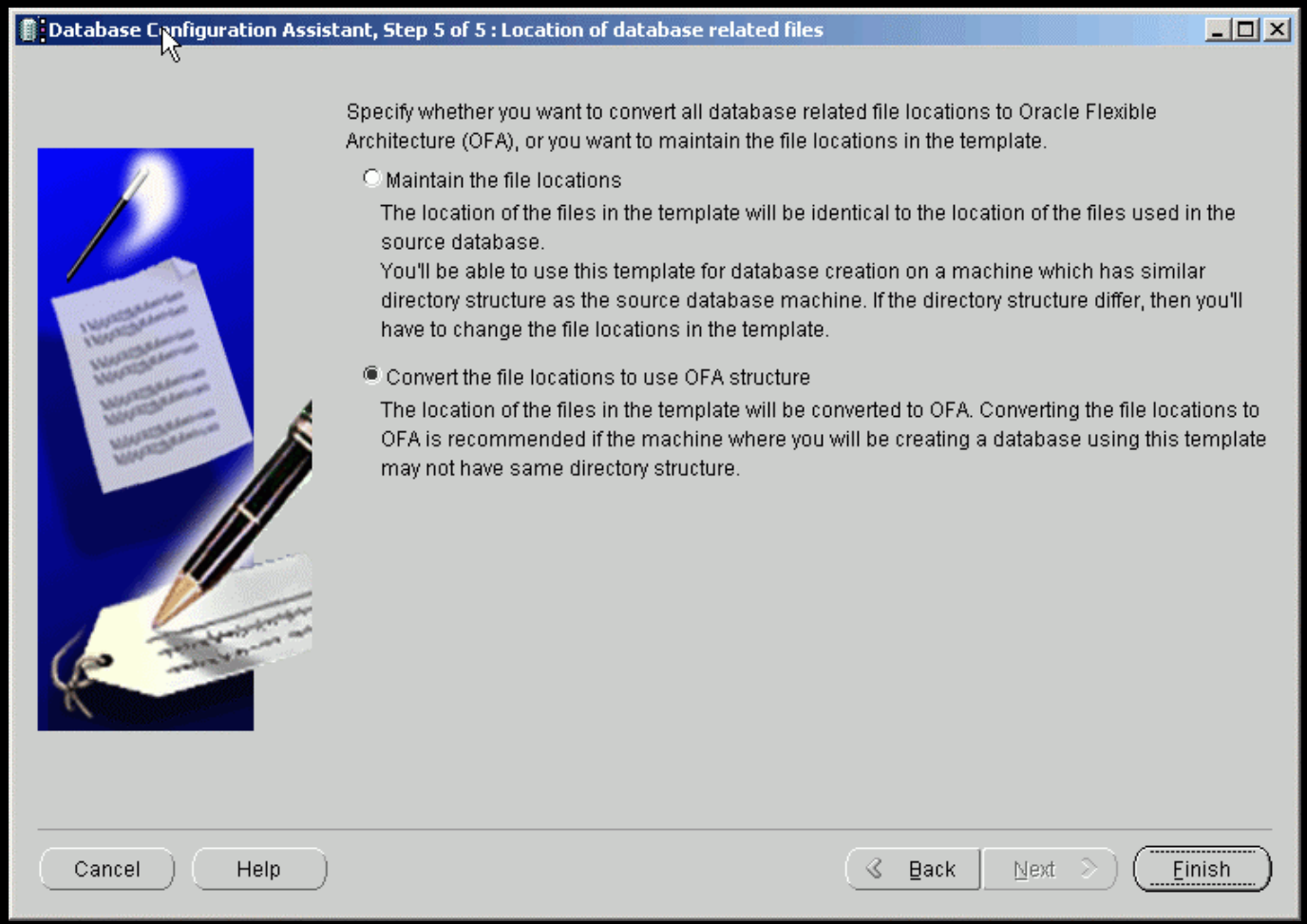
# Select the database you want to use as source database and enter sys/password



