Department of Computer Science and Engineering

Subject Name: **ENTERPRISE SOLUTIONS** Subject Code: **CS T61**

UNIT III

Oracle Suite : Oracle Apps 11i - Application Framework - File System - Workflow Analysis - SQL / PLSQL fundamentals - Creating Forms - Oracle Reports.Oracle Electronic Data Interchange – functions of EDI – Data File Structure - Oracle Data, Oracle Database - Oracle Database - DW vs OLTP - DW Connectors.

2 Marks

1. **What is Oracle Application Architecture?**

   The *Oracle Applications Architecture* is a framework for multi-tiered, distributed computing that supports Oracle Applications products. In this model, various *servers* are distributed among multiple levels, or *tiers*.

2. **What are the three tiers in an Oracle E-Business Suite installation?**

   - the *database tier*, which supports and manages the Oracle database
   - the *application tier*, which supports and manages the various Applications components, and is sometimes known as the middle tier
   - the *desktop tier*, which provides the user interface via an add-on component to a standard web browser

3. **What is Web server?**

The Oracle HTTP server (powered by Apache) acts as the Web server. It processes the requests received

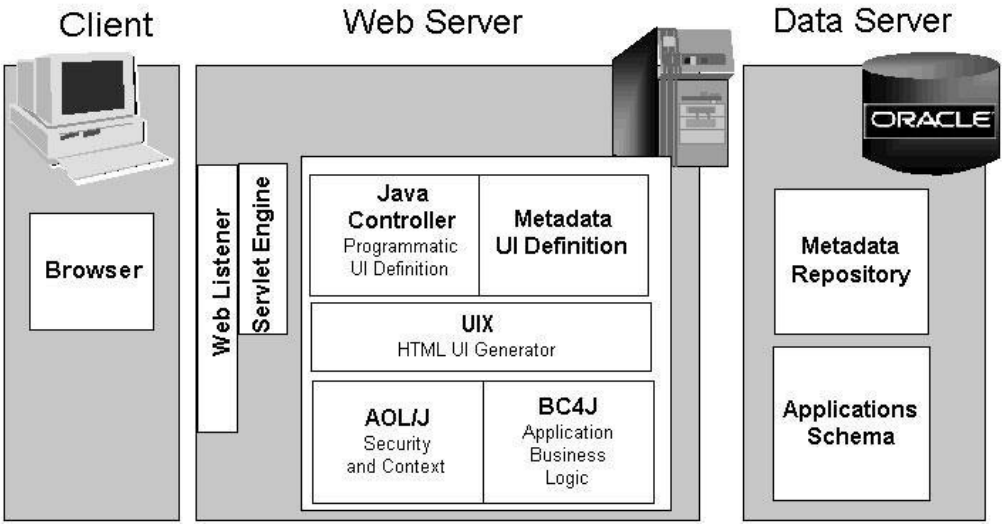
over the network from the desktop clients, and includes additional components such as:

- Web Listener
- Java Servlet Engine
- JavaServer Pages (JSP)

4. **What is Oracle Application Framework?**

   The *Oracle Applications Framework* is the development platform for HTML-based applications. It consists of a Java-based application tier framework and associated services, designed to facilitate the rapid deployment of HTML-based applications.

5. **Draw Oracle Applications Framework Architecture?**



6. **What is Discoverer Server?**

   Discoverer is an ad hoc query, reporting, analysis, and publishing tool that allows business users at all levels of an organization to gain immediate access to information from data marts, data warehouses, and online transaction processing (OLTP) systems.

7. **What are operations from Admin server?**

   - Upgrading Oracle Applications
   - Applying database patches to Oracle Applications
   - Maintaining Oracle Applications data

8. **What is Daily Business Intelligence(DBI)?**

   Daily Business Intelligence (DBI) is a reporting framework that is integrated with Oracle E-Business Suite. It replaces the Business Intelligence System (BIS), and includes a new set of materialized views that pre-summarize transaction data. Using Daily Business Intelligence *overview pages*, managers can view summarized information across multiple organizations, drilling down to specific transaction details on a daily basis.

9. **What is oracle overflow?**

   Oracle Workflow provides an infrastructure for the enterprise-wide communication of data related to defined business events, providing the capabilities needed to:

   - Manage enterprise business processes that may span trading partners
   - Support standard and personalized business rules

- Streamline and automate transaction flows
- Manage exceptions without manual intervention

10. What is oracle workflow builder?

Oracle Workflow Builder provides a graphical drag and drop process designer. You can create and evolve business processes to incorporate existing business practices between your organization and customers or suppliers, without modifying existing business processes and without changing applications code.

11. What is the Oracle Workflow Business Event System?

It provides a workflow-enabled solution for your enterprise application integration requirements.

The Business Event System supports the following types of integration:

- Message-based point-to-point system integration
- System integration messaging hubs
- Distributed applications messaging

12. What is the Oracle Workflow Event Manager?

It enables registration of significant business events for selected applications, including functions that generate the XML event messages.

13. What are the features in Oracle E-Business Suite Release 11i?

Release 11i utilizes various Oracle database features to optimize performance, scalability, and business intelligence capacity.

14. What is the use cost-based optimization (CBO)?

The Oracle optimizer evaluates many factors to calculate the most efficient way to execute a SQL statement. The optimizer compares the costs of the execution plans and chooses the one with the smallest cost, i.e. optimum execution characteristics.

15. What are Materialized Views?

Materialized views are schema objects that can be used to summarize, precompute, replicate, and distribute data.

16. What is Real Application Clusters?

Real Application Clusters (RAC) harness the processing power of multiple interconnected computers. RAC software and a collection of computers (known as a cluster) harness the processing power of each component to create a robust and

powerful computing environment. A large task divided into subtasks and distributed among multiple nodes is completed more quickly and efficiently than if the entire task was processed on one node. Cluster processing also facilitates deployment of additional hardware resources for larger workloads and rapidly growing user populations.

17.Define Structured Query Language (SQL)?

An internationally standardized language that is used to access data in a relational database.

SQL statements enable you to perform the following tasks:

- Query data
- Insert, update, and delete rows in a table
- Create, replace, alter, and drop objects
- Control access to the database and its objects
- Guarantee database consistency and integrity

18. What is Data Definition Language (DDL) Statements?

Data definition language (DDL) statements define, structurally change, and drop schema objects. For example, DDL statements enable you to:

- Create, alter, and drop schema objects and other database structures, including the database itself and database users. Most DDL statements start with the keywords CREATE, ALTER, or DROP.
- Delete all the data in schema objects without removing the structure of these objects (TRUNCATE)
- Grant and revoke privileges and roles (GRANT, REVOKE).
- Turn auditing options on and off (AUDIT, NOAUDIT).
- Add a comment to the data dictionary (COMMENT).

19.What is Data Manipulation Language (DML) Statements?

DML statements are the most frequently used SQL statements and enable you to:

- Retrieve or fetch data from one or more tables or views (SELECT).
- Add new rows of data into a table or view (INSERT) by specifying a list of column values or using a subqueryto select and manipulate existing data.
- Change column values in existing rows of a table or view (UPDATE).
- Update or insert rows conditionally into a table or view(MERGE).
- Remove rows from tables or views (DELETE)

20. What is PL/SQL?

PL/SQL provides a server-side, stored procedural language that is easy-to-use, seamless with SQL, robust, portable, and secure. You can access and manipulate database data using procedural schema objects called PL/SQL program units

21. List advantages of PL/SQL subprograms?

- Improved performance
- Memory allocation
- Improved productivity
- Security with definer's rights procedures

22.. What is PL/SQL Packages?

