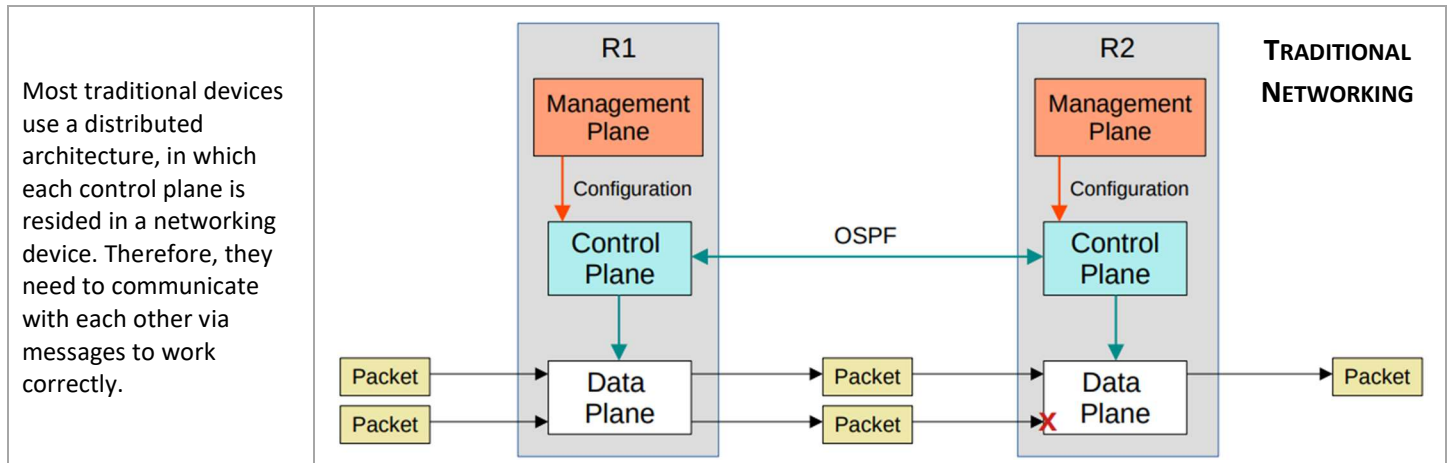


SDN vs TRADITIONAL - DATA, CONTROL, AND MANAGEMENT PLANES

Everything that networking devices do can be categorized into three planes: Data Plane, Control Plane and Mgmt Plane.

- **Data Plane:** responsible for the switching of packets through the router. In short, it includes any action after receiving data (processing, encapsulating/decapsulating, matching destination MAC & IP addresses, forwarding, QoS, filtering with access-list)
- **Control Plane:** responsible for maintaining sessions and exchanging protocol information with other network devices. It consists of dynamic IP routing protocols (OSPF, EIGRP, BGP...), the RIB, routing updates, in addition to other protocols such as STP, ARP, ICMP, PIM, IGMP, LACP...
- **Management Plane:** is used to manage a device through its connection to the network. Examples of protocols processed in the management plane include Simple Network Management Protocol (SNMP), Telnet, File Transfer Protocol (FTP), Secure FTP, and Secure Shell (SSH). These management protocols are used for monitoring and for command-line interface (CLI) access.



- In contrast to distributed architecture, **centralized (or controller-based)** architectures centralizes the control of networking devices into one device, called SDN controller.
- As we took the **control planes** off networking devices but not **data planes** so we need a way to communicate with them. So we put a **southbound interface (SBI)** at the bottom of SDN controller for this task. An **SBI communicates with the devices via an application programming interface (API)**.
- Now, in turn, the networking administrators and SDN applications want to control the controller! So the controller need a **northbound interface (NBI)** to communicate with us. The NBI applications included various network services, including network virtualization, dynamic virtual network provisioning, firewall monitoring, user identity management and access policy control.

