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1. How Automation Impacts Network Management

Automation helps reduce manual work in configuring, monitoring, and managing networks.

Benefits:

- **Faster deployments** of devices and services.
- **Fewer errors** (no manual config mistakes).
- **Better scalability** — can manage large networks easily.
- **Consistency** in configuration across the network.
- **Easier troubleshooting** using tools/scripts.

2. Compare Traditional Network vs Controller-Based Networking

Feature	Traditional Network	Controller-Based (SDN)
Control Plane	Distributed (each device decides)	Centralized (controller makes decisions)
Configuration	Manual, device-by-device	Automated via controller
Scalability	Hard to scale	Easy to scale
Management	Complex and time-consuming	Central and simpler
Updates/Changes	Slower, more manual errors	Fast and consistent

3. Explain Virtualization

Virtualization means running multiple virtual devices (like VMs or virtual routers) on one physical machine.

Benefits:

- Saves cost and space.

- Easier to manage.
- Allows testing different setups without needing real hardware.
- Enables cloud computing.

4. Characteristics of REST-Based APIs

REST (Representational State Transfer) is used in network automation APIs.

Key Characteristics:

- **Stateless:** No client data is stored between requests.
- **Uses HTTP:** (GET, POST, PUT, DELETE).
- **Data format:** Usually uses JSON or XML.
- **Uniform Interface:** All resources accessed via URLs.
- **Client-Server Model:** Client and server are independent.

5. Methods of Automation

Network automation can be done using:

1. **CLI Scripting:** Python or Bash scripts to send commands to devices.
2. **APIs (REST APIs):** Communicate with devices or controllers programmatically.
3. **Ansible:** Agentless automation tool (used widely).
4. **Cisco DNA Center / SDN Controllers:** Central tools for large-scale automation.
5. **Templates/Profiles:** Pre-built configurations applied automatically.

6. Explain SDN (Software-Defined Networking)

SDN separates the control plane from the data plane.

- **Control Plane:** Makes decisions (via controller).
- **Data Plane:** Forwards data (switches/routers).
- **Controller:** Central brain of the network (like Cisco APIC or OpenDaylight).

Advantages:

- Easier to manage.
- Programmable.
- Scalable and flexible.

7. Explain DNA Center

Cisco DNA Center is a centralized management and automation platform for networks.

Features:

- Automation (zero-touch provisioning).
- Policy-based management.
- Assurance (monitoring and analytics).
- Integration with APIs and tools.
- Works with **SD-Access**.

8. Explain SD-Access and SD-WAN

✓*SD-Access (Software Defined Access):*

- Automates user and device access to the network.
- Uses Cisco DNA Center.
- Offers segmentation, automation, and security inside LANs.
- Good for campuses or enterprise LANs.

✓*SD-WAN (Software Defined Wide Area Network):*

- Manages WAN connections (Internet, MPLS) smartly.
- Uses central controller.
- Sends traffic based on app type or policy.
- Reduces WAN costs and improves performance.