DATABASES AND OPERATING SYSTEM INTERACTION

SUBMITTED BY :

NAME : ROA'A ALI ABDULLAH MOHAMMEDQASEM

ID STUDY : 163104009

SUBMITTED TO :

PROF. DR. HASAN HUSEYIN BALIK

Introduction

In any computing environments, the operating system could control all system resources, no other program could be allowed to direct access any of these resources, otherwise the operating system is considered effected or inefficient.

When installing any database server on the machine, it could interact with the operating system to get access to system resources, which are including

❖ The processing devices .

❖ Temporary storage RAM .

❖ Storage devices .

❖ Server-clients tools or programs .

❖ Human input-output devices .

these activities usually done by communicating between a server programs contained by database management system (DBMS) and a background operating system processes called system services.

from a system console, bellow fig. represent minimal oracle services.

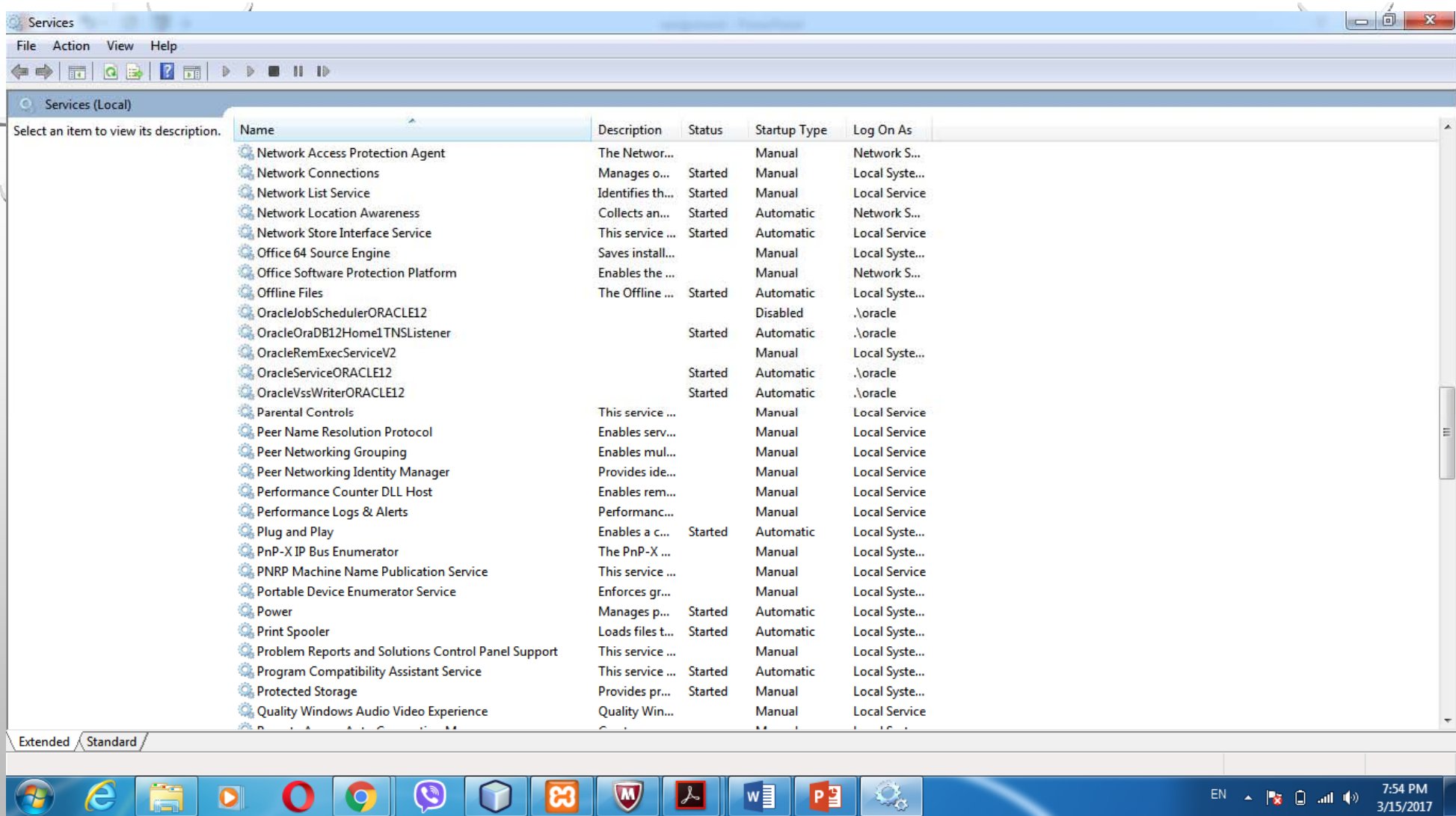(administrative tools → services)

