DATA

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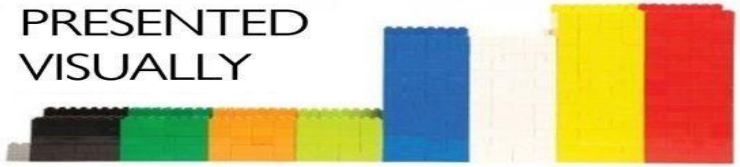


EXPLAINED
WITH A STORY

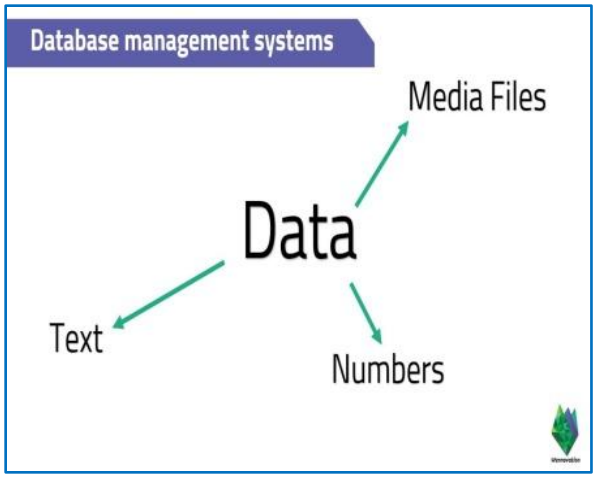
# Database Administration

**Unit 1: Introduction**

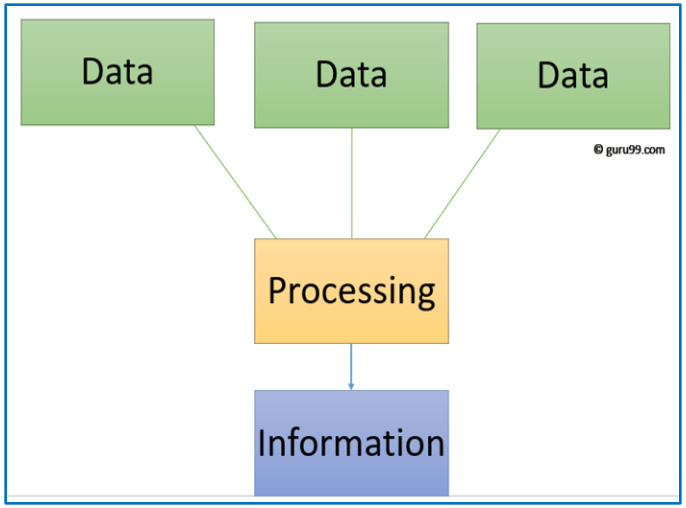
- DBA Roles and Responsibilities;
- Database Architecture; ORACLE logical and physical database structure; Memory and Process Structure,
- SQLPLUS Overview, creating a database;

# Data , Information

- In simple words, **data** can be facts related to any object in consideration. For example, your name, age, height, weight, etc. are some data related to you. A picture, image, file, pdf, etc. can also be considered data
  - Example : student ,Ram, CSIT, seventh, Semester




- **Information** is a processed, organized data which gives logical meaning
  - **Ram** is a **student** of **CSIT seventh semester**.



# Database

- A database is a systematic collection of data. They support electronic storage and manipulation of data. Databases make data management easy.
- Let us discuss a database example: An online telephone directory uses a database to store data of people, phone numbers, and other contact details.
- Your electricity service provider uses a database to manage billing, client-related issues, handle fault data, etc.
- Let us also consider Facebook. It needs to store, manipulate, and present data related to members, their friends, member activities, messages, advertisements, and a lot more. We can provide a countless number of examples for the usage of databases.

# Database Management System

- Database management system is a software which is used to manage the database. For example: MySQL, Oracle, etc are a very popular commercial database which is used in different applications.
- DBMS provides an interface to perform various operations like database creation, storing data in it, updating data, creating a table in the database and a lot more.
- It provides protection and security to the database. In the case of multiple users, it also maintains data consistency.

