



DevOps education program

Network Programming

Optional

Serhii Zakharchenko



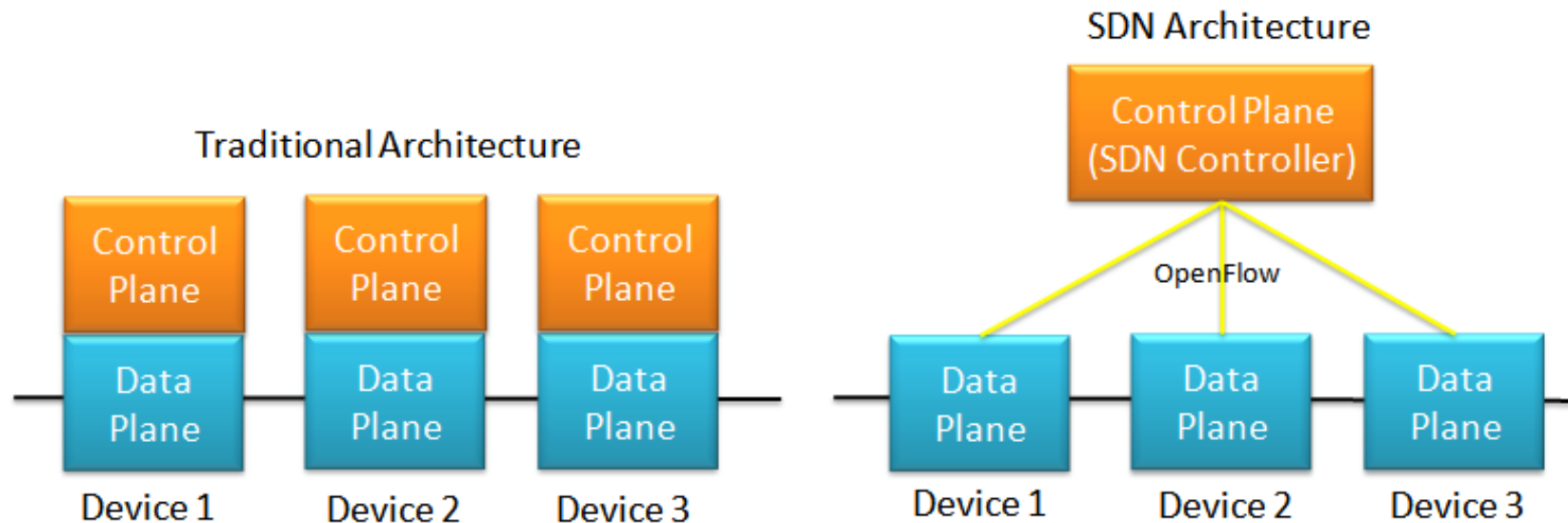
Network Virtualization

Some network architectures have been developed to support network virtualization:

- **Software Defined Networking (SDN)** - A network architecture that virtualizes the network.
- **Cisco Application Centric Infrastructure (ACI)** - A purpose-built hardware solution for integrating Cloud computing and data center management.

