Intent based VPN and its future in SDN

Icaro Camelo, Rashmi Pujar, *Inocybe*
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

Scope:
- Simple Multimap API

Mapping API

Mapping Impl #1
- List of IPs and masks
- Datacenter Identifier

Mapping Impl #2
- List of Mac Addresses

Mapping Impl #3

Mapping Impl # n

["Raphael’s devices"]
["Infected"]
["Windows Servers"]...
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