Towards Content-Oriented Orchestration for virtual networks

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Talk Outline

- **Context**
  - Named Data Networking

- **Road to ICN deployment**
  - Programmable ICN
  - NFV and ICN
  - Doctor project’s objectives

- **Content-Oriented Orchestration**

- **Demonstration**

- **Future works**
Named Data Networking

- An Information-Centric Network paradigm
- A promising clean-state effort for future internet
- Key concepts:
  - Naming content object instead of using IP address
  - In-network caching
  - Ensure content integrity, authenticity
IP dominant position make it almost impossible to replace it with ICN in a one-shot process
  • Progressive ICN deployment scenarios are more realistic

*How can ICN and IP cohabit or even cooperate?*
  • To date, several SDN solutions, all bringing different constraints and benefits, have been proposed

Most studies consider IP to carry ICN traffic while leveraging network programmability offered by the SDN paradigm
ICN and SDN

Vahlenkamp et al. [2]

Conet [2]


NFV

- Leverage advances in virtualization to decouple network functions from dedicated hardware to run them on standard servers, storage and switches.

- Formalization: ETSI NFV Industry Standard Group
ICN and NFV

- NFV could be the key for ICN progressive deployment
- ICN introduced as NFV software (VNFs)
- NFV represents a natural solution to use for ICN experimentation and deployment
- Only a few studies have been performed to date [1, 2]
  - Control and management components were not deeply investigated


Doctor project

Objectives:

- Design the architecture of the virtualized node that will support IP/ICN co-existence

- Design and conceive virtualized monitoring and security tools dedicated to a NDN architecture deployed in a NFV framework

- Design and conceive the management and orchestration plane for a virtualized NDN network
Architecture of the DOCTOR Virtualized Node


ETSI NFV MANO

OSS/BSS

EM 1
VNF 1
NFVI
Virtual Computing
Virtual Storage
Virtual Network
Virtualisation Layer
VI-Ha
Hardware resources
Computing Hardware
Storage Hardware
Network Hardware

VNF Manager(s)

NFV Orchestrator

Service, VNF and Infrastructure Description

Vn-Nf
Ve-Vnf
Os-Ma

Or-Vnfm

Or-Vi

NFV Management and Orchestration

Source: ETSI GS NFV-MAN 001
Missing building blocks

- Content-based Deployment and Orchestration specification
- Content-based NFVO and VNFM
- Service function chaining
  - We need to create route for content based on prefix and not IP/TCP headers
- A choice then arises: modify an existing tool or to develop a new one?
Content-Oriented MANO
Questions ?