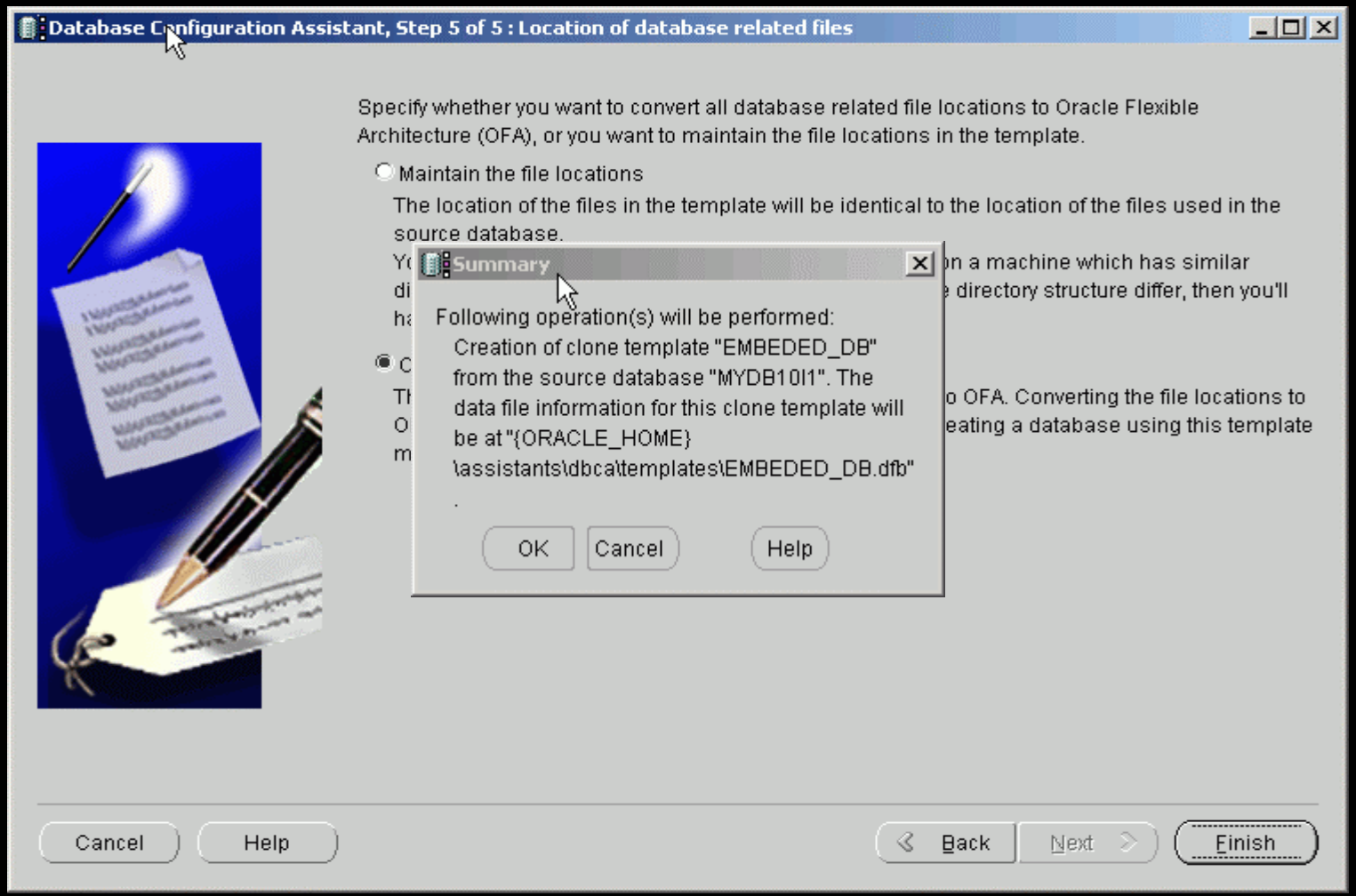
# Enter Template Name and Description



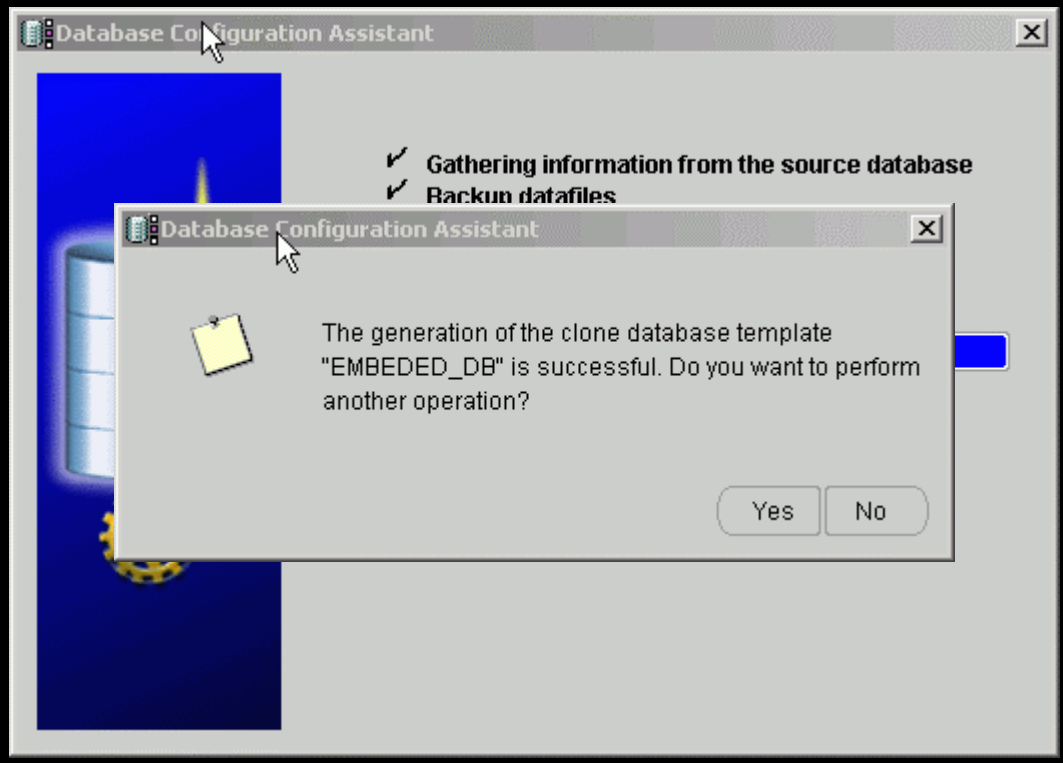
# Select ‘Convert to OFA’ and hit Finish



# Select ‘OK’ on Message



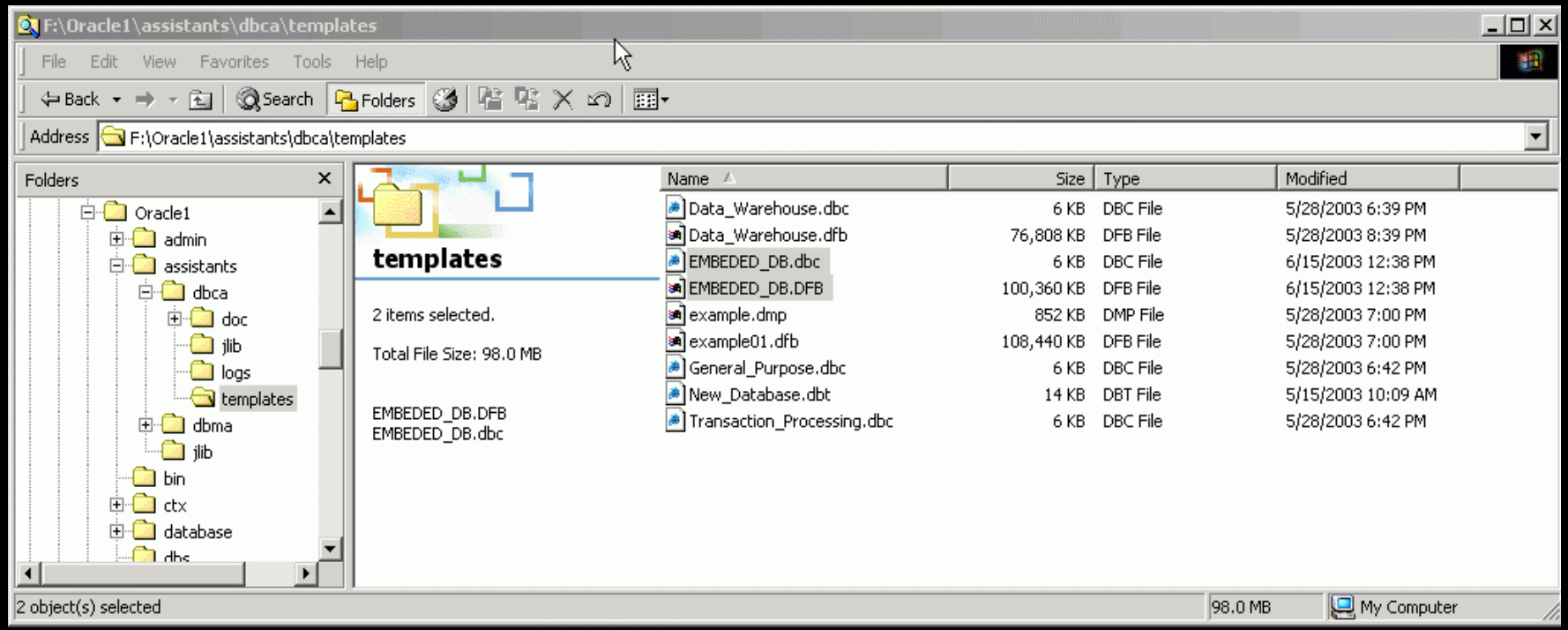
# Select ‘No’ to perform another operation



# Save your database template files

**You should have two files in your OH\assistants\dbca\template directory**

- **EMBEDDED_DB.DBC - Database Template Definition**
- **EMBEDDED_DB.DBF - Database datafiles**