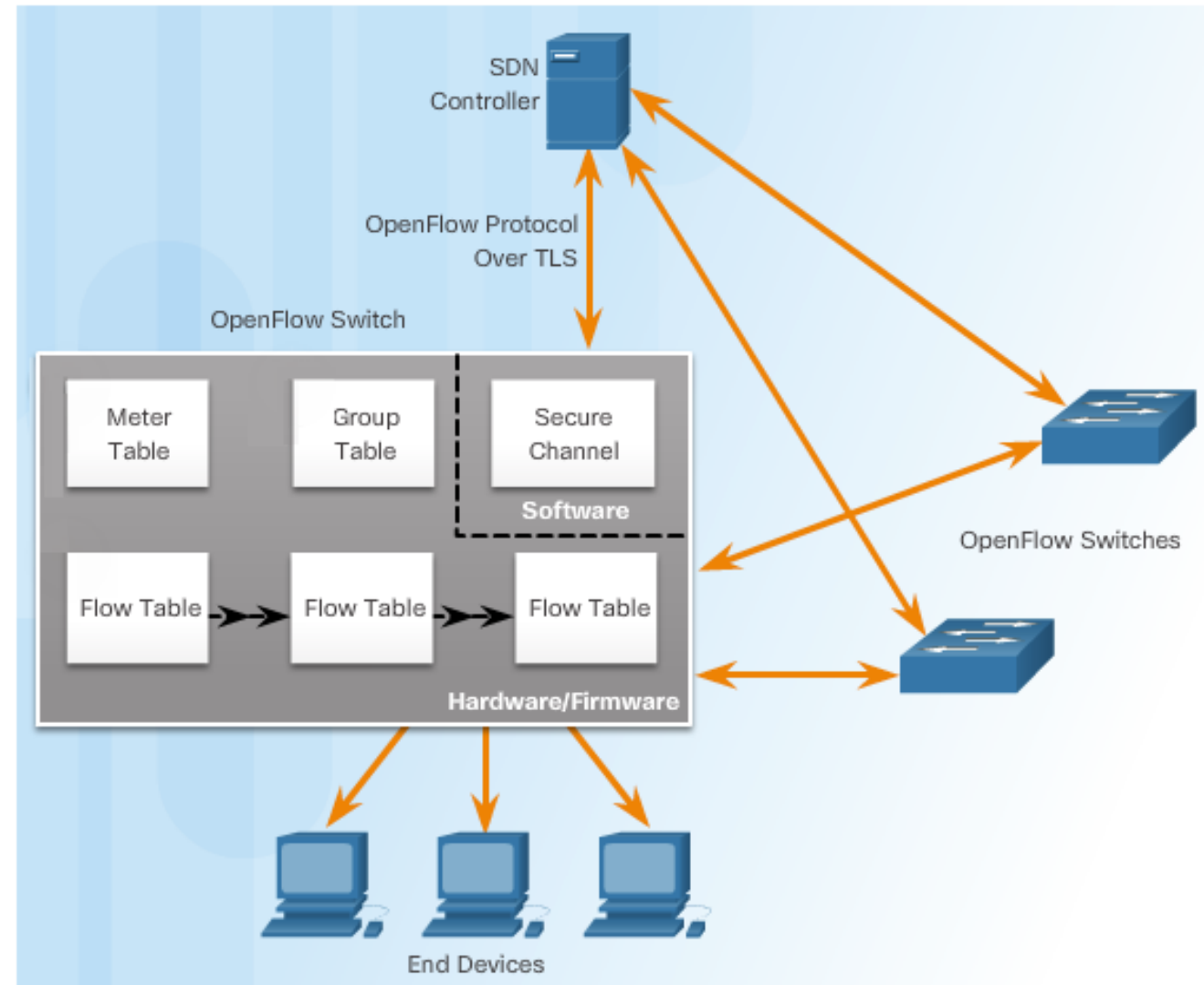
SDN Architecture

- Traditional router or switch architecture, the control plane and data plane functions occur in the same device.
- Software defined networking (SDN) moves the control plane from each network device to a central network intelligence and policy-making entity called the SDN controller.