FIG 1 OPERATING SYSTEM SERVICES

Secure of Operating System

- **Interaction of oracle and OS**

- **Windows**

- **Security administrative accounts**

- **Control registry access**

- **Need good account policies**

- **Others…**

- **Linux/unix**

- **Choose different account names than standard suggestions**

- **Restrict use of the account that owns oracle software**

- **Secure temporary directory**

- **Some oracle files are SUID(root)**

- **Command line SQL*PLUS with user/pass parameters appears under PS output**

- **Others…**

The Interaction

The interactions between oracle databases and operating system are not the same for all types of databases, and it's differ according to operating systems. also it's subjected to changes according to performance and security policies applied by database administrators.
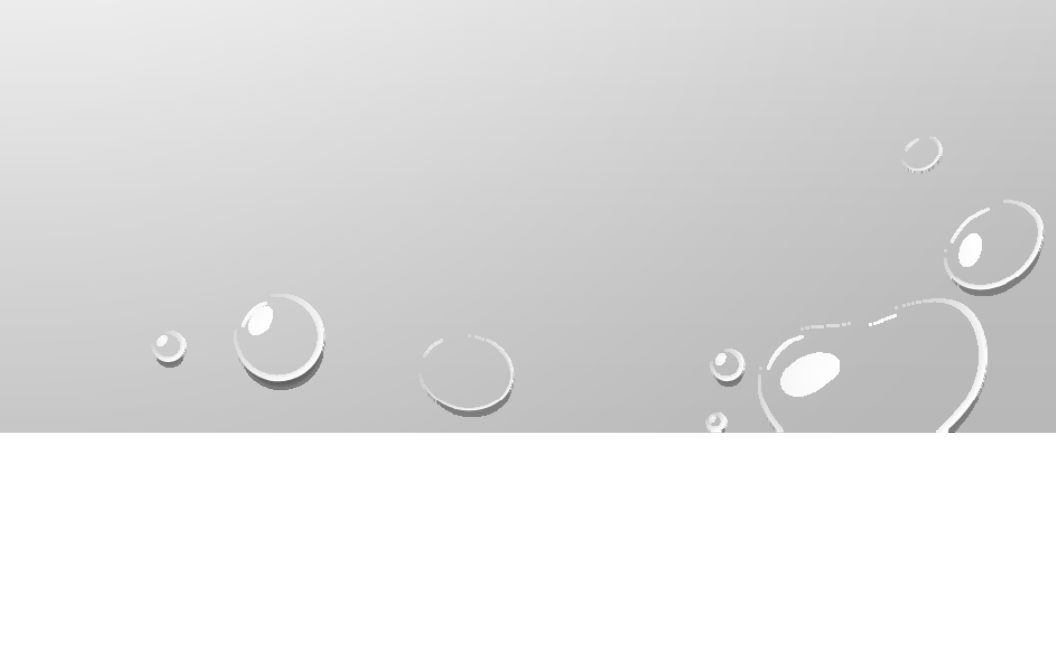
Database Startup at Operating System Start

At system startup, an operating system service will load the database server main process to the system memory. the most size of the RAM could be allocated to server process depending on database initialization parameters. this memory fragment maintained to the database all operating time; it could not swapped in nor out. otherwise the database would get slower.

System Global Area (SGA)

Any database operations should be done within its portion of memory, which is called system global area (SGA). In case of oracle automatic memory management, the size of memory portion could be flexible depending on system load.