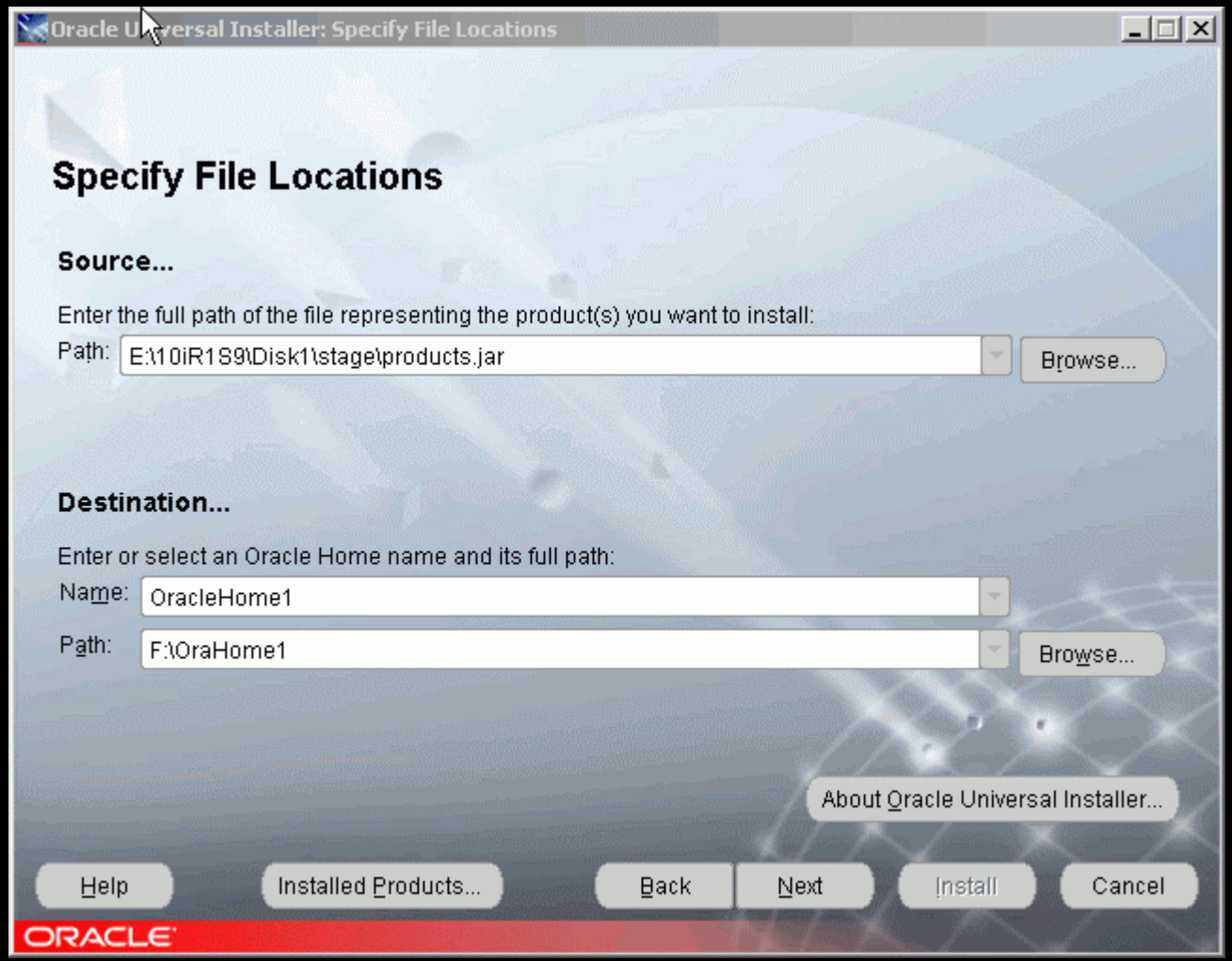
# Call Oracle Installation in record mode

# Call Oracle Oracle Universal Installer in record mode

- setup.exe (windows) or runInstaller (Unix and Linux)
- -record
- -destinationFile E:\Technology\embed_oracle\Test10g\my.oracle.server.rsp