A PL/SQL package is a group of related subprograms, along with the cursors and use, stored together in the database for continued use as a unit.

23. Advantages of PL/SQL Packages?

- Encapsulation
- Data security
- Better Performance

24. What is Cursor?

A cursor is a pointer to this context area. PL/SQL controls the context area through a cursor. A cursor holds the rows (one or more) returned by a SQL statement. The set of rows the cursor holds is referred to as the **active set**.

25. What is Electronic Data Interchange (EDI)?

EDI is an electronic exchange of information between trading partners. Data files are exchanged in a standard format to minimize manual effort, speed data processing, and ensure accuracy.

26. What are the functions performed by EDI?

- define trading partner groups and trading partner locations
- enable transactions for trading partners
- provide location code conversion between trading partner location codes and codes used in Oracle Applications
- provide general code conversion between trading partner codes or standard codes
- define interface data files so that application data can interface with EDI translators

27. Write about Data File Structure?

- Oracle Database creates a data file for a table space by allocating the specified amount of disk space plus the overhead for the data file header.
- The operating system under which Oracle Database runs is responsible for clearing old information and authorizations from a file before allocating it to the database
- The data file header contains metadata about the data file such as its size and checkpoint SCN. Each header contains an absolute file number and a relative file number.
- The absolute file number uniquely identifies the data file within the database. The relative file number uniquely identifies a data file within a table space.

28. List some unstructured data?

- Spatial data
- Multimedia data
- Text data

29. What is LOB?

The large object (LOB) data types enable you to store and manipulate large blocks of unstructured data in binary or character format. LOBs provide efficient, random, piece-wise access to the data.

30. Write about external LOBs?

A BFILE(binary file LOB) is an external LOB because the database stores a pointer to a file in the operating system. The external data is read-only.

Overview of XML in Oracle Database

Oracle XML DBis a set of Oracle Database technologies related to high-performance XML storage and retrieval. XML DB provides native XML support by encompassing both SQL and XML data models in an interoperable manner

31. What is Oracle Spatial ?

Oracle Spatial makes spatial data management easier to users of location-enabled applications and geographic information system (GIS) applications

32. What is Oracle multimedia ?

Oracle Multimedia enables Oracle Database to store, manage, and retrieve images, medical images that follow the Digital Imaging and Communications in Medicine (DICOM) standard, audio, and video data in an integrated fashion with other enterprise information

33. Write advantages of Oracle Text?

■ Oracle Text allows text searches to be combined with regular database searches in a single SQL statement. The Text index is in the database, and Text queries are run in the Oracle Database process. The optimizer can choose the best execution plan for any query, giving the best performance for ad hoc queries involving Text and structured criteria.

34. What is DBMS?

A database management system (DBMS) is software that controls the storage, organization, and retrieval of data. Typically, a DBMS has the following elements:

35. What is RDBMS?

- An RDBMS moves data into a database, stores the data, and retrieves it so that it can be manipulated by applications.
- Oracle Database is an RDBMS. An RDBMS that implements object-oriented features such as user-defined types, inheritance, and polymorphism is called an object-relational database management system (ORDBMS).

36. What is transaction management?

Oracle Database is designed as a multiuser database. The database must ensure that multiple users can work concurrently without corrupting one another's data.

37. What is meant by Data warehousing?

A data warehouse is a relational database designed for query and analysis rather than for transaction processing. For example, a data warehouse could track historical stock prices or income tax records. A warehouse usually contains data derived from historical transaction data, but it can include data from other sources.

38. List Characteristics of Data warehouse?

- Subject-Oriented
- Nonvolatile
- Time-Variant

39. Write Data warehouse Vs OLTP?

Characteristics	Data Warehouse	OLTP
Workload	Designed to accommodate ad hoc queries. You may not know the workload of your data warehouse in advance, so it should be optimized to perform well for a wide variety of possible queries.	Supports only predefined operations. Your applications might be specifically tuned or designed to support only these operations.
Data modifications	Updated on a regular basis by the ETL process using bulk data modification techniques. End users of a data warehouse do not directly update the database.	Subject to individual DML statements routinely issued by end users. The OLTP database is always up to date and reflects the current state of each business transaction.
Schema design	Uses denormalized or partially denormalized schemas (such as a star schema) to optimize query performance.	Uses fully normalized schemas to optimize DML performance and to guarantee data consistency.
Typical operations	A typical query scans thousands or millions of rows. For example, a user may request the total sales for all customers last month.	A typical operation accesses only a handful of records. For example, a user may retrieve the current order for a single customer.
Historical data	Stores many months or years of data to support historical analysis.	Stores data from only a few weeks or months. Historical data retained as needed to meet the requirements of the current transaction.

11 Marks

1. Explain PL/SQL?

PL/SQL is Oracle's procedural language extension to SQL. PL/SQL combines the ease and flexibility of SQL with the procedural functionality of a structured programming language, such as **IF** ... **THEN**, **WHILE**, and **LOOP**.

When designing a database application, consider the following advantages of using stored PL/SQL:

- PL/SQL code can be stored centrally in a database. Network traffic between applications and the database is reduced, so application and system performance increases. Even when PL/SQL is not stored in the database, applications can send blocks of PL/SQL to the database rather than individual SQL statements, thereby reducing network traffic.
- Data access can be controlled by stored PL/SQL code. In this case, PL/SQL users can access data only as intended by application developers, unless another access route is granted.
- PL/SQL blocks can be sent by an application to a database, running complex operations without excessive network traffic.
- Oracle supports PL/SQL Server Pages, so your application logic can be invoked directly from your Web pages.

The following sections describe the PL/SQL program units that can be defined and stored centrally in a database.

PL/SQL Program Units

Program units are stored procedures, functions, packages, triggers, and autonomous transactions.
Procedures and **functions** are sets of SQL and PL/SQL statements grouped together as a unit to solve a specific problem or to perform a set of related tasks. They are created and stored in compiled form in the database and can be run by a user or a database application.
Procedures and functions are identical, except that functions always return a single value to the user. Procedures do not return values.

Packages encapsulate and store related procedures, functions, variables, and other constructs together as a unit in the database. They offer increased functionality (for example, global package variables can be declared and used by any procedure in the package). They also improve performance (for example, all objects of the package are parsed, compiled, and loaded into memory once).

2) Write Data Warehousing Vs OLTP?

