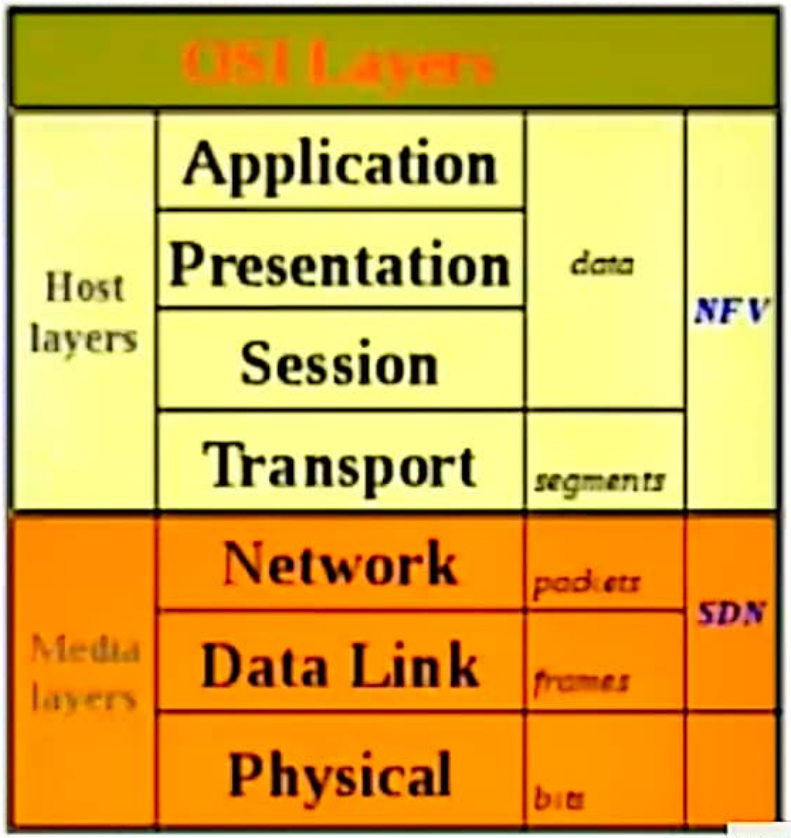
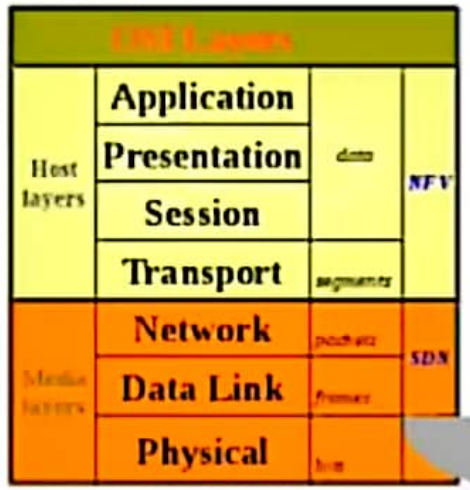
What is SDN