Furthermore, many sites use procedures to enable automatic startup of one or more oracle database instances and databases immediately following a system start . The procedures for performing this task are specific to each operating system, and usually done by operating system service.

Database Listener program

Oracle database creates server processes to handle the requests of client processes connected to the instance. A client process always communicates with a database through a separate server process.
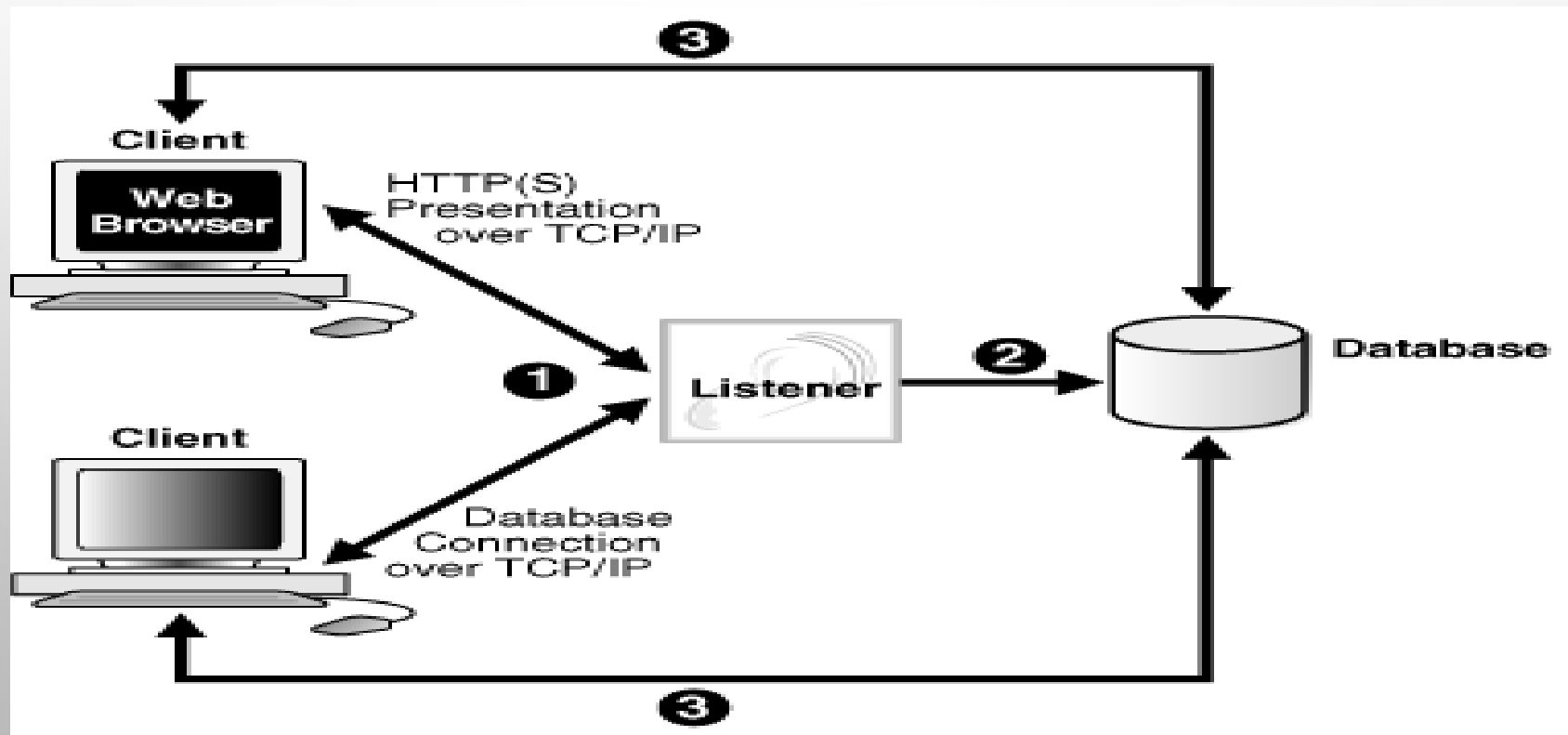
Fig. 2 shows a browser making an http connection and a client making a database connection through a listener. the listener does not need to reside on the database host, it reside on separate node.

