Call:	H2020-EUB-2017
Funding scheme:	RIA
Proposal number:	777067
Proposal acronym:	NECOS
Duration (months):	24
Proposal title:	Novel Enablers for Cloud Slicing
Activity:	EUB-01-2017 RIA

European Commission

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ICT Week, EU-Brazil ICT Cooperation Workshop, 6 December 2017, Brasília

Novel Enablers for Cloud Slicing - NECOS

ICT Week, EU-Brazil ICT Cooperation Workshop, 6 December 2017, Brasília

Agenda

- Consortium

- Motivation and Objectives

- Project target

- Advancing the State of the Art

- Lightweight Slice Defined Cloud

- Use Cases

- Kick-Off

Consortium

Participant No	Part. short name	Participant organization name	Country
1 (Overall Co-ordinator)	UPC	Universitat Politècnica de Catalunya	Spain
2	UCL	University College London	UK
3	TID	Telefónica Investigación y Desarrollo	Spain
4	UOM	University of Macedonia	Greece
5 (Brazil Co-ordinator)	UNICAMP	University of Campinas	Brazil
6	UFSCAR	Federal University of São Carlos	Brazil
7	UFU	Federal University of Uberlândia	Brazil
8	UFPA	Federal University of Pará	Brazil
9	UFRN	Federal University of Rio Grande do Norte	Brazil
10	CPqD	CPqD Telecom Research and Development Center	Brazil
11	UFG	Federal University of Goiás	Brazil

Motivation & Objectives

- Cloud service **models SaaS, PaaS, IaaS** – have **separately managed** computing, connectivity and storage resources
  - **Uniform management** of the currently separated computing, connectivity and storage resources
- Challenge to provide dynamic mapping of service components to a **slice** & enforcing SLA
  - Need a new *Cloud Slice concept* across all resources in a set of *federated* data centers and provide *inter-operability* across multiple domains
- **Develop** and experiment with **Lightweight Slice Defined Cloud** (LSDC)
- **Develop** and **experimentally evaluate two use cases**:
  - Telco Cloud and Mobile Edge Computing

Project Target

A novel solution based on resource virtualization – *Lightweight Slice Defined Cloud (LSDC)* – as an approach for **automating the process of optimal cloud configuration** by extending the virtualization concept to all resources in a data centre and by providing a **uniform management with a high-level of autonomicity for the currently separated computing, connectivity, and storage resources**

Characteristic 1 - It presents a new service model – the *Slice as a Service*.

Characteristic 2 – It enables the configuration of *slices* across the physical resources in the cloud networking infrastructure.

Characteristic 3 - It allows each aspect that comprises the cloud environment – from the networking between virtual machines, to the SLAs of the hosted applications – to be managed via software.

Characteristic 4 - It utilises lightweight and uniform management and virtualisation systems, with small footprint components, deployable on large number of small servers and clouds at the network core and edges.

Contributions beyond SOTA

Areas of Advances	NECOS Results
Cloud Management Platforms	A Cloud Operating System enabling infrastructure as a Service (IaaS) network-based federation.
Mobile Cloud, Mobile Edge and Fog Computing	The LSDC facilities supporting Mobile Edge Computing features and the implementation of a relevant use-case.
Slice as a Service	Inherent support of "Slice as a Service" for federated cloud environments.
Orchestrating Slices Across Federated Domains	Prototyping of novel orchestration features for future federated cloud infrastructures.
Federation of Cloud Services and Resources	Intelligent resource allocation to fulfil user's service requirements for cloud federation.

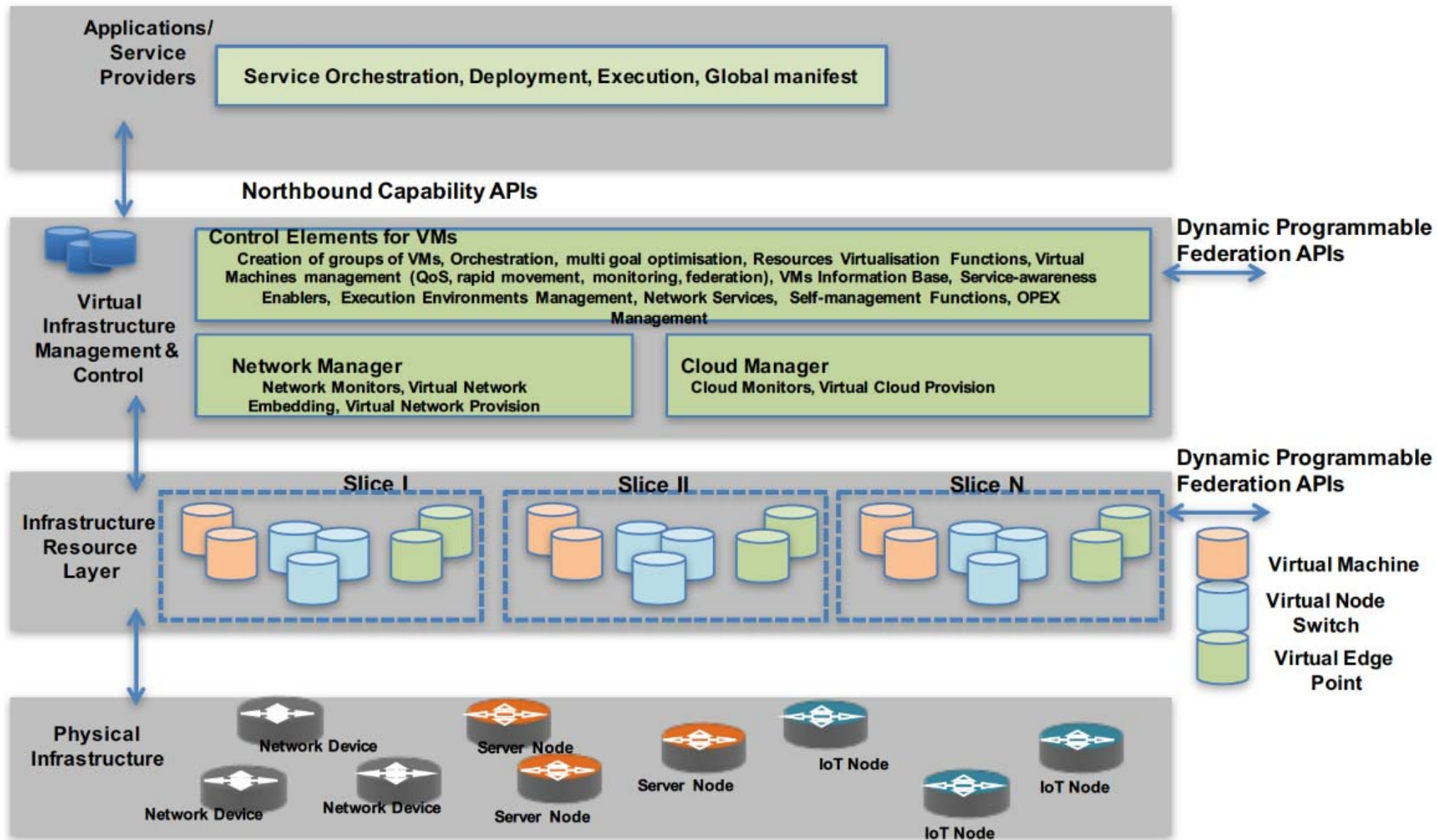