What is SDN

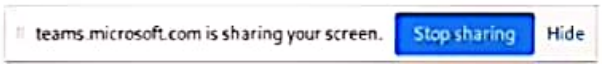
What is Control plane and Data plane

Decoupling of Control plane and Data plane

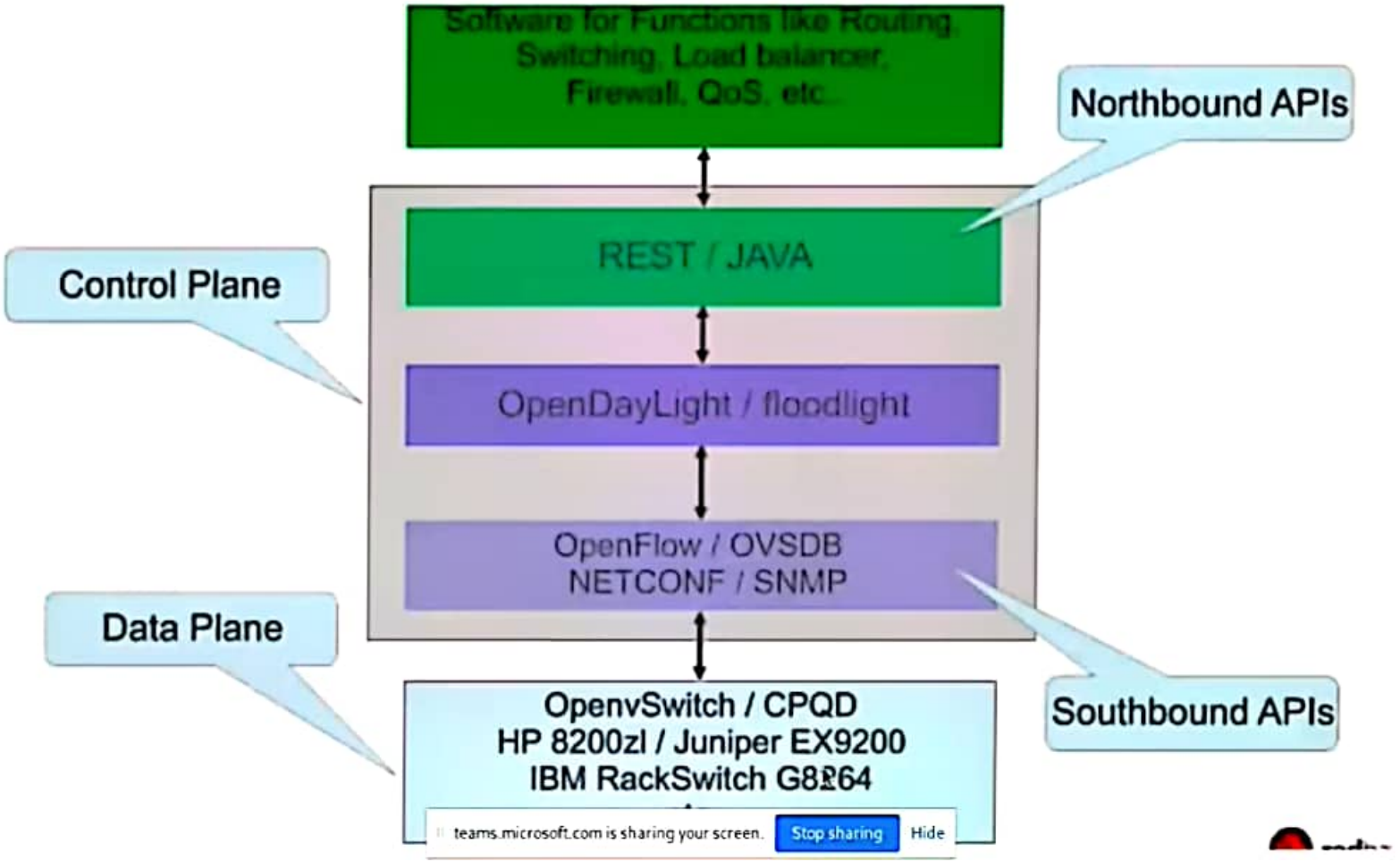
Software Defined Networking is about having customizable software as part of network devices

Control plane is made available for customization and centralized management

Data plane is a programmable network device that a user can manage from a centralized control plane outside of the device



SDN components



Why to use SDN

Challenges with a traditional network

- Manage huge number of devices
- Configure each device separately
- No centralized view of network topology
- Different vendors involved with vendor specific software on device (vendor locking)
- Specialized devices are costly

Why to use SDN

Advantages with SDN

- Centralized management of devices
- Orchestration of device configuration possible
- Centralized view of network topology
- No vendor locking as hardware is just a forwarding device
- No specialized devices hence cost effective

Why to use SDN

Achievements using SDN

- Abstraction
- Programming ability
- Simplification
- Manageability
- Orchestration
- Vendor Independence

What is NFV?