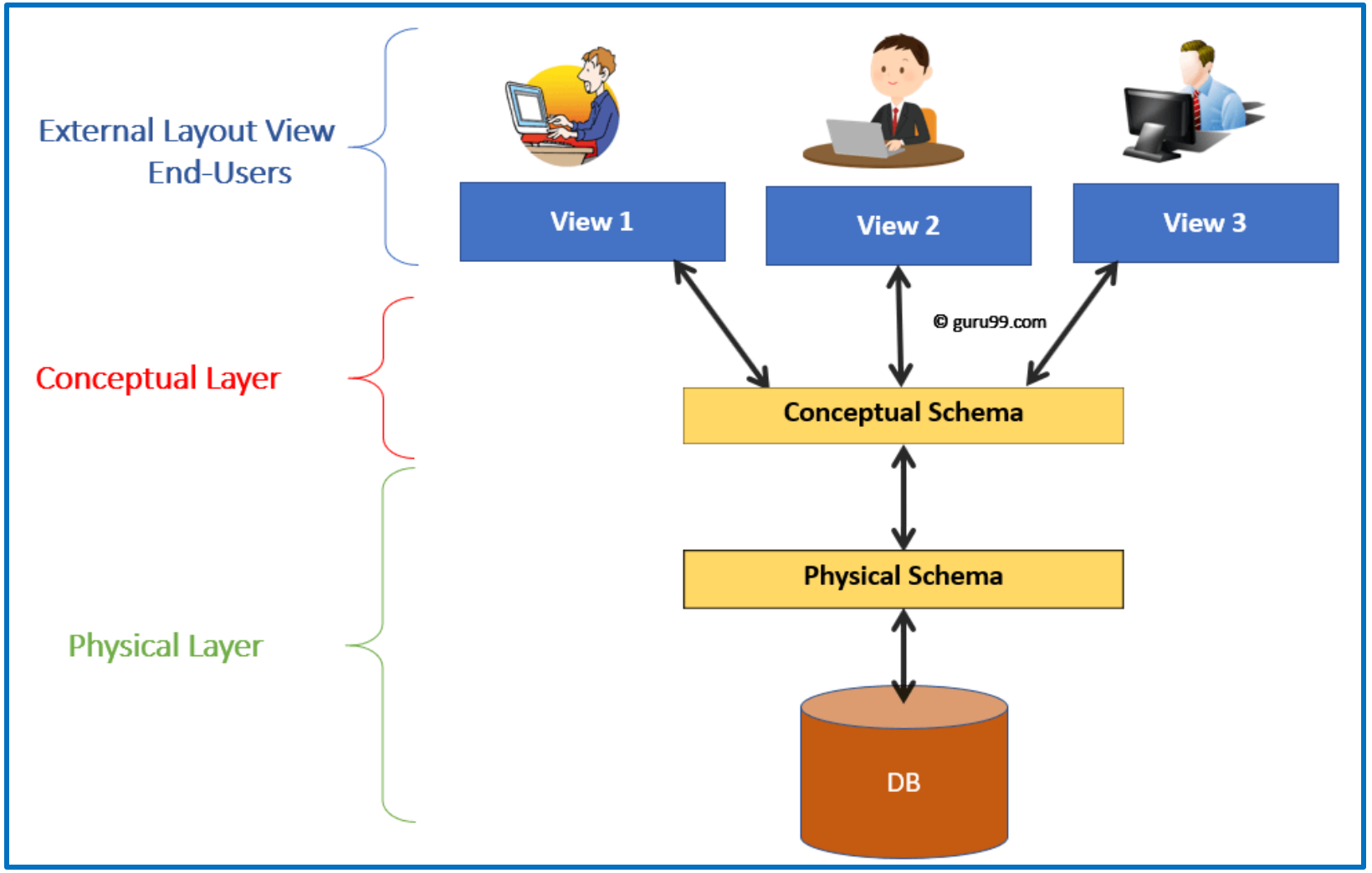
# Database Management System

- **DBMS allows users the following tasks:**
  - **Data Definition:** It is used for creation, modification, and removal of definition that defines the organization of data in the database.
  - **Data Updation:** It is used for the insertion, modification, and deletion of the actual data in the database.
  - **Data Retrieval:** It is used to retrieve the data from the database which can be used by applications for various purposes.
  - **User Administration:** It is used for registering and monitoring users, maintain data integrity, enforcing data security, dealing with concurrency control, monitoring performance and recovering information corrupted by unexpected failure.

