Q-1 What is network controller in SDN?

→ Network controller is the cornerstone of SDN, particularly in its management
→ It is a highly scalable server role that provides a centralized programmable point of automation.
→ The automation is provided to manage, configure, monitor and troubleshoot.

→ By using the controller, we are automating the configuration and management of network infrastructure.

→ It provides one application programming interface (API) that allows the controller to communicate & manage network devices, services, etc.

→ Second API is used allows management applications to tell the controller what network settings & services they need.

→ With southbound API, controller manage network devices & services.

→ With northbound API, provides ability to manage the data center network.

→ The controller allows you to manage virtual networks, firewalls, Software load Balancer, etc.

Q-2 = What are the central tasks of the Control Plane with its Network Controller?

→ The central tasks of the Control Plane with its Network Controller are the following:-

=> The management of different Network Components.

=> The configuration of the hardware

=> The configuration of network security relevant specifications

=> The management of access to the network components

=> The control of data forwarding by hardware

=> Creating the routing specifications for forwarding the data packets to the desired destination

Q-3 What is the advantage of central intelligence over distributed intelligence in SDN?

=> As Software Defined Networking moves away from the concept of distributed intelligence and the use of different operating system.

=> In SDN, the intelligence of network is moved to a central instance and the configuration of individual devices is superfluous.

=> The goal of the concept or a bigger advantage is to reduce the network maintenance and administration.

=> Another advantage is in increase of intelligence and flexibility.

=> In addition, the hardware can concentrate on its actual task, the data forwarding and is relieved of control & management functions.

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(4)

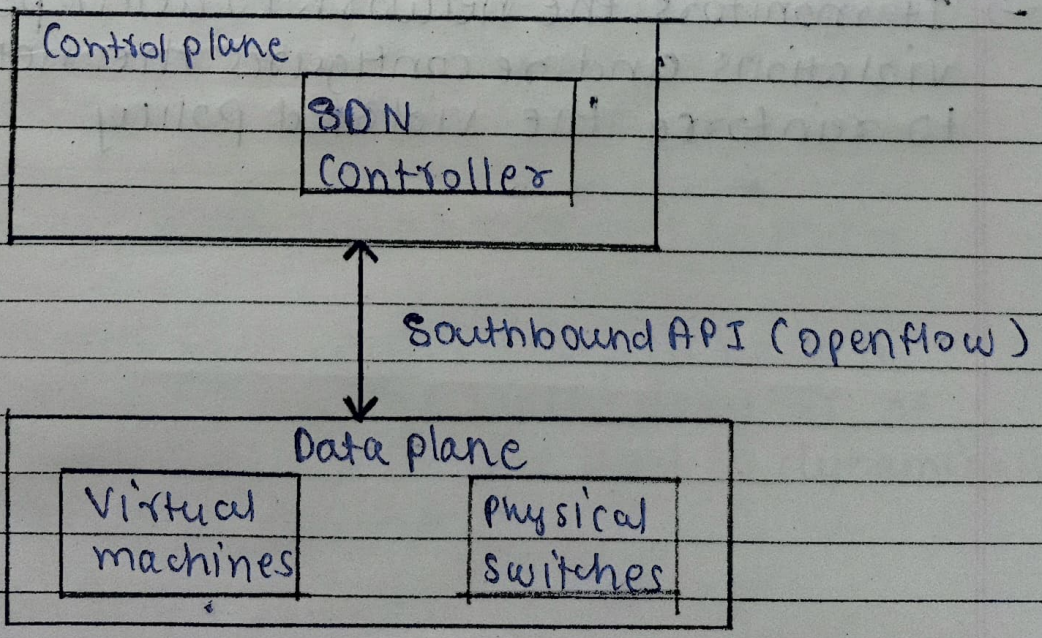
Q-4 How does control plane and data plane communicate in SDN?

→ Depending on the implementation, the devices of controlplane and the Dataplane communicate via an open, standardized or manufacturer-specific protocols.

→ The openflow protocol is an open source way to have the different planes of a network communicate.

→ In SDN, the south bound interface ensures communication between the control plane and data plane using a protocol such as openflow.

→ The network controller thus controls the forwarding of packets through the hardware via the sound bound interface.



Q-5 Explain Traffic Engineering with example.

=> Traffic engineering is a method for dynamically analyzing, regulating and predicting the behaviour of data flowing in the networks with the aim of performance optimization to meet SLAs.

* PolicyCop

=> An example of traffic engineering is policycop, which is an automated QoS policy enforcement framework.

-> It leverages the programmability offered by SDN & openflow for:-
  => Dynamic traffic steering
  => Flexible flow level control
  => Dynamic traffic Releases

-> It monitors the network to detect policy violations and re configures the network to reinforce the violated policy

