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# Intent based VPN and its future in SDN

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# AGENDA

- Introduction to VPN
- Overview of Intent-based VPN modelling process
- Architectural challenges
  - Mapping Service
  - MPLS Label management
  - Flow Rendering
- Demonstration
- Conclusion

# Introduction to VPN

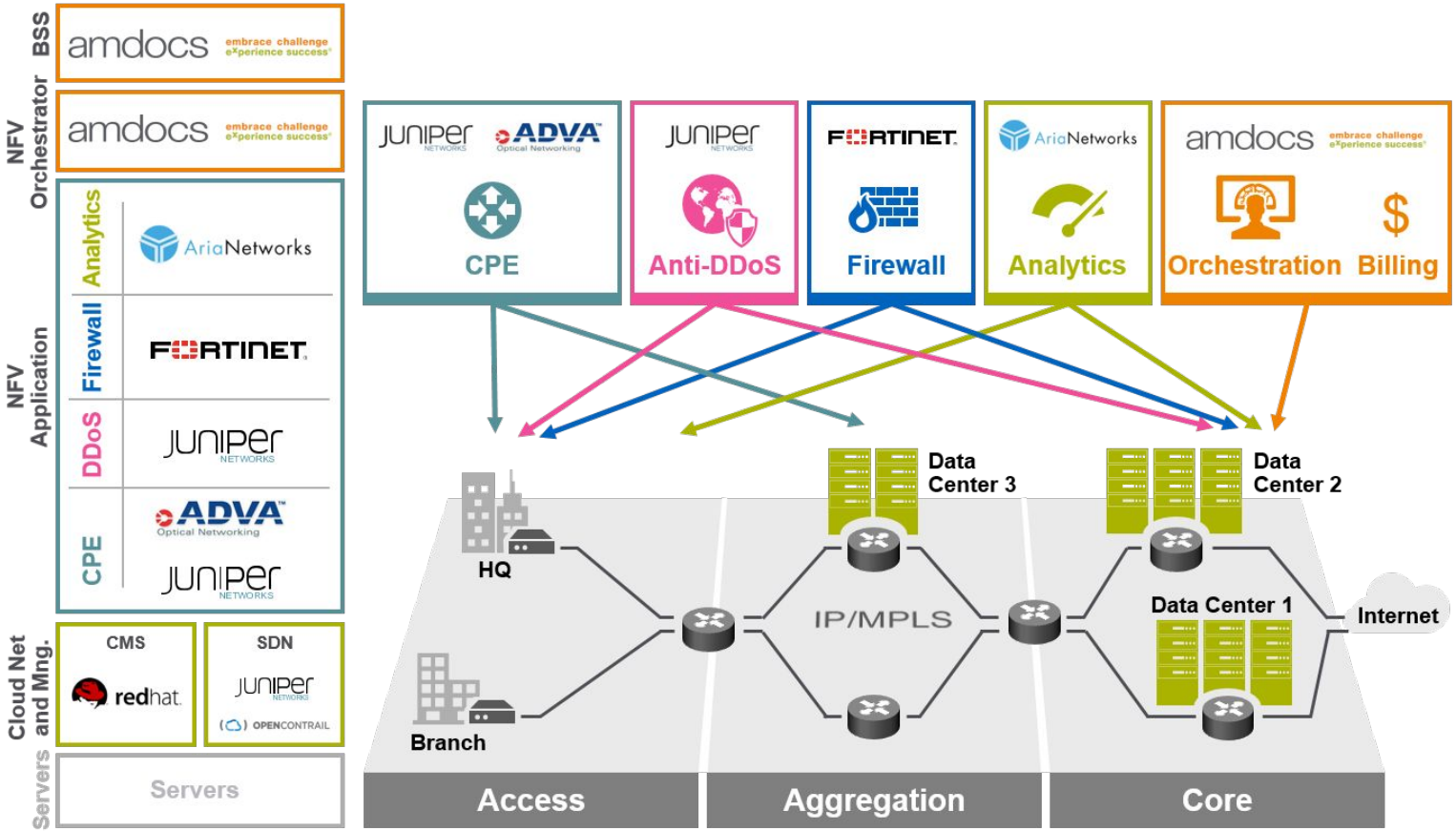
- L2VPN
  - Ethernet
  - ATM
  - Frame relay
- L3VPN
  - BGP (Border Gateway Protocol)
  - VRF (Virtual Routing Forwarding)
  - OSPF (Open shortest path first)

