**Module 11 CCNA -Automation and Programmability**

1. Explain How Automation Impacts Network Management

Ans:

Network administration has undergone a revolution thanks to automation, which greatly boosts operational effectiveness. Network administrators can minimize human mistake and manual workload by automating common tasks like monitoring and configuration updates. This guarantees that policies are applied consistently throughout the network and speeds up issue response times. Consequently, entities might uphold enhanced efficacy and dependability, a crucial attribute in the current swiftly evolving digital terrain.  
  
Better resource allocation and scalability are also made possible by automation. Automated systems can handle growing demands without necessitating a corresponding increase in staffing as networks become more sophisticated. This effectiveness lowers operating expenses while simultaneously strengthening security through prompt update application and vulnerability monitoring. In the end, automation enables network staff to refocus their attention from routine maintenance to greater.

1. Compare Traditional network with Controller based networking

Ans:

|  |  |  |
| --- | --- | --- |
| Feature | Traditional Networking | Controller-Based Networking |
| Control Model | Distributed control across devices | Centralized control through a single controller |
| Setup Complexity | Manual configuration for each device | Simplified, automated setup for multiple devices |
| Response to Changes | Manual adjustments needed | Dynamic adjustments based on real-time data |
| Network Visibility | Limited visibility into overall network | Comprehensive visibility and analytics from a central point |
| Policy Management | Policies applied individually on each device | Unified policy management across the entire network |
| Resource Utilization | Inefficient use of network resources | Optimized resource allocation through centralized control |

1. Explain Virtualization

Ans:

Virtualization is the process of creating a virtual version of a physical resource, such as a server, storage device, or network. It allows multiple virtual instances to run on a single physical machine, maximizing resource utilization and efficiency. By using software called a hypervisor, virtualization enables the isolation of different workloads, simplifies management, and enhances scalability. This technology is commonly used in data centers and cloud computing to reduce costs and improve flexibility.

1. Describe Characteristics of REST-based API

Ans:

 **CRUD Operations**: REST APIs allow you to perform basic operations on resources. You can create new resources, read existing ones, update them, and delete them as needed.

 **HTTP Verbs**: REST uses specific HTTP methods to perform these operations. For example, you use:

* **GET** to retrieve a resource,
* **POST** to create a new resource,
* **PUT** to update an existing resource, and
* **DELETE** to remove a resource.

 **Data Encoding**: REST APIs use formats like JSON or XML to represent data. This makes it easy for different systems to understand and exchange information. The format is usually specified in the request and response headers.

1. Explain SDN

Ans:

One method of networking that separates the control plane from the data plane is called software-defined networking, or SDN. This implies that more flexibility and simpler configuration are possible due to the possibility of centralized and automated network management. SDN allows for dynamic network administration, which facilitates resource optimization, improved security, and easier adaptation to changing requirements.

1. Explain DNA Center

Ans:

Cisco DNA Center is an intuitive network management platform that leverages Software-Defined Networking (SDN) to simplify and automate network operations. It provides a centralized dashboard for monitoring and managing network devices, allowing IT teams to quickly configure, troubleshoot, and optimize their networks.

1. Explain SD-Access and SD-WAN

Ans:

A framework called SD-Access (Software-Defined Access) divides control from data to simplify network access management. It enables businesses to automate the enforcement of policies and user access on wired and wireless networks. IT teams can quickly and simply establish and maintain secure network segments according to user identification and device type with SD-Access, boosting security and optimizing network performance in response to shifting network requirements.

SD-WAN (Software-Defined Wide Area Network) is a technology that simplifies the management of wide area networks. It improves application performance and reliability by using software to route traffic dynamically across multiple internet connections, such as broadband and MPLS. With centralized management, businesses can easily oversee multiple locations while reducing costs and enhancing security through features like traffic segmentation and encryption. This flexibility allows organizations to quickly adapt to changing network needs.