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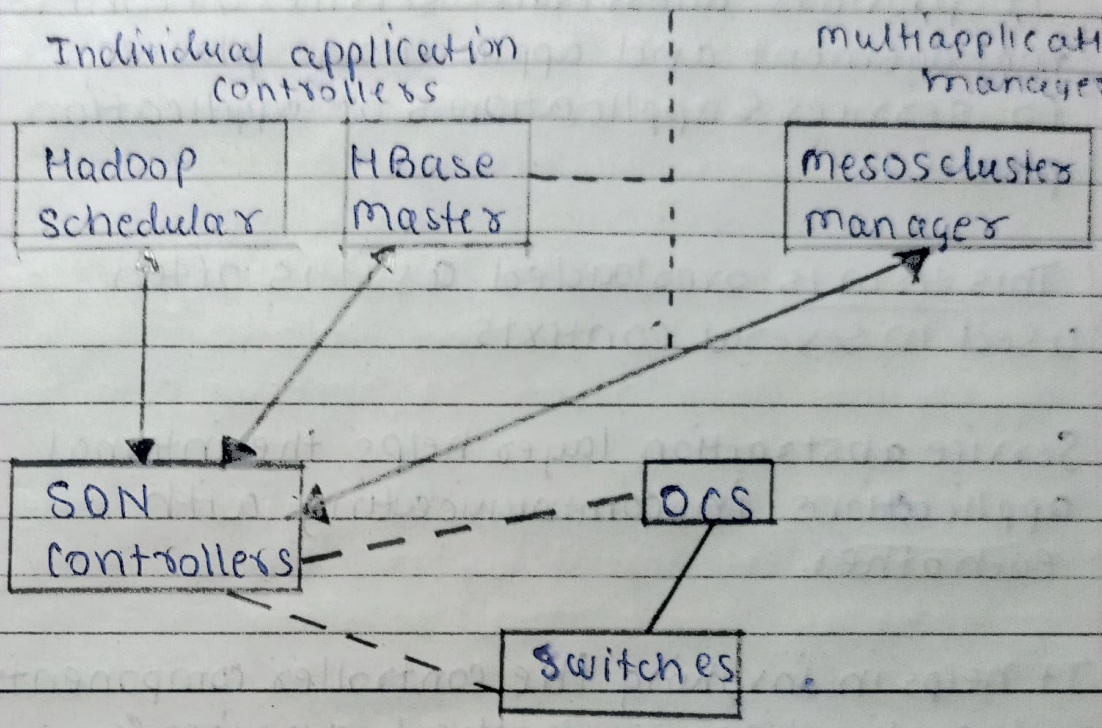
6

Q-1 How SDN works with Big Data & cloud computing?

→ Big Data Over SDN :-



⇒ The above figure shows an integrated network control for Big Data.

→ The SDN controller is connected to hadoop Scheduler, which forms queues of jobs and HBase master controller holds data.

→ SDN controller is also connected to Mesos.

→ From the above, it is possible to setup a scheme whereby, the traffic demands of big data applications are used to dynamically manage the network.

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Q-7 What is the work of network services abstraction layer?

→ It provides access from services of control, management and application planes to services & applications of application planes.

→ This term is overloaded as it is often used in several contexts.

→ Service abstraction layer helps the internal applications in communicating with each other.

→ It helps in invoking the controller components and applications each other's services & also to subscribe the events which they generate.

→ It helps for the specific underlying protocols in providing the uniform abstract interface in communication layer.

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Q-8 Explain characteristics of Cloud Computing?

=> Following are the characteristics:-

(1) Broad Network Access:-

=> Capabilities are there over network & accessed through standard mechanisms.
=> e.g. mobile phones, laptops, etc.

(2) Rapid elasticity:

=> Cloud computing enables you to expand & reduce resources according to your service requirement.

(3) Measured Service

-> Cloud systems automatically control & optimize resource use by leveraging a metering capability at some level.

(4) Ondemand Self Service

-> A consumer can unilaterally provision computing capabilities, such as servertime & network storage, as needed automatically without requiring human interaction with each service provider.

(5) Resource pooling

-> The provider's computing resources are pooled to serve multiple consumers using a multitenant model, with different physical & virtual resources assigned & reassigned dynamically.

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Q-9 Explain layers of IOT in detail

=> (1) Sensors and actuators => Sensors observe the environment & report back a quantitive measurements of variables.
→ Actuators operate on their environment, such as changing a setting, etc.

(2) Connectivity => Wireless / wired link into a network to send collected data to the appropriate data center or receive commands

(3) Capacity => The network supporting the devices must be handle a potentially huge flow of data

(4) Storage => There needs to be a large storage facility to store and maintain backups of all collected data.

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congestion
Q-10 Explain control with congestion control techniques.

⇒ If traffic demand on an internet exceeds capacity or if internet does not manage traffic effectively, congestion will occur.

→ If packets arrive too quickly for router to process them or faster than outgoing buffers, eventually packets will arrive when no memory is available.

⇒ As the load on network continues to increase, the queue lengths of various nodes continue to grow.

→ Eventually, a point is reached beyond which throughput actually drops with increased offered load.

→ As more and more packets are retransmitted, load on system grows.

→ As sender assumes the packet did not get through & retransmit it.

→ Under these scenarios, the effective capacity of system declines to zero.

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* Congestion control techniques:-

(1) Back pressure:-

→ It is exerted on the basis of links or connections

→ Back pressure for all traffic on a particular link is automatically invoked by flow control mechanisms of Data link layer protocols.

→ It is also applied to logical connections, so that the flow from one node to next is restricted on some connections.

(2) ~~Chock~~ Choke Packet

→ It is a control packet generated at congested node and transmitted back to a source node to restrict traffic flow.

→ On receiving choke packet, source must cut back the rate at which it is sending traffic.

(3) Implicit Congestion Signaling

→ This type of signaling is an effective congestion control technique in connectionless, or datagram networks.

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→ In such cases, there are no logical connections through the internet on which flow can be regulated.

(4) Explicit Congestion Signaling

→ For this congension avoidance, network alerts end systems to growing congestion within the network & end systems takes steps to reduce the offered load to the network.

⇒ This works in 2 directions :-

(1) Backward

(2) Forward