# Actual state of VPN's in SDN

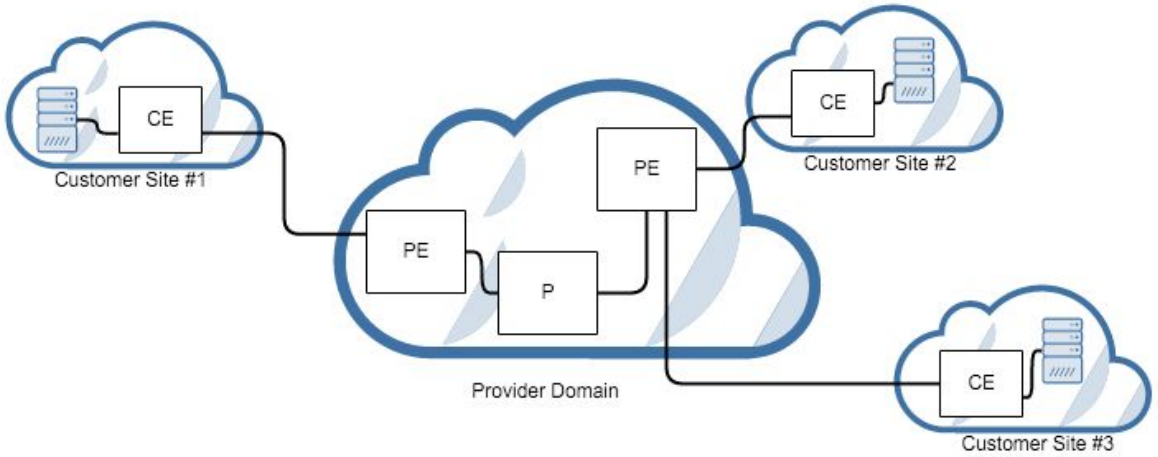
- IETF
- RFC 4364
- Deutsche Telecom and Vodafone
  - End-to-end NFV service
  - Croatia, Hungary, Slovakia
  - AmDocs at Mobile World Congress 2016

