MODUL : 9 CCNA-Automation and programmability

1. Explain how automation impacts network management compare

traditional network with controller based networking

ANS=Automation in Network Management:

Automation significantly impacts network management by increasing efficiency, reducing errors, and improving scalability. Automated network management involves using software tools and scripts to perform routine tasks, such as:

1. Configuration backups and restores

2. Firmware updates

3. Monitoring and alerts

4. Traffic analysis and optimization

5. Security policy enforcement

Traditional Network Management:

In traditional network management, administrators manually configure and manage network devices using command-line interfaces (CLIs) or graphical user interfaces (GUIs). This approach has several limitations:

1. Time-consuming and error-prone

2. Difficult to scale

3. Limited visibility and control

4. Inconsistent configurations

Controller-Based Networking:

Controller-based networking, also known as Software-Defined Networking (SDN), introduces a centralized controller that manages and orchestrates network devices

2.Explain virtualization

ANS=Virtualization:

Virtualization creates virtual environments (e.g., VMs, networks, storage) to abstract and isolate physical resources.

Types:

1. Server Virtualization

2. Desktop Virtualization

3. Network Virtualization

4. Storage Virtualization

Benefits:

1. Improved resource utilization

2. Increased flexibility

3. Enhanced scalability

4. Better disaster recovery

5. Improved security

Examples:

1. VMware

2. VirtualBox

3. Hyper-V

4. KVM

3.Describe characteristics of REST-based API

ANS=Characteristics of REST-based API:

1. Resource-based: Everything is a resource (e.g., users, products, orders).

2. Client-Server Architecture: Separate client and server, with the client making requests to the server.

3. Stateless: Server does not maintain client state between requests.

4. Cacheable: Responses can be cached to reduce the number of requests.

5. Uniform Interface: Follows a uniform interface, including HTTP methods (GET, POST, PUT, DELETE).

6. Layered System: Architecture is designed as a layered system, with each layer being responsible for a specific function.

7. Code on Demand: Optional feature that allows the server to send executable code to the client.

HTTP Methods:

1. GET: Retrieve a resource

2. POST: Create a new resource

3. PUT: Update an existing resource

4. DELETE: Delete a resource

RESTful API Benefits:

1. Platform independence

2. Scalability

3. Flexibility

4. Easy to implement and maintain

5. Well-suited for web and mobile applications

4.Explain methods of automation

ANS=Methods of Automation:

1. Scripting: Using programming languages like Python, PowerShell, or Bash to automate tasks.

2. Workflow Automation: Using tools like Ansible, SaltStack, or VMware vRealize Automation to automate complex workflows.

3. Orchestration: Using tools like Kubernetes, Docker Swarm, or Apache Mesos to automate deployment, scaling, and management of applications.

4. Configuration Management: Using tools like Puppet, Chef, or Ansible to automate configuration and management of infrastructure.

5. Robotic Process Automation (RPA): Using tools like Automation Anywhere, Blue Prism, or UiPath to automate repetitive, rule-based tasks.

6. Machine Learning (ML) and Artificial Intelligence (AI): Using ML and AI to automate tasks like data analysis, prediction, and decision-making.

7. API Automation: Using APIs to automate interactions between systems, applications, and services.

8. Scheduled Tasks: Using scheduling tools like cron, Windows Task Scheduler, or Apache Airflow to automate tasks at specific times or intervals.

Automation Tools:

1. Ansible

2. Puppet

3. Chef

4. SaltStack

5. VMware vRealize Automation

6. Kubernetes

7. Docker Swarm

8. Apache Mesos

9. Automation Anywhere

10. Blue Prism

11. UiPath

Automation Benefits:

1. Increased efficiency

2. Reduced errors

3. Improved consistency

4. Enhanced scalability

5. Faster deployment

6. Better resource utilization

7. Improved compliance

8. Reduced costs

5.Explain SDN

ANS= Software-Defined Networking (SDN):

1. Separates control plane from data plane

2. Centralized control and management

3. Programmable network infrastructure

4. Improves network flexibility, scalability, and security

Key Components:

1. SDN Controller

2. OpenFlow Protocol

3. Network Devices (Switches, Routers)

6. Expalin DNS center

ANS=DNS Center:

A DNS Center, also known as a DNS Server or Name Server, translates human-readable domain names into machine-readable IP addresses.

Key Functions:

1. Domain Name Resolution

2. IP Address Mapping

3. DNS Caching

4. DNS Security

Components:

1. DNS Server Software

2. DNS Database

3. DNS Cache

DNS Query Process:

1. Client Query

2. DNS Resolver

3. DNS Server

4. Client Response

7.Explain SD-Access and SD-WAN

ANS=SD-Access and SD-WAN:

SD-Access:

1. Software-Defined Access

2. Automates and secures user and device access

3. Provides identity-based network segmentation

4. Integrates with Cisco ISE and DNA Center

SD-WAN:

1. Software-Defined Wide Area Network

2. Simplifies WAN management and reduces costs

3. Provides application-aware routing and traffic optimization

4. Integrates with Cisco Viptela and vManage