Module 11 CCNA -Automation and Programmability

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

Ans - Automation has revolutionized network management, significantly improving efficiency, reducing human error, and enabling faster response times.

Traditional Network Management –

- Manual Configuration: Network devices are configured manually, which is time-consuming and prone to human error.
- Time-Consuming Troubleshooting: Troubleshooting involves manually checking device logs and configurations, which can be a lengthy process.
- Slower Response Times: Manual processes can lead to slower response times to network issues and changes.

Controller-Based Networking

- Centralized Management: A central controller manages and configures network devices, streamlining the process.
- Automated Provisioning: Devices are automatically provisioned and configured, reducing human error and accelerating deployment.
- Proactive Monitoring and Troubleshooting: The controller continuously monitors network health and automatically identifies and resolves issues.
- Faster Response Times: Automated processes enable rapid response to network changes and incidents.

2. Explain virtualization

Ans - Virtualization is a technology that allows you to create virtual representations of physical hardware, like servers, storage, and networks. This means you can run multiple operating systems and applications.

3. Describe Characteristics of REST-based API

1. Client-Server Architecture
2. Statelessness
3. Cache ability
4. Uniform Interface
5. Layered System

4. Explain methods of Automation

1. Mechanical Automation

- Robotics: Employing robots to perform tasks with precision and speed.
- Machine Tools: Using automated machines to shape and cut materials.
- Assembly Lines: Automating production processes through conveyor belts and robotic arms.

2. Electrical Automation

- Programmable Logic Controllers (PLCs): Digital computers used to control industrial processes.
- Distributed Control Systems (DCS): Systems that control large-scale processes like power plants and oil refineries.
- Human-Machine Interface (HMI): Interfaces that allow humans to interact with automated systems.

3. Software Automation

- Robotic Process Automation (RPA): Using software robots to mimic human actions on computer systems.
- Business Process Automation (BPA): Automating business processes like approvals, data entry, and report generation.
- Artificial Intelligence (AI): Leveraging AI to automate decision-making and problem-solving.
- Machine Learning: Training machines to learn from data and make predictions.

4. Hybrid Automation

- Cyber-Physical Systems (CPS): Integrating physical and digital systems to create intelligent systems.
- Internet of Things (IoT): Connecting devices to the internet for data collection and control.

5 - Explain SDN

SDN stands for Software Defined Network which is a networking architecture approach. It enables the control and management of the network using software applications. Through Software Defined Network (SDN) networking behavior of the entire network and its devices are programmed in a centrally controlled manner through software applications using open APIs.

6 – Explain dna center

Cisco DNA Center is a network management platform that helps users optimize their network, integrate security, and automate processes. It's a centralized controller and management dashboard that provides a single pane of glass for managing a network.

7- Explain SD-Access and SD-WAN

SD-Access is a networking solution that simplifies network management and improves security by decoupling the control plane from the data plane. It leverages intent-based networking to automate network configurations and policy enforcement.

Key factor -

- Simplified Network Management: Reduces operational complexity and speeds up deployment.
- Enhanced Security: Protects sensitive data and applications with advanced security features.
- Improved User Experience: Delivers consistent and reliable network access

SD-WAN is a networking technology that optimizes WAN connections by intelligently routing traffic across multiple WAN links. It provides a flexible and cost-effective way to connect remote sites and cloud applications.

Key factor -

- Dynamic Path Selection: Automatically selects the best path for traffic based on factors like latency, jitter, and packet loss.
- Centralized Management: Simplifies network management with a centralized control plane.
- Improved Performance: Optimizes application performance by prioritizing critical traffic.

- Enhanced Security: Protects network traffic with advanced security features like encryption and firewall.
- Reduced Costs: Reduces WAN costs by leveraging broadband and MPLS connections.