Module 11 CCNA -Automation and Programmability

**1. Explain How Automation Impacts Network Management Compare Traditional network with Controller based networking**

**2. Explain Virtualization**

Ans: Virtualization is the process of creating virtual instances of physical resources like servers, storage, or networks. It allows multiple virtual machines (VMs) or networks to run on a single physical device, optimizing resource utilization and flexibility. Examples include server virtualization (e.g., VMware, Hyper-V) and network virtualization (e.g., VLANs, SDN).

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

**Stateless**: Each request is independent and contains all necessary information.

**Resource-Based:** Focuses on accessing and manipulating resources using URLs.

**Standard Methods**: Uses HTTP methods like GET, POST, PUT, DELETE.

**Data Formats:** Typically exchanges data in JSON or XML formats.

**Scalability:** Lightweight and scalable due to its simplicity**.**

**Caching:** Supports caching mechanisms to improve performance.

**4. Explain methods of Automation Explain SDN**

**Ans: Scripting:** Using languages like Python or Bash to automate repetitive tasks.

**Configuration Management Tools: Tools like Ansible, Puppet, or Chef for managing and deploying configurations.**

**Orchestration Platforms:** Tools like Kubernetes for automating workflows and processes.

**APIs:** Using RESTful APIs to interact programmatically with devices and applications.

**AI and Machine Learning:** Automating advanced tasks like anomaly detection and predictive maintenance.

SDN separates the control plane (decision-making) from the data plane (traffic forwarding). A central controller manages the network, enabling dynamic and programmable configurations. Benefits include improved flexibility, centralized management, and reduced costs.

**5. Explain DNA Center Explain SD-Access and SD-WAN**

**Ans: Cisco DNA Center**

Cisco DNA Center is a centralized network management platform that provides automation, assurance, and analytics for enterprise networks. Key features include:

* **Automation**: Simplifies provisioning and configuration.
* **Analytics:** Offers insights into network performance and user experience.
* **Policy Enforcement:** Centralized policy creation and deployment.
* **AI/ML Integration:** Enables proactive issue detection and resolution.

**SD-Access and SD-WAN**

* SD-Access (Software-Defined Access):
  + Provides secure, automated access control to network resources.
  + Uses a centralized controller to manage campus networks.
  + Features include user identity-based policies, segmentation, and simplified management.
* **SD-WAN (Software-Defined Wide Area Network):**
  + Optimizes and secures WAN connectivity across multiple locations.
  + Centralized management for branch-to-branch or branch-to-cloud communication.
  + Benefits include improved application performance, cost savings, and enhanced security.