# Vodafone Demo in MWC 2016

## VPN+ empowered by SDN and NFV



# Intent-based VPN modelling process



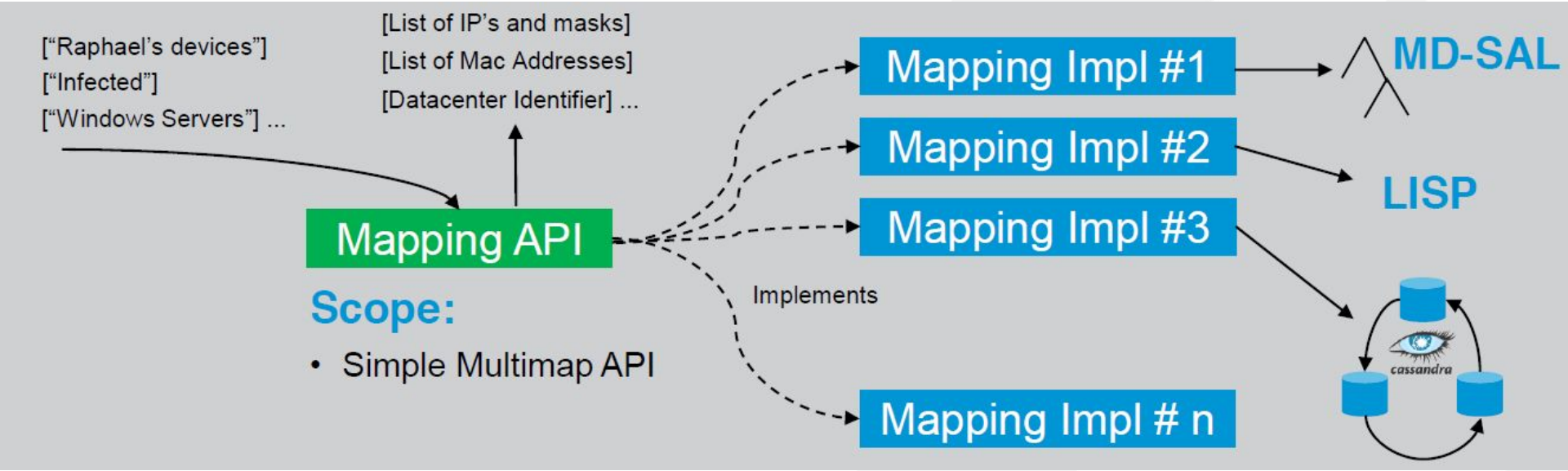
# Intent-based VPN modelling process

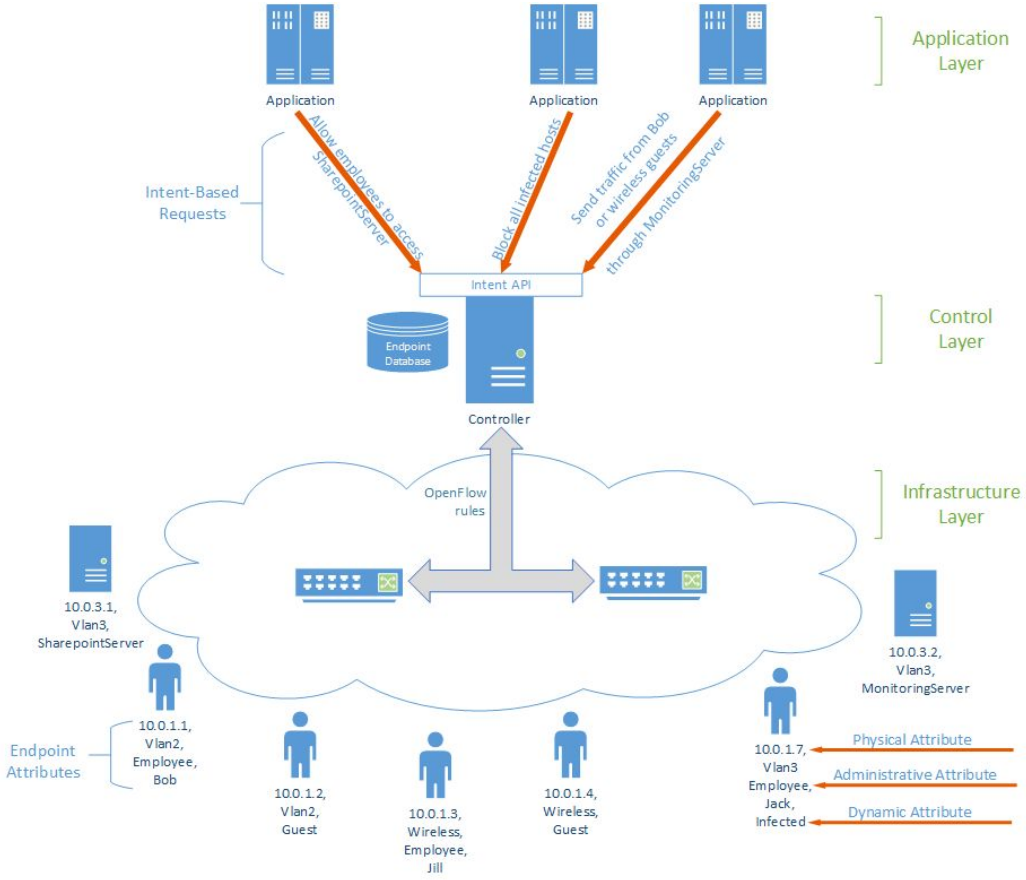
- BGP agents
- Network Intent Composition (NIC);
- VPNService;
- Openflowplugin (Openflow render)

# Mapping Service

- Abstract network details
- Data repository for translation
- Hash Table of hash table
  - Accommodate different attributes
  - Support different implementation technologies (Cassandra, Hazelcast, MD-SAL, etc)

