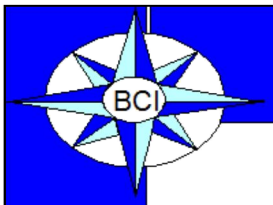
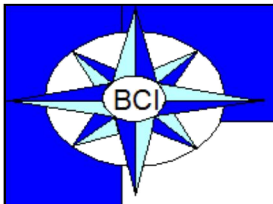


1

Installing the Oracle Database Software

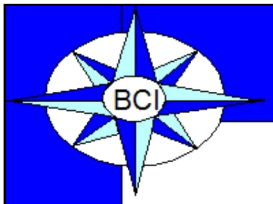


Terminal Learning Objective

ACTION: Install the Oracle RDBMS Software.

CONDITION: Given a student handout and the Oracle DBA Handbook.

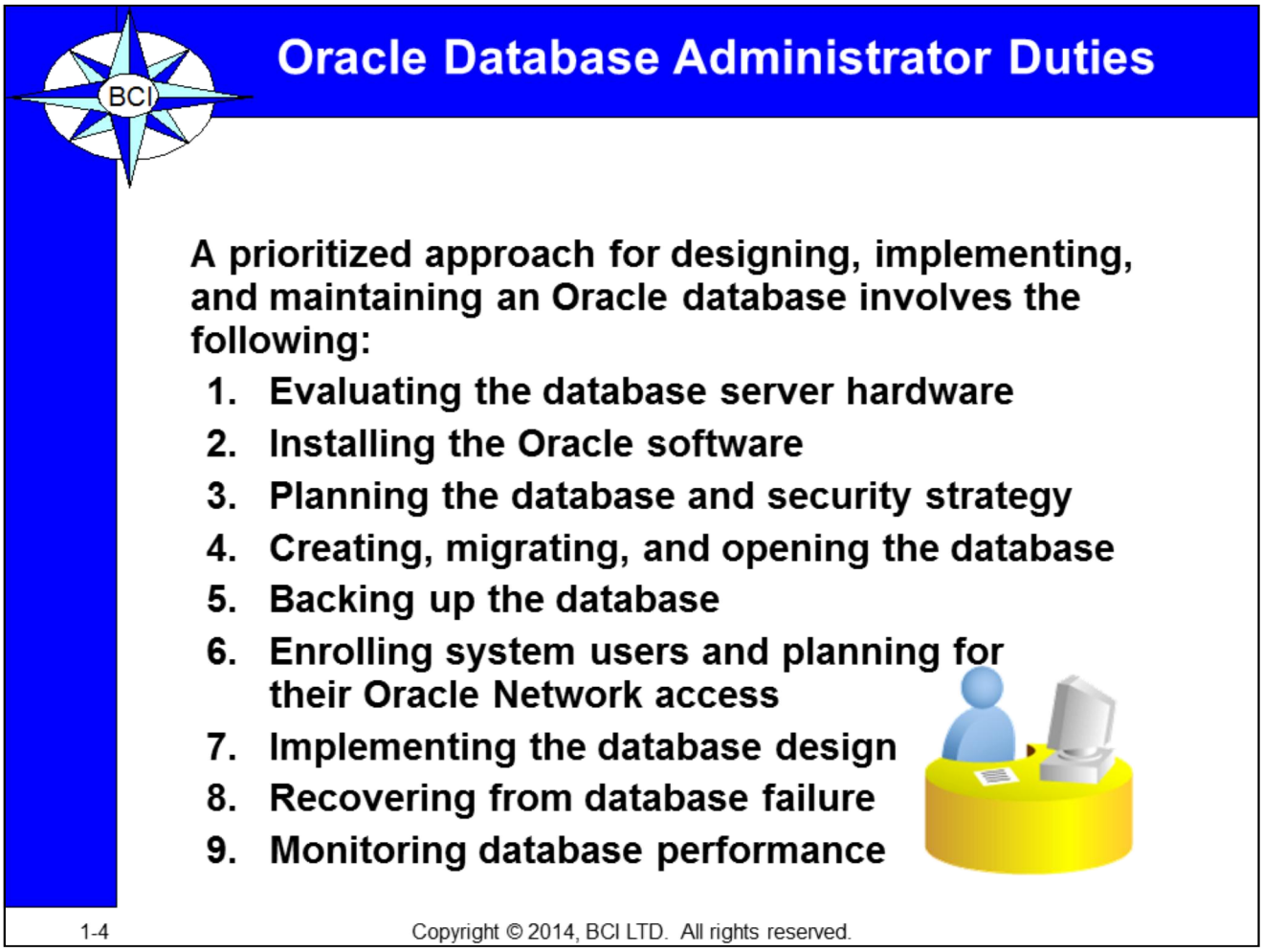
STANDARD: Students must successfully install the Oracle RDBMS Software during a scenario-based performance evaluation.



Lesson Overview

At the completion of this lesson, you should be able to:

- Describe your role as a database administrator (DBA), and explain typical tasks and tools
- Plan an Oracle database installation
- Use Optimal Flexible Architecture (OFA)
- Install the Oracle software by using Oracle Universal Installer (OUI)



Duties of an Oracle Database Administrator

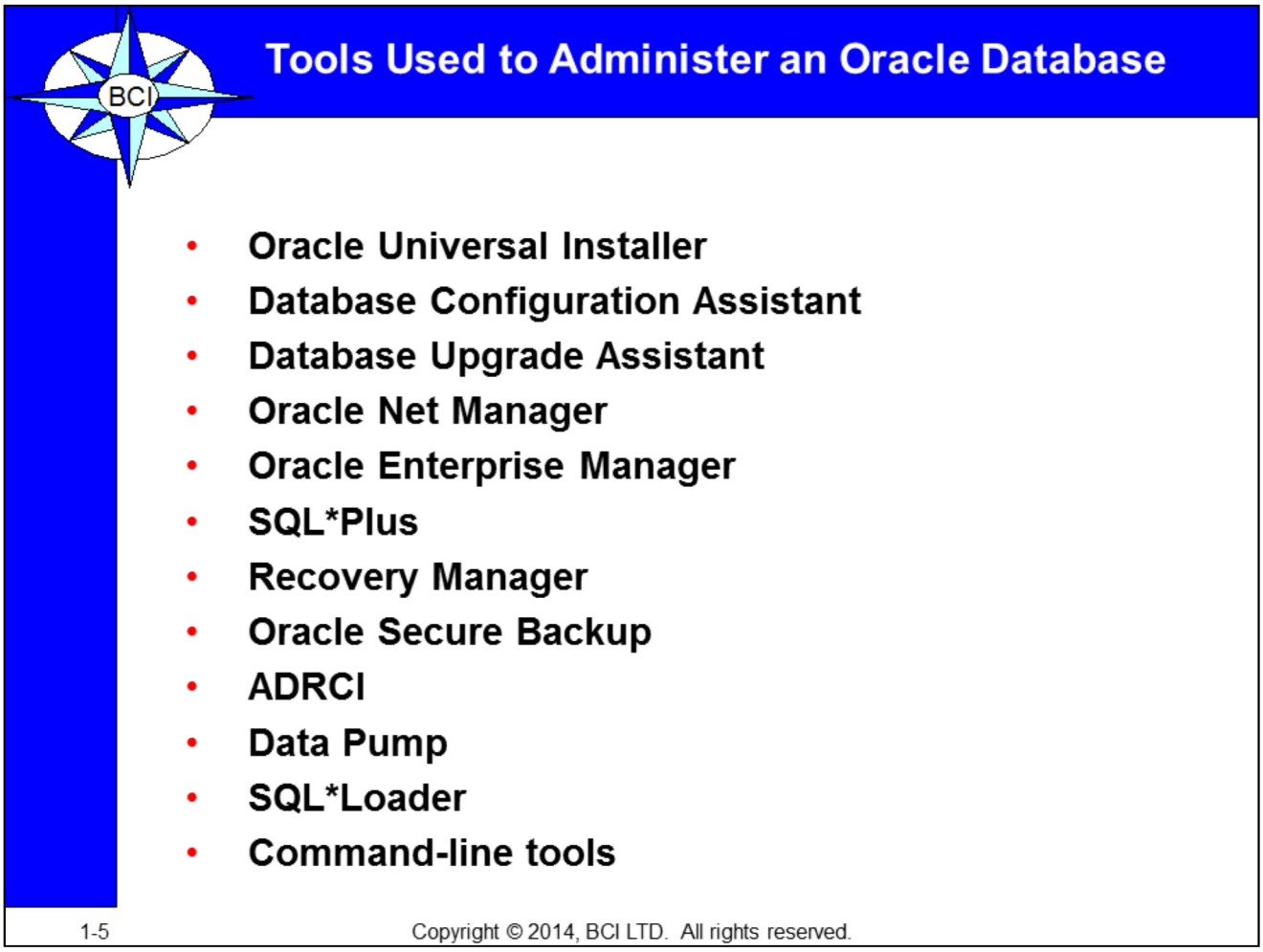
A DBA is typically responsible for installing the Oracle software and creating the database. As a DBA, you may be responsible for creating database storage structures, such as tablespaces. In addition, you may create the schema or set of objects to hold application data.

You must ensure that the database is available for users. You can accomplish this by starting up the database, backing up the database on a regular basis, and monitoring the performance of the database. These tasks should be performed within the framework of a security strategy.

As you proceed through the lessons in this course, you learn how to perform each of these duties. You can also refer to the *Oracle Database Administrator's Guide* for additional information about each of the duties outlined in the slide.

In this lesson, you focus on installation. For this core task, consider the following subtasks:

- Understand how the installation fits into the overall technical architecture of an organization.
- Review (and update) capacity plans.
- Choose the database software (required version and options).
- Ensure that system requirements are met for all chosen elements.



