



**I E T F<sup>®</sup>**

# **Abstraction and Control of Transport Networks Problem Statement**

**<draft-leaking-actn-problem-statement-03>**

Diego Lopez - *Telefónica*

IETF 91 @Honolulu, November 11, 2014

# Current Network Requirements

- Elasticity
  - Changing and unpredictable demands created by new ways of consuming network resources: cloud, multi-tenancy & network slicing, NFV, etc.
- Uniform management and control
  - Multiple technologies and multiple implementations per technology
  - Multiple administrative domains in an e2e service provision
- Programmability
  - On-demand configuration, customization and service innovation
- All the above are targets for brownfield scenarios
  - Greenfield scenarios, while relevant, do not cover all operators needs

# Current Tools and Methods

- Siloed control planes per data plane technology, and even per implementation because of their maturity degrees
- Overlay networks as an initial form of network virtualization
  - Abstracted visibility and controllability are limited for certain applications/services
  - Preparation of the underlay network yet retains the complexity

# Foreseen Tools and Methods

- Virtualization, by composing virtual networks (slices) using resources of heterogeneous environments
- Abstraction of the underlying multi-admin, multi-vendor, multi-technology networks to facilitate network virtualization
- Operation of the heterogeneous infrastructure as if it were a part of an homogeneous network

# Motivation

- Automation and adaptability
- Time-To-Market
- Increase network resource usage
- Control and management simplification

# Objectives and Requirements (I)

- Capability and resource visibility
  - Discovery and/or publishing
- Programmability
  - Separation of control and forwarding
- Common data models
  - Resource description models exposed in a uniform structured manner
- Scheduling
  - on-demand/calendared consumption of resources

# Objectives and Requirements (II)

- Allocation
  - Specific guarantees for the virtual resources
- Adaptability
  - Modification of allocated network resource
- Slicing
  - Partitioning into independent virtual networks
- Isolation
- Manageability

# Objectives and Requirements (III)

- Resilience
  - From customer and provider perspectives
- Security
- Technology independence
  - Heterogeneous network technologies
- Optimization
  - Optimize resource usage
- Multi-domain



# Conclusions

- New control capabilities are needed in current transport networks
- Multi-\* orchestration requires well defined interfaces, common for all technologies and domains
- Abstraction is key for virtualizing transport infrastructure