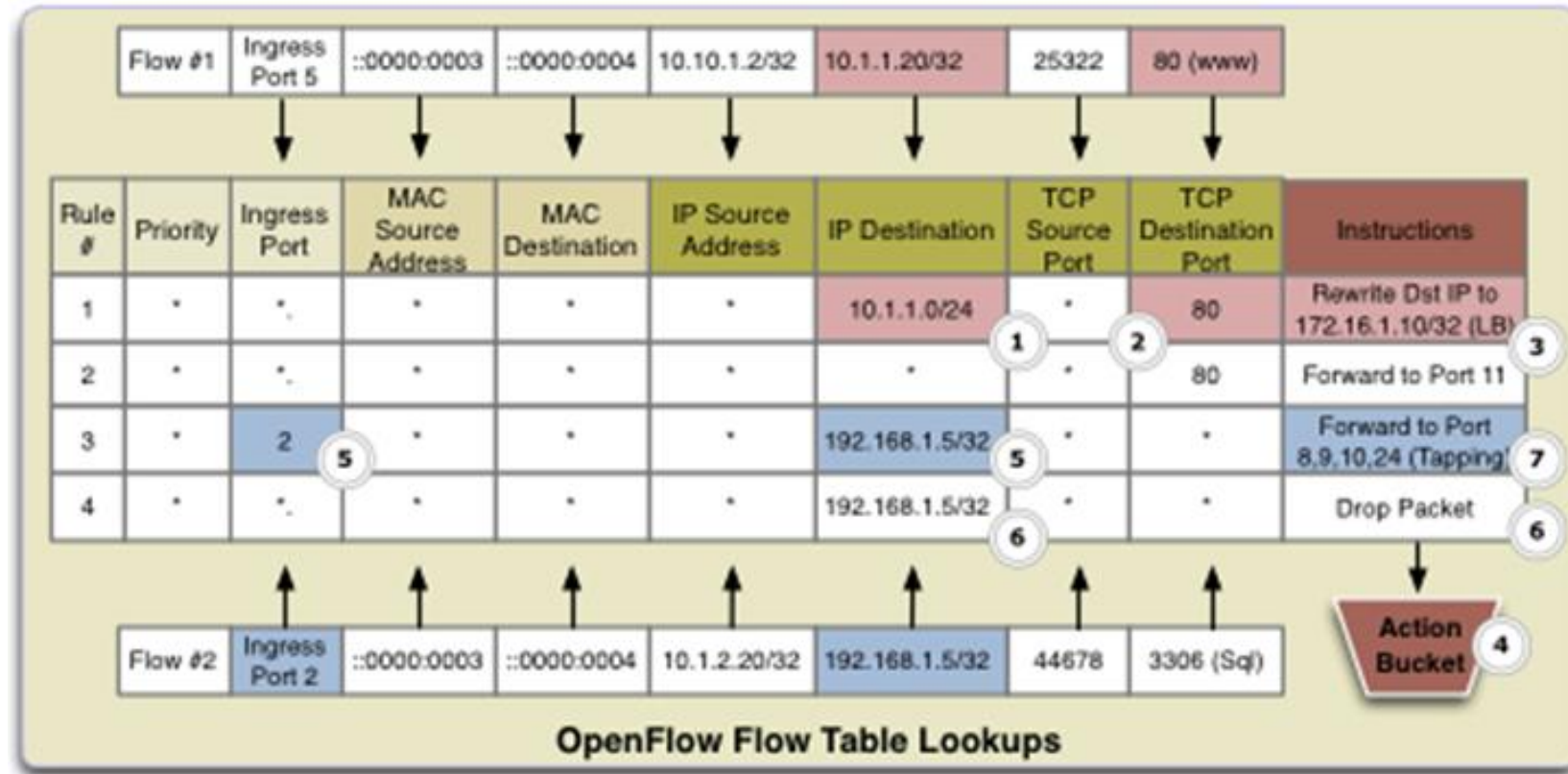


SDN Controller and Operations

- To the switch, a flow is a sequence of packets that matches a specific entry in a flow table.
- The tables serve the following purposes:
 - A **Flow Table** matches incoming packets to a particular flow and specifies the functions that are to be performed on the packets.
 - A **Meter Table** triggers a variety of performance-related actions on a flow.
 - A flow table may direct a flow to a **Group Table**, which may trigger a variety of actions that affect one or more flows.