Tools Used to Administer an Oracle Database

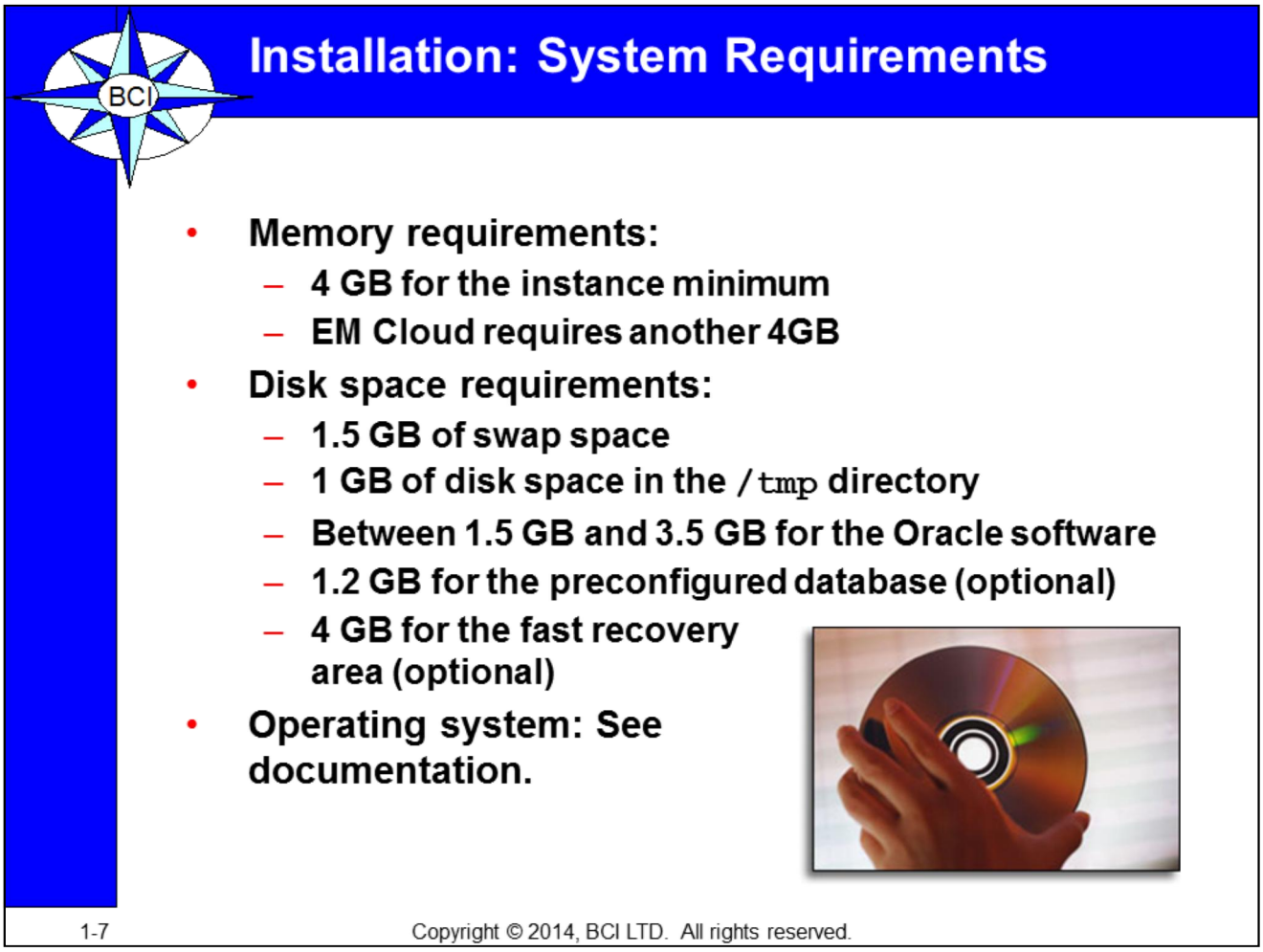
You can use the following tools for installation and upgrade:

- **Oracle Universal Installer (OUI):** Oracle Universal Installer installs your Oracle software and options. It can automatically launch the Database Configuration Assistant (DBCA) to create a database.
- **Database Configuration Assistant (DBCA):** It creates a database from Oracle-supplied templates. It enables you to copy a preconfigured seed database. Alternatively, you can create your own database and templates.
- **Database Upgrade Assistant (DBUA):** This tool guides you through the upgrade of your existing database to a new Oracle release.
- **Oracle Net Manager:** This is used to configure network connectivity for your Oracle databases and applications.

Tools Used to Administer an Oracle Database (continued)

The following tools are used to manage your Oracle instance and database:

- **Oracle Enterprise Manager Cloud Control (EM):** EM combines a graphical console, agents, common services, and tools to provide an integrated and comprehensive system management platform for managing Oracle products. After you have installed the Oracle software, created or upgraded a database, and configured the network, you can use Enterprise Manager as the single interface for managing your database. In addition to providing a Web-based user interface for executing SQL commands, it seamlessly interfaces with other Oracle components that are used to administer your database (for example, Recovery Manager and Scheduler).
  The three main Enterprise Manager tools that are used to administer an Oracle database are:
  - Enterprise Manager Database Express: Used to administer one database
  - Enterprise Manager Grid Control: Used to administer many databases at the same time
  - Enterprise Manager Java Console: Used to access tools that are not Web enabled
- **SQL*Plus:** SQL*Plus is the standard command-line interface for managing your database.
- **Recovery Manager (RMAN):** RMAN is an Oracle tool that provides a complete solution for the backup, restoration, and recovery needs of the entire database or of specific database files.
- **Oracle Secure Backup** provides tape backup management for the Oracle ecosystem, which includes:
  - Oracle database protection to tape through integration with Recovery Manager
  - Seamless support of Oracle Real Application Clusters (RAC)
  - Central administration of distributed clients and media servers including Oracle Application Servers, Oracle Collaboration Suites, Oracle home, and binaries
- **Data Pump:** Data Pump enables the high-speed transfer of data from one database to another. For example, you may want to export a table and import it into another database.
- **SQL*Loader:** The SQL*Loader utility enables the loading of data from an external file into an Oracle database. It is one of several Oracle utilities that you can use to load data into database tables.
- **Command-line tools:**
  - To administer Enterprise Manager Cloud Control, use:
    ```
    emctl start | status | set | stop
    ```
  - To administer the listener, use:
    ```
    lsnrctl help | start | status | stop
    ```

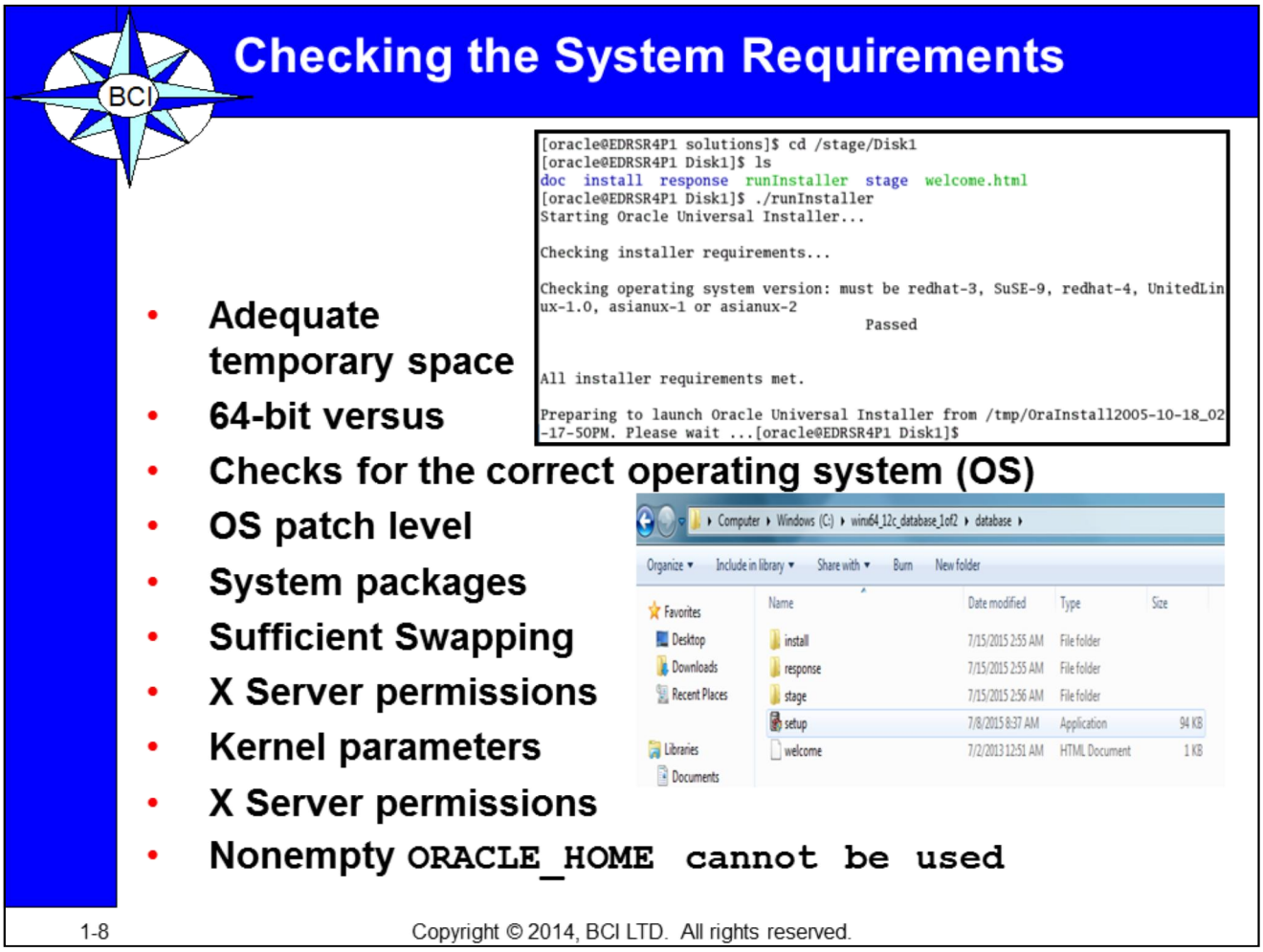


Installation: System Requirements

- A standard installation can be completed on a computer with 2 GB of RAM and 1.5 GB of swap space or larger.
- Depending on the activity level of the machine on which you are installing the Oracle database software, the standard installation can complete in 20 minutes or less.
- Some installation details:
  - Oracle Database 12c ships only one seed database template.
  - Duplicated files are removed.
  - Many other products and demonstrations are installable from additional CDs.