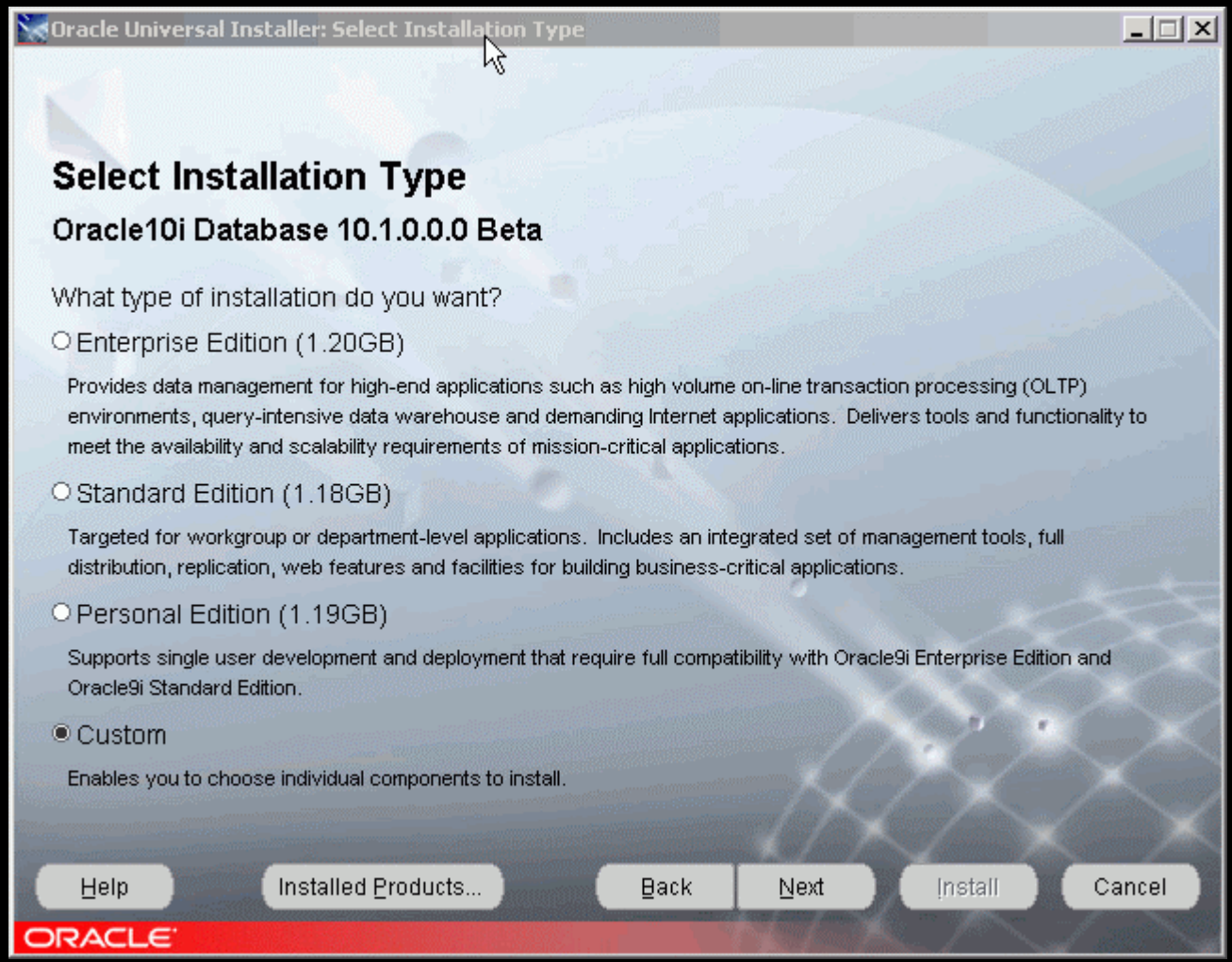
# Click ‘Next’ on Welcome screen

# Enter Oracle Home Name and Path

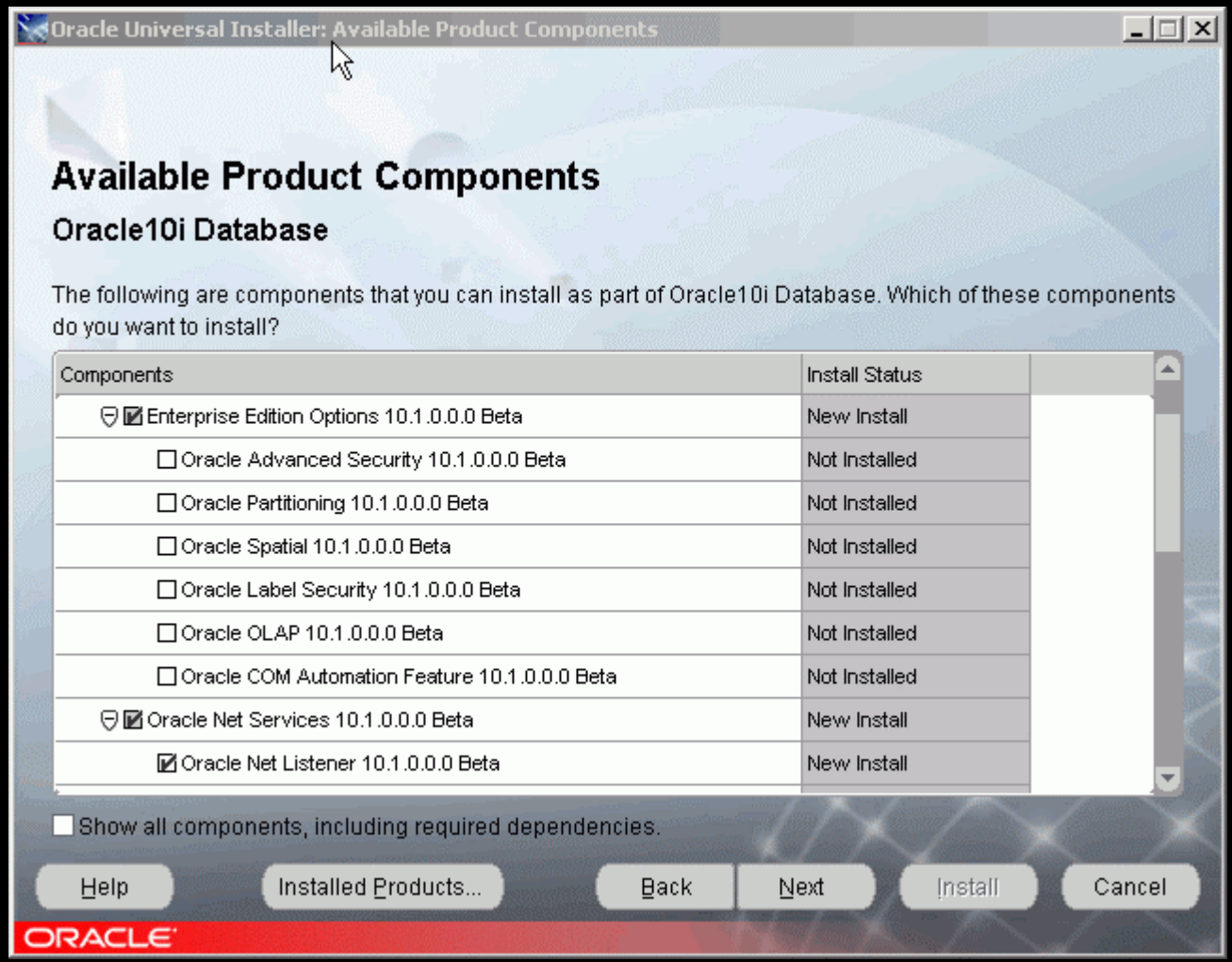


# Select Oracle 10g Database

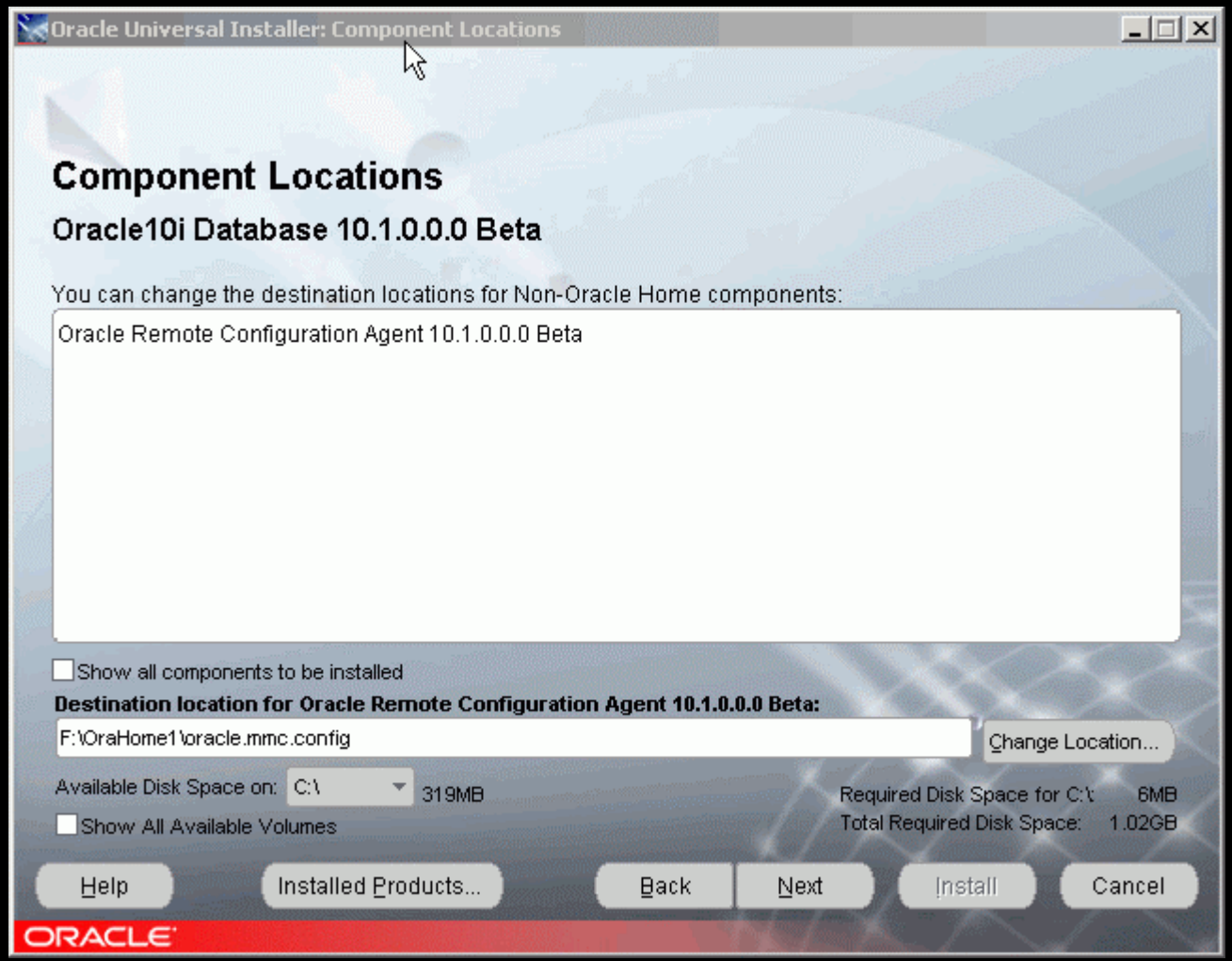
# Select Custom from Install Type



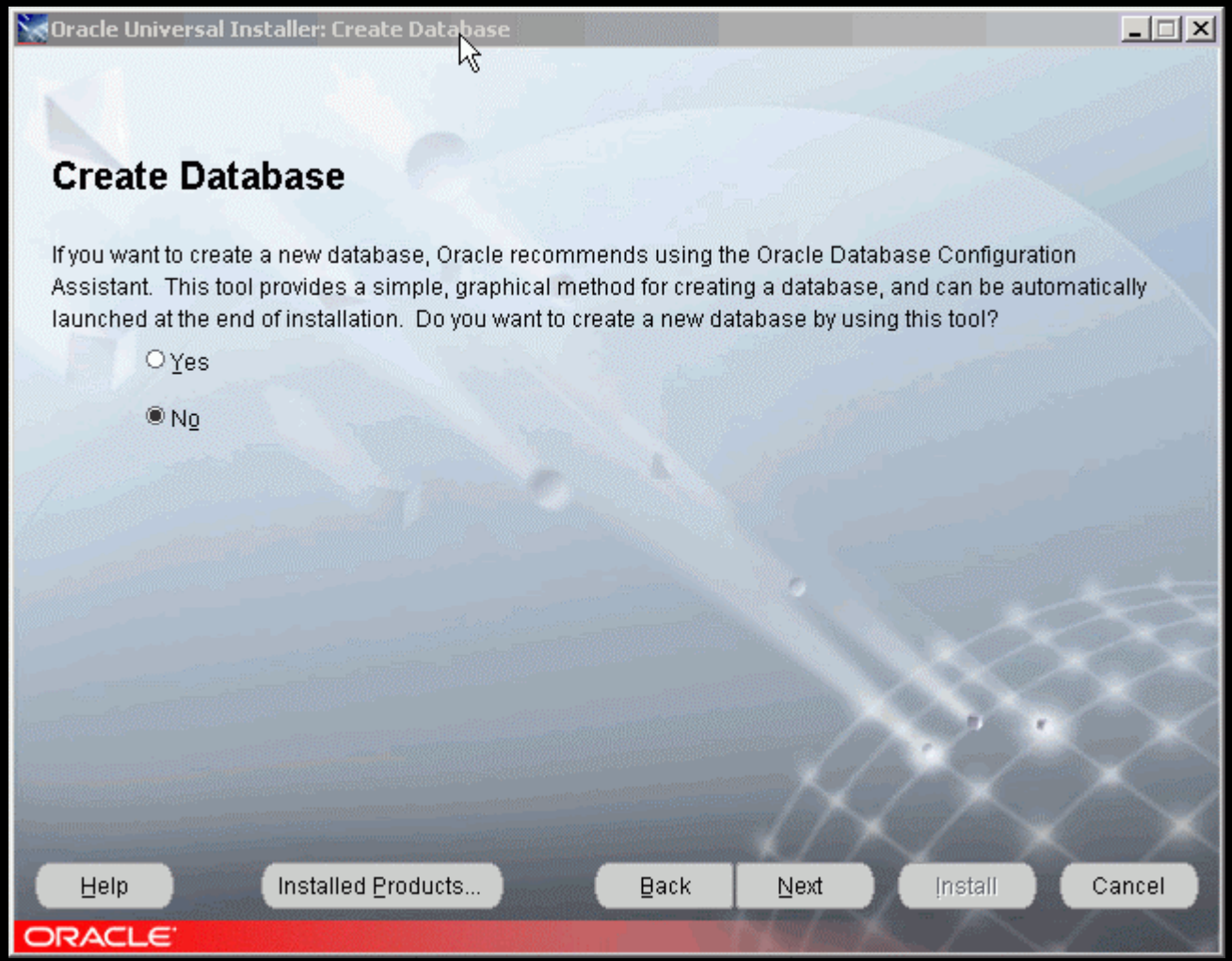
# Make your selections



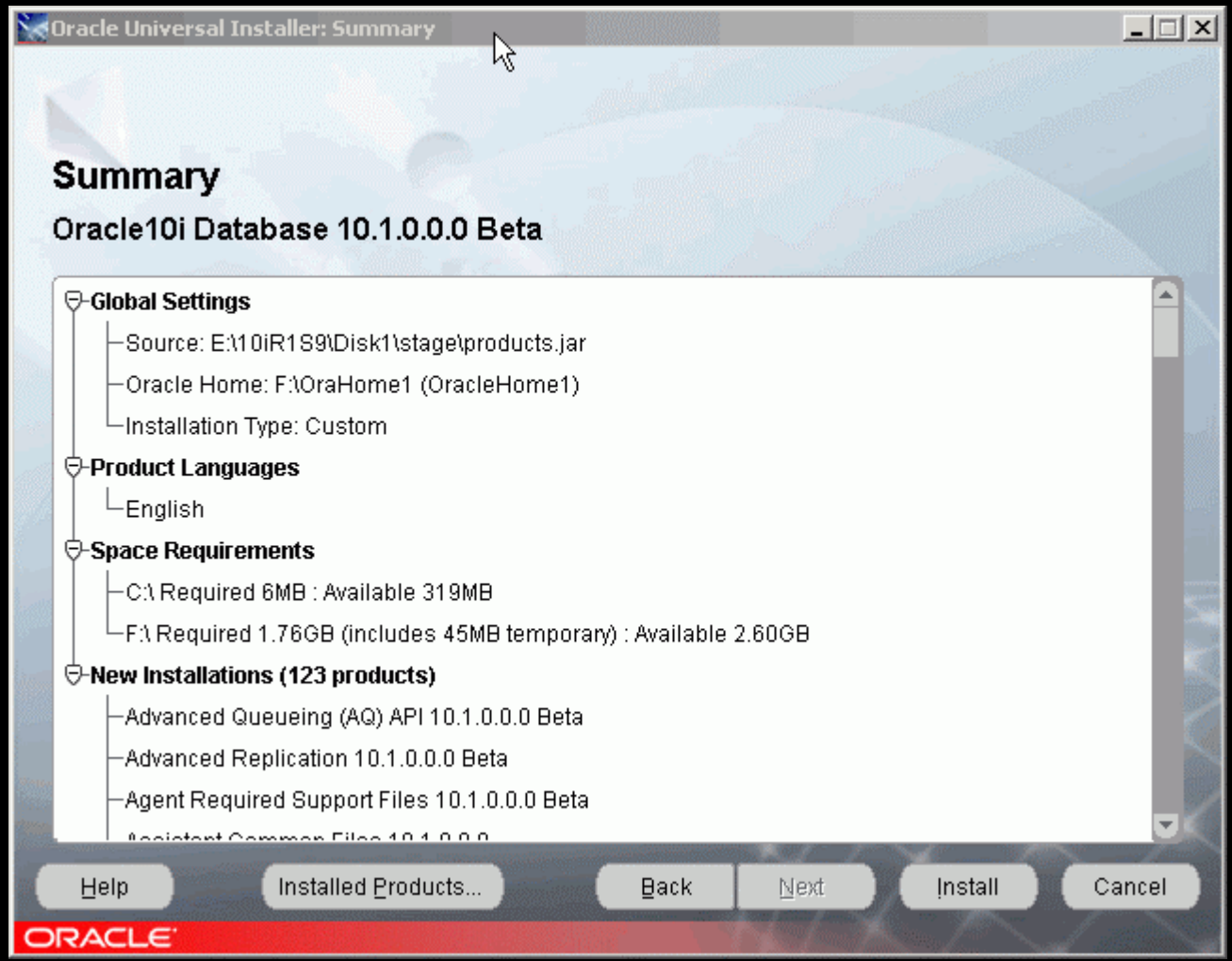
# Click ‘Next’ to continue



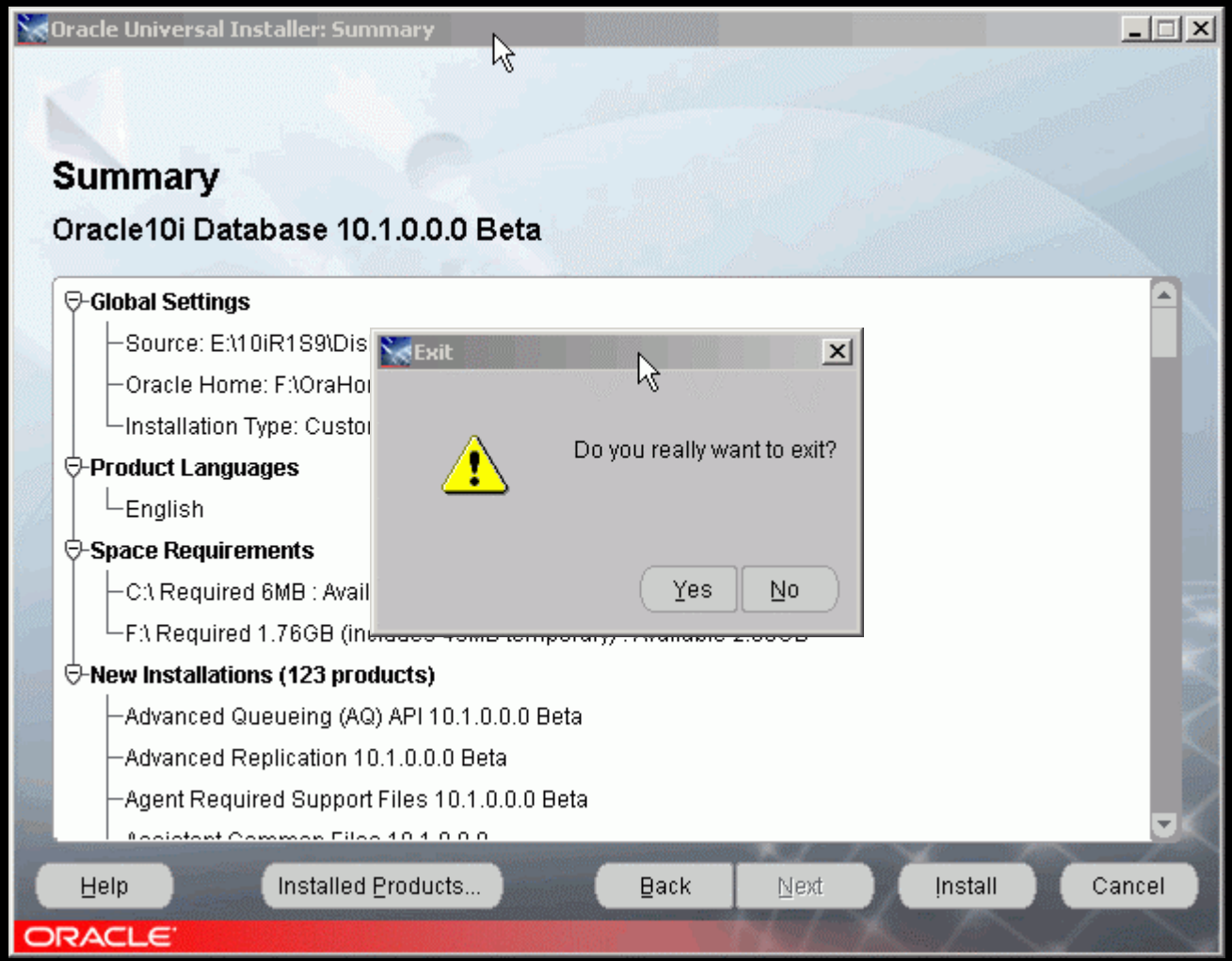
# Select ‘No’ to not create database



# Review your selection and click ‘Cancel’



# Select ‘Yes’ to exit



# Review your responseFile

FROM_LOCATION=E:\10gR1S9\Disk1\stage\products.jar

ORACLE_HOME=F:\OraHome1

ORACLE_HOME_NAME=OracleHome1

TOPLEVEL_COMPONENT={oracle.server,10.1.0.0.0}

oracle.server:DEPENDENCY_LIST={oracle.rdbms:10.1.0.0.0,oracle.options:10.1.0.0.0,oracle.networking:10.1.0.0.0}

b_createStarterDBReturn=false

