# Kernel Mode Components

Numerous services exist within the kernel-mode operating system service section.  There are two main features to kernel mode: Executive area and the Windows/Graphics area.

Kernel mode components within Windows include the following:

- Windows *Executive*
    - o Contains base OS services
        - Memory Management
        - Process/Thread Management
        - Security
        - I/O
        - Networking
        - Inter-process Communication
- Windows *Kernel*
    - o Contains low-level OS functions
        - Thread scheduling
        - Interrupt
        - Exception dispatching
        - Multiprocessor synchronization
    - o Provides a set of sequences and basic objects which *executive* uses to implement higher-level constructs
- Windows *Device Drivers*
    - o Contain hardware drivers
        - Translate user I/O function calls to special hardware device I/O requests
        - Includes file system and network drivers
- *Hardware Abstraction Layer (HAL)*
    - o Isolates the kernel, device drivers and remaining items within the *executive* from hardware differences
        - Example – Code would not need to account for a Realtek audio chipset on an Asus motherboard.

In addition to:

- Windows *USER*
    - o The graphical frontend of Windows (GUI)
    - o Entails windows, user interface controls, drawing, message passing, input processing
        - Implementation: user32.dll