The hardware requirements listed in the slide are minimal requirements across all platforms. Your installation may have additional requirements (especially disk space).

Note: An Enterprise Edition installation type that includes a standard seed database is referred to as a "standard installation."



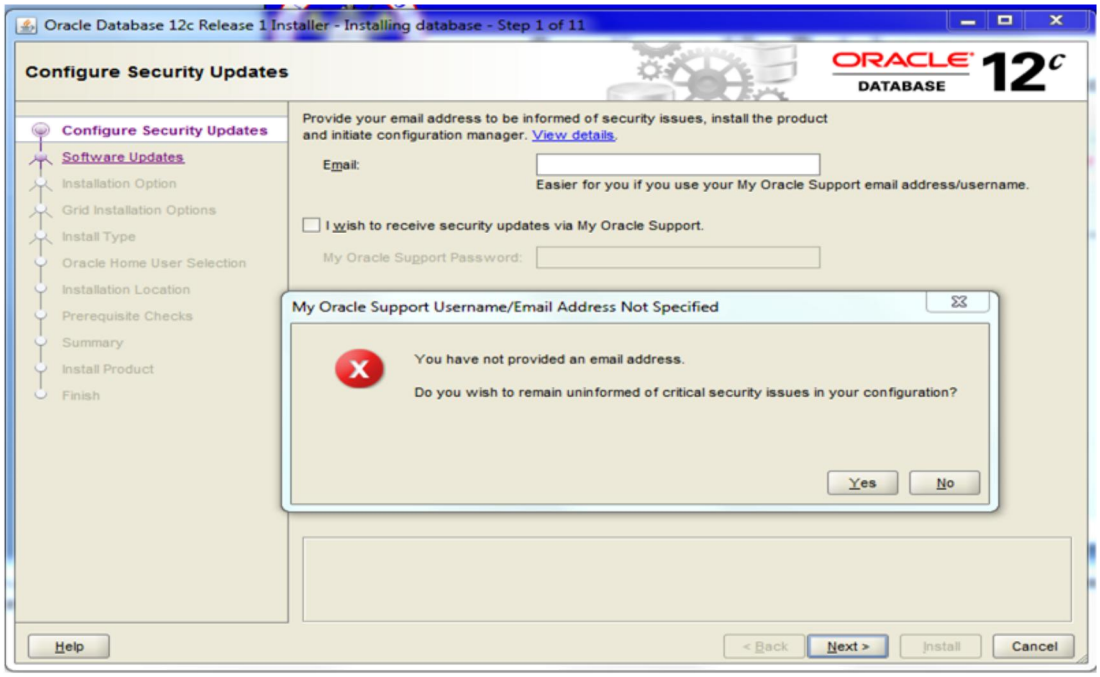
Checking the System Requirements

The Oracle Database 12c installation automates most of the prerequisite checks:

- Adequate temporary space is checked for. It is determined what the minimum temporary space requirements are for installation and configuration, and those requirements are validated during the installation process.
- 64-bit installations are prevented from being installed into Oracle homes with 32-bit software already installed (and vice versa).
- On the Linux platform, RedHat-7.0,6.0, 5.0, 4.0, Asianux 1.0, 2.0, and SUSE Linux E.S. 9.0 are certified.
- The installation process checks whether all the required OS patches are installed.
- The installation process checks whether all the required system and kernel parameters are set correctly.
- The installation process verifies that the `DISPLAY` environment variable is set and that the user has sufficient permissions to display to the specified `DISPLAY`.
- The installation process verifies that the system has sufficient swapping set.
- The installation process verifies that the Oracle home into which the new installation is being performed is either empty or is one of a handful of supported releases on top of which Oracle Database 12c can be installed, and that they are registered in the Oracle inventory.

Creating a 12c Database

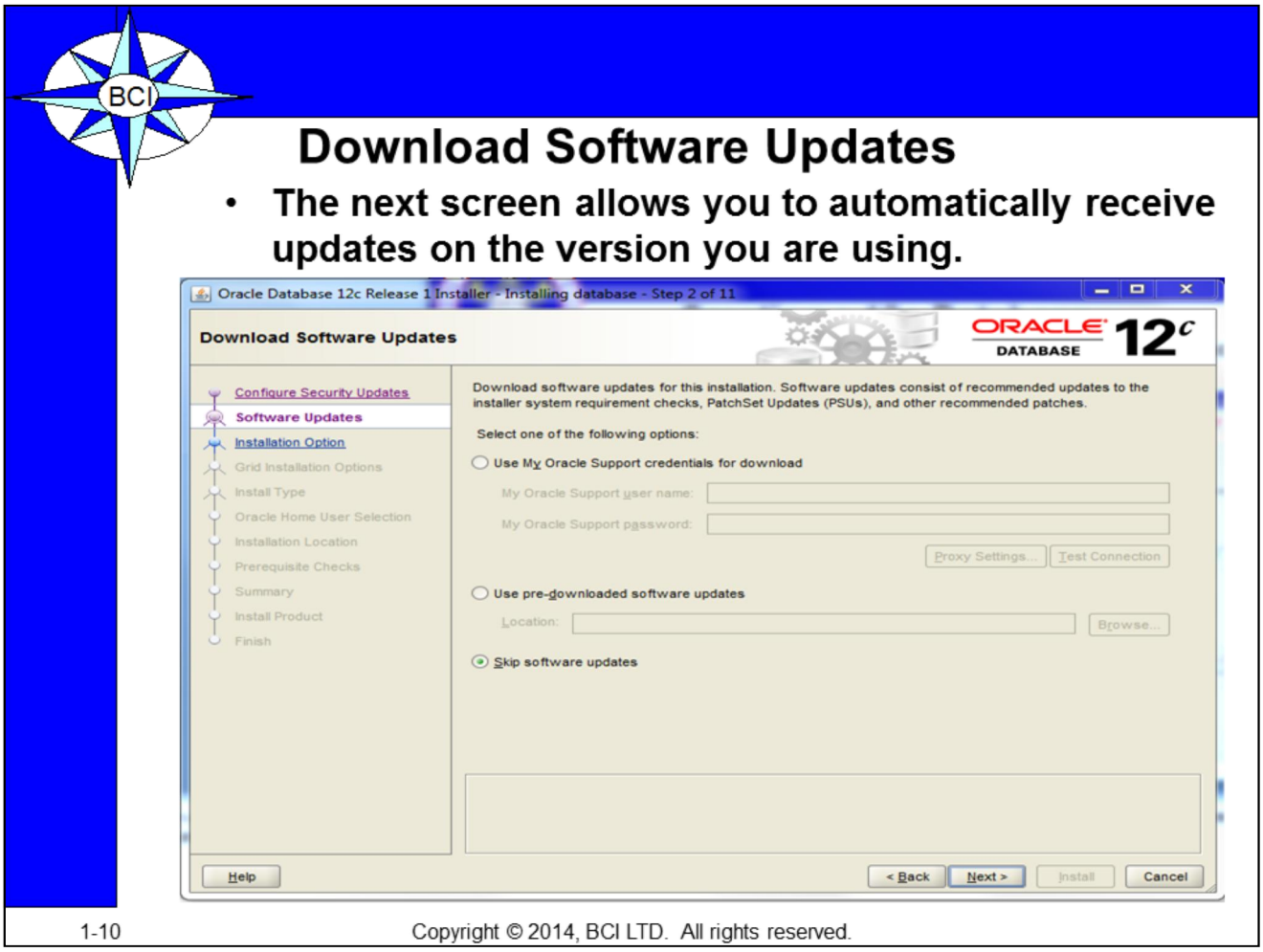
- Linux, Windows and Unix all have the same look and feel when creating a new 12c database.



