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BSSE 1125

1. Discuss about the kernel structure of Windows.

Windows is an operating system which is a layered design consisting of two components :

- User Mode
- Kernel Mode

User mode is made of different subsystem servers. The interface between user and kernel functions is called “Environment Subsystem” which can be divided into three sections such as :

- The Win32 subsystem
- OS/2 subsystem
- POSIX subsystem

Windows kernel is a hybrid kernel. A hybrid kernel is an operating system kernel architecture that attempts to combine aspects and benefits of microkernel and monolithic kernel architectures used in computer operating systems.

- **Microkernel :** A microkernel is the near-minimum amount of software that can provide the mechanisms needed to implement an operating system. These mechanisms include low-level address space management, thread management, and inter-process communication (IPC).

- **Monolithic Kernel :** A monolithic kernel is an operating system architecture where the entire operating system is working in kernel space. The monolithic model differs from other operating system architectures in that it alone defines a high-level virtual interface over computer hardware.

The kernel mode stops user mode services and applications from accessing critical areas of the operating system that they should not have access to. The kernel sits between the hardware abstraction layer and the Executive to provide multiprocessor synchronization, thread, interrupt scheduling and dispatching, and trap handling and exception dispatching. The kernel is also responsible for initializing device drivers at bootup. Kernel mode drivers exist in three levels :

- Highest Level Drivers
- Intermediate Drivers
- Low-level Drivers

These are divided into many subsystems. Such as :

- Cache Manager
- Configuration Manager
- I/O Manager
- Local Procedure Call (LPC)

- Memory Manager
- Object Manager
- Process Structure
- Security Reference Monitor (SRM)

The Windows hardware abstraction layer, or HAL, is a layer between the physical hardware of the computer and the rest of the operating system. It was designed to hide differences in hardware and provide a consistent platform on which the kernel is run. The HAL includes hardware-specific code that controls I/O interfaces, interrupt controllers and multiple processors.

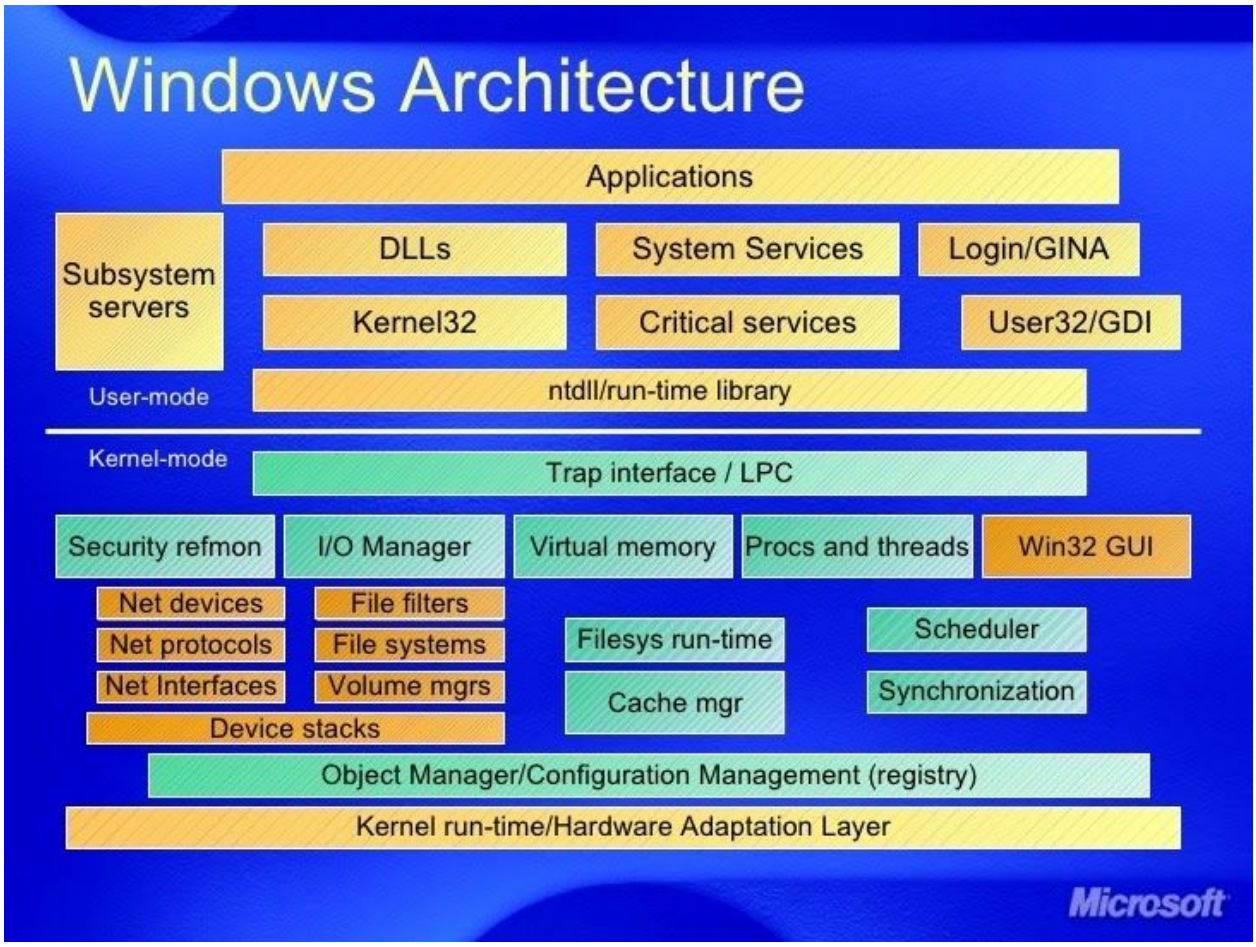

Figure : Windows Architecture of User and Kernel Mode

2. Compare between android and iOS.

Android	iOS
Android is an open system. People can customize it easily.	iOS is more closed. Users have barely any system permissions.
Android is available for many manufacturers such as Samsung, LG etc. This may lead to some quality problems.	iOS is only available to Apple inc. So there is no problem with quality.
The Android applications are obtained from Google Play.	The iOS applications are available in the Apple app store.
Integration with other devices is pretty complex.	Integration with other devices is easy.
the performance of Android devices may decline over time.	The running speed of iOS devices remains consistent with time.
Android OS structure has four layers.	The iOS structure has seven layers.
It is based on the LINUX kernel.	It is only created by Apple Inc.