# DBMS Architecture

- A **DBMS Architecture** is a representation of DBMS design.
- It helps to design, develop, implement, and maintain the database management system.
- A DBMS architecture allows dividing the database system into individual components that can be independently modified, changed, replaced, and altered.
- It also helps to understand the components of a database.
- There are following three levels or layers of DBMS architecture:
  - External Level/View Level
  - Conceptual Level
  - Internal Level/Physical

# DBMS Architecture…



# DBMS Architecture…

- **External Level / View Level**
  - The user's view of the database.
  - Consists of a number of different external views of the DB.
  - Describes part of the DB for particular group of users.
  - Provides a powerful and flexible security mechanism by hiding parts of the DB from certain users.
  - The user is not aware of the existence of any attributes that are missing from the view.
  - It permits users to access data in a way that is customized to their needs, so that the same data can be seen by different users in different ways, at the same time.

# DBMS Architecture…

- **Conceptual Level**
- The logical structure of the entire database as seen by DBA.
  - What data is stored in the database.
  - The relationships among the data.
- Complete view of the data requirements of the organization, independent of any storage consideration.
- It Represents:
  - entities, attributes, relations
  - constraints on data
  - semantic information on data
  - security, integrity information
- Supports each external view: any data available to a user must be contained in, or derivable from the conceptual level

