Computer System Architectures and Interfaces

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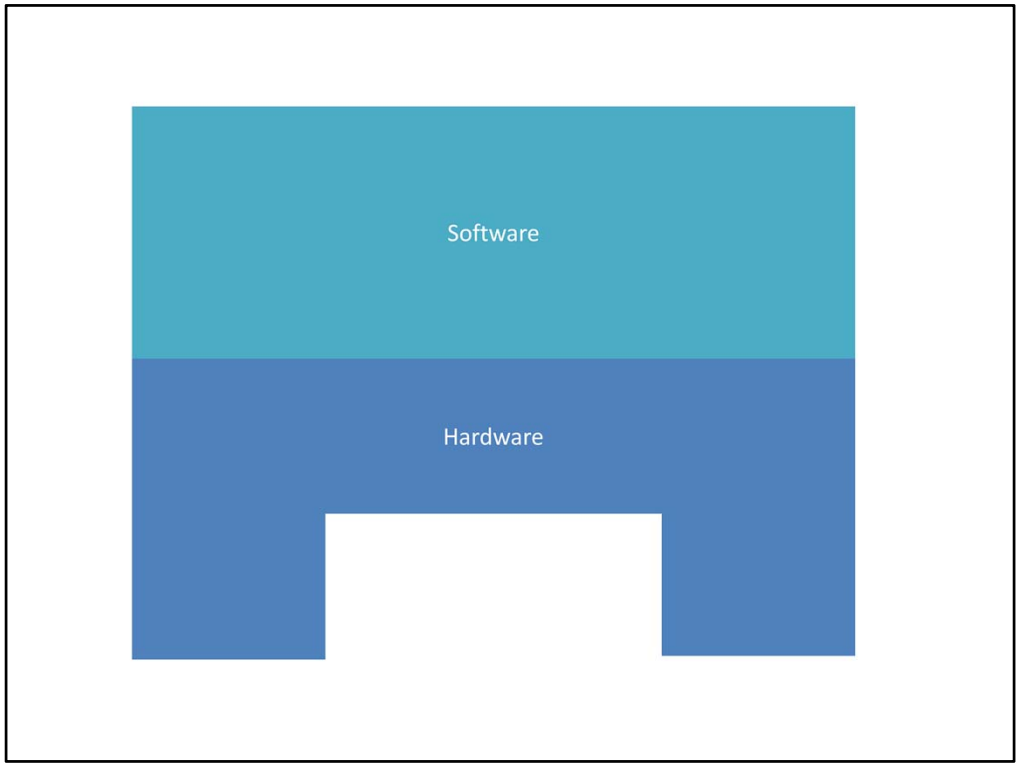
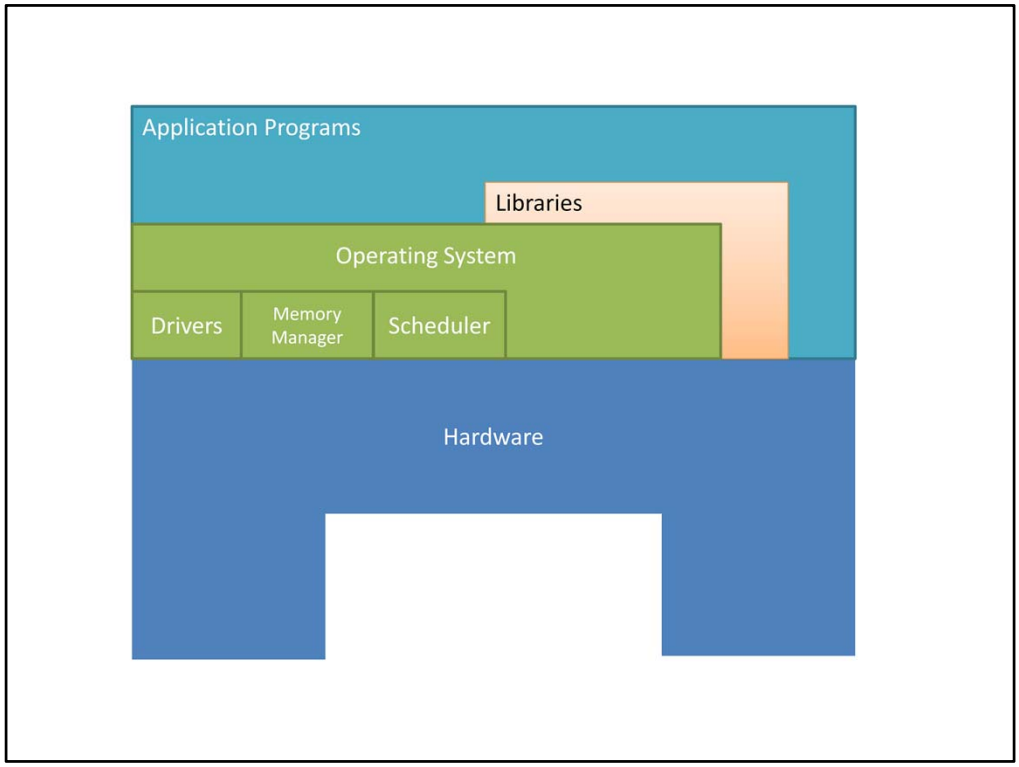
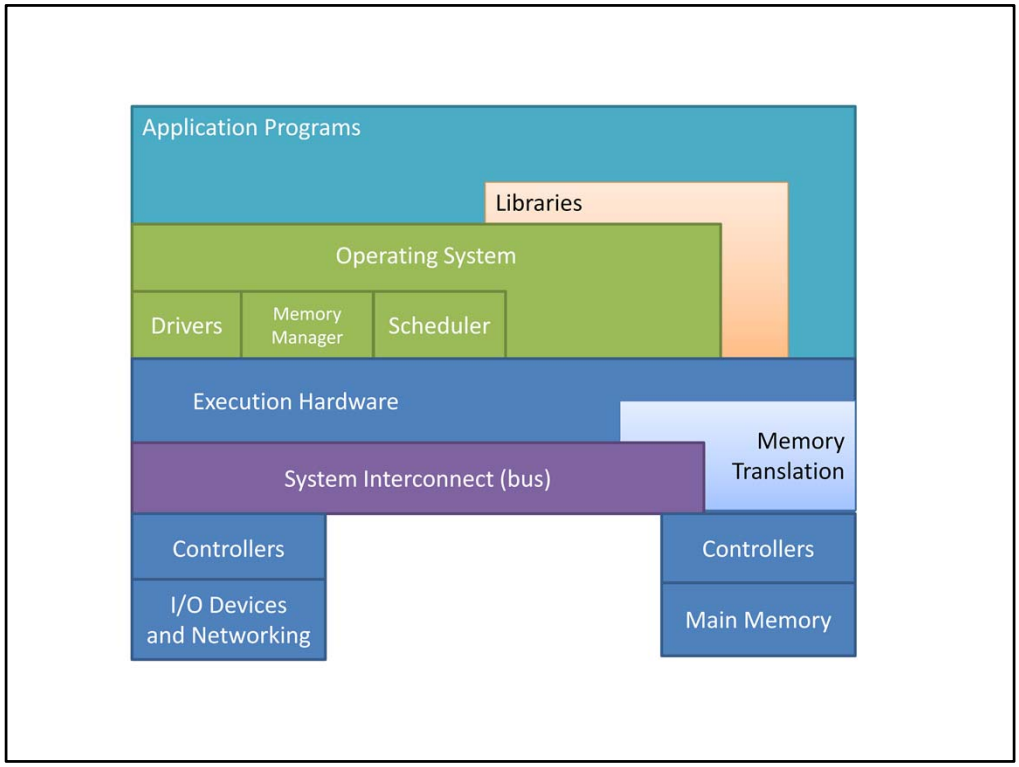