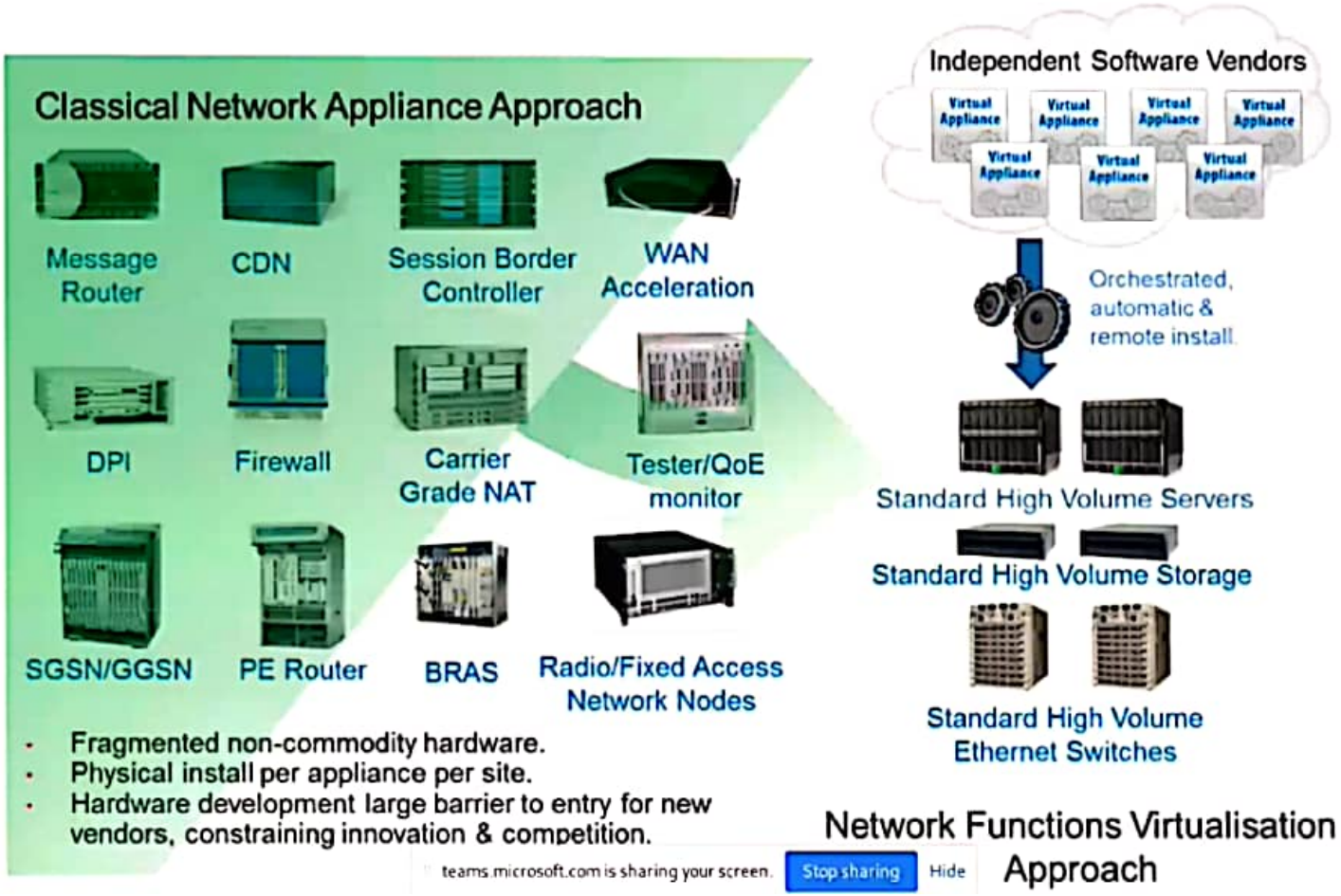
Network Functions Virtualization (NFV) is targeted at virtualizing the tasks performed by traditional network hardware