1-9

Since the students will not have access to My Oracle Support, we will deselect the security updates. Then click Next. You will be provided a dialogue box

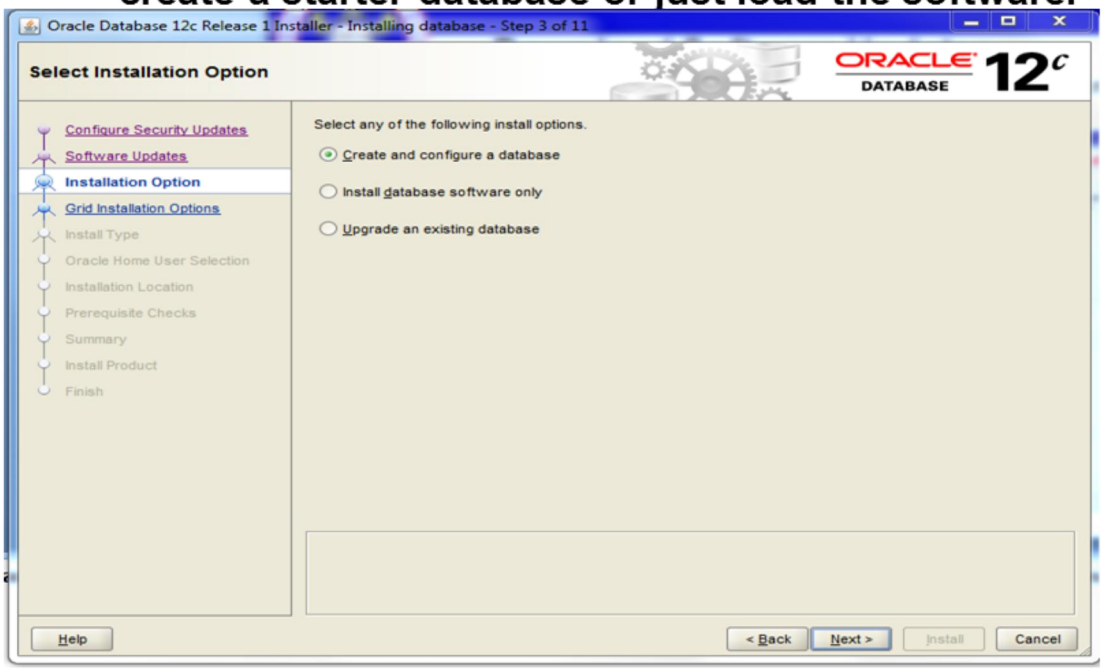
Which indicates you will not receive updates. Click Yes to continue.



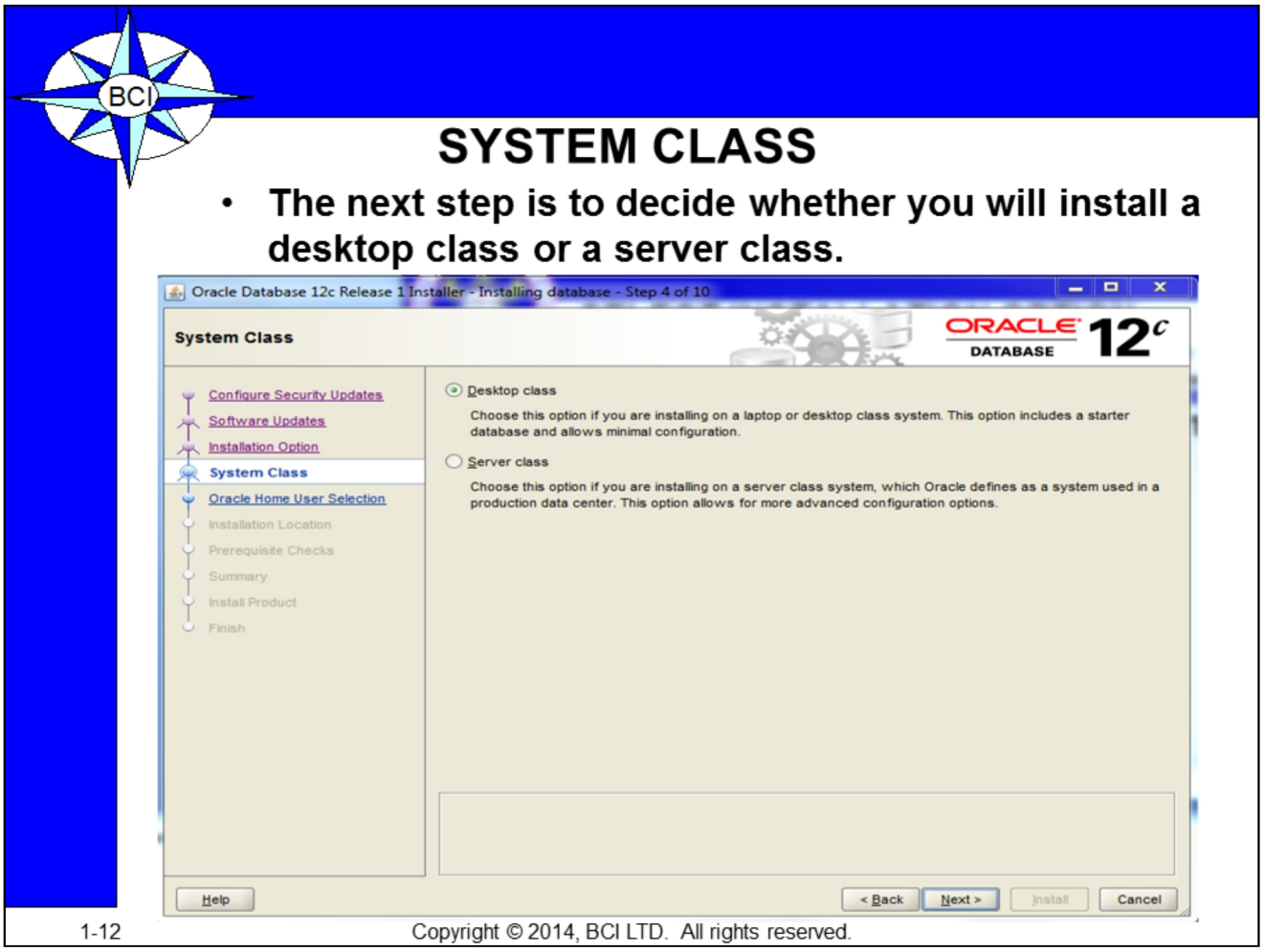
Select the default of Skip software updates. This will also be standard for the ARNG because we receive our updates from ARNG Headquarters.

SELECT INSTALLATION OPTION

- The next step is to select whether you want to create a starter database or just load the software.



Since we are starting with a brand new database, we will not be upgrading. Select Next as indicated.

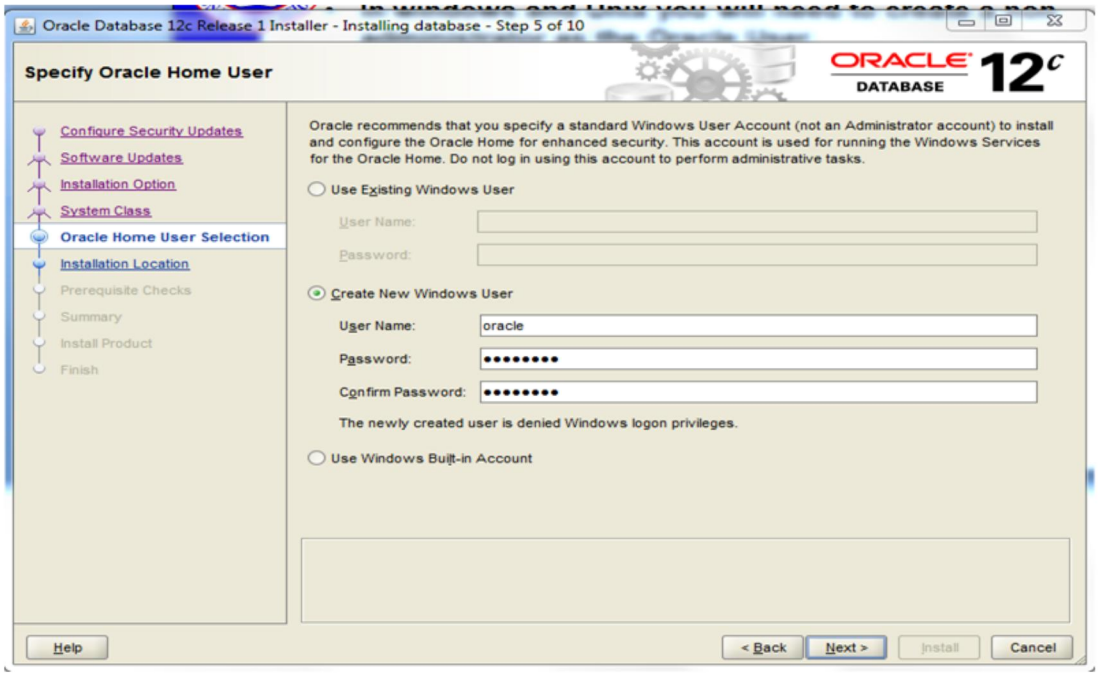


We will select the desktop class because or database is a test database and will be relatively small. Server class databases have extra options which can include RAC and features not

Available in the Desktop version. However, for this class, the desktop version has all the features we need and will discuss in this class.

Windows Oracle Home User

- In windows and Unix you will need to create a non administrator as the Oracle User.



