# Answer on Question #54811, Physics / Other

**Task:**

Describe in brief any five high level networking software systems.

**Answer:**

Cisco IOS is software used on most Cisco Systems routers and current Cisco network switches. IOS is a package of routing, switching, internetworking and telecommunications functions integrated into a multitasking operating system. In all versions of Cisco IOS, packet routing and forwarding (switching) are distinct functions. Routing and other protocols run as Cisco IOS processes and contribute to the Routing Information Base (RIB). This is processed to generate the final IP forwarding table (FIB, Forwarding Information Base), which is used by the forwarding function of the router. On router platforms with software-only forwarding (e.g., Cisco 7200) most traffic handling, including access control list filtering and forwarding, is done at interrupt level using Cisco Express Forwarding (CEF) or dCEF (Distributed CEF). This means IOS does not have to do a process context switch to forward a packet. Routing functions such as OSPF or BGP run at the process level. In routers with hardware-based forwarding, such as the Cisco 12000 series, IOS computes the FIB in software and loads it into the forwarding hardware (such as an ASIC or network processor), which performs the actual packet forwarding function.Cisco IOS has a "monolithic" architecture, which means that it runs as a single image and all processes share the same memory space.

Juniper Junos is the FreeBSD-based operating system used in Juniper Networks hardware routers. It is an operating system that is used in Juniper's routing, switching and security devices. Juniper offers a Software Development Kit (SDK) to partners and customers to allow additional customization. Junos operating system is primarily based on FreeBSD, an advantage of which is the Unix-like environment: customers can access a Unix shell and execute normal Unix commands. Junos is platform independent within Juniper hardware systems. After Juniper acquired NetScreen, it also integrated ScreenOS security functions into its own Junos network operating system so that now Juniper offers routing and security functions in a single device.

ExtremeXOS is the software or the network operating system used in newer Extreme Networks network switches. It is Extreme Networks second generation operating system after the VxWorks based ExtremeWare operating system. ExtremeXOS is based on the Linux kernel and BusyBox.

DNOS or Dell Networking Operating System is an operating system running on switches from Dell Networking. It is derived from either the PowerConnect OS (DNOS 6.x) or Force10 OS/FTOS (DNOS 9.x) and will be made available for the 10G and faster Dell Networking S-series switches, the Z-series 40G core switches and DNOS6 is available for the N-series switches.

EOS is Arista's network operating system, and comes as a single image that runs across all Arista devices or in a virtual machine. EOS runs on an unmodified Linux kernel under a Fedora-based userland.There are more than 100 independent regular processes, called agents, responsible for different aspects and features of the switch, including drivers that manage the switching ASICs, the CLI, SNMP, Spanning Tree Protocol, and various routing protocols. All the state of the switch

and its various protocols is centralized in another process, called Sysdb. Separating processing (carried by the agents) from the state (in Sysdb) gives EOS two important properties. The first is software fault containment, which means that if a software fault occurs, the damage is limited to a single agent. The second is stateful restarts, since the state is stored in Sysdb, when an agent restarts it picks up where it left off. Since agents are independent processes, they can also be upgraded while the switch is running (a feature called ISSU – In-Service Software Upgrade).