The software performing a specific task is separated from specialized hardware

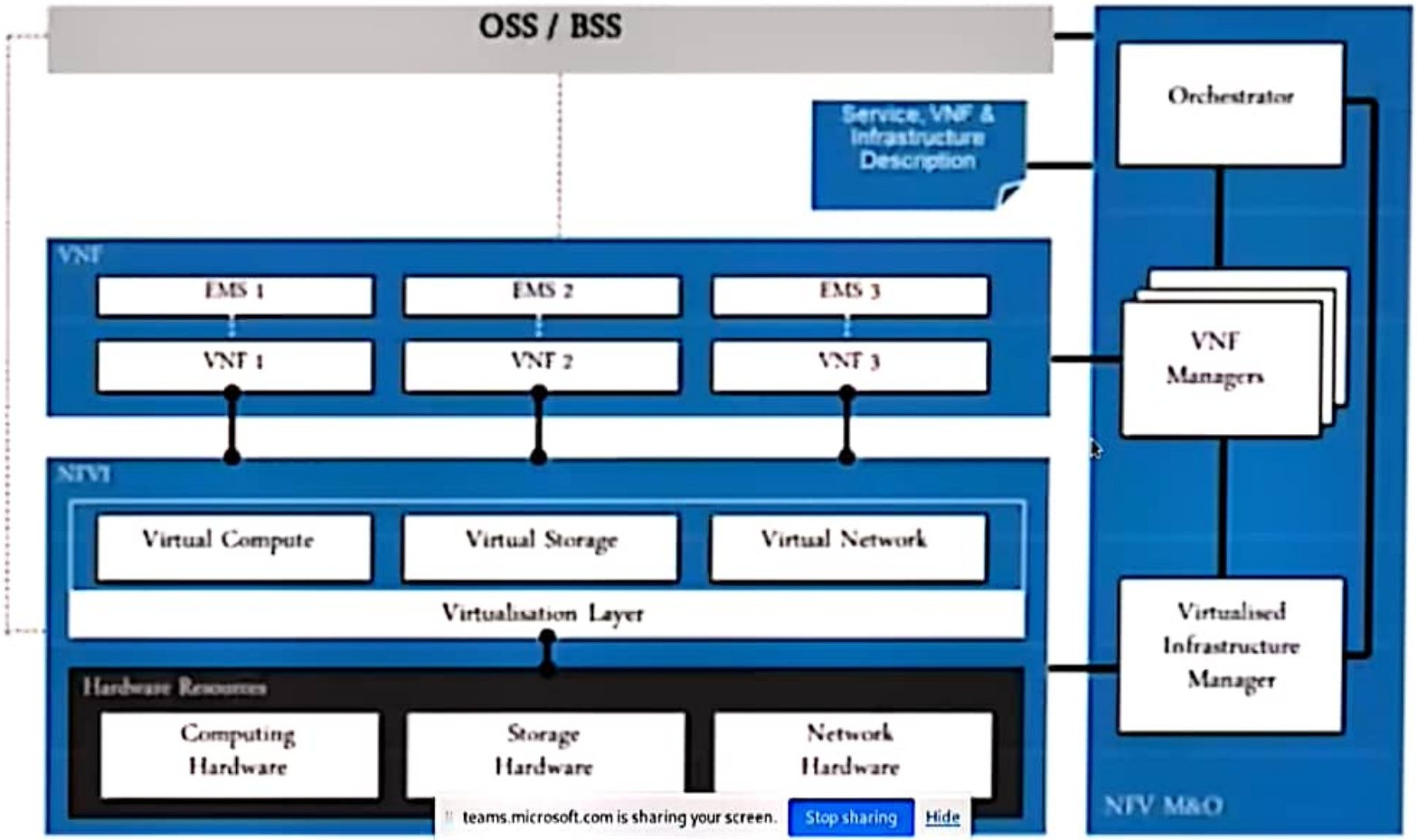
The software is made available in the form of virtual environment

The hardware in question is replaced by generic hardware performing tasks based on the instructions received from external software in virtualized form

