



SDN Engineer

Module 1: SDN Concepts

- SDN Value Proposition
- Implementing the SDN Forwarding Plane
- Implementing the SDN Control Plane
- Evolution of Switches and Control Plane
- Protocol Limitations that SDN solves
- Inadequacies in Networks today
- SDN Devices and Device Functions
- Application workflow
- Programmability (Netconf, Yang, REST)

Module 2: Virtualization

- Introduction to Virtualization and Hypervisors.
- Use cases of Virtualization in IT- use cases.
- Type of Hypervisors- qemu, KVM, Virtual box, etc.
- Demo to understand virtualization and hypervisors on your machines.
- Introduction to Linux bridging and hands-on demo.

Module 3: Openflow Deepdive

- Deep dive in SDN- What is Openflow.
- Introduction to NFV.
- Openflow architecture
- Openflow protocol

- Openflow message structure
- SDN and Openflow use cases.

Module 4: Building Blocks of SDN

- SDN building blocks in detail
- How is control plane is defined and controlled.
- How is data plane defined and controlled.
- Overview of controllers- OpenDaylight, Floodlight, RYU, POX, NOX, Contrail.
- Open Source tools- Mininet and Wireshark hands-on demo.
- Introduction to Flow-Visor and Flow-Sim.
- Introduction to open source routers- Quagga and Vynos.

Module 5: SDN Interfaces

- SDN Interfaces- North-Bound and South-bound.
- South-bound interfaces introduction- Openflow, OVSDB, BGP-LS, BGP-PCEP, NetConf and YANG.
- Northbound interfaces introduction- REST, RESTful and RESTCONF.
- Imperative vs Declarative SDN
- SDN Deployment- Intent based deployment or Application Driven Network.
- VXLAN primer.
- Centrally distributed or Hybrid networks.
- Open Source projects contributing to development of SDN- Atrium, ONF, OPNFV, ON-Lab, Openstack, ETSI.
- Understanding working of Floodlight Controller- practical hands-on demo.

Module 6: Practical Demonstration

- Practical demonstration of Opendaylight controller.
- Practical demonstration of ONOS Controller.

Module 7: Multi-Layer SDN

- SDN Multilayer deployment.
- Packet and optical layer convergence- Use case in ISP.
- Introduction to SD-WAN.

Module 8: Openstack

- Openstack overview.
- Understanding Openstack architecture and how SDN fits in.
- Practical demonstration of Openstack.

Module 9: SDN Optimization

- SDN performance, high availability and security considerations.
- Open source complementing projects.
- Introduction to Segment Routing and LISP.
- SDN NFV management and orchestration.
- CP level secure channel/communication/session establishment between controller/switch
- In-Band and Out-of-Band management security considerations
- Controller HA
- The Implications of SDN on Network Security
- Securing the OpenFlow® Protocol
- Securing the OpenFlow® data plane
- Software Development Lifecycle
- Controller/Element Hardening

Module 10: SDN and Cloud

- Cloud Computing
- Cloud Networking
- Does SDN enhance cloud computing?

Innovative Execution...

Module 11: Contributing Projects

- MANO Architecture overview
- ETSI and NFV
- NFVI, VIM, VNFM and NFVO
- NFV use cases- VCPE.

Module 12: SDN in Business

- Business alignment with SDN- DevOps, Six Sigma, Service Function Chaining.
- NFVaaS