Module 11

CCNA -Automation and Programmability

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

Explain Virtualization

Describe Characteristics of REST-based API Explain methods of Automation

Explain SDN

Explain DNA Center

Explain SD-Access and SD-WAN

ANS: Here's an explanation of each topic:

Automation Impacts on Network Management

Automation in network management improves efficiency, reduces errors, and enhances scalability. Automated tasks include:

- Configuration backups

- Firmware updates

- Monitoring and troubleshooting

- Security policy enforcement

Automation enables network administrators to focus on strategic tasks, improving overall network reliability and performance.

Traditional Network vs. Controller-Based Networking

Traditional Network

- Distributed architecture

- Each device configured individually

- Limited scalability and manageability

- Difficult to implement policy changes

Controller-Based Networking

- Centralized architecture

- Single point of management

- Improved scalability and manageability

- Easy to implement policy changes

- Enhanced security and monitoring capabilities

Controller-based networking, such as Software-Defined Networking (SDN), provides a more efficient and scalable way to manage networks.

Virtualization

Virtualization is a technology that creates virtual resources, such as:

- Virtual Machines (VMs)

- Virtual Networks (VNs)

- Virtual Storage

Virtualization provides benefits, including:

- Improved resource utilization

- Increased flexibility and scalability

- Enhanced security and isolation

- Simplified management and maintenance

Characteristics of REST-based API

REST (Representational State of Resource) APIs have the following characteristics:

- Resource-based

- Client-server architecture

- Stateless

- Cacheable

- Uniform interface

- Layered system

REST-based APIs provide a simple and flexible way to interact with network devices and services.

Methods of Automation

Automation methods include:

- Scripting (e.g., Python, Bash)

- Automation frameworks (e.g., Ansible, SaltStack)

- Orchestration tools (e.g., Cisco NSO)

- SDN controllers (e.g., Cisco APIC)

- Machine learning and artificial intelligence

These methods enable network administrators to automate various tasks, improving efficiency and reducing errors.

SDN (Software-Defined Networking)

SDN is an architecture that separates the control plane from the data plane, providing:

- Centralized management and control

- Improved scalability and flexibility

- Enhanced security and monitoring capabilities

- Simplified network configuration and management

SDN enables network administrators to program and automate network behavior.

DNA Center

Cisco DNA Center is a network management and orchestration platform that provides:

- Centralized management and control

- Automated network provisioning and configuration

- Enhanced security and monitoring capabilities

- Simplified network troubleshooting and maintenance

DNA Center enables network administrators to manage and automate their networks, improving efficiency and reducing errors.

SD-Access

Cisco SD-Access is a software-defined access solution that provides:

- Automated network provisioning and configuration

- Enhanced security and monitoring capabilities

- Simplified network troubleshooting and maintenance

- Improved scalability and flexibility

SD-Access enables network administrators to create a highly secure and automated campus network.

SD-WAN

Cisco SD-WAN is a software-defined wide-area networking solution that provides:

- Automated WAN provisioning and configuration

- Enhanced security and monitoring capabilities

- Simplified WAN troubleshooting and maintenance

- Improved scalability and flexibility

- Optimized WAN traffic and performance

SD-WAN enables network administrators to create a highly secure and automated WAN infrastructure.