Open Federated Testbeds:
with focus on 5G/SDN/NFV/MEC
2nd workshop with IEEE SDN initiative-EIT Digital

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SDN Initiative Background

Goal/Mission

– To foster growth and development of Software-Defined Networks (SDN), Network Functions Virtualization (NFV), Cloud-Edge-Fog Computing as key technologies for Network Softwarization;

– To promote a systemic vision addressing the socio-economic transformation of ICT and Telecom Ecosystems also encompassing skill development, policy, ethics.

IEEE Society membership participation: Communications, Computer, Signal Processing, Reliability, Consumer Electronics, Vehicular Technology, Social Implications of Technology

Why & how to Federate?

- Use of New Architectural principles

- Isolated vs Federated

- Autonomy/Individuality vs Common shared framework: Discovery, resource sharing, ….

- Trust and maintain autonomy

- Unified interface and coordination

- Evolved Control, Orchestration, Management, Policy: E2E slicing

- Resiliency

- Need new business models

Common requirements for Federation

- Trust between federated entities who maintain all autonomy; local control over all policies

- Support of existing testbeds, software that manage them through a single uniform interface for potential users

- Coordination among members to improve resilience using fundamentals of distributed systems

Architectural principles

- Compatible with SDN/NFV frameworks that are Programmable
- Simplicity (as opposed to complexity)
- Efficiency (Energy & spectrum), Modularity, Scalability, Flexibility
- Resiliency
- Software architecture focus: "softwarization"
- Shared Common Cloud platforms
- Drives an Open Mobile Ecosystem
- Good TCO/flexible transport
- Future proof
- Allows (Easily deployable) Value Creation platforms

& other Architectural principles

- IDEAL principles: Isolated state, Distributed, Elastic, Automanaged, Loosely coupled

- CAP theorem: how much of each?

FTB initiatives

- **Many initiatives!!!**

- **EIT digital FTB:** SDN/NFV/Mobile Computing/5G focus

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- **How** to work together? Slicing? How to compose the slices*?

- Catalog (in the form of a Wiki) of available testbeds and tools around the world (both open and commercial) for testing SDN, NFV and 5G service and product concepts

* **ITU-T Slicing (2011)** as defined in [ITU-T Y.3011], [ITUTY.3012] is the basic concept of the Network Softwarization. Slicing allows logically isolated network partitions (LINP) with a slice being considered as a unit of programmable resources such as network, computation and storage.

5G and MEC

- Mobile Edge clouds: various efforts underway
- ETSI/MEC
- OEC
- Openfog
- IEEE OMEC
- Edge is the key architectural component of 5G era networks
- It is a key candidate for federated testbed research

A word of caution

- Too much of a good thing?
  - How do we:
    - focus and support one key FTB?
    - create universal requirements
    - explain the value proposition effectively
    - Support key POCs, do benchmarking, Certification, ..
    - IEEE Comm mag article?
    - Industry wp's?
  - We will have a meeting report summarizing all recommendations!

THANK YOU!