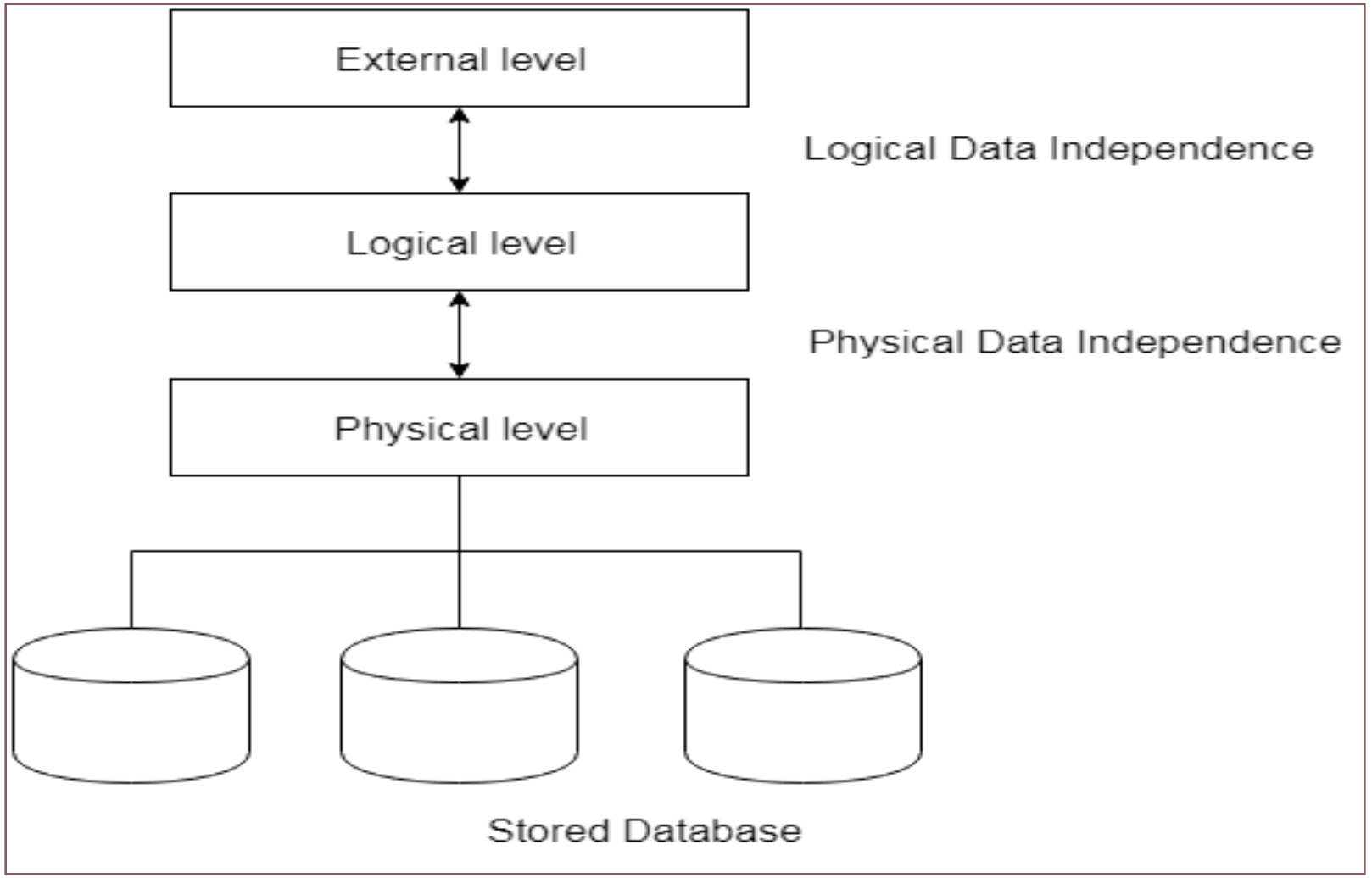
# DBMS Architecture

- **Internal Level/ Physical Level**
- Physical representation of the DB on the computer.
- How the data is stored in the database?
- Physical implementation of the DB to achieve optimal runtime performance and storage space utilization.
  - Storage space allocation for data and indexes
  - Record description for storage
  - Record placement
  - Data compression, encryption
  - Managed by the OS under the direction of the DBMS

# Data Independence

- The ability to modify a scheme definition in one level without affecting a scheme definition in a next higher level is called data independence.