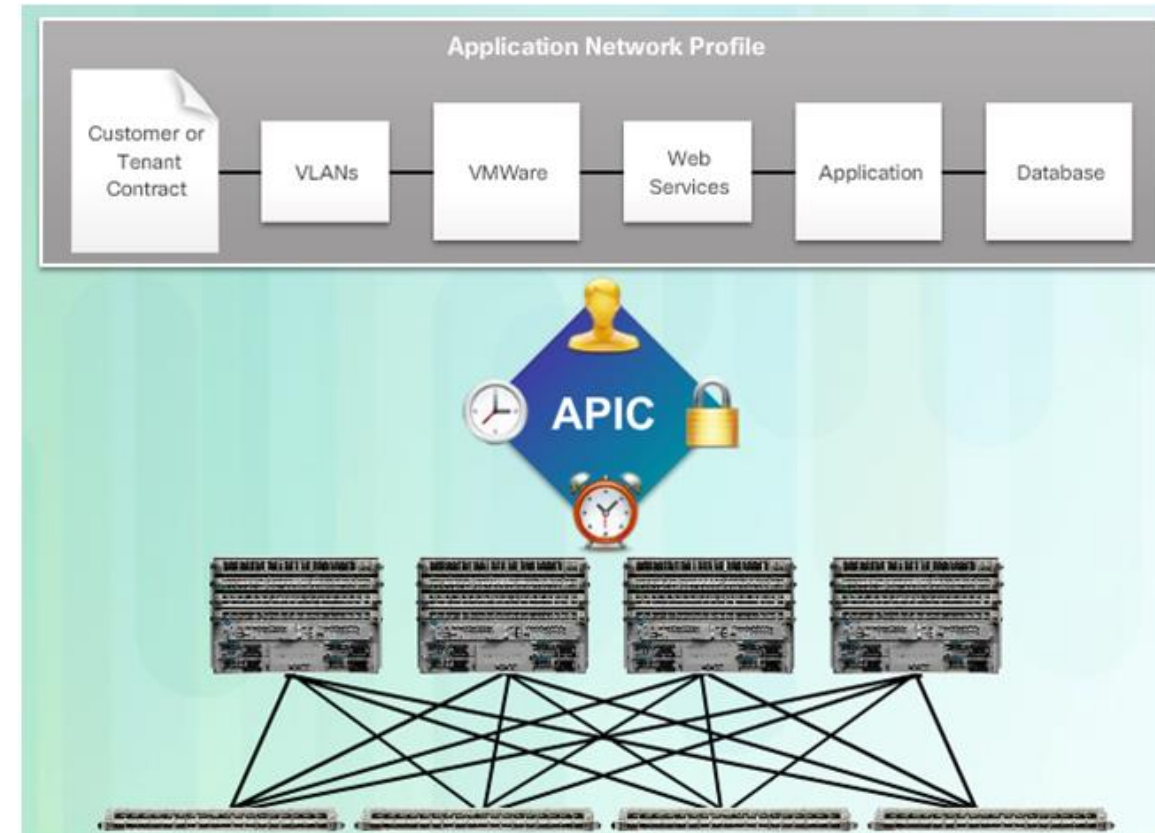


Flow table sample



Cisco Application Centric Infrastructure

- **Application Network Profile (ANP)** - An ANP is a collection of end-point groups (EPG), their connections, and the policies that define those connections. The EPGs describes a network, such as VLANs, Web Services, and Applications.
- **Application Policy Infrastructure Controller (APIC)** – The APIC is considered to be the brains of the ACI architecture. APIC is a centralized software controller that manages and operates a scalable ACI clustered fabric. It is designed for programmability and centralized management. It translates application policies into network programming.
- **Cisco Nexus 9000 Series switches** – These switches provide an application-aware switching fabric and work with an APIC to manage the virtual and physical network infrastructure.



A light blue world map is centered on the Atlantic Ocean, showing the continents of North America, South America, Europe, Africa, Asia, and Australia. The map is rendered in a simple, stylized manner with thin lines for coastlines and country borders.

Thank you!