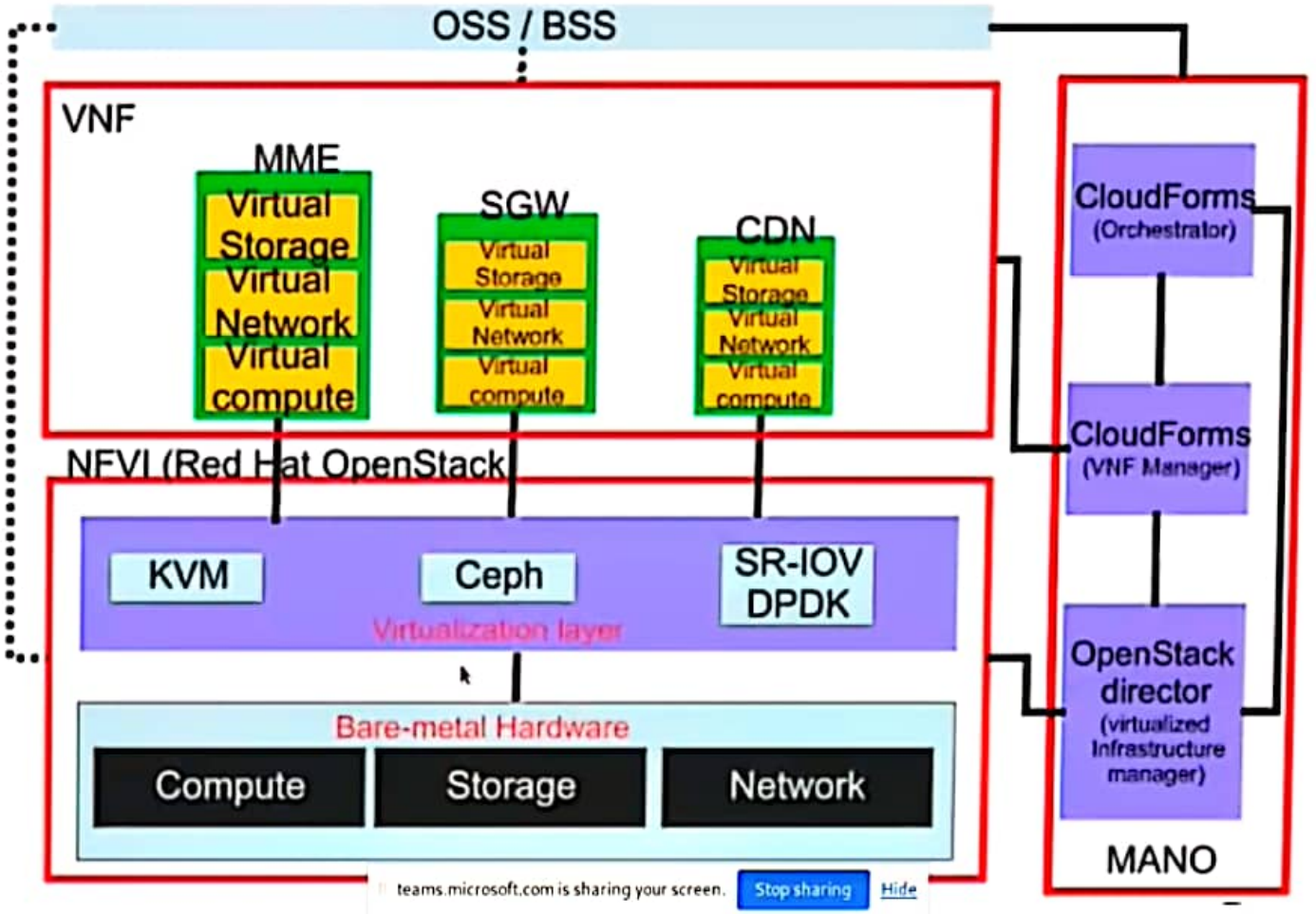
What is NFV?



Architectural Framework of NFV



Components involved in NFV



NFV vs. SDN

NFV and SDN are not substitutes for each other

SDN focuses on separating the control plane and data plane of networking hardware

NFV focuses on virtualization of network functions performed by specialized hardware devices

NFV and SDN are complimentary to each other can work together in the same infrastructure

