

# Exploring SDN for Network Operators

Instructor Led | Duration: 2 Days | Course Number: NWV\_704c



Software Defined Networking (SDN) is a relatively new concept within the industry and has recently gained traction. Standards and implementations of SDN are still evolving as the industry grapples with this potentially significant technology transformation. SDN proposes to take the traditional implementation of the networking and dis-assemble it. SDN is a collection of technologies that split the data, control and management planes of the network. By doing this, the expectation is that it will improve network flexibility, manageability and allow the network administrator to customize the operations and services of the network on a large scale. Recent developments and the use of virtualization and cloud computing are some of the key enablers of this transformation. The course starts with a discussion of the industry landscape and the motivation behind deploying SDN. This course describes the key concepts upon which SDN is founded and provides an overview of the various enabling technologies like OpenFlow, OpenStack and NFV.

## Intended Audience

This is a technical overview, intended for a technical audience that has knowledge of packet networking and an interest in understanding key concepts in Software Defined Networking (SDN).

## Learning Objectives

After completing this course, the student will be able to:

- Describe Software Defined Networking
- List the motivations for SDN
- List the competing standards for SDN
- Sketch the SDN architecture
- List the functions of SDN components
- Discuss the Southbound Protocols
- List the operational difference between the Southbound Protocols
- Discuss the role of OpenStack in SDN
- Sketch an end-to-end SDN architecture for Service Provider Network
- Describe how end-to-end service orchestration is achieved

## Course Outline

1. SDN Architecture
  - 1.1. SDN architecture
  - 1.2. SDN Deployment Flavors
    - 1.2.1. Data Center vs WAN vs Services
  - 1.3. SDN Principles
2. SDN Interfaces
  - 2.1. Southbound interface options
  - 2.2. Northbound Interface
  - 2.3. East-West Interface
3. SDN Operations
  - 3.1. Separation of Control Plane and Data Plane
  - 3.2. SDN Traffic Flow
4. YANG for Data modeling
  - 4.1. YANG Overview
  - 4.2. Public YANG Models
    - 4.2.1. Device Model
    - 4.2.2. Service Model
5. NETCONF Operations
  - 5.1. NETCONF Overview
  - 5.2. Configuration and state data
  - 5.3. NETCONF Operations
6. SDN in Data Center
  - 6.1. Configuration of NFVI
    - 6.1.1. OpenFlow
  - 6.2. Networking for the VM
  - 6.3. SDN and VIM Interworking
  - 6.4. Overlay Operations
    - 6.4.1. VxLAN,..
7. SDN and Inter-Data Center Connectivity
  - 7.1. Overlay vs Underlay
  - 7.2. Overlay-Underlay coordination
8. SDN in the WAN
  - 8.1. Multi-layer requirements
  - 8.2. SDN for Packet SDN
    - 8.2.1. SDN and MPLS
    - 8.2.2. Segment Routing
  - 8.3. SDN for Optical VPN
  - 8.4. SDN Operations
9. Service Orchestration
  - 9.1. SDN hierarchy
  - 9.2. Service Chaining
  - 9.3. NFV and SDN Orchestration
  - 9.4. Orchestration and the northbound APIs
  - 9.5. SDN use cases