# Call Oracle Universal Installer in silent mode

# Call Oracle Universal Installer in silent mode

- setup.exe (windows) or runInstaller (Unix and Linux)
- -nowait
- -silent
- ORACLE_HOME="F:\OraHome10g" ORACLE_HOME_NAME="OracleHome10g" –responseFile E:\Technology\embed_oracle\Test10g\my.oracle.server.rsp

# Call Oracle Network Configuration Assistant (NETCA) in silent mode

# Call NETCA in silent mode

- Current (beta) – Create a script like this
- set ORACLE_HOME=F:\OraHome10g
- <<Command from $ORACLE_HOME/network/tools/netca.cl>> /silent
- /responseFile %ORACLE_HOME%\network\install\netca_typ.rsp

- In production – use “netca” command
- /silent
- /responseFile %ORACLE_HOME%\network\install\netca_typ.rsp

# Call Database Configuration Assistant (DBCA) in silent mode

# Call DBCA in silent mode

Copy saved files to ORACLE_HOME\assistants\dbca\template directory

- EMBEDDED_DB.DBC - Database Template Definition
- EMBEDDED_DB.DBF - Database datafiles

```
dbca -silent -createDatabase
-templateName “embedded_db.dbc"
-gdbname "my10db1.us.oracle.com"
-sid "my10db1"
-sysPassword sysoracle
-systemPassword systemoracle
```

# Tools For Embedding

# Tools for Embedding (Production)

- Oracle Embedded Installation (OEI) Kit.
  - Supports embedded installation of Oracle8*i* and Oracle9*i* databases.

- To Download:
- Sign in at http://opn.oracle.com
- Click on Development tab on the Top Navigation section
- Click on Embedded Installation Resource Kit in Technology Spotlight section in the left navigation.

# What Is The Oracle Embedded Installation Kit?

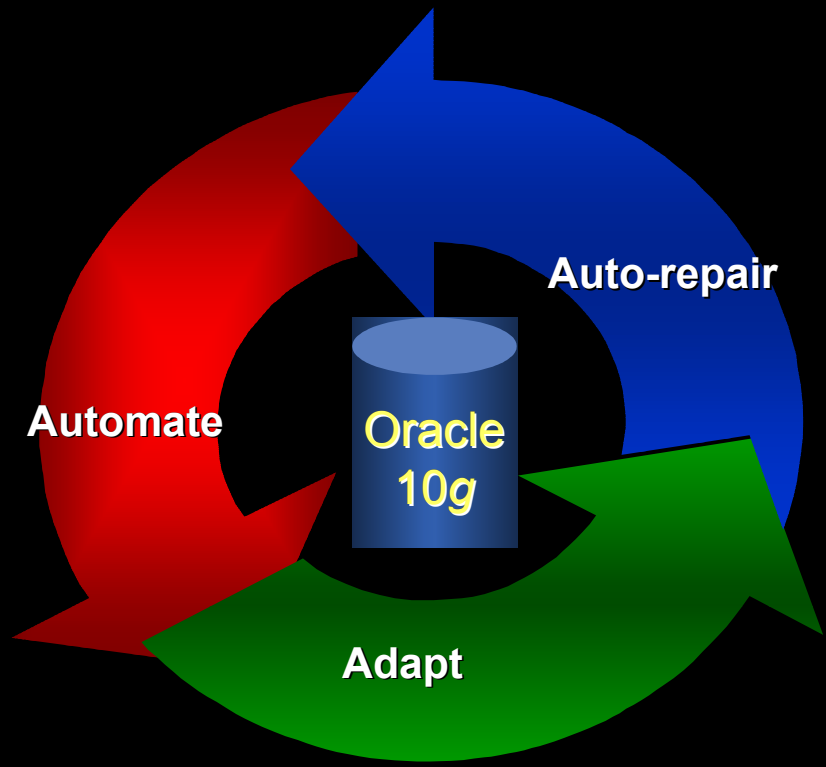
- Tools
- Utilities
- Documentation

- … that make it easier for partners to integrate the installation and configuration of the Oracle database into their application.