- There are two kinds of data independence:
  - Logical data independence
  - Physical data independence

# Data Independence…



# Data Independence…

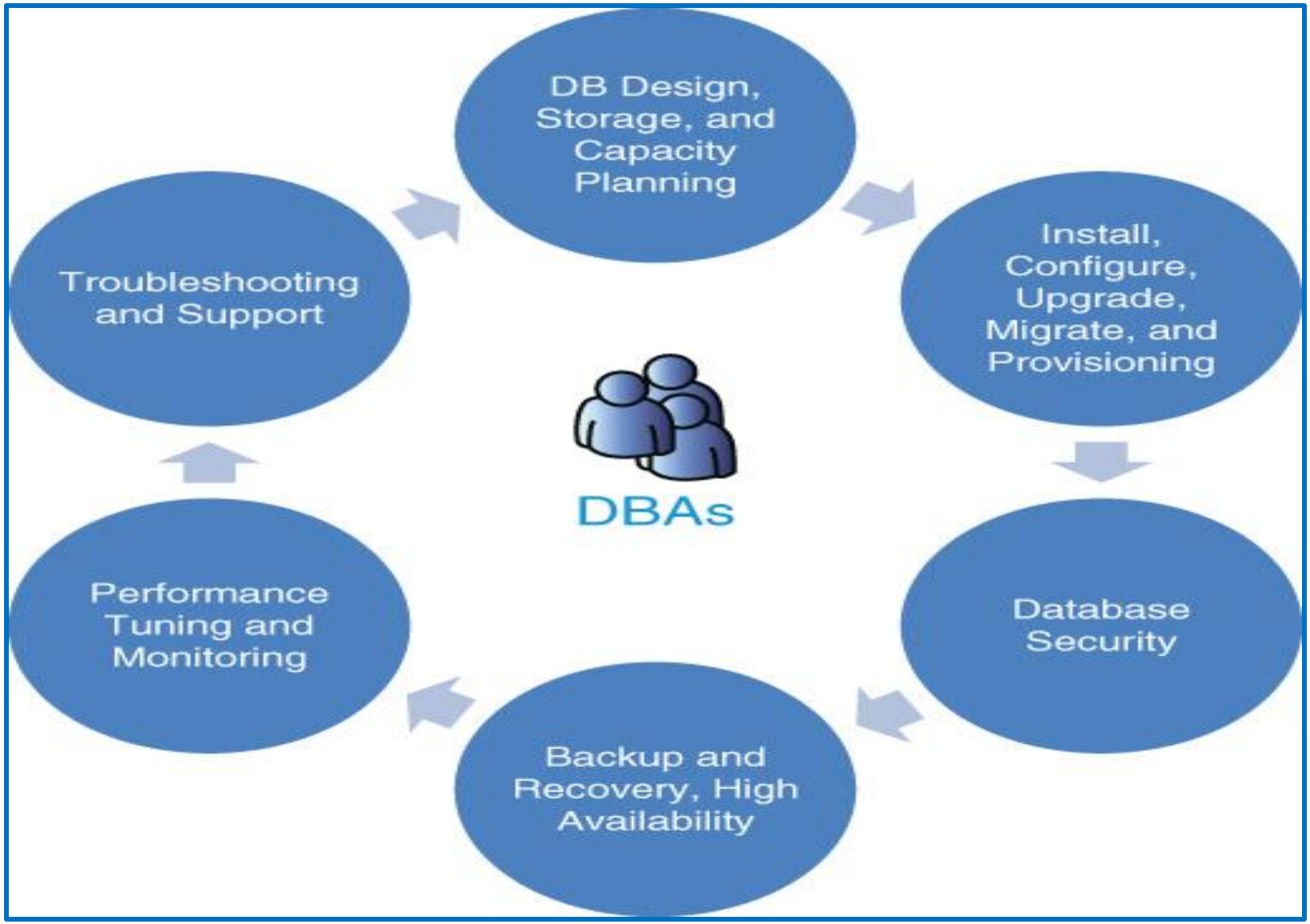
- **Logical data independence**
  - The ability to modify the conceptual schema without causing application programs to be rewritten.
  - The change would be absorbed by the mapping between the external and conceptual levels.
  - Usually done when logical structure of database is altered.
- **Physical data independence**
  - The ability to modify the internal scheme without having to change the conceptual or external schemas.
  - Modifications at this level are usually to improve performance.