# Mapping service

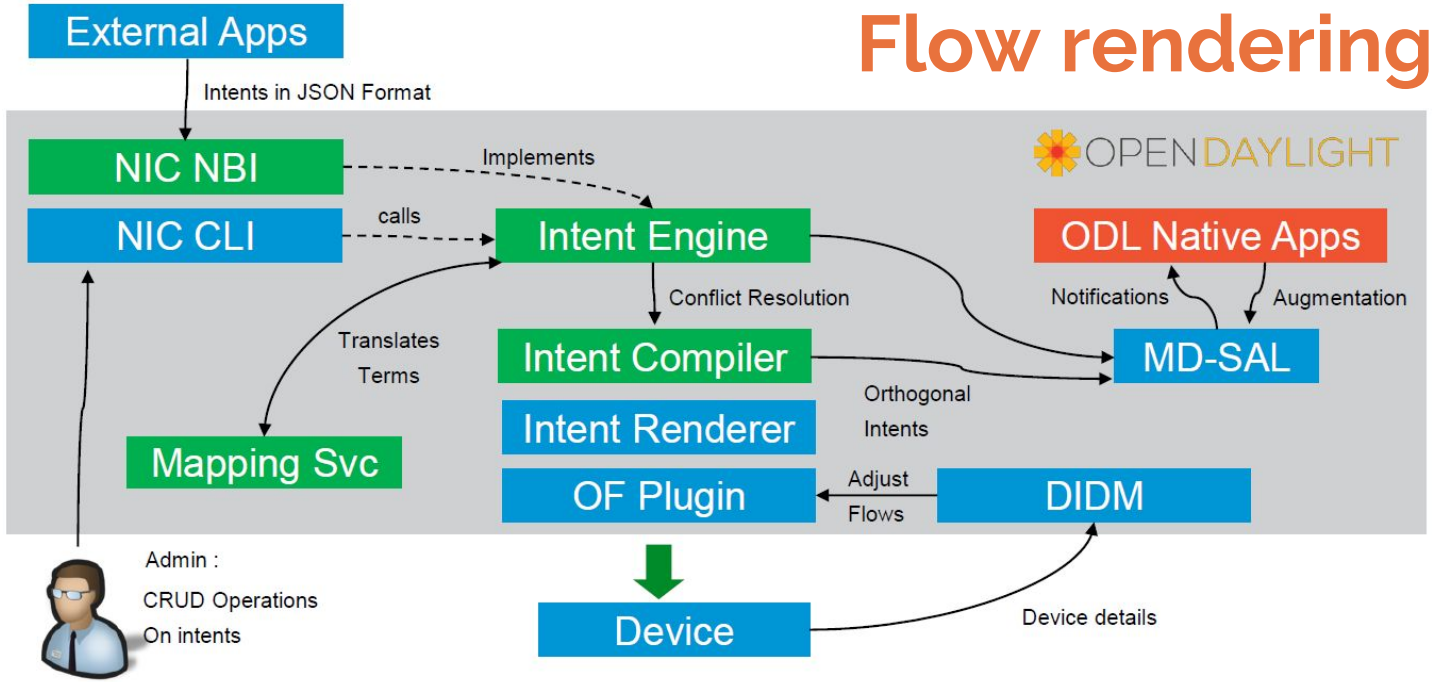



Application
Application
Application
Application Layer
Intent-Based Requests
Allow employees to access SharepointServer
Block all infected hosts
Send traffic from Bob or wireless guests through MonitoringServer
Intent API
Endpoint Database
Controller
Control Layer
OpenFlow rules
Infrastructure Layer
10.0.3.1, Vlan3, SharepointServer
10.0.3.2, Vlan3, MonitoringServer
Endpoint Attributes
10.0.1.1, Vlan2, Employee, Bob
10.0.1.2, Vlan2, Guest
10.0.1.3, Wireless, Employee, Jill
10.0.1.4, Wireless, Guest
10.0.1.7, Vlan3 Employee, Jack, Infected
Physical Attribute
Administrative Attribute
Dynamic Attribute

# MPLS Label management

- How we manage MPLS labels
  - Transparent to users
  - 1 MPLS label per path
- Improvements
  - Burning MPLS Labels
  - 2 MPLS labels: 1 for domain and other for path

# Flow rendering



# Demonstration

# Conclusions

- How to map network details in a standardized way?
- YANG based solution?
  - Gaining momentum in network industry
  - Augmentation
- JSON based solution?
  - Widely spread technology
  - Interoperability