

1. TAG

08:30 Eintreffen der Teilnehmer im Gebäude 4 (Mensa)
Begrüssung bei Kaffee und Gipfeli

09:00 - 10:15 **Introduction to INS-HSR**
Introduction to Software Defined Networking

- Market Drivers (Cloud Computing, Virtual Machine Mobility, Smart-phones, etc.)
- Benefits: Network Orchestration, Mobility, Virtualization, Layer-/ Cross-Domain Intelligence, etc.
- Standardization Drivers (IETF, ONF, OpenDaylight, OpenStack, etc.)
- Customer Examples: Google, Amazon, Deutsche Telekom, etc.

Pause

10:30 - 11:30 **SDN Architecture**

- Separation of Data and Control Plane, Hybrid Models, Hardware vs. Software
- Network Function Virtualization (NFV)
- Network Automation

11:30 - 12:00 **Demo: Experience SDN**

- Automated Provisioning with OpenStack

Mittagessen

13:00 - 13:45 **Introduction to Application Programming Interfaces**

- Northbound and Southbound Interfaces
- Device APIs (Netconf, Yang)
- Architectural Comparison (Scripting, Object-Oriented Languages)
- Data Representation (XML, CSV, HTTP)
- Communications Models (REST API)

13:45 - 14:00 **Demo: APIs**

- Examples of APIs

14:00 - 15:00 **Introduction to Openflow**

- Openflow Architecture
- Protocol and Versions

Pause

15:15 - 16:15 **Network Vendors SDN Approaches**

- The legacy vendors: Cisco, HP, Brocade, VMware, Intel, etc.
- The new startups: BigSwitch, Nicira (VMware)
- Technical Implementations and Controller Types
- Open Source Implementations

16:15 - 17:00 **Lab: Explicit Switching with Openflow**

- Use OpenDaylight Controller to direct traffic through the network

Agenda SDN Fundamentals

2. TAG

09:00 - 09:30

The New Network Engineer

- How have we been managing our networks in the past?
- What kind of skills will be required in the future?
- How to go on from here?

09:30 - 10:15

Introduction to Cisco ONE

- Cisco's SDN / DNA Architecture
- Elements of Cisco's SDN Approach: APIs, Controllers, Fabrics, Virtualized Network Functions

Pause

10:30 - 11:30

SDN in the WAN

- Benefits
- Architectural Changes
- Use-Cases: Dynamic WAN

11:30 - 12:30

Lab: iWAN

- Cisco iWAN Solution

Mittagessen

13:30 - 14:30

SDN in the Data Center

- Benefits
- Architectural Changes
- Cisco APIC Architecture as an Example
- Use-Case: Automated Provisioning of Cloud Services

14:30 - 14:40

Lab: Demo Cisco ACI

14:40 - 15:00

Lab: NSX

- VMWare NSX

Pause

15:15 - 16:00

SDN in the Campus / Access

- Benefits
- Architectural Changes
- Use-Case: Network Access Control
- Demo: DNA Center

16:00 - 16:45

SDN in the Service Provider Network

- The internet of the future (Google Espresso, Facebook OCP, etc.)
- Deploy L3VPNs using UI, CLI and RESTCONF APIs
- Demo: NSO und WAE