Characteristics	Data Warehouse	OLTP
Source of data	Consolidation data; OLAP data comes from the various OLTP Databases	Operational data; OLTPs are the original source of the data.
Purpose of data	To help with planning, problem solving, and decision support	To control and run fundamental business tasks
What the data	Multi-dimensional views of various kinds of business activities	Reveals a snapshot of ongoing business processes
Inserts and Updates	Periodic long-running batch jobs refresh the data	Short and fast inserts and updates initiated by end users
Queries	Often complex queries involving aggregations	Relatively standardized and simple queries Returning relatively few records
Processing Speed	Depends on the amount of data involved; batch data refreshes and	Typically very fast

	complex queries may take many hours; query speed can be improved by creating indexes	
Space Requirements	Larger due to the existence of aggregation structures and history data; requires more indexes than OLTP	Can be relatively small if historical data is archived
Database Design	Typically de-normalized with fewer tables; use of star and/or snowflake schemas	Highly normalized with many tables
Backup and Recovery	Instead of regular backups, some environments may consider simply reloading the OLTP data as a recovery method	Backup religiously; operational data is critical to run the business, data loss is likely to entail significant monetary loss and legal liability
Workload	Designed to accommodate ad hoc queries. You may not know the workload of your data warehouse in advance, so it should be optimized to perform well for a wide variety of possible queries.	Supports only predefined operations. Your applications might be specifically tuned or designed to support only these operations.
Data modifications	Updated on a regular basis by the ETL process using bulk data modification techniques. End users of a data warehouse do not directly update the database.	Subject to individual DML statements routinely issued by end users. The OLTP database is always up to date and reflects the current state of each business transaction.
Schema design	Uses denormalized or partially denormalized schemas (such as a star schema) to optimize query performance.	Uses fully normalized schemas to optimize DML performance and to guarantee data consistency.
Typical operations	A typical query scans thousands or millions of rows. For example, a user may request the total sales for all customers last month.	A typical operation accesses only a handful of records. For example, a user may retrieve the current order for a single customer.
Historical data	Stores many months or years of data to support historical analysis.	Stores data from only a few weeks or months. Historical data retained as needed to meet the requirements of the current transaction.

3) Write about Oracle Data?

The traditional relational model deals with simple structured data that fits into simple tables. Oracle Database also provides support for unstructured data, which cannot be decomposed into standard components. Unstructured data includes text, graphic images, video clips, and sound waveforms.

Oracle Database includes data types to handle unstructured content. These data types appear as native types in the database and can be queried using SQL

Unstructured Data:

Oracle Spatial Data:

Oracle Spatial makes spatial data management easier to users of location-enabled applications and geographic information system (GIS) applications.

Oracle Multimedia Data:

Oracle Multimedia enables Oracle Database to store, manage, and retrieve images, medical images that follow the Digital Imaging and Communications in Medicine (DICOM) standard, audio, and video data in an integrated fashion with other enterprise information. Oracle Multimedia provides object types and methods for:

Oracle Text Data:

Oracle Text (Text)is a fast and accurate full-text retrieval technology integrated with Oracle Database. Oracle Text indexes any document or textual content stored in file systems, databases, or on the Web. These documents can be searched based on their textual content, metadata, or attributes.

LOBs

The large object (LOB) data types enable you to store and manipulate large blocks of unstructured data in binary or character format. LOBs provide efficient, random, piece-wise access to the data.

Internal LOBs An internal LOB stores data in the database itself rather than in external files. Internal LOBS include the following:

■ CLOB(character LOB), which stores large amounts of text, such as text or XML files, in the database character set

■ NCLOB(national character set LOB), which stores Unicode data

■ BLOB(binary LOB), which stores large amounts of binary information as a bit stream and is not subject to character set translation

External LOBs A BFILE(binary file LOB) is an external LOB because the database stores a pointer to a file in the operating system. The external data is read-only.

Overview of XML in Oracle Database

Oracle XML Dbis a set of Oracle Database technologies related to high-performance XML storage and retrieval. XML DB provides native XML support by encompassing both SQL and XML data models in an interoperable manner

4) Write about Electronic Data Interchange (EDI)?

Oracle Applications provides users with the ability to conduct business electronically between trading partners based on the Electronic Commerce standards and methodology. One form of Electronic Commerce is Electronic Data Interchange (EDI).

EDI is an electronic exchange of information between trading partners. Data files are exchanged in a standard format to minimize manual effort, speed data processing, and ensure accuracy.

The EDI Gateway performs the following functions:

- define trading partner groups and trading partner locations
- enable transactions for trading partners
- provide location code conversion between trading partner location codes and codes used in Oracle Applications
- provide general code conversion between trading partner codes or standard codes
- define interface data files so that application data can interface with EDI translators
- extract application data, format, and write to data files (outbound transactions)
- import data or converted codes into application open interface tables so that application program interfaces (API) can validate and update Oracle application tables (inbound transactions)

How Oracle EDI Gateway Works with Other Oracle Applications

Oracle Applications are designed with an open architecture for easy integration with EDI translators and electronic transmission products to provide a seamless solution. Oracle Applications utilize the Oracle EDI Gateway to integrate with EDI translator software. EDI translation software packages integrate with an electronic transmission service to provide a closed-loop between Oracle Applications and the trading partner's application.

The Oracle Applications for Manufacturing, Distribution, and Financials are EDI-enabled using the Oracle EDI Gateway product. The Oracle EDI Gateway product augments the existing standard

paper document capabilities of Oracle Applications, or adds functionality where no corresponding paper documents exist.

A common EDI implementation is via ASCII data files in a batch environment. Data from the sending application is extracted into an application data file. The application data file is received by the translation software which translates it into the an EDI standard both trading partners agree upon. Then the EDI data file is placed on a network for transmission to the receiving application. The receiving application's EDI translator receives the EDI data file from the network and begins the file processing in reverse sequence. The translator translates the EDI data file and creates an application data file meaningful to the receiving application. The receiving application receives the application data file for processing and imports the data into the application.

The following figure illustrates the outbound EDI Gateway transaction flow:

5)Write about Oracle workflow analysis?

Oracle Workflow provides an infrastructure for the enterprise-wide communication of data related to your organization and customers or suppliers, without modifying existing business processes and without changing applications code. The Oracle Workflow *Business Event System* provides a workflow-enabled solution for your enterprise application integration requirements. The Business Event System is an application service delivered with Oracle Workflow that uses Oracle Advanced Queuing technology to communicate business events between systems. The Business Event System supports the following types of integration:

- Message-based point-to-point system integration
- System integration messaging hubs
- Distributed applications messaging

The Business Event System uses Oracle Advanced Queuing to propagate messages between communication points on systems, called *agents*, using a specified protocol. Events received from external systems are processed by an agent listener that runs on that agent's queue.

The *Oracle Workflow Event Manager* enables registration of significant business events for selected applications, including functions that generate the XML event messages. Users of those applications can register *subscriptions* on events that are significant to their systems, to take actions such as triggering custom code.

Operation

When a business event occurs, the Workflow Event Manager executes any subscriptions registered on the event. For local events, the subscribing code can be executed synchronously, in the same database transaction as the code that raised the event, or asynchronously, deferring costly subscription processing to a later time, and thus allowing control to be returned more quickly to the calling application. Events can also be received asynchronously from external systems. Before producing the XML event message, the Event Manager minimizes processing by checking whether event information is required by subscriptions on the event.

You can review and respond to your business process notifications from one central window, known as the worklist, using a standard Web browser. This offers the flexibility to prioritize tasks and to define sort criteria, giving you the flexibility to organize your work the way you wish. For example, you can group notifications by type or subject, to avoid having to jump from one context to another. Alternatively, you can focus on time critical tasks first, sorting by priority or due date. Oracle Workflow is fully integrated with the Oracle E-Business Suite, providing the ability to drill down to any Oracle E-Business Suite or associated URL to view or complete a transaction.