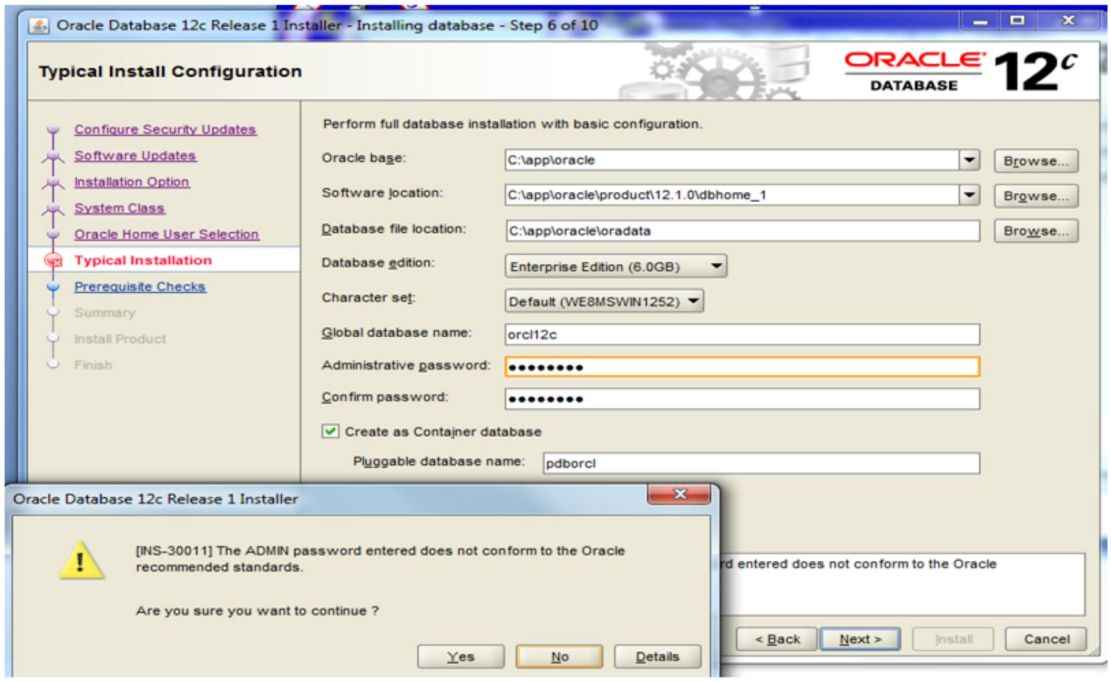
In Linux and Unix, it was common to create an oracle user who would administer the database but not be root. In windows, this is now an option. In the screen provided,

You can see where we have created an oracle user. The password was set to password for simplicity sake and this is not something you would do at your production sites.

Click next to continue.

TYPICAL INSTALLATION

- The next step is to identify the OFA or Oracle Base and Oracle Home and the database sid



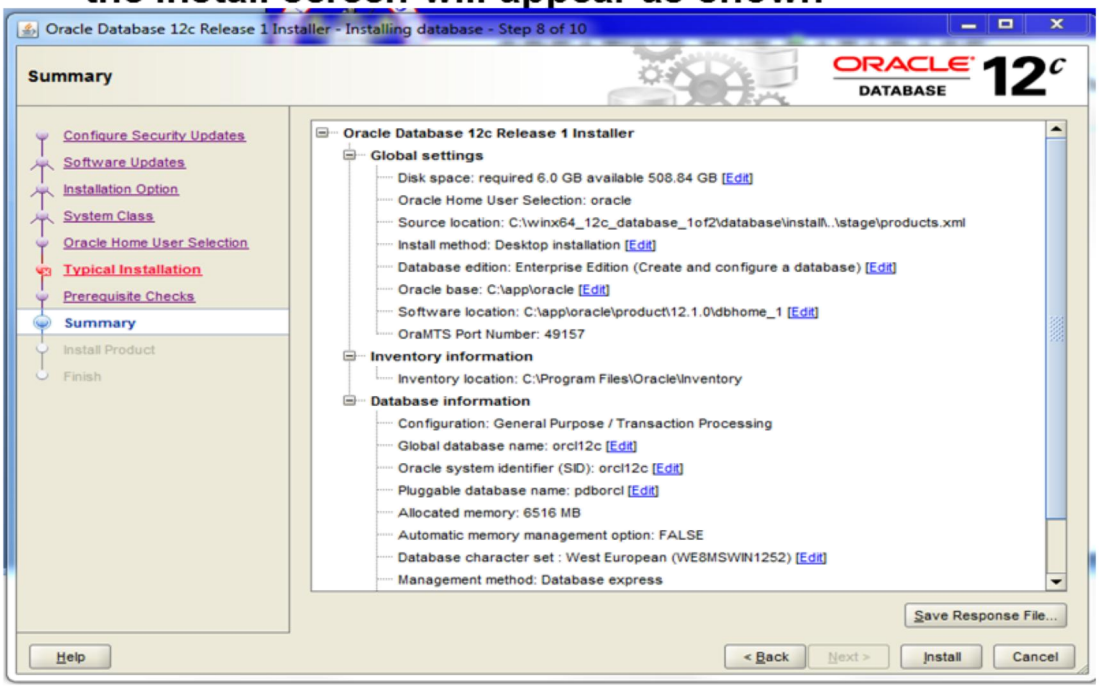
The Oracle Database Installation screen will prompt you for passwords. If the password does not comply with Oracle's password security,

You will be prompted as shown identifying that the ADMIN password does not comply. In this case, for ease of use, we are using a

Non-compliant password of password. So click on the Yes button to continue.

CREATING THE DATABASE

- If you have enough memory (4 gb minimum) then the Install screen will appear as shown

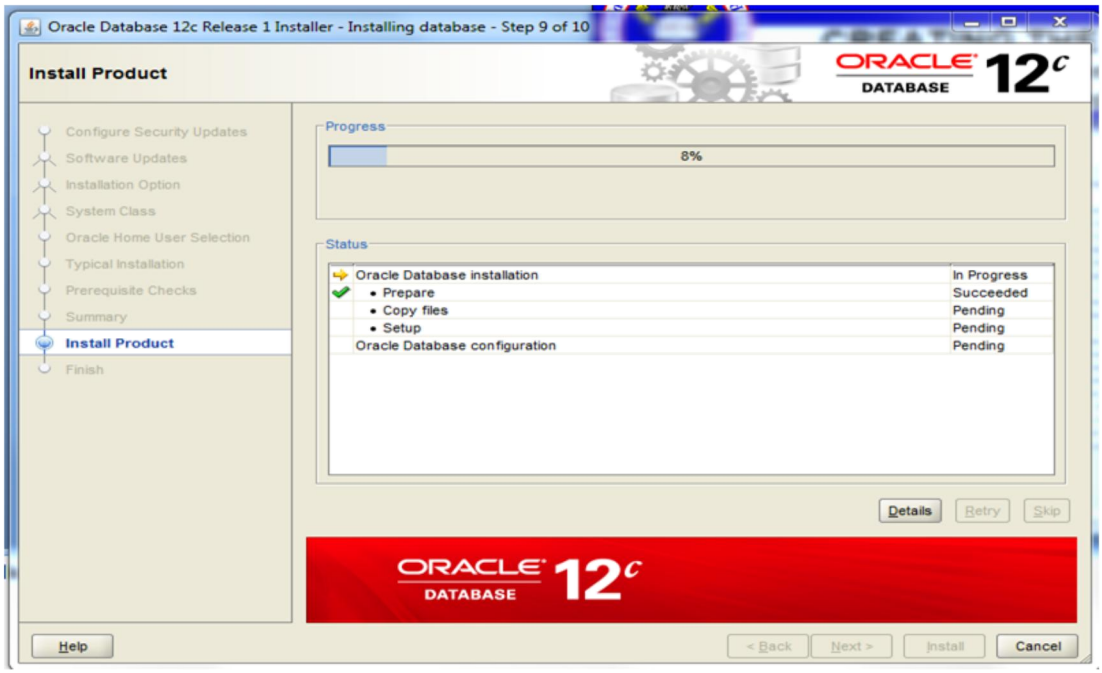


1-15

Click on the Install button to begin your database install. This may take up to 20 minutes.

Database Install

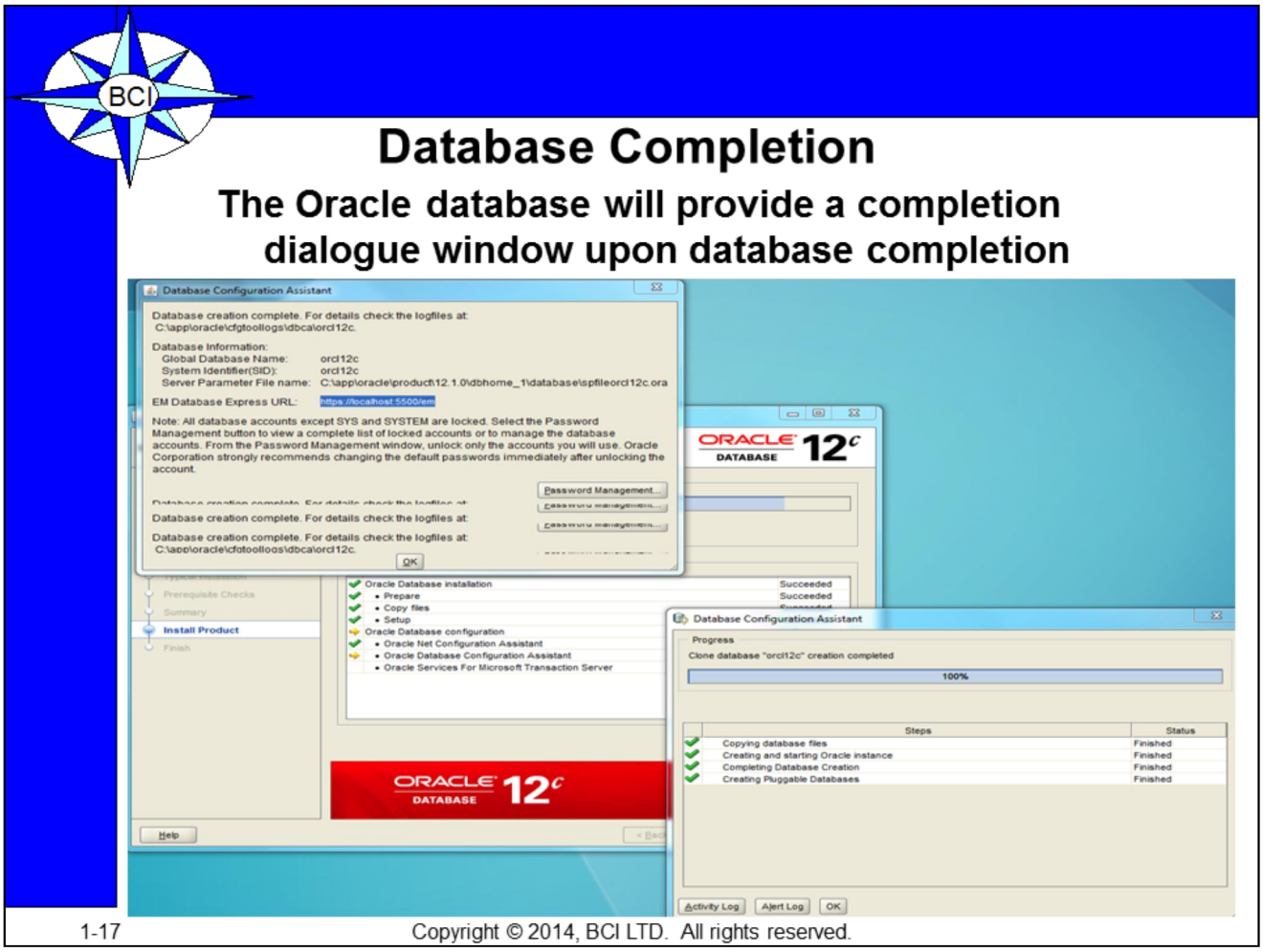
- The Install Screen will identify what percentage of the database installation is complete as shown