# WHAT IS DATABASE ADMINISTRATOR ?

A database administrator is a person responsible for the

- installation
- configuration
- upgradation
- administration
- monitoring and maintenance of databases.

# DBA Roles and Responsibilities



# DBA Roles and Responsibilities

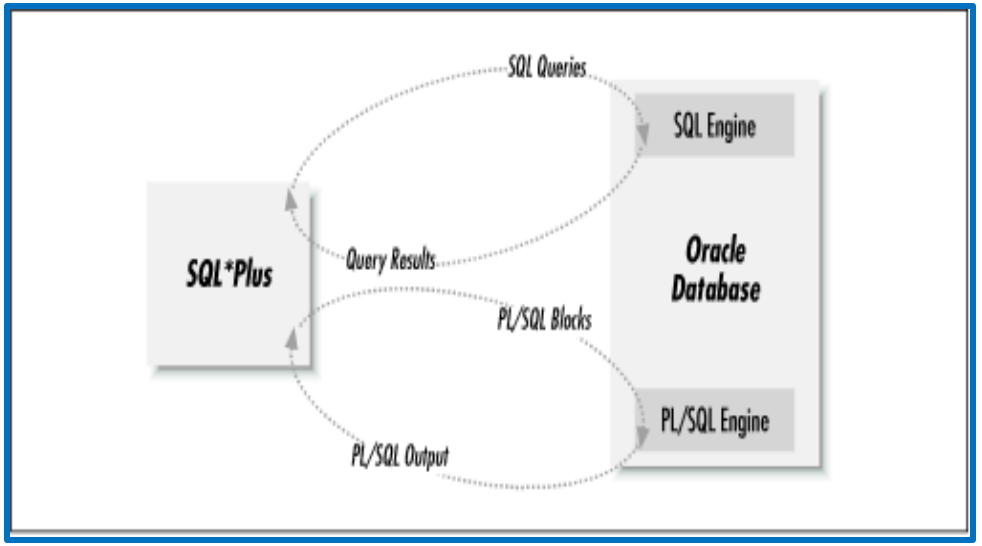
- Database installation, upgrade and patching
- Install and configure relevant network components
- Ensure database access, consistency and integrity
- Resolving issues related to performance bottlenecks
- Provide reporting on various metrics including availability, usage and performance
- Performance testing and benchmark activities
- Work with development staff on architectures, coding standards, and quality assurance policies
- Create models for new database development or changes to existing ones
- Respond to and resolve database access and performance issues
- Monitor database system details

