Module 11 CCNA -Automation and Programmability

* ***Beginner Question***

1. ***Explain How Automation Impacts Network Management***

***Ans.*** *With Network Automation, various Network Management activities are done such as network management, testing, deployment,* [*configuration*](https://ipcisco.com/cisco-packet-tracer-configuration-examples-2/) *and various network operations.*

*With Network Automation, complex network duties for example configurations can be done automatically. As you know, network engineers likes configurations. But for a large network, router/switch configurations can be difficult. To overcome this issue, Network Automation is used and this makes network engineers role easier.*

1. ***Compare Traditional network with Controller based networking***

***Ans.***

*1.* [*Software Defined Network (SDN)*](https://www.geeksforgeeks.org/software-defined-networking/) *:*  
*SDN stands for Software Defined Network which is networking architecture approach. It enables the control and management of network using software applications. Through Software Defined Network (SDN) networking behavior of entire network and its devices are programmed in centrally controlled manner through software applications using open APIs.*

*Software Defined Network improves performance by network virtualization. In SDN software controlled applications or APIs work as basis of complete network management that may be directing traffic on network or to communicate with underlying hardware infrastructure. So in simple we can say SDN can create virtual network or it can control traditional network with the help of software.*

*2. Traditional Network :*  
*Traditional network refers to the old conventional way of networking which uses fixed and dedicated hardware devices such as* [*routers and switches*](https://www.geeksforgeeks.org/network-devices-hub-repeater-bridge-switch-router-gateways/) *to control network traffic. Inability to scale and network security and Performance are the major concern now a days in the current growing business situation so that SDN is taking control to traditional network. Traditional network is static and based on hardware network appliances.*

*Traditional network architecture was used by many companies till recent years but now a days due to its drawbacks Software Defined Network has been developed and in coming years it will be used more.*

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| *S.NO.* | *SDN* | *Traditional Network* |
| *1* | *Software Defined Network is virtual networking approach.* | *Traditional network is the old conventional networking approach.* |
| *2* | *Traditional network is the old conventional networking approach.* | *Traditional Network is distributed control.* |
| *3* | *This network is programmable.* | *This network is non programmable.* |
| *4* | *Software Defined Network is open interface.* | *Traditional network is closed interface.* |
| *5* | *In Software Defined Network data plane and control plane are decoupled by software.* | *In traditional network data plane and control plane are mounted on same plane.* |
| *6* | *It supports automatic configuration so it takes less time.* | *It supports static/manual configuration so it takes more time.* |
| *7* | *It can prioritize and block specific network packets.* | *It leads all packets in the same way no prioritization support.* |
| *8* | *It is easy to program as per need.* | *It is difficult to program again and to replace existing program as per use.* |
| *9* | *Cost of Software Defined Network is low.* | *Cost of Traditional Network is high.* |
| *10* | *Structural complexity is low in Software Defined Network.* | *Structural complexity is high in Traditional Network.* |

1. ***Explain Virtualization***

***Ans.*** *Virtualization uses software to create an abstraction layer over computer hardware that allows the hardware elements of a single computer—processors, memory, storage and more—to be divided into multiple virtual computers, commonly called virtual machines (VMs).*

* ***Intermediate Question***

1. ***Describe Characteristics of REST-based API***

***Ans.***

* ***Advance Question***

1. ***Explain methods of Automation***

***Ans.*** *There are two main methods of network automation. Script-driven automation and software-based automation. Script-driven automation uses scripting and programming languages such as Perl, Python, Tcl and Ruby. You can use script-driven automation scripts to execute tasks.*

1. ***Explain SDN***

***Ans.*** *Software-Defined Networking (SDN) is a network architecture approach that enables the network to be intelligently and centrally controlled, or ‘programmed,’ using software applications. This helps operators manage the entire network consistently and holistically, regardless of the underlying network technology.*

*Enterprises, carriers, and service providers are being surrounded by a number of competing forces. The monumental growth in multimedia content, the explosion of cloud computing, the impact of increasing mobile usage, and continuing business pressures to reduce costs while revenues remain flat are all converging to wreak havoc on traditional business models.*

*To keep pace, many of these players are turning to* [*SDN*](https://www.ciena.com/#incontent-1) *technology to revolutionize network design and operations.*

*SDN enables the programming of network behavior in a centrally controlled manner through software applications using open APIs. By opening up traditionally closed network platforms and implementing a common SDN control layer, operators can manage the entire network and its devices consistently, regardless of the complexity of the underlying network technology.*

1. ***Explain DNA Center***

***Ans.*** *DNA-Center is a totally open and extensible platform that contains multi-vendor software development kits that allow interaction with network equipment from other vendors. It can also integrate with other management tools through its API structure.*

1. ***Explain SD-Access and SD-WAN***

***Ans.*** *SD-WAN and SD-Access are ways to approach software-defined networking terminology. While SD-Access is used to change the architecture of LAN networks, SD-WAN creates next-generation wide area networks with significant automation capabilities instead of MPLS/VPLS.*