1-16

Oracle will copy the appropriate files required for the database first. Then it will begin the setup and configuration of an Oracle Database. Upon completion,

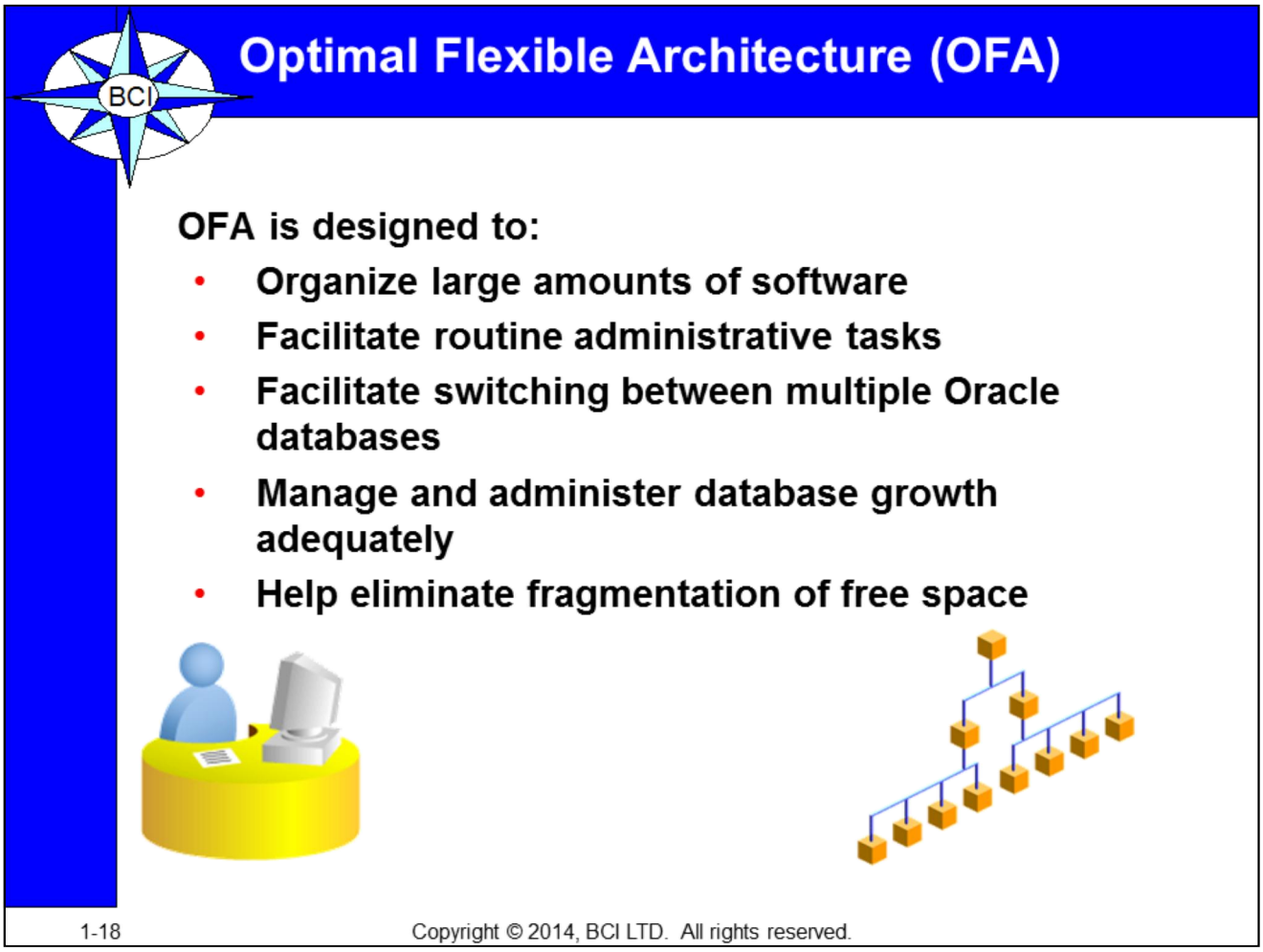
Oracle will provide a screen that shows how to connect to Enterprise Manager Express. This is new on Oracle 12c database.



1-17

Click on the OK button to complete the database installation. The original 12c window will then specify a close button. Click on the Close button upon

Database completion.



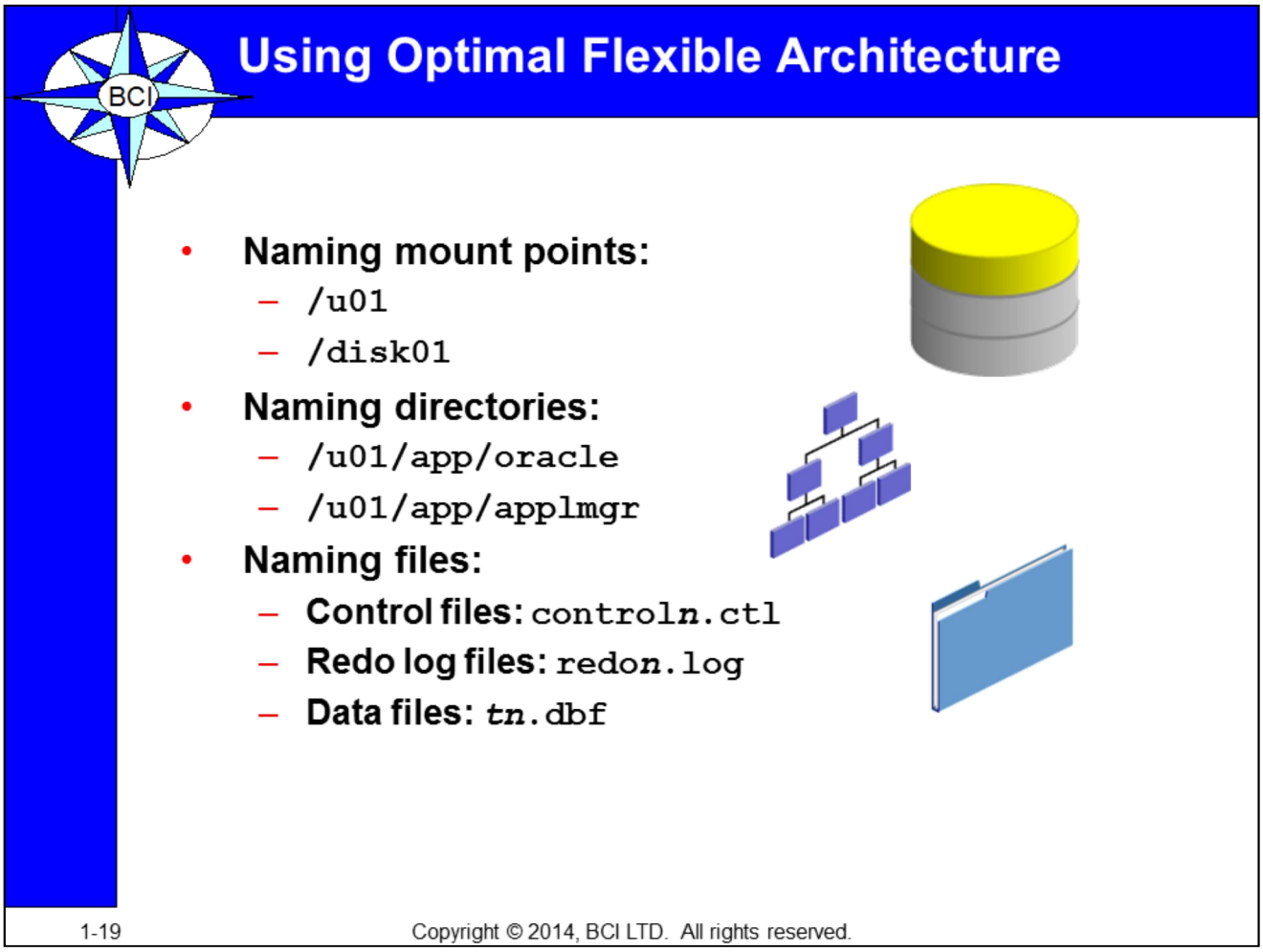
Optimal Flexible Architecture (OFA)

OFA is a method for configuring the Oracle database and other databases. OFA takes advantage of the capabilities of the OS and disk subsystems to create an easy-to-administer configuration that allows maximum flexibility for growing and high-performance databases. The methods described here are the basics of OFA.