Let us now take a closer look at Computer System Architectures and Interfaces



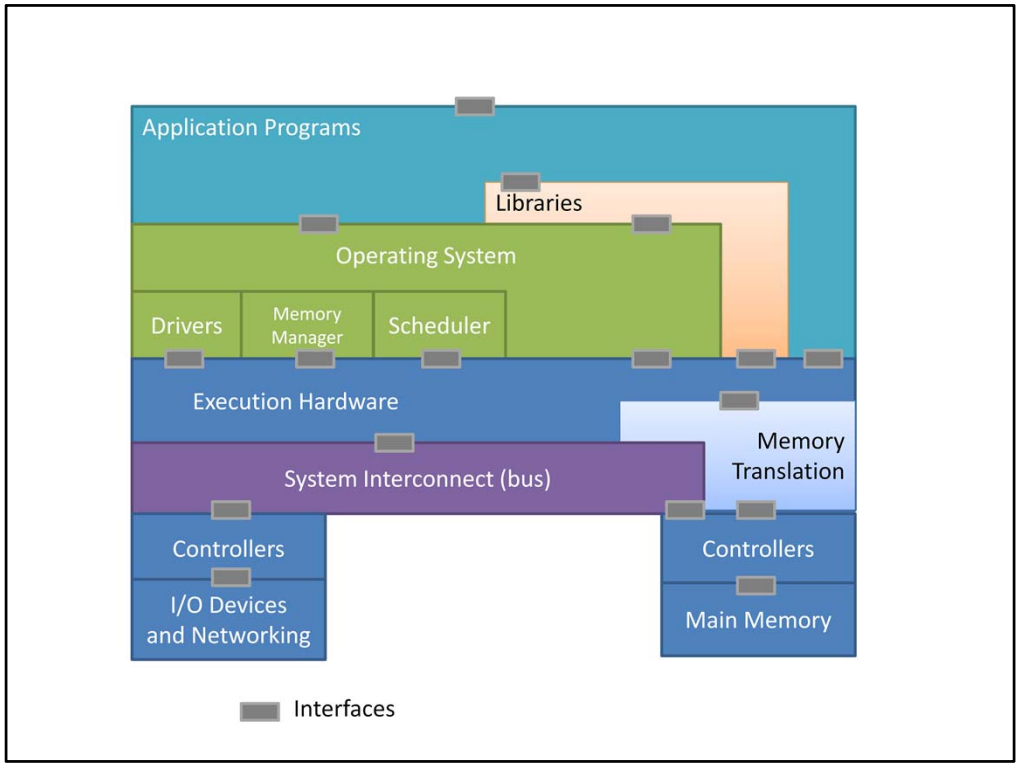
Computer systems can be mainly divided into software and hardware.



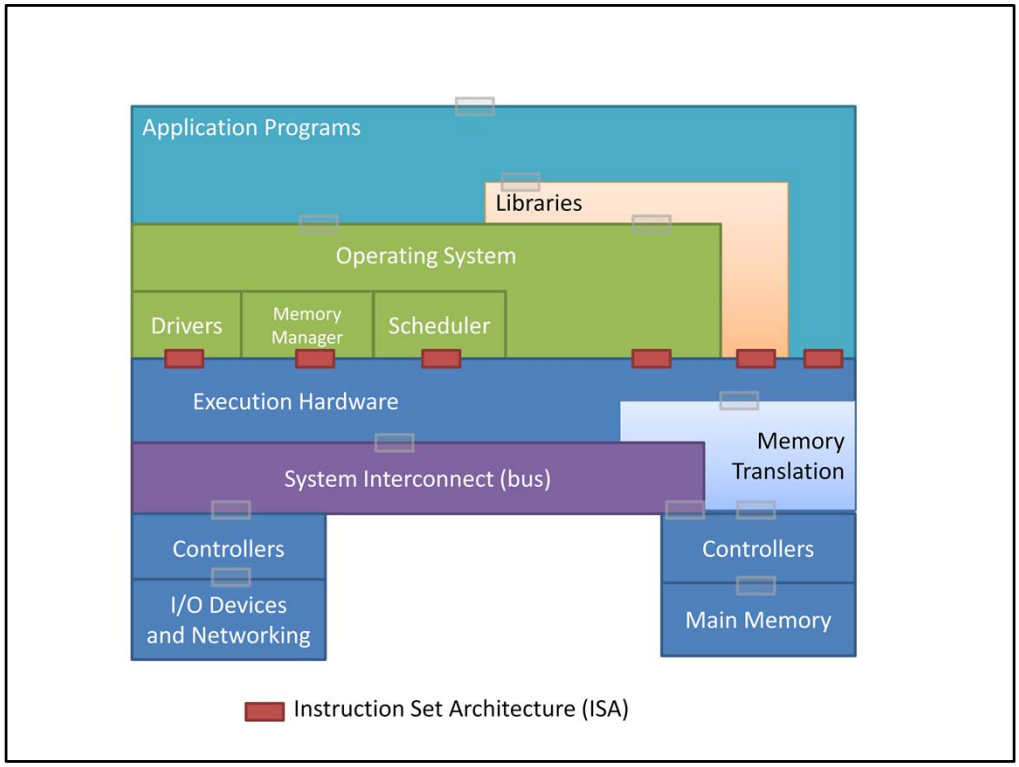