# The Second Challenge: Self-managing Database

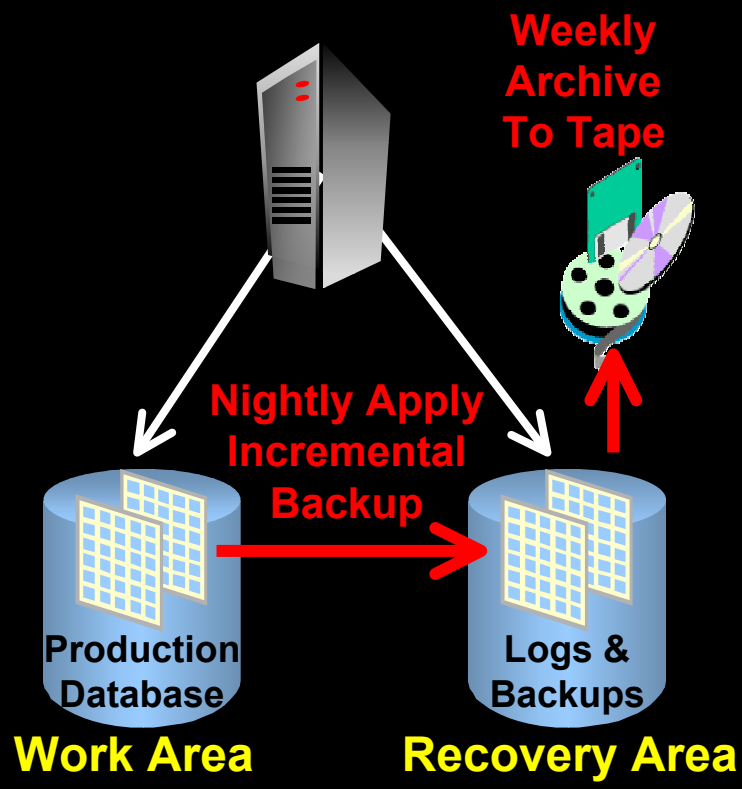
# Self-managing Database

- Once deployed, an embedded database must be self-managing. It must
  - Automate routine administrative tasks
  - Adapt to workload variations to prevent problems
  - Auto-repair if problems do happen



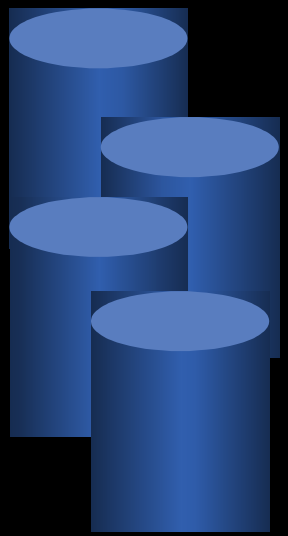
# Automate Routine Tasks: Backup & Recovery

- Use RMAN
- Use Unified Scheduler to configure regular, scheduled backups
- Use Recovery Area for on-disk backups
  - Recovery Area is self-managing
    - old files aged out, current files maintained
- Perform incremental backups
  - Only changed blocks backed up — fast and space efficient
  - Backed up files can be merged with the original
  - You perform a full database backup only once!



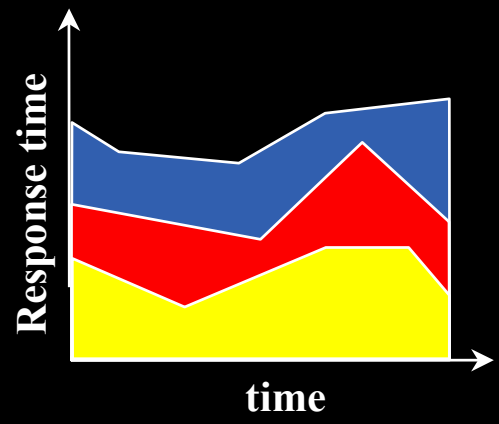
# Automate Routine Tasks

- Space Management Automation
  - Use Automatic Undo Management: No more rollback segment space and object management (Oracle9i)
  - Use locally managed tablespaces with auto-allocate and auto-extend (Oracle9i)
    - No more external defragmentation required
    - No more extent management
  - Automate segment shrink for tables and indexes to run in the management window
    - More efficient space management
    - Reduces occurrence of out-of-space conditions
  - Oracle Managed Files (OMF)
    - Transparently manages creation and deletion of Oracle database files



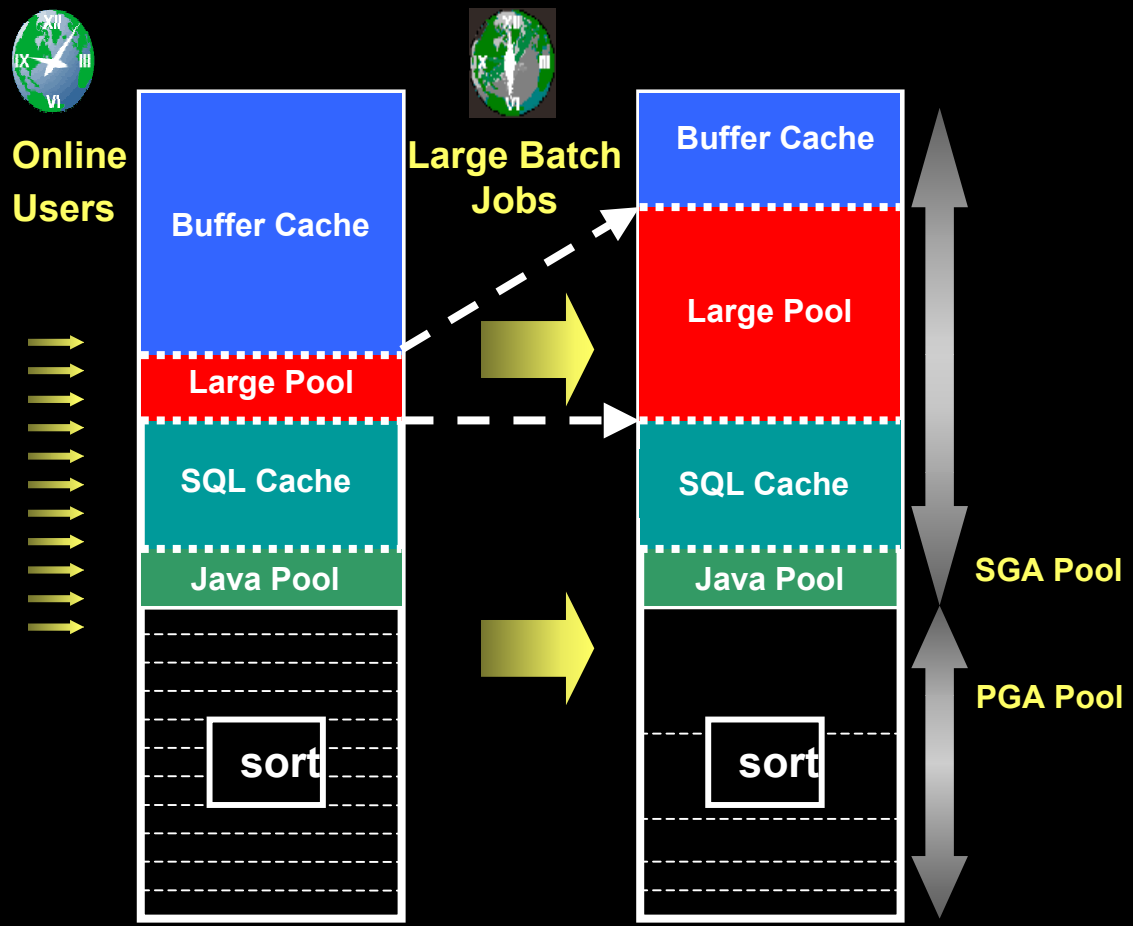
# Automate Routine Tasks

- Performance Management
  - Ensure automatic optimizer statistics collection is enabled
  - Enabled by default
  - Runs in management window
  - Job CPU usage can be controlled using Resource Manager
  - Superior query optimization