OFA is designed to:

- Organize large amounts of complicated software and data on the disk to avoid device bottlenecks and poor performance
- Facilitate routine administrative tasks, such as software and data backup, which are often vulnerable to data corruption
- Facilitate switching between multiple Oracle databases
- Adequately manage and administer database growth
- Help eliminate fragmentation of free space in the data dictionary, isolate other fragmentation, and minimize resource contention

For details about the goals and implementation of OFA, refer to the *Oracle Installation Guide for UNIX Systems*.



Using Optimal Flexible Architecture

At the core of OFA is a naming scheme that gives you a standard to apply to your mount points (which are often the physical disks), directories and subdirectories on those mount points, and finally the files themselves.

Mount point syntax: Name all mount points by using the */pm* syntax, where *p* is a string constant and *m* is a unique fixed-length key (typically a two-digit number) used to distinguish each mount point. The examples of mount points are `/u01` and `/u02`.

Home directories syntax: Name all home directories by using the */pm/h/u* syntax, where *pm* is a mount point name, *h* is a standard directory name, and *u* is the name of the owner of the directory. The examples of OFA-compliant home directories are:

```
/u01/app/oracle
/u01/home/oracle
```

Software directories syntax: Store each version of the Oracle software in a directory matching the pattern: */pm/h/u/product/v*. Here, `product` is a literal and *v* is a variable for the version number. This syntax helps to enable the OFA feature of simultaneously executing multiple versions of application software. An OFA-compliant installation of the Oracle Database 12c version 10.2.0 looks like:

```
/u01/app/oracle/product/10.2.0
```

Using Optimal Flexible Architecture (continued)

Naming subdirectories syntax: To facilitate the organization of administrative data, you should store database-specific administration files in subdirectories matching the pattern: `/h/admin/d/a/`. Here, `h` is the Oracle software owner's home directory, `admin` is a literal, *d* is the database name, and *a* is a subdirectory for each of the database administration files. The following is a list of these administration file subdirectories:

- `adhoc`: Ad hoc SQL scripts for a particular database
- `arch`: Archived redo log files
- `adump`: Audit files (Set the `AUDIT_FILE_DEST` initialization parameter to the `adump` directory. Clean out this subdirectory periodically.)
- `Bdump`: Background process trace files
- `Cdump`: Core dump files
- `Create`: Programs used to create the database
- `Exp`: Database export files
- `Logbook`: Files recording the status and history of the database
- `Pfile`: Instance parameter files
- `udump`: User SQL trace files

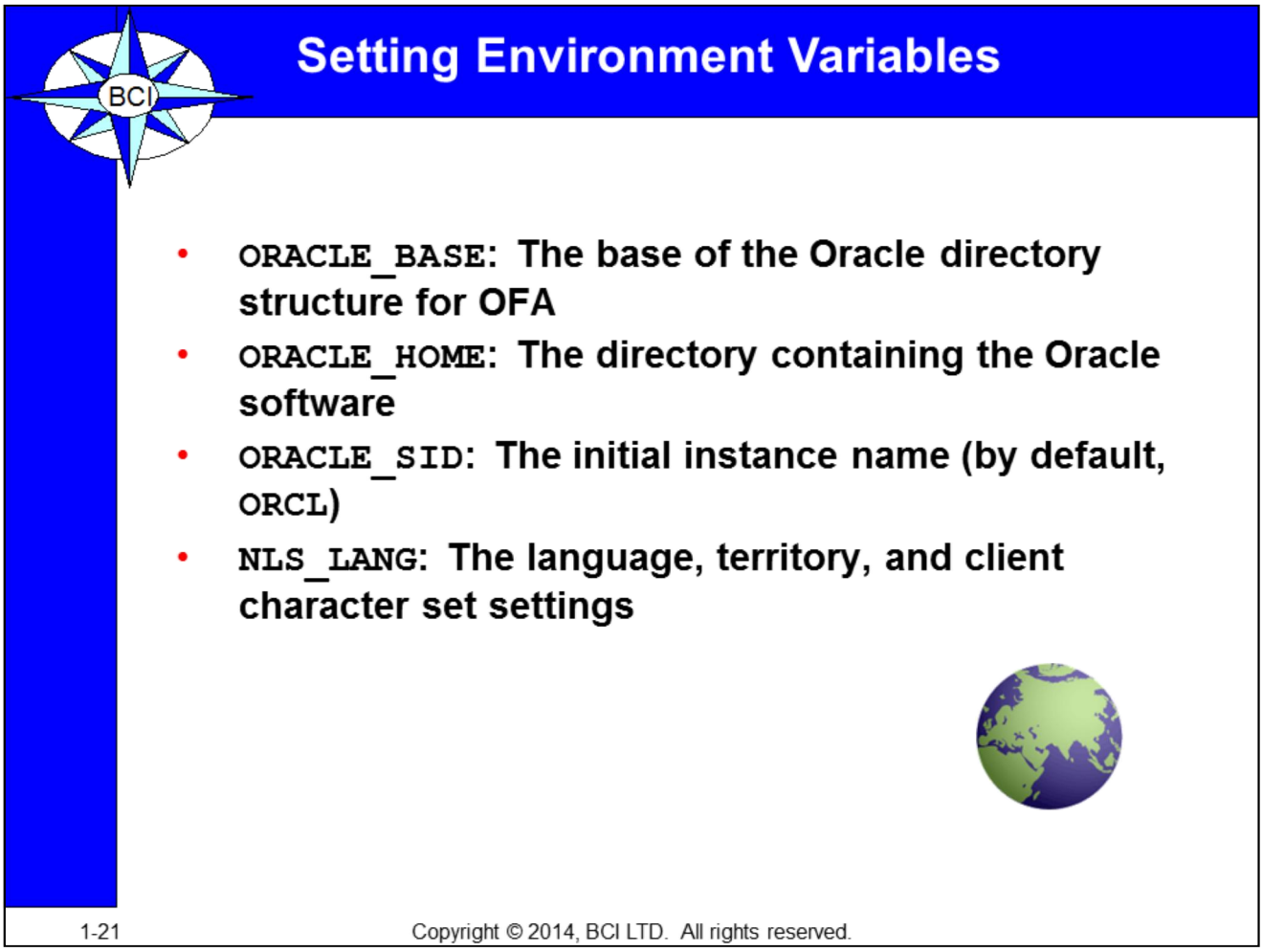
File-naming syntax: The following naming convention for database files ensures that they are easily identifiable:

- Control files: `/pm/q/d/control`*n*`.ctl`
- Redo log files: `/pm/q/d/redo`*n*`.log`
- Data files: `/pm/q/d/t`*n*`.dbf`

The variables used in these file names are:

- *pm*: A mount point name as described previously
- *q*: A string distinguishing the Oracle data from all other files (commonly named `ORACLE` or `oradata`)
- *d*: The value of the initialization parameter, `DB_NAME` (the database name)
- *t*: An Oracle tablespace name
- *n*: A two-digit string

Note: Do not store files other than control files, redo log files, or data files associated with the *d* database in the */pm/q/d/* path.



Setting Environment Variables

There are many Oracle environment variables, and those mentioned here are very important to a successful installation and use of an Oracle database. None of these are required to be set, but by setting them before the installation, you can avoid future problems.

- `ORACLE_BASE`: Specifies the base of the Oracle directory structure for OFA. Use of this is optional, but if used, this can facilitate future installations and upgrades. It is a directory path, as shown in this example:

  ```
  /u01/app/oracle
  ```

- `ORACLE_HOME`: Specifies the directory containing the Oracle software. It is a directory path, as shown in this example:

  ```
  $ORACLE_BASE/product/12.2.0/dbhome_1
  ```

- `ORACLE_SID`: The initial instance name (by default, `ORCL`). It is a string of numbers and letters that must begin with a letter. Oracle Corporation suggests that a maximum of eight characters be used for system identifiers.

Setting Environment Variables (continued)

- NLS_LANG: Specifies the initial National Language Support (NLS) settings for a session in the form of *language_territory.character set*. For example, a setting of:

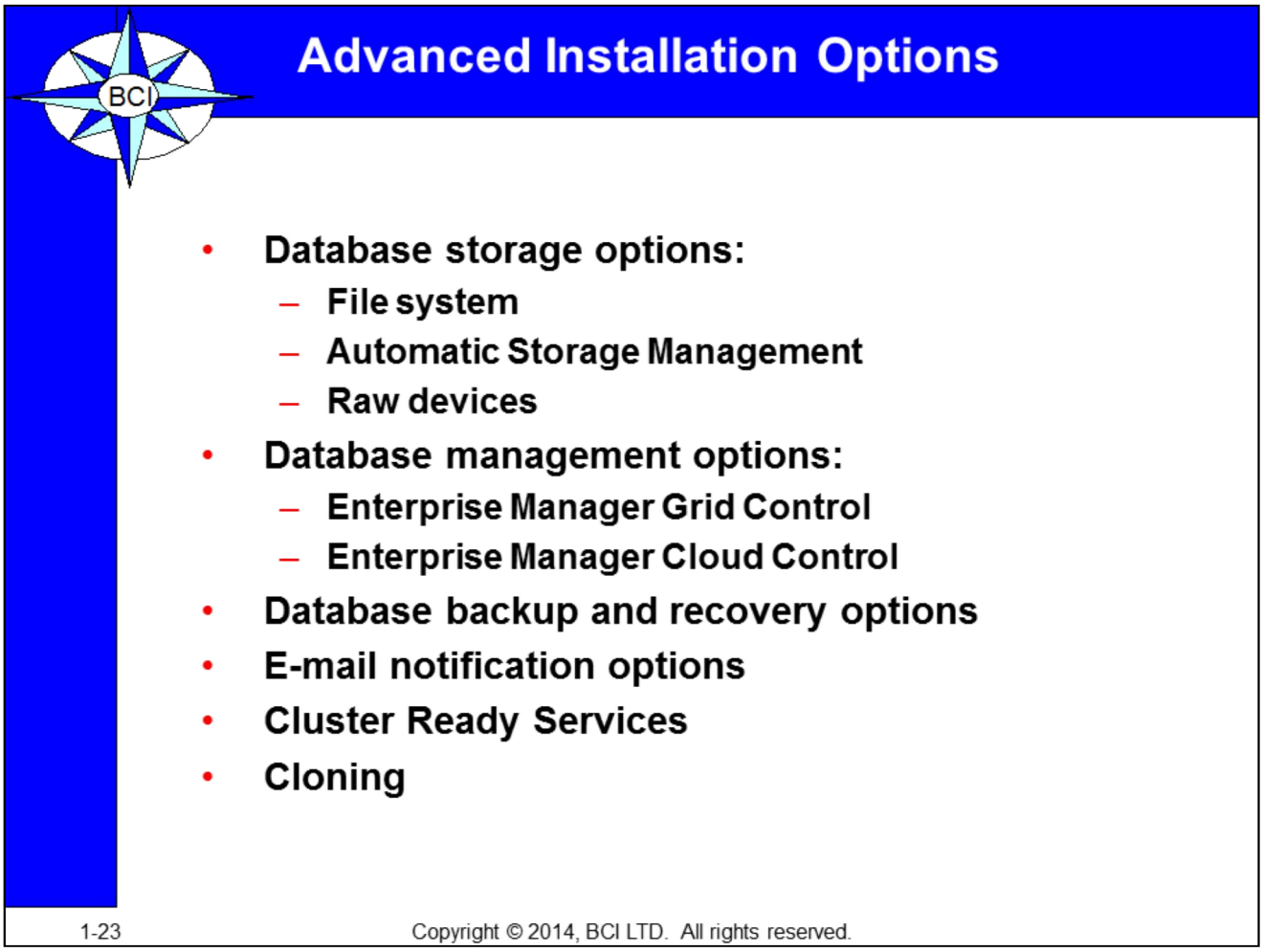
  ```
  AMERICAN_DENMARK.WE8MSWIN1252
  ```

  This sets the session to use the AMERICAN language for Oracle messages, alphabetical sorting sequence, day names, and month names. The territory is DENMARK, which sets the time format, date format, and numeric and monetary conventions. The character set of WE8MSWIN1252 instructs Oracle Net to convert character information to this character set. This is an environment variable in UNIX and a registry setting in Windows. You can query the actual NLS settings of your current session using:

  ```
  select * from nls_session_parameters;
  ```

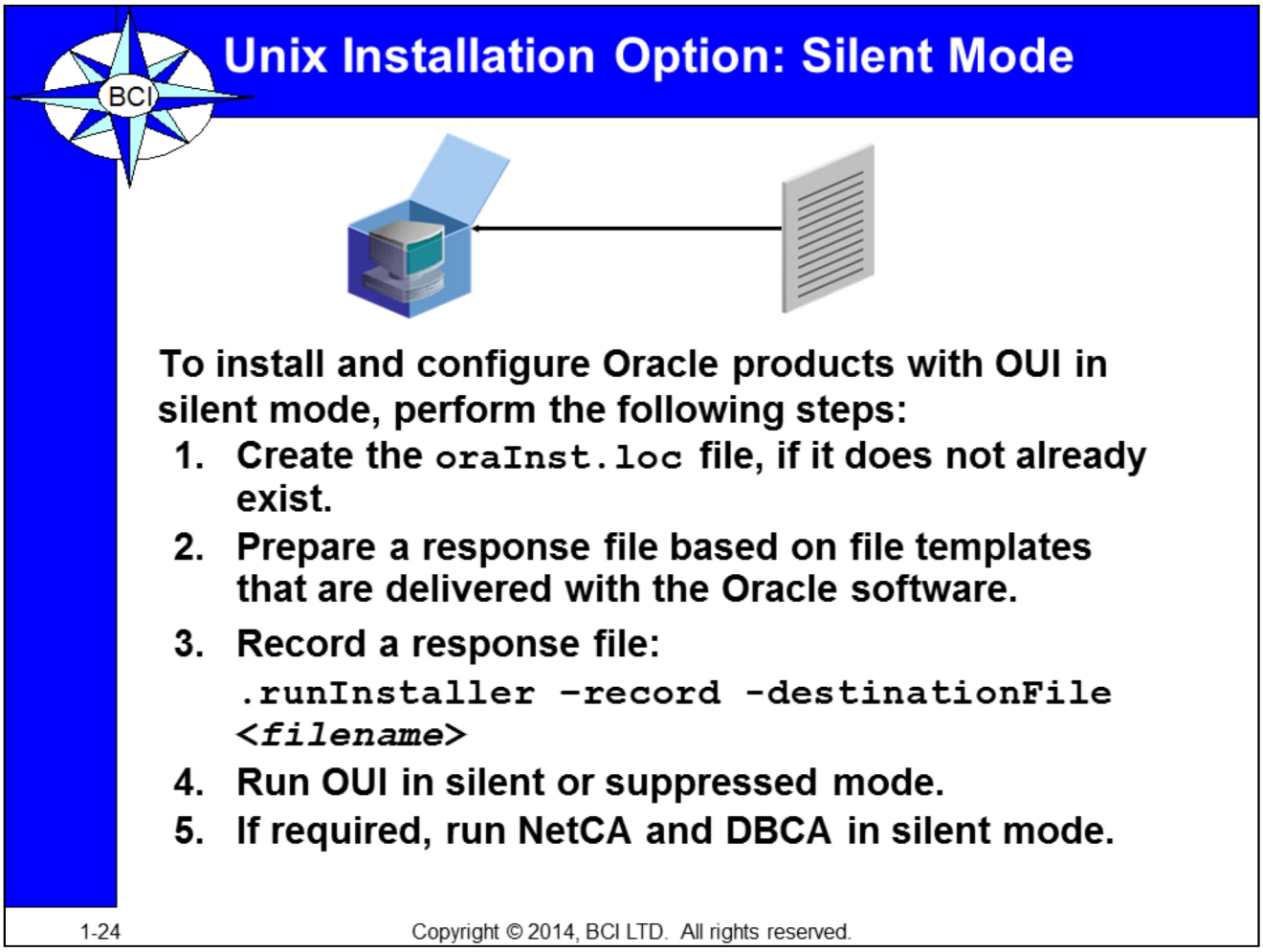
  For more information about valid languages, territories, character sets, and language support, refer to the *Globalization Support Guide*.

  Note: A Windows installation defaults the NLS_LANG values in the registry, where the *language* part originates from the keyboard language. This has the effect that the default installation on Windows with non-American keyboards will get the non-American value in the NLS_LANG setting. This, in turn, will default the NLS_SORT session variable to be different from "binary," which makes it difficult for the optimizer to use character-based indexes for sessions from this node.



Advanced Installation Options

- With OUI, you can create configurations that use Automatic Storage Management.
- You can install and configure the Enterprise Manager (EM) framework. Oracle Enterprise Manager Cloud Control is installed in the same Oracle home as the database and is configured to run on a stand-alone OC4J instance. You have to perform a separate installation to get EM central management capabilities.
- If you choose to use Oracle Enterprise Manager Cloud Control, you can optionally configure the database to use the Oracle-recommended default backup strategy.
- If you choose to use Oracle Enterprise Manager Cloud Control during the installation, you can configure Enterprise Manager to send e-mail alerts to an e-mail address that you specify. These alerts can include issues such as disk space reaching a critical limit or a database shutting down unexpectedly.
- The Oracle Database 12c installation supports RAC features, particularly the installation of Cluster Ready Services (CRS).
- Oracle homes can be cloned by using the Enterprise Configuration Management tool. This tool enables users to create clone requests and then schedule and process them. This tool is available via EM Grid Control.



Installation Option: Silent Mode

To install and configure Oracle products by using OUI in silent or suppressed mode, perform these steps:

1. Create the `oraInst.loc` file, if it does not already exist. Most likely, the file is already in `ORACLE_BASE/oraInventory`, if you previously installed the Oracle software.
2. Prepare a response file. File templates for each product and installation type are provided, such as `enterprise.rsp`, `standard.rsp`, and `netca.rsp`.
3. You can use OUI in interactive mode to record a response file that you can edit and then use to complete silent-mode or suppressed-mode installations. Create the response file under Linux and UNIX with the following command:
   `.runInstaller -record -destinationFile <filename>`
   where `-destinationFile` is the file location.
4. Run OUI in silent or suppressed mode.
5. If you completed a software-only installation, run Oracle Net Configuration Assistant (NetCA) and Database Configuration Assistant (DBCA) in silent or noninteractive mode, if required.

For more information, see your OS-specific *Oracle Database Installation Guide*.

Terminal Learning Objective

ACTION: Install the Oracle RDBMS Software.

CONDITION: Given a student handout and the Oracle DBA Handbook.

STANDARD: Students must successfully install the Oracle RDBMS Software during a scenario-based performance evaluation.

*** See Student Evaluation Plan (SEP) for evaluation details.**