Within software, we have application programs, libraries and operating systems. Some of the components in the OS include Device dirvers, Memory manager and a Scheduler



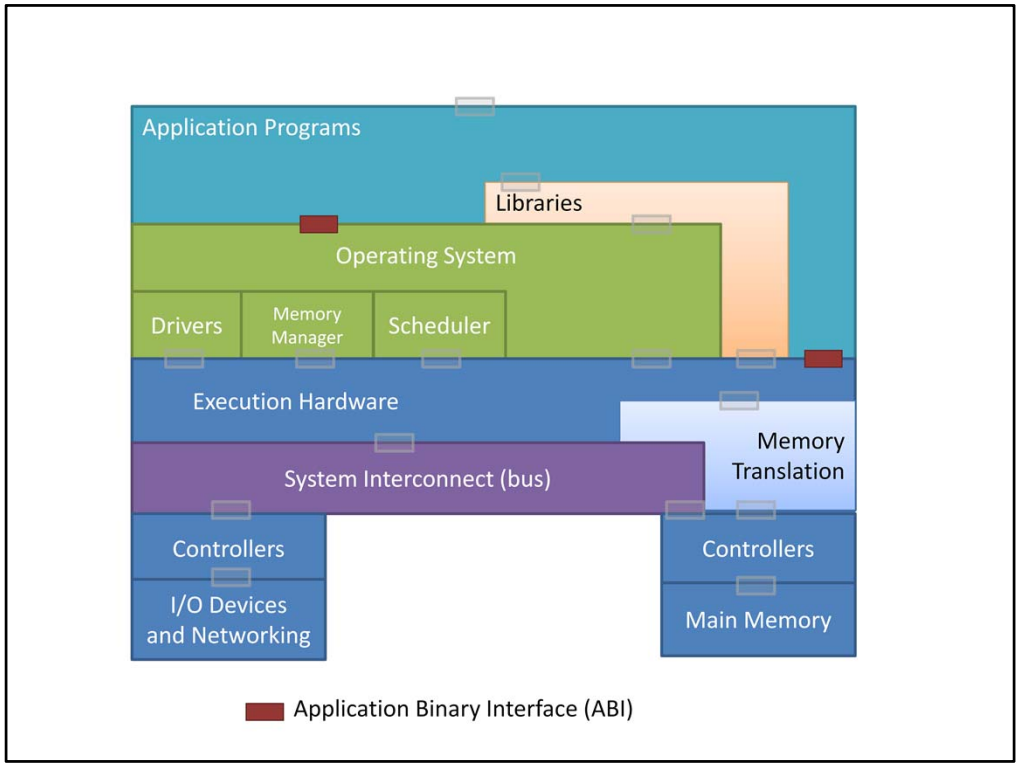
Within Hardware, we have the execution hardware, a memory translation system, a system interconnect or bus as well as controllers for both I/O and Memory. The memory translation system allows application programs (by a combination of the OS and hardware) to run simultaneously though virtual memory.