Additional Capabilities

The flexibility of the powerful *Workflow Engine* event activities enable you to model business events within workflow processes. Event activities can be used to model content-based routing, transformations, error handling, and so on. A workflow process can be started or processed by an inbound message, and can send an outbound message or raise an event to the Event Manager. XML function activities give you access to event content data within workflow processes. Workflow processes based on business events give the greatest flexibility when implementing an integration solution. However, the Business Event System can also run independently of the Workflow Engine, to enable point-to-point messaging to be utilized.

You can perform complex transformations between different formats required for your business documents. Oracle Workflow allows you to apply a style sheet to an XML event message. In addition, when queues are defined within the Business Event System, you specify the logic used to enqueue and dequeue messages. This logic, called a *queue handler*, can include transformations.

Oracle Workflow also allows you to take advantage of XML support in the Oracle database. Oracle9*i* and later releases deliver native support for XML via a new XML data type, which makes the manipulation of XML data and documents in applications seamless and straightforward. From Oracle9*i*, the database server offers the capability to generate, massage, and transform XML data

and documents inside the runtime engine itself, giving excellent scalability and performance. Defined business events, providing the capabilities needed to:

- Manage enterprise business processes that may span trading partners
- Support standard and personalized business rules
- Streamline and automate transaction flows
- Manage exceptions without manual intervention

Oracle Workflow lets you model and maintain your business processes using a graphical workflow builder. You can model and automate sophisticated business processes, defining processes that can loop, branch into parallel flows and rendezvous, decompose into sub-flows, branch on task results, time out, and more.

Acting as a *system integration hub*, Oracle Workflow can apply business rules to control objects and route them between applications and systems. It extends the reach of business process automation throughout an enterprise and beyond, to include any email user, web user, or system, enabling people to receive, analyze, and respond to *notifications* needing their attention. Users can respond to a notification via any standard email system or standard Web browser.

Components

Oracle Workflow Builder provides a graphical drag and drop process designer.

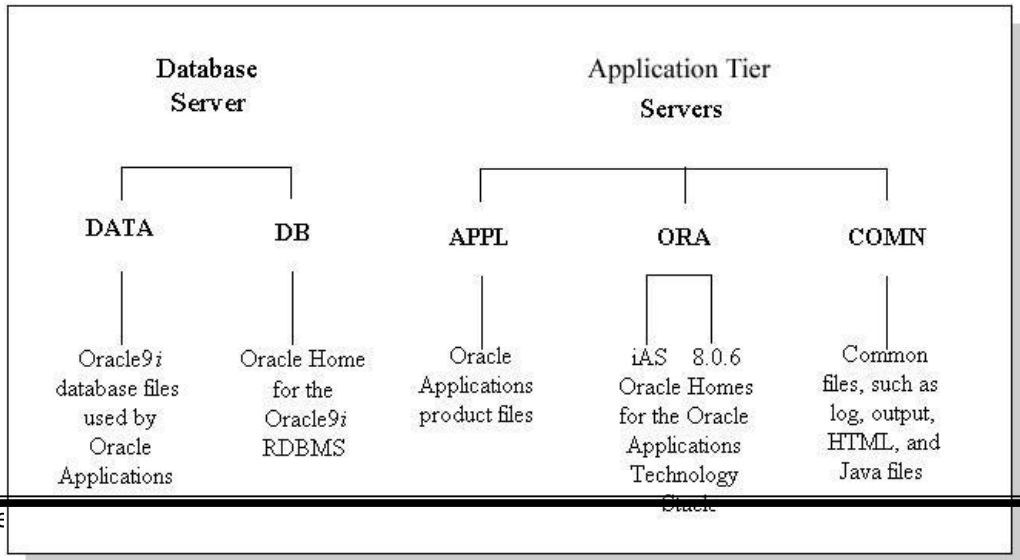
6) Write Oracle 11i File System

Introduction

An Oracle Applications Release 11*i* system utilizes components from many Oracle products. These product files are stored below a number of key top-level directories on the database and application server machines.

Operating system *environment settings* indicate the location of the various files in the file systems of the database and application server machines.

Applications Directory Structure



Oracle Applications Environment

- Oracle Applications makes extensive use of environment settings to locate executable programs and other files essential to Applications operation
- The environment settings and their associated values are stored in *environment files*, which have a *.env* suffix (*.cmd* on Windows)

The DATA Directory

The <*dbname*>DATA file system contains the data (.dbf) files of the Oracle database.

DB and ORA Directories

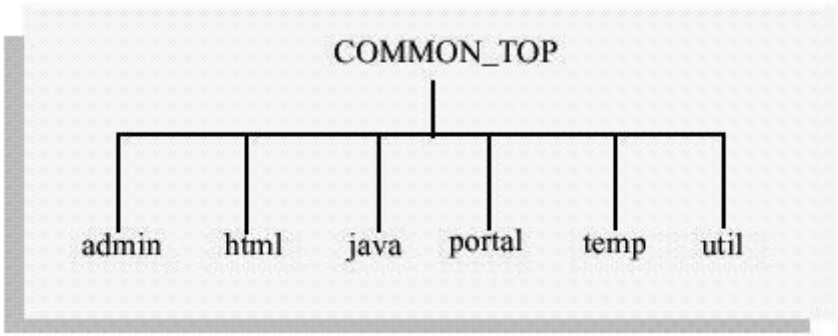
Release 11*i* utilizes three ORACLE_HOMEs:

- The 9.2.0 ORACLE_HOME (Applications database home) is located in the <*dbname*>DB directory. It contains **the files needed for running and maintaining the Oracle Applications database**.
- The 8.0.6 directory contains the ORACLE_HOME for the Developer 6*i* products (Forms, Reports, and Graphics). The product libraries in the 8.0.6 ORACLE_HOME are **used to relink Oracle Applications executables.**
- The iAS directory, also under the <*dbname*>ORA, contains the ORACLE_HOME **for Oracle9*i* Application Server.**

The COMN Directory

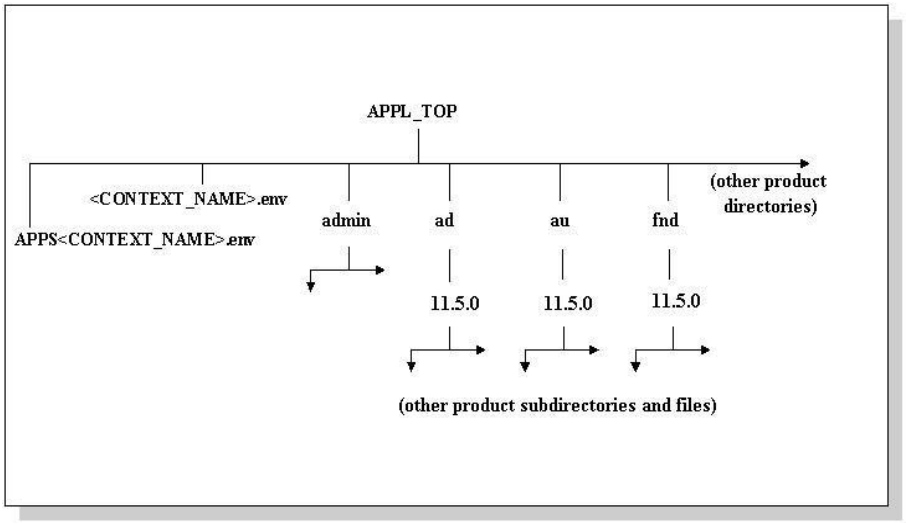
The <*dbname*>COMN or COMMON_TOP directory contains files used by many different Oracle Applications products, and which may also be used with third-party products.