# DBA Roles and Responsibilities…

- Design and implement redundant systems, policies, and procedures for disaster recovery
- Monitor, optimize and allocate physical data storage for database systems
- Plan and coordinate data migrations
- Develop, implement, and maintain change control and testing processes
- Perform database transaction and security audits
- Establish end-user database access control levels
- Implement database encryption and data encryption
- Plan and ensure compliance with established best practices, related policies and legislation
- Participate as a member of a team to move the team toward the completion of its goals

# SQLPLUS Overview

- SQL*Plus is an Oracle-developed tool that allows you to interactively enter and execute SQL commands and PL/SQL code and send it to the server to be executed.
- SQL*Plus is one of the most common front end used to develop and create stored PL/SQL functions and procedures.
- SQL * Plus is command line tool.

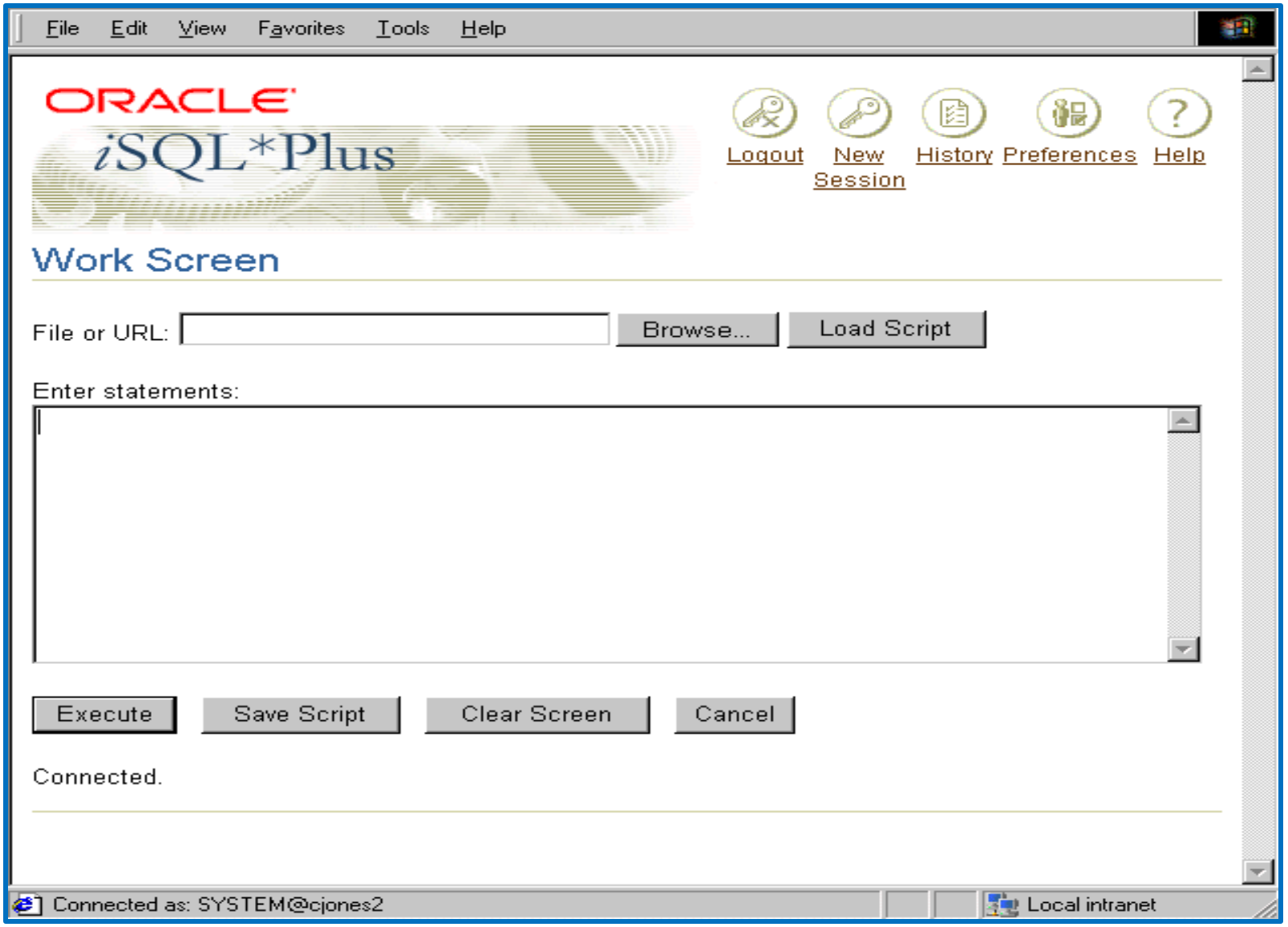


# SQLPLUS Overview

- If you are in windows environment and your database server somewhere on the network, so the following things is happen:
  - SQL*plus is transfer the your sql query over the network on the database server.
  - SQL*Plus is wait for the reply from the database server.
  - The database server execute the query and transmit result to the SQL * plus.
  - Then SQL *Plus display the query result on computer screen.
- If you are not running in a networked windows environment, the same thing is happen. only difference might be that the database server and SQL * Plus is running on same physical machine.

# What is *i*SQL*Plus?

- *i*SQL*Plus is a browser-based interface to SQL*Plus. *i*SQL*Plus is a component of the SQL*Plus product.
- *i*SQL*Plus enables you to use a web browser to connect to Oracle9i and perform the same actions as you would through the command line version of SQL*Plus (known as *SQL*Plus* in this guide). You can use *i*SQL*Plus to write SQL*Plus, SQL and PL/SQL commands to:
  - Enter, edit, run and save SQL commands and PL/SQL blocks.
  - Calculate, and print query results.
  - List column definitions for any table.
  - Access and copy data between databases.
  - Perform database administration.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ORACLE
iSQL*Plus
Logout
New Session
History
Preferences
Help
Work Screen
File or URL:
Browse...
Load Script
Enter statements:
Execute
Save Script
Clear Screen
Cancel
Connected.
Connected as: SYSTEM@cjones2
Local intranet

# Creating a Database

- **Creating a Database with DBCA**
  - Database Configuration Assistant (DBCA) is the preferred way to create a database, because it is a more automated approach, and your database is ready to use when DBCA completes.
  - DBCA can be launched by the Oracle Universal Installer (OUI), depending upon the type of install that you select. You can also launch DBCA as a standalone tool at any time after Oracle Database installation.

- The Database Configuration Assistant (DBCA) Creation Mode window enables you to create a database with default configuration or to use Advanced Mode to create a database.
- If you choose **Advanced Mode**, you can customize storage locations, initialization parameters, management options, database options, and different passwords for Administrator user accounts.
- If you choose **Create a database with default configuration**, you make fewer choices in the options for your database, which allows you to create your database sooner.
- When you select **Create a database with default configuration**, you can select the following options:
  - **Global Database Name**: Enter the database name in the form *database_name.domain_name*.

- **Storage Type**: Choose either **File System** or **Automatic Storage Management**.
- When you choose **File System**, your database files are managed by the file system of your operating system.
- When you choose **Automatic Storage Management**, you place your data files in Oracle Automatic Storage Management (Oracle ASM) disk groups.
- **Database Files Location**: The choice you make for the **Storage Type** option determines what you specify for the **Database Files Location** option.
- When you choose **File System** in the **Storage Type** field, you specify the directory path where the database files are to be stored in the **Database Files Location** field. Oracle Database can create and manage the actual files.

- When you choose **Automatic Storage Management** in the **Storage Type** field, you specify the disk group to use in the **Database Files Location** field (the disk group must already exist). With Oracle ASM, Oracle Database automatically manages database file placement and naming.
- **Fast Recovery Area**: Specify a backup and recovery area.
- **Database Character Set**: Choose the character set to use for the database. See "Character Sets" for more information about character sets.
- **Administrative Password**: Enter the password to use for the database administrative passwords (such as the SYS and SYSTEM accounts).

- **User "Oracle Home User" Password** *(on Microsoft Windows operating systems only)*: If during the installation you specified a non-administrator, low privileged Windows User Account (as Oracle Home User) to run the database services under, you are prompted for the password of that user account.
- **Create as Container Database**: Enable this option to create the database as a multitenant container database (CDB) that can support zero, one, or many user-created pluggable databases (PDBs).
- If you want DBCA to create a PDB when it creates the CDB, specify the PDB name in the **Pluggable Database Name** field.

Thank You