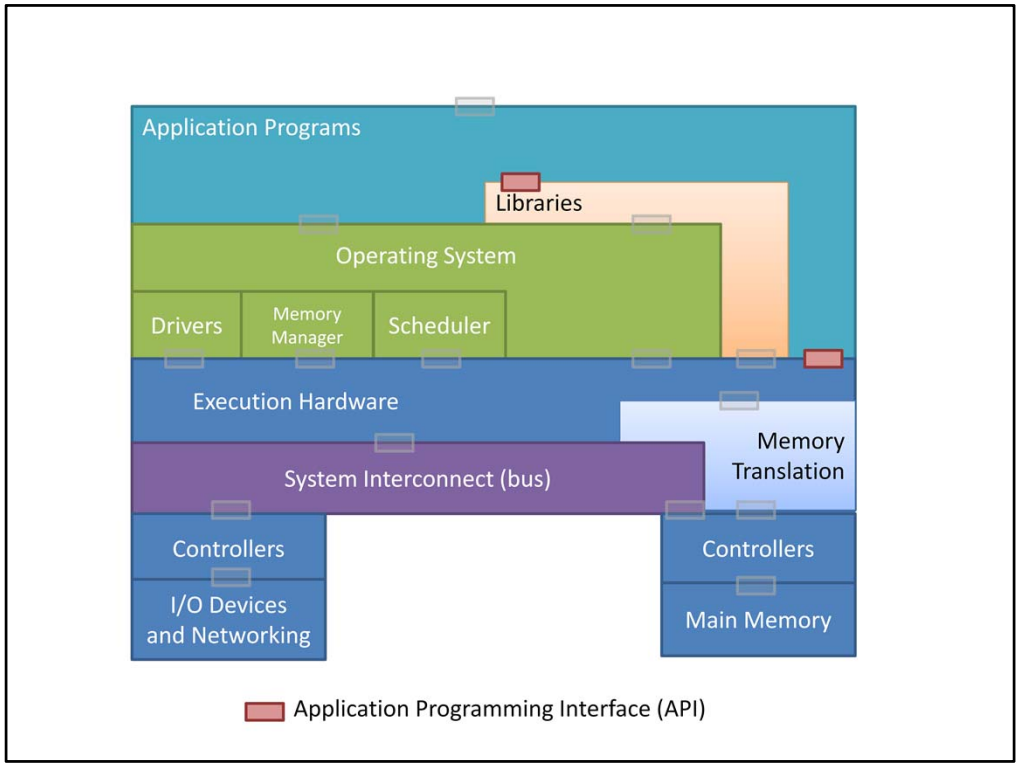
Each system talks to each other through a set of interfaces. These interfaces allow data to pass through the various layers in the system. All of the interfaces that are present in our example are highlighted in grey. These interfaces allow complex systems to work in a reliable and predictable manner.



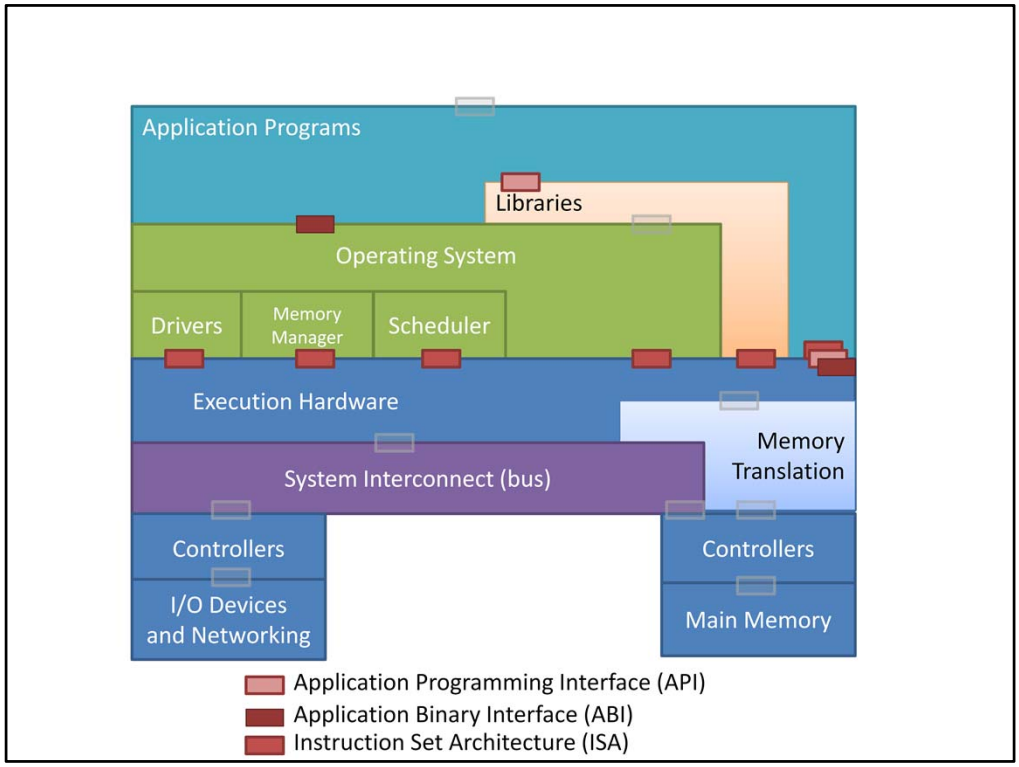
An important set of interfaces in our diagram is the Instruction Set Architecture or ISA. ISA acts as the interface between the software/hardware barrier. ISA exist between multiple entities in the software space and can interact with the execution hardware.