Server processes created on behalf of a database application can perform one or more of the following tasks:

- Parse and run SQL statements issued through the application, including creating and executing the **query plan**

- Execute PL/SQL code

- Read data blocks from data files into the database buffer cache .

Net Listener

Certain background operating service could starting oracle net listener, which is a third party, program i.e. java script. it is a server-side process that listens for incoming client connection requests and manages traffic to the database. when a database instance starts, and at various .
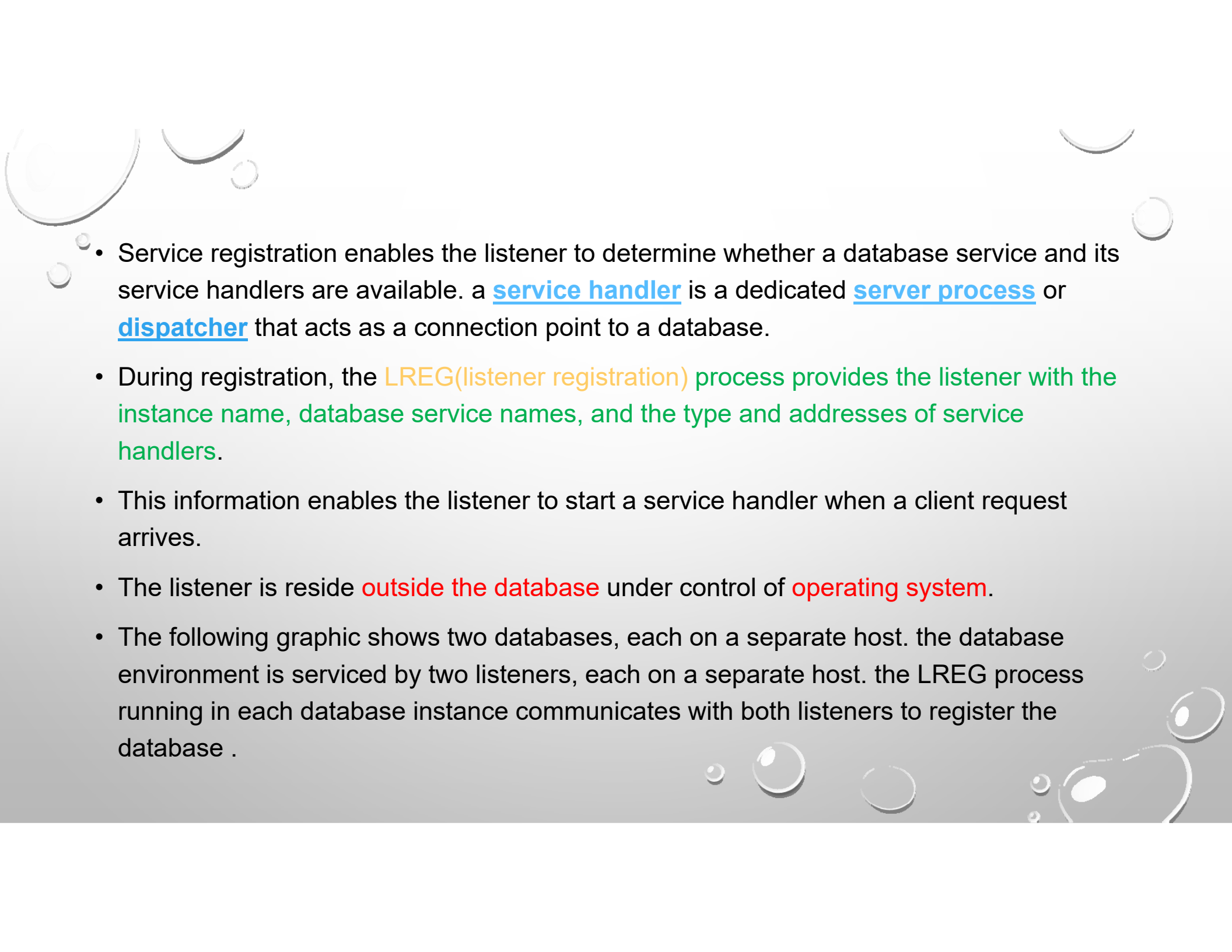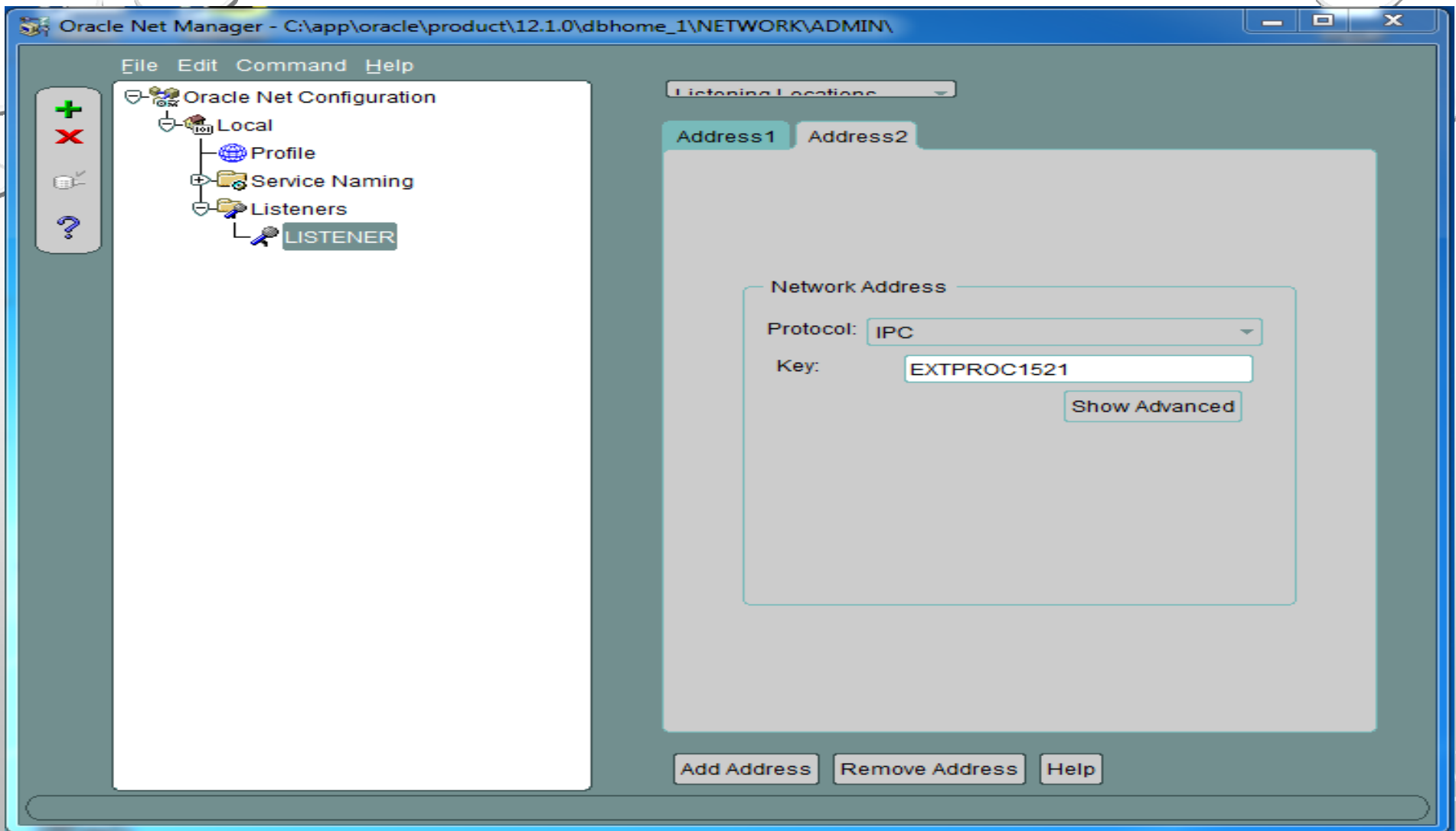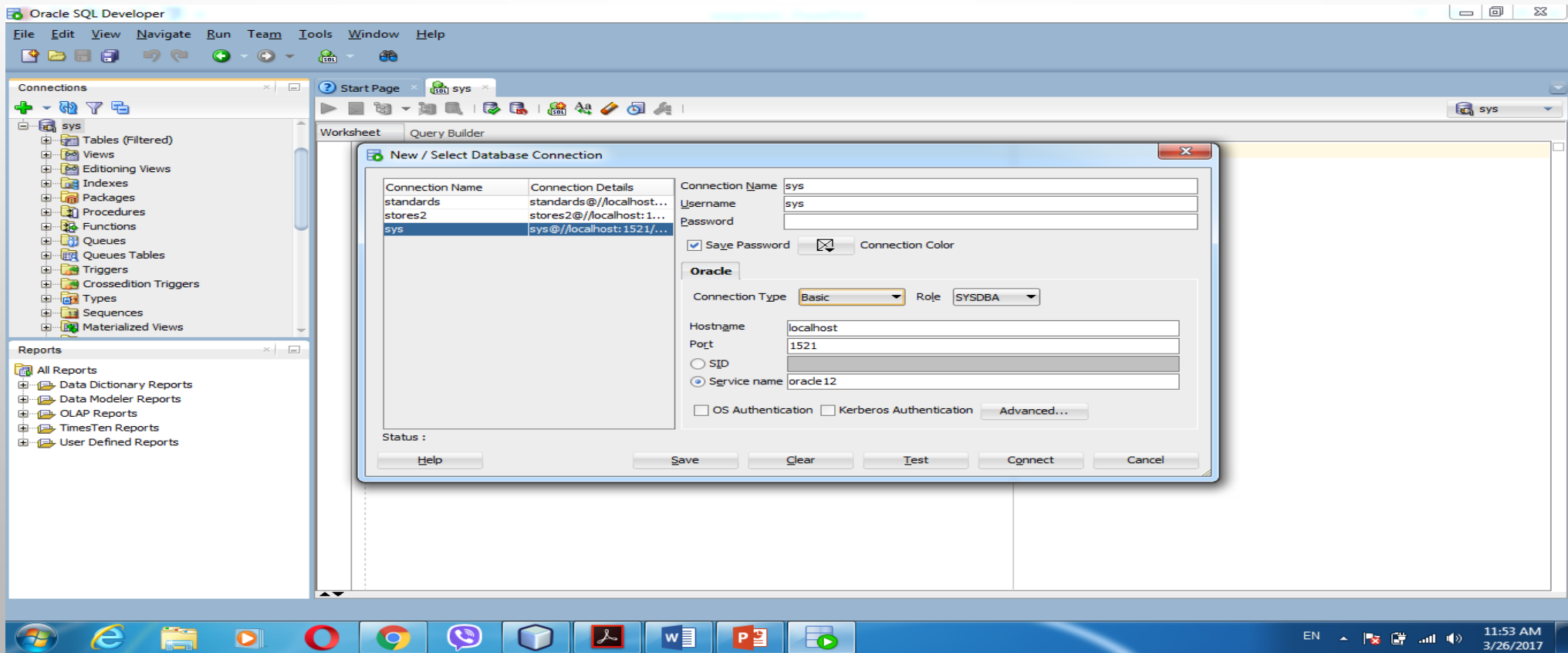
Fig. 3 view the net listener