Revolution with SDN and NFV

Enable innovation in networking domain

Improve manageability due to centralized administration

Introduce abstraction to encourage new development

Prevent vendor locking

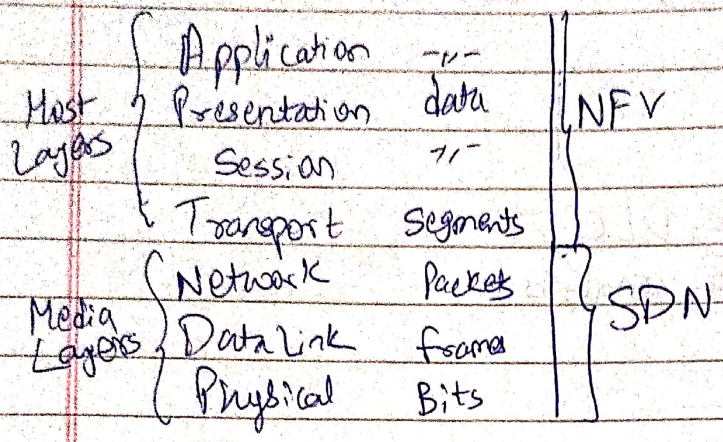
Offer easy deployment, scalability and elasticity

Reduce capital and operational expenditures (CAPEX and OPEX)

Software Defined Networking

Why SDN

- Evolution of Computer systems vs Networking technology
- Vendor Locking : No restriction on OS/Application
- Abstraction



SDN works with Media Layers.

* 3 tasks to be done:

is done in

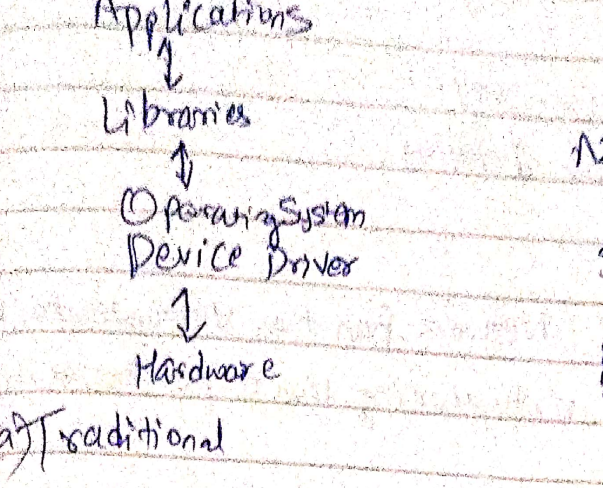
- Device Configuration — (In traditional system, it was done in Hardware)
- Forwarding decision → whether a packet is allowed to be forwarded or not, ie job of Firewa
- Forwarding Packets

- Management Plane
- Control plane - software ~~Data plane~~ Part
- Data plane → is still part of hardware [programmable network devic

SDN is about decoupling of control plane & data plane.
SDN is about having customizable software as part of network devices.
SDN ~~SDN Controller~~

Specialized hardware devices like firewall, QoS, routers are replaced by dumb devices ~~with~~ called SDN compatible Switch. All intelligence is embeded in SDN controller

Abstraction in SDN



SDN Components:

Northbound API's: REST/JAVA

Southbound API's: Open Flow/NETConf/SNMP/OVSDB

SDN Controller: OpenDayLight/floodlight

How SDN works

Consider Switch (SDN compatible) connected to 3 servers (X,Y,Z) & 3 clients (A,B,C)

Switch is dumb, asks SDN controller, which checks Flow table & Makes decision

Flow Table

SRC	DST	DATA	ACTION
A	X	Red	Allow
Any	Any	Black	Drop
C	Y	Blue	Allow
Any	Any	Yellow	Drop

Switch also has cache, 2nd time when packet arrives, it doesn't Contact SDN controller & check its cache only

Why to use SDN:

Challenges with traditional network

- Manage huge number of devices
- Configure each device seperately
- No centralized view of network technology
- Different vendors involved with vendor specific software on device (vendor locking)

Control plane is intelligent part, having
data plane is just forwarding of packets
NFV is more specific to Telecommunication, while
SDN for offices

- Specialized Devices are costly

Why to use SDN (see ss)
Centralized management of devices

NFV (Network Function Virtualization)

NFV is targeted at virtualizing tasks performed by traditional network hardware.
More specific to telecommunication System.

VNF : Virtual Network Functions

Examples:
Operational Support System : activation of callertune through
Bussiness Support System : Cost of callertune

CPU pinning: Allot few of compute Cores dedicately to that process/Virtual System

Single Route-IO Virtualization.
Virtualizing a large 20GB Network Card into smaller network Cards, for seperate services.

DPDK: Dataplane Development Kit : Avoiding context switch for forwarding network packets