COMMON_TOP Directory Structure



The APPL Directory

Oracle Applications files are stored in the *<dbname>*APPL directory, which is known as the *APPL_TOP* directory ***APPL_TOP Directory Structure***

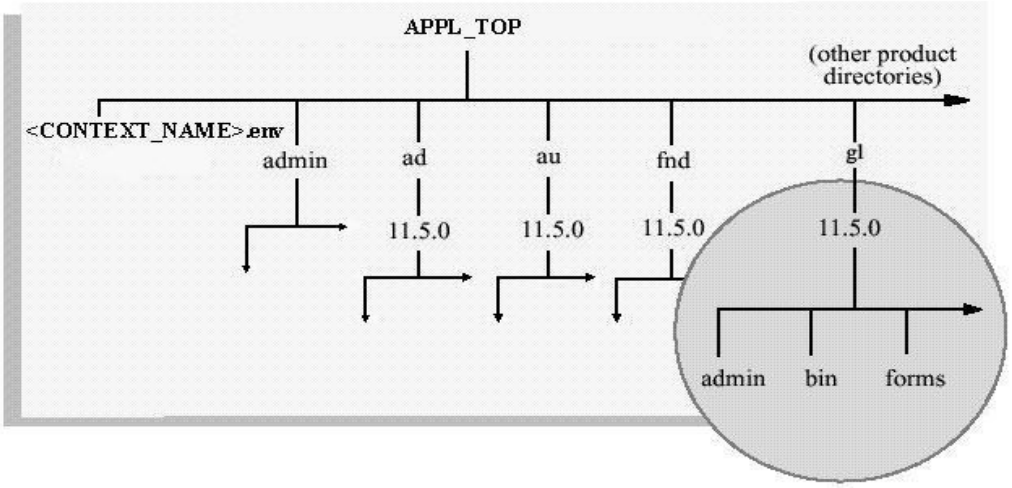


Product Directories

<PROD>_TOP Directory

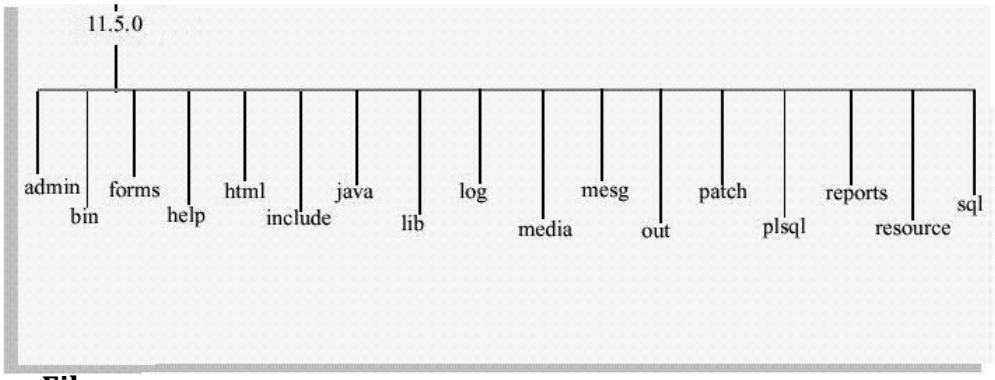
The <APPL_TOP>/<prod>/<version> path is known as the *product top directory* (<PROD>_TOP), and its value is stored in the <PROD>_TOP environment variable.

APPL_TOP Directory Structure



Within each <PROD>_TOP directory, the product's files are grouped into subdirectories according to file type and function. The next figure expands the inset to show the full directory structure for gl.

Detail of gl Directory Structure



Language Files

When you install Oracle Applications in a language other than American English, each product tree includes directories that use the NLS language code.

Core Technology Directories

The *admin*, *ad*, *au*, and *fnd* directories are the core technology directories.

Distributing the APPL_TOP Across Disks

The Oracle Applications file system on the application tier requires a significant amount of disk space

Other Environment Files

Several other key environment files are used in an Oracle Applications system.

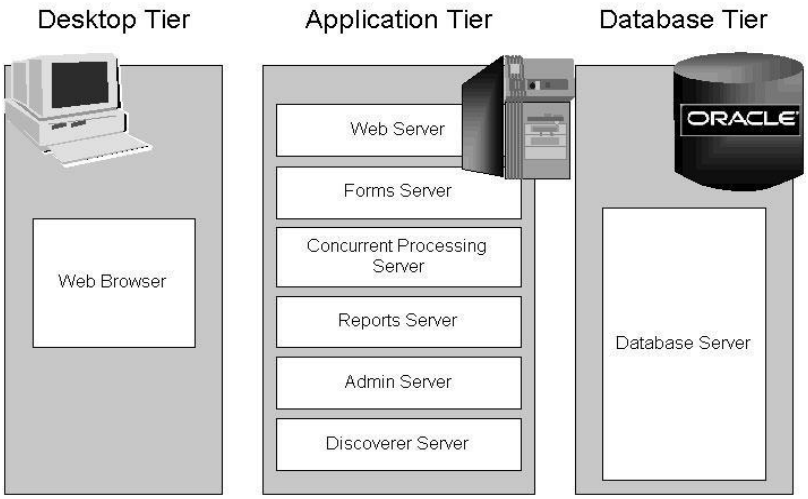
The adovars.env file

The adovars.env file, located in $APPL_TOP/admin, specifies the location of various files such as Java files, HTML files, and JRE (Java Runtime Environment) files. It is called from the main applications environment file, <CONTEXT_NAME>.env.

7. Write about Oracle Framework?

- The *Oracle Applications Architecture* is a framework for multi-tiered, distributed computing that supports Oracle Applications products. In this model, various *servers* are distributed among multiple levels, or *tiers*.
- A server is a process or group of processes that runs on a single machine and provides a particular functionality, often referred to as a *service.*
- For example, the *HTTP server* is a process that listens for and processes HTTP requests, and the *Forms server* is a process that listens for and processes requests for activities related to Oracle Forms.

- A tier is a logical grouping of services, potentially spread across more than one physical machine.
- The three-tier architecture that comprises an Oracle E-Business Suite installation is made up of
  - the *database tier*, which supports and manages the Oracle database;
  - the *application tier*, which supports and manages the various Applications components, and is sometimes known as the middle tier; and
  - the *desktop tier*, which provides the user interface via an add-on component to a standard web browser.



The Desktop Tier

The client interface is provided through HTML for the newer HTML-based applications, and via a Java applet in a Web browser for the traditional Forms-based interface.

- In Oracle Applications Release 11*i*, each user logs in to Oracle Applications through the E-Business Suite Home Page on a desktop client web browser.
- The E-Business Suite Home Page provides a single point of access to HTML-based applications, Forms-based applications, and Business Intelligence application

The Application Tier

- The *application tier* has a dual role: hosting the various servers that process the business logic, and managing communication between the desktop tier and the database tier. This tier is sometimes referred to as the *middle tier*.

