*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.*

*2. Compare Traditional network with Controller based networking*

*ANS:*

*Traditional Networking*

*•Architecture: Tightly coupled control and data planes in hardware.*

*•Configuration: Manual, device-specific, and static.*

*•Scalability: Limited and complex as the network grows.*

*•Monitoring: Device-specific, reactive management.*

*•Flexibility: Low, slow to adapt.*

*Controller-Based Networking (SDN)*

*•Architecture: Decoupled control plane managed by a centralized controller.*

*•Configuration: Centralized, dynamic policies that can be adjusted easily.*

*•Scalability: High, with simplified management.*

*•Monitoring: Holistic view, proactive management.*

*•Flexibility: High, enabling rapid adaptation to changes.*

*3. 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.*

*4. Describe Characteristics of REST-based API*

*ANS:*

*REST-based APIs have the following key characteristics:*

*1.Stateless: Each request contains all necessary information; the server does not store client state.*

*2.Client-Server Architecture: Separation of concerns between client and server.*

*3.Uniform Interface: Uses standard HTTP methods (GET, POST, PUT, DELETE) and resource representations (like JSON).*

*4.Resource-Based: Everything is a resource identified by URIs.*

*5.Cacheable: Responses can be cached to improve performance.*

*6.Layered System: Can include multiple layers (e.g., proxies) for scalability.*

*7.Code on Demand (optional): Servers can send executable code to the client.*

*8.HATEOAS: Clients use hypermedia links to navigate resources dynamically.*

*5. 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.*

*6. 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.*

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

*ANS: SD-Access (Software-Defined Access) focuses on simplifying and automating local area networks (LANs) through centralized management, policy-based automation, and enhanced security and visibility.*

*SD-WAN (Software-Defined Wide Area Network) optimizes and manages wide area networks (WANs) by dynamically routing traffic across various connections, improving performance and reducing costs, while providing centralized management and built-in security features.*