- times during its life, the instance contacts a listener and establishes a communication pathway to this instance. after the communication or link is established, the sever process client request directly and no need to the listener any more.(Fig. 4 represent the database after install listener)

- Service registration enables the listener to determine whether a database service and its service handlers are available. a **service handler** is a dedicated **server process** or **dispatcher** that acts as a connection point to a database.

- During registration, the LREG(listener registration) process provides the listener with the instance name, database service names, and the type and addresses of service handlers.

- This information enables the listener to start a service handler when a client request arrives.

- The listener is reside outside the database under control of operating system.

- The following graphic shows two databases, each on a separate host. the database environment is serviced by two listeners, each on a separate host. the LREG process running in each database instance communicates with both listeners to register the database .

FIG. 5 The listener which is controlled by operating system is registered by oracle server process lreg reside on dbms
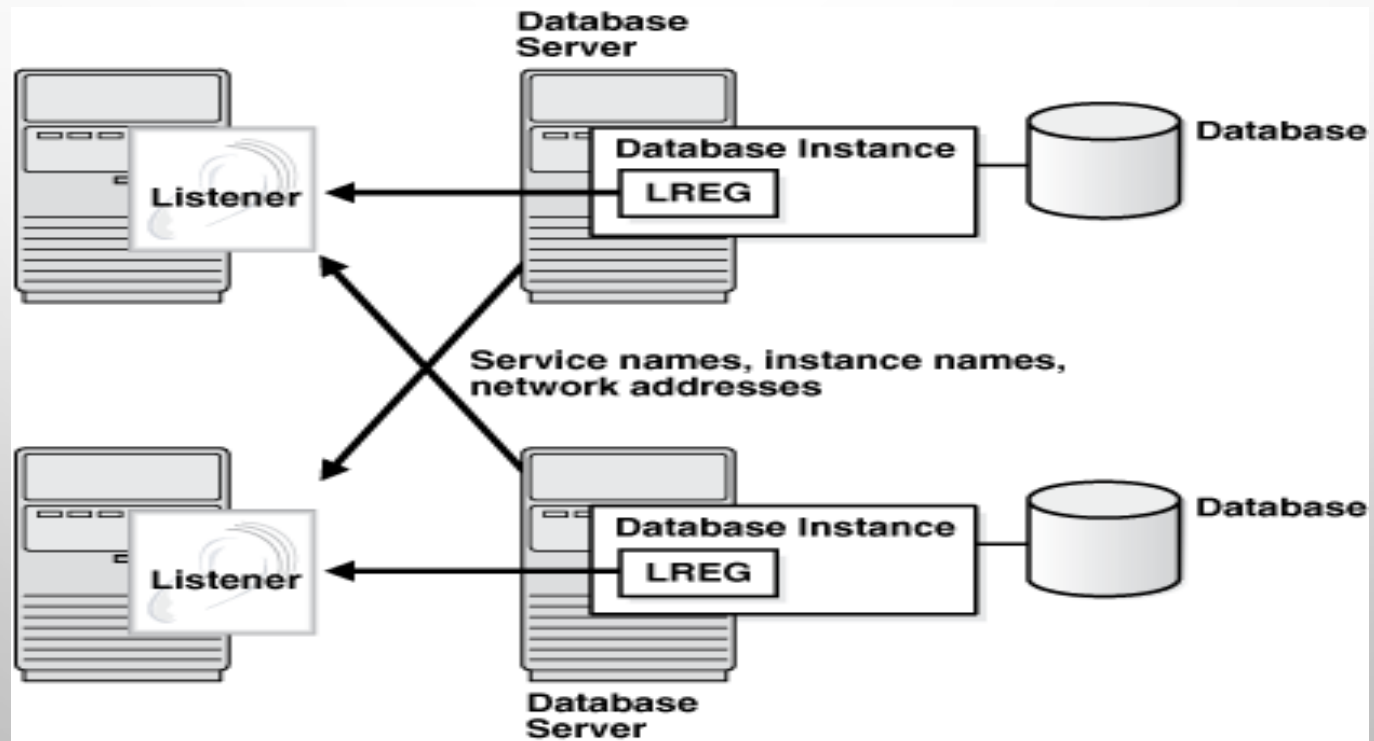
The basic steps by which a client establishes a connection through a listener are :

1. A **client process** or another database requests a connection.

2. The listener selects an appropriate service handler to service the client request and forwards the request to the handler.

3. The client process connects directly to the service handler. the listener is no longer involved in the communication.