HTML-Based Applications and the Oracle Applications Framework

The Oracle HTML-based (formerly known as Self-Service) Applications:

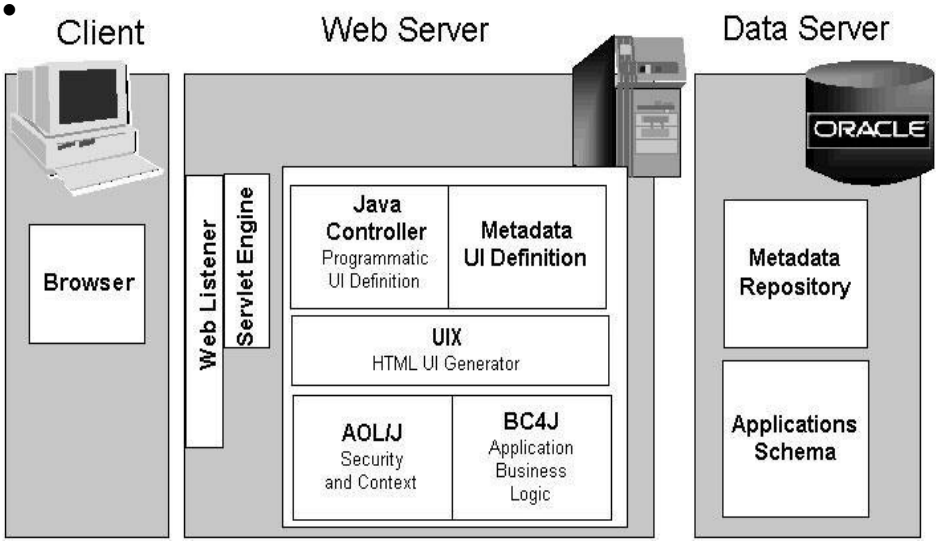
- Do not use Oracle Forms for the interface

- Are designed in pure HTML and JavaScript
- Dynamically generate HTML pages by executing Java code
- Use a metadata dictionary for flexible layout
- Operate by direct connection to the Web server

- The *Oracle Applications Framework* is the development platform for HTML-based applications.
- It consists of a Java-based application tier framework and associated services, designed to facilitate the rapid deployment of HTML-based applications.

Notable Oracle Applications Framework components include:

- ***Business Components for Java*** **(BC4J),** included in Oracle JDeveloper, is used to create Java business components for representing business logic*AOL/J* supplies the Oracle Applications Framework with underlying security and applications Java services.



Oracle Applications Framework Processing Details

The following is a more detailed explanation of how the JSP obtains the content from the Applications tables and uses information from the metadata dictionary to construct the HTML page.

- AOL/J validates user access to the page.
- The page definition (metadata UI definition) is loaded from the metadata repository on the database tier into the application tier.
- The BC4J objects that contain the application logic and access the database are instantiated.
- The Java Controller programmatically manipulates the page definition as necessary, based on dynamic UI rules.

- UIX (HTML UI Generator) interprets the page definition, creates the corresponding HTML in accordance with UI standards, and sends the page to the browser.

8) Explain Oracle Database?

About Relational Databases

Every organization has information that it must store and manage to meet its requirements. For example, a corporation must collect and maintain human resources records for its employees. This information must be available to those who need it. An information system is a formal system for storing and processing information.

An information system could be a set of cardboard boxes containing manila folders along with rules for how to store and retrieve the folders. However, most companies today use a database to automate their information systems. A database is an organized collection of information treated as a unit. The purpose of a database is to collect, store, and retrieve related information for use by database applications.

Database Management System (DBMS)

A database management system (DBMS)is software that controls the storage, organization, and retrieval of data. Typically, a DBMS has the following elements:

The first generation of database management systems included the following types:

■ **Hierarchical**

A hierarchical database organizes data in a tree structure. Each parent record has one or more child records, similar to the structure of a file system.

■ **Network**

A network database is similar to a hierarchical database, except records have a many-to-many rather than a one-to-many relationship

Relational Model

A relational database is a database that conforms to the relational model.

The relational model has the following major aspects:

■ Structures

Well-defined objects store or access the data of a database.

■ Operations

Clearly defined actions enable applications to manipulate the data and structures of a database.

■ Integrity rules

Integrity rules govern operations on the data and structures of a database. A relational database stores data in a set of simple relations. A relation is a set of tuples. A tuple is an unordered set of attribute values.

A table is a two-dimensional representation of a relation in the form of rows (tuples) and columns (attributes). Each row in a table has the same set of columns. A relational database is a database that stores data in relations (tables). For example, a relational database could store information about company employees in an employee table, a department table, and a salary table.

Relational Database Management System (RDBMS)

The relational model is the basis for a relational database management system (RDBMS). Essentially, an RDBMS moves data into a database, stores the data, and retrieves it so that it can be manipulated by applications

Schema Objects

One characteristic of an RDBMS is the independence of physical data storage from logical data structures. In Oracle Database, a database schema is a collection of logical data structures, or schema objects. A database schema is owned by a database user and has the same name as the user name.

Data Access

A general requirement for a DBMS is to adhere to accepted industry standards for a data access language.

Structured Query Language (SQL)

SQL is a set-based declarative language that provides an interface to an RDBMS such as Oracle Database.

A SQL statement is a string of SQL text such as the following:

```
SELECT first_name, last_name FROM employees;
```

SQL statements enable you to perform the following tasks:

- ■ Query data
- ■ Insert, update, and delete rows in a table
- ■ Create, replace, alter, and drop objects
- ■ Control access to the database and its objects
- ■ Guarantee database consistency and integrity

SQL unifies the preceding tasks in one consistent language. Oracle SQLis an implementation of the ANSI standard. Oracle SQL supports numerous features that extend beyond standard SQL.

PL/SQL and Java

PL/SQL is a procedural extension to Oracle SQL. PL/SQL is integrated with Oracle Database, enabling you to use all of the Oracle Database SQL statements, functions, and data types. You can use PL/SQL to control the flow of a SQL program, use variables, and write error-handling procedures.

Transaction Management

Oracle Database is designed as a multiuser database. The database must ensure that multiple users can work concurrently without corrupting one another's data.

Transactions

An RDBMS must be able to group SQL statements so that they are either all committed, which means they are applied to the database, or all rolled back, which means they are undone. **Data Concurrency**

A requirement of a multiuser RDBMS is the control of concurrency, which is the simultaneous access of the same data by multiple users. Oracle Database uses locks to control concurrent access to data.

Data Consistency

Oracle Database always enforces statement-level read consistency, which guarantees that the data returned by a single query is committed and consistent with respect to a single point in time.

9) Explain Data File Structure?