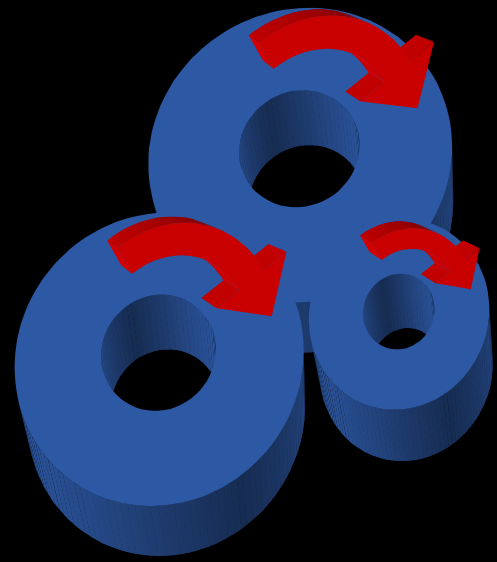
# Configure Adaptive Systems

- Use Automatic Memory Tuning (SGA & PGA)
  - Tunes to different workloads by dynamically
  - Tuning actions based on proactive analysis of performance statistics and internal simulations
  - More efficient use of shared memory



# Configure Adaptive Systems

- Use Automatic Undo Retention Tuning
  - Dynamically tunes the retention of undo information based on available resources and user activity
  - Superior transaction undo optimization
  - More efficient space utilization of Undo tablespace

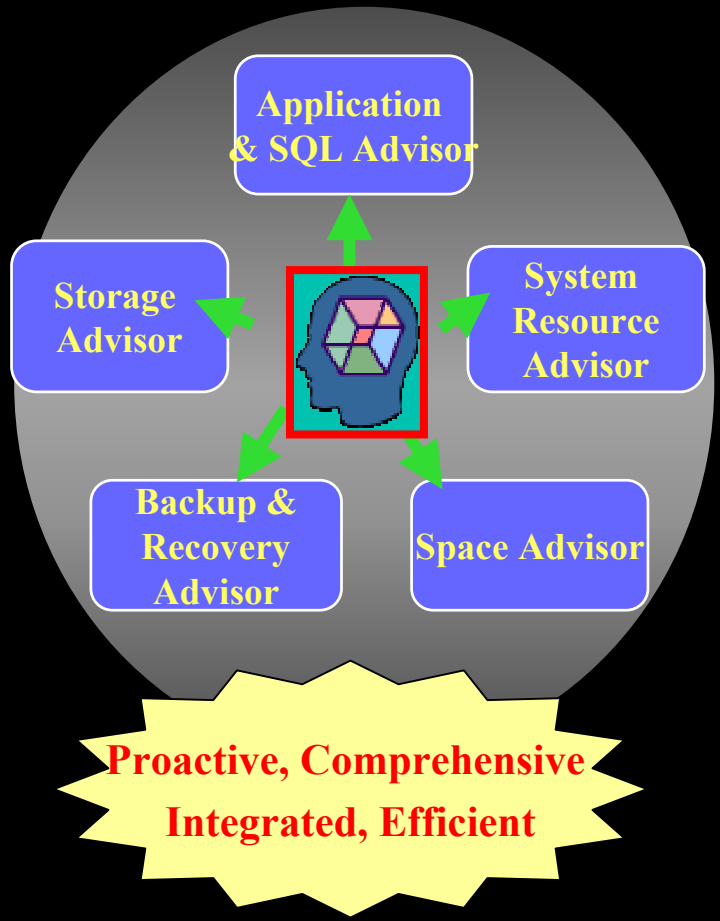


# Auto-repair: Graceful Exception Handling

- Use proactive alerts to catch exception conditions
  - Space pressure
    - Tablespace running out of space
    - Resumable session suspended
  - ORA-1555
  - Backup space problems: Recovery Area alert
- Define fix-it jobs to handle exceptions
  - Use Oracle Managed Files (OMF) to facilitate space
  - Use segment shrink, addition of datafile, etc., for space pressure problems
  - Use Undo Advisor to determine size of Undo tablespace for ORA-1555 errors
  - Age out old files from Recovery Area
  - Merge incremental backup files
  - Perform full database backup

# Easy Problem Diagnostic: ADDM

- Provide interface that calls ADDM in the background and generates report
- ADDM provides comprehensive, real-time performance picture of the database
- Identifies problem root-causes (not just symptoms) and offers remedies
- Runs proactively in the background
- Integrates with all advisors to provide guided problem resolution



# Easy Problem Diagnostic: Server Generated Alerts

- Use Server Generated Alerts to diagnose non-performance problems
- Provide interface to views DBA_ALERT_HISTORY and DBA_OUTSTANDING_ALERTS for problem diagnosis
- Optionally provide tool that regularly reports on alerts generated

# Third Challenge: Maintenance & Support

# Maintenance & Support

- Patch Management
  - Use ECM Patch Wizard for
    - Automatic identification of customers where particular patch is applicable
    - Automatic identification of patches applicable to a given customer
    - Download relevant patches
  - Patch can be placed on ISV website or on a CD for end-customer download/application
  - ISVs can put a wrapper around the patch for silent application where applicable

- System Upgrade
  - Use DBUA to perform silent upgrades
  - Upgrade process can be customized
    - XML files used to drive upgrade process
    - Scripts can be added
  - Implement best practices (pre-upgrade database backup, replacing obsolete parameters, verify successful completion)
  - Guide administrators in activating new features

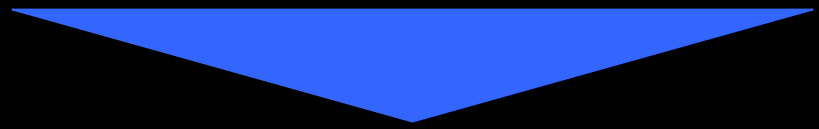
# Embedded License

# What is an Embedded Software License?

- Can only be used to run the licensed application
- Oracle must be installed as an integrated component by the application's installation routine
- An Oracle license must be sold with each application sale
- License type can not be upgraded or migrated to full use license
- User minimums apply
- ISV provides front-line support

# Conclusion

- Oracle Database 10g
  - is easy to deploy
  - is self-managing
  - provides easy problem diagnostic capability
  - makes software maintenance simple and straightforward



Oracle Database 10g is ideal for embedding

**Reminder –**
**please complete the OracleWorld online session survey**

**Thank you.**

QUESTIONS
ANSWERS

ORACLE®