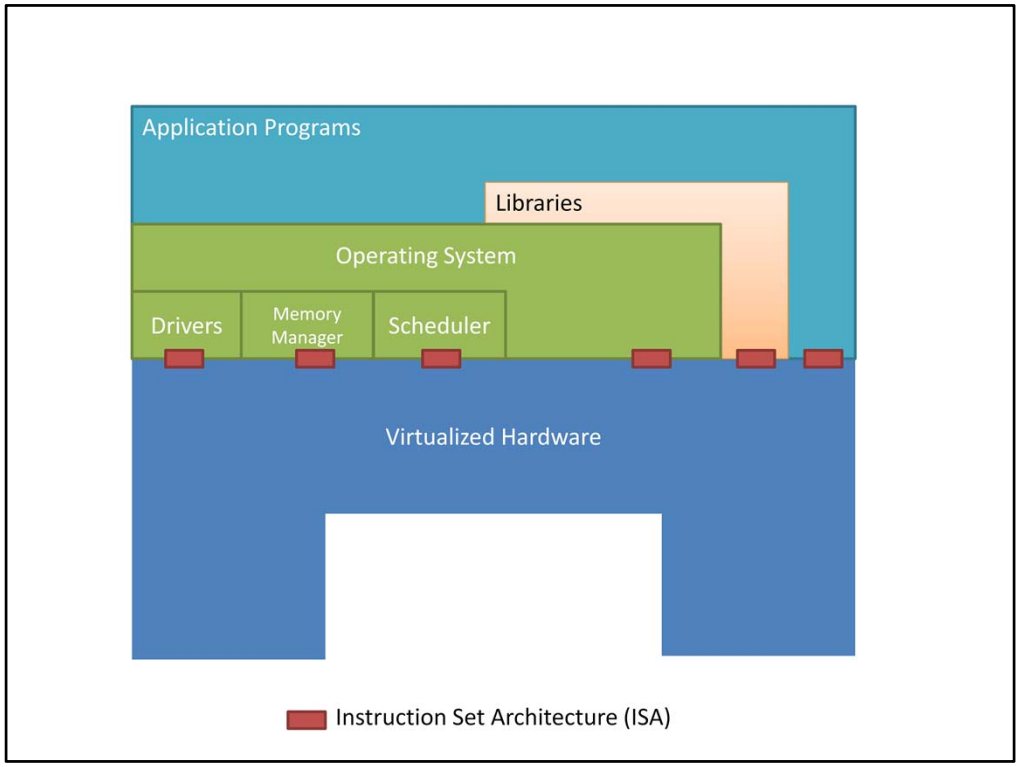
Another set of interfaces exist between the Application programs and the Operating System as well as the Execution Hardware. These interfaces are referred to as the Application Binary Interface or ABI. ABIs exist at the machine language level and allow programs to execute on hardware that runs a particular OS and ISA.



Finally, the API or application programming interface allows developers to write code and request for services through pre-written libraries or OS features through system calls.



Having these set of well-defined interfaces is critical in making virtualization a reality.



This allows various entities in the system to be virtualized and run seamlessly.