An Oracle database is a set of files that store Oracle data in persistent disk storage. This section discusses the database files generated when you issue a CREATE DATABASE statement:

- Data files and temp files

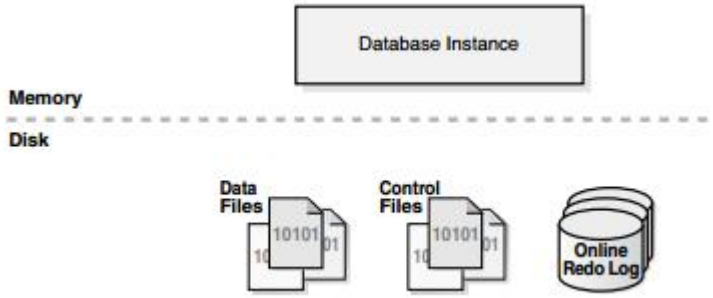
  A data file is a physical file on disk that was created by Oracle Database and contains data structures such as tables and indexes. A temp file is a data file that belongs to a temporary table space. The data is written to these files in an Oracle proprietary format that cannot be read by other programs.

- Control files

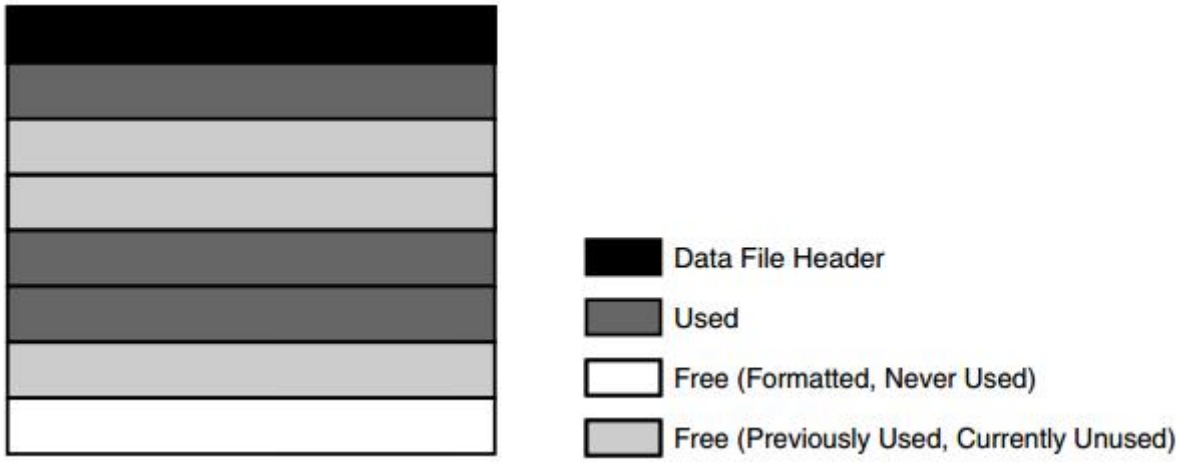
  A control file is a root file that tracks the physical components of the database.

- Online redo log files

The online redo log is a set of files containing records of changes made to data



- Oracle Database creates a data file for a table space by allocating the specified amount of disk space plus the overhead for the data file header.
- The operating system under which Oracle Database runs is responsible for clearing old information and authorizations from a file before allocating it to the database
- The data file header contains metadata about the data file such as its size and checkpoint SCN. Each header contains an absolute file number and a relative file number
- The absolute file number uniquely identifies the data file within the database. The relative file number uniquely identifies a data file within a table space.
- When Oracle Database first creates a data file, the allocated disk space is formatted but contains no user data. However, the database reserves the space to hold the data for future segments of the associated table space.
- As the data grows in a table space, Oracle Database uses the free space in the data files to allocate extents for the segment.
- Figure illustrates the different types of space in a data file. Extents are either used, which means they contain segment data, or free, which means they are available for reuse. Over time, updates and deletions of objects within a table space can create pockets of empty space that individually are not large enough to be reused for new data. This type of empty space is referred to as fragmented free space.



Space in a Data File

10) Explain SQL?

SQL is the set-based, high-level declarative computer language with which all programs and users access data in an Oracle database

Oracle SQL statements are divided into the following categories:

■ Data Definition Language (DDL) Statements

■ Data Manipulation Language (DML) Statements

■ Transaction Control Statements

Data Definition Language (DDL) Statements

Data definition language (DDL) statements define, structurally change, and drop schema objects. For example, DDL statements enable you to:

■ Create, alter, and drop schema objects and other database structures, including the database itself and database users. Most DDL statements start with the keywords CREATE, ALTER, or DROP.

■ Delete all the data in schema objects without removing the structure of these objects (TRUNCATE)

■Grant and revoke privileges and roles (GRANT, REVOKE).

■ Turn auditing options on and off (AUDIT, NOAUDIT).

■ Add a comment to the data dictionary (COMMENT).

Data Manipulation Language (DML) Statements

Data manipulation language (DML) statements query or manipulate data in existing schema objects. Whereas DDL statements enable you to change the structure of the database, DML statements

enable you to query or change the contents. For example, ALTER TABLE changes the structure of a table, whereas INSERT adds one or more rows to the table.

DML statements are the most frequently used SQL statements and enable you to:

- Retrieve or fetch data from one or more tables or views (SELECT).
- Add new rows of data into a table or view (INSERT) by specifying a list of column values or using a subqueryto select and manipulate existing data.
- Change column values in existing rows of a table or view (UPDATE).
- Update or insert rows conditionally into a table or view(MERGE).
- Remove rows from tables or views (DELETE)

Example:

```
SELECT * FROM employees;
INSERT INTO employees (employee_id, last_name, email, job_id, hire_date, salary)
VALUES (1234, 'Mascis', 'JMASCIS', 'IT_PROG', '14-FEB-2011', 9000);
UPDATE employees SET salary=9100 WHERE employee_id=1234;
DELETE FROM employees WHERE employee_id=1234;
```

Transaction Control Statements

Transaction control statements manage the changes made by DML statements and group DML statements into transactions.

- Make changes to a transaction permanent (COMMIT).
- Undo the changes in a transaction, since the transaction started (ROLLBACK) or since a savepoint (ROLLBACK TO SAVEPOINT). A savepoint is a user-declared intermediate marker within the context of a transaction

11) Explain Oracle Database 11i Feature?

Introduction

Many features in Oracle E-Business Suite Release 11*i* are built on the advanced capabilities of the underlying Oracle database technology. Release 11*i* utilizes various Oracle database features to **optimize performance, scalability, and business intelligence capacity.**

Performance Features

Database performance features include **optimization, resource usage, space management, and access rights.**

Cost-Based Optimization

Using CBO, the optimizer considers the available access paths, factoring in statistical information for the tables and indexes that the SQL statement will access.

For some operations, such as batch processing, Release 11*i* uses CBO to achieve the most efficient means of processing *all rows* that are accessed by the statement.

Database Resource Manager

The gives the system administrator extensive control over processing resources on the database node. The administrator can distribute server CPU based on business rules, ensuring that the highest priority activities always have sufficient CPU resources.

Partitioned Tables

Partitioning helps support very large tables and indexes by dividing them into smaller, more manageable pieces called *partitions*. Once the desired partitions have been defined, SQL statements can access them instead of the original tables or indexes.

Business Intelligence Features

To meet the increasing demand for up-to-date details of business activities, Oracle Applications utilizes Oracle database features that help to optimize the types of query typically required in such environments

Materialized Views

Materialized views are schema objects that can be used to summarize, precompute, replicate, and distribute data. They can markedly increase the speed of queries on very large databases when used to precompute and store aggregated data such as sums and averages.

Scalability

As well as providing more computing power, multi-node systems facilitate the addition of machines to meet increases in demand. They also provide resilience in the event of failures of individual components.

Real Application Clusters: Real Application Clusters (RAC) harness the processing power of multiple interconnected computers. RAC software and a collection of computers (known as a *cluster*) harness the processing power of each component to create a robust and powerful computing environment.

12) How to develop forms in Oracle?

Tutorial Connect Oracle Forms 11g to database 11g

1)First you need to copy the file tnsnames.ora from database folder to config folder from Oracle Middleware.

2) Open the Oracle Form Builder, go to File Menu and press Connect or just execute the command Ctrl+J.

3) On the last step, you need to enter the user name, password and the database name.

4) Change Module Name in Oracle Forms 11g

Right-click on Form Module name, then choose Property Palette. On Property Palette just click on the name and write your module name.

5) Open the Oracle Form Builder, go to File Menu and press Connect or just execute the command Ctrl+J.

6) Create New Data Block Wizard in Oracle Forms 11g

First you must click on Data Blocks and the press the button Create. An alert with two option will appear, and here you choose: Use the Data Block Wizard.

7) Welcome to the Data Block Wizard! - Click Next to begin creating your data block.

8) Select the type of Data Block: Table/View or Stored Procedure.

9) Create New Data Block Wizard in Oracle Forms 11g

Press Browse button and will appear a small window with more choices: Tables, Views, Current user, Synonyms, Other users.

10) After you choose the table name, oracle forms will show all Available Columns from the table. Here you can bring all columns from the table in your form or you can select just a few columns.

11) After you moved the items press Next.

12) Create New Data Block Wizard in Oracle Forms 11g

Enter a name for your Data Block.

13) You have finished describing you data block. Now you will have two options:

- Continue with: Call the Layout Wizard
- Stop: Just create the data block(is recommended when you use multiple data block on the same canvas)

13) Create Wizard Layout Oracle Forms 11g: Display in a frame on a canvas

14) Here you have to choose the canvas name (can be a new one or an existing canvas) and the type of canvas.

Types of canvas:

- Content
- Stacked
- Vertical Toolbar

- Horizontal Toolbar
- Tab

15) Create Wizard Layout Oracle Forms 11g

Here you select and move item that you want to be displayed in the frame.

For each each item displayed you can choose the item type from the list.

16) Enter a prompt, width and the height for each item.

17) Create Wizard Layout Oracle Forms 11g

Select the Layout Style for your frame

18) On this step you can choose the Frame Title, you can insert how many records to be displayed in the field Records Displayed, also Distance Between Records and Display Scrollbar.

19) Finish the Wizard Layout and display the new frame in the Layout Editor

You Finish the Wizard Layout.

20) Display the new frame in the Layout Editor.

13) How to generate Report?

1) Connect Oracle Reports 11g to database 11g

Open the Oracle Reports Builder, go to File Menu and press Connect or execute the command Ctrl+J.

2) On the second step, you need to enter the user name, password and the database name.

Create Report Wizard in Oracle Reports 11g

First you must click on Reports and the press the button Create. An alert "Create a new report" with two option will appear, and here you choose: Use the Report Wizard.

3) Welcome to the Report Wizard! - Click Next to begin creating your report.

4) Choose The Type of Layout and Style Reports in Oracle 11g

Here you must choose the type of layout you would like to generate: Create both Web and Payper Layout, Create Web Layout only, Create paper Layout only.

5) On the next step you have to choose the report style and give a title name for your report. The report style option are: Tabular, Group Left, Group Above, Matrix, Matrix with Group.

6) Choose a Data Source and Select Sql Query Builder for Reports in Oracle 11g

On this step you have to choose a Data Source for your report. The Data Source can be from JDBC Query, SQL Query, Text Query, XML Query.

7) You can do write the query manually, you can use Query Builder or Import Builder.

8) Move Available Fields in Displayed Fields in R reports Oracle 11g

Select the fields that you would like to display in your report. You can move one item or all items to target from Available Fields in Displayed Fields.

9) After you moved the items press Next.

10) Select Available Fields in Reports Wizard to calculate totals

Select the fields that you would like to calculate totals in your report. Also you can do choose to calculate: sum, count, minimum, maximum, average.

11) Here you can modify the labels of the fields and also the width for each field.

12) Choose a Template for your Report Wizard in Oracle Reports 11g

Select the template for your report. You have multiple options: Predefined Template, Template File or No Template.

13) You have finished describing your report!

14) Run Module Report Editor Paper Design Oracle Reports 11g

Select the template for your report. You have multiple options: Predefined Template, Template File or No Template.

14. Explain any two Data warehouse Connectors?

1) <u>Teradata OLAP Connector</u>

Teradata OLAP Connector is the one tool available that makes the direct connection between the Teradata system and Excel applications.

Overview

Teradata OLAP Connector provides self-service analytics for Excel, Tableau, and arcplan users by enabling them to access the corporate data stored in the Teradata Data Warehouse. This eliminates the inconsistencies and security concerns associated with the traditional approach of extracting and storing corporate data locally.

Challenges

Desktop-based BI solutions allow business users to extract data from the data warehouse for desktop analysis but this approach is challenging:

- Creates spread marts all over the organization
- Static view of the data of when it was extracted which leads to inconsistencies with the reporting

- Limited data leads to limited analysis
- Causes security challenges for leaving sensitive data on the users's desktops
- Data extractions scripts are difficult to maintain

ORACLE BIG DATA CONNECTORS

Oracle Big Data Connectors is a software suite that integrates processing in Hadoop with operations in a data warehouse. Designed to leverage the latest features of Apache Hadoop, Big Data Connectors connect Hadoop clusters with database infrastructure to harness massive volumes of structured and unstructured data for critical business insights. Big Data Connectors greatly simplify development and are optimized for efficient connectivity and high-performance between Oracle Big Data Appliance and Oracle Exadata. Oracle Big Data Connectors 3.0 delivers a rich set of new features, increased connectivity, enhanced performance, and security for Big Data applications.

Oracle Big Data Connectors

Large volumes of data are increasingly collected and processed in Hadoop, while enterprise IT systems are centered on relational data warehouses. Oracle Big Data Connectors bridges data processing in Hadoop with Oracle Database, providing the crucial ability to unify data across these systems. Combining pre-processing of large data volumes of raw and unstructured data in Hadoop with the advanced analytics, complex data management, and real-time query capabilities of Oracle Database, Oracle Big Data Connectors deliver features that support information discovery, deep analytics and fast integration of all data in the enterprise. The components of this software suite are:

Oracle SQL Connector for Hadoop Distributed File System
Oracle Loader for Hadoop
Oracle Data Integrator Application Adapter for Hadoop
Oracle R Advanced Analytics for Hadoop
Oracle XQuery for Hadoop

Oracle Big Data Connectors work with Oracle's engineered systems - Oracle Big Data Appliance and Oracle Exadata - as well as with supported Hadoop distributions and database versions on non-engineered systems.

KEY FEATURES

- Tight integration with Oracle Database
- Leverage Hadoop compute resources for data in HDFS

- Enable Oracle SQL to access and load Hadoop data
- Fast and very efficient load from Hadoop into Oracle Database
- Partition pruning of Hive tables during load and query
- Graphical user interfaces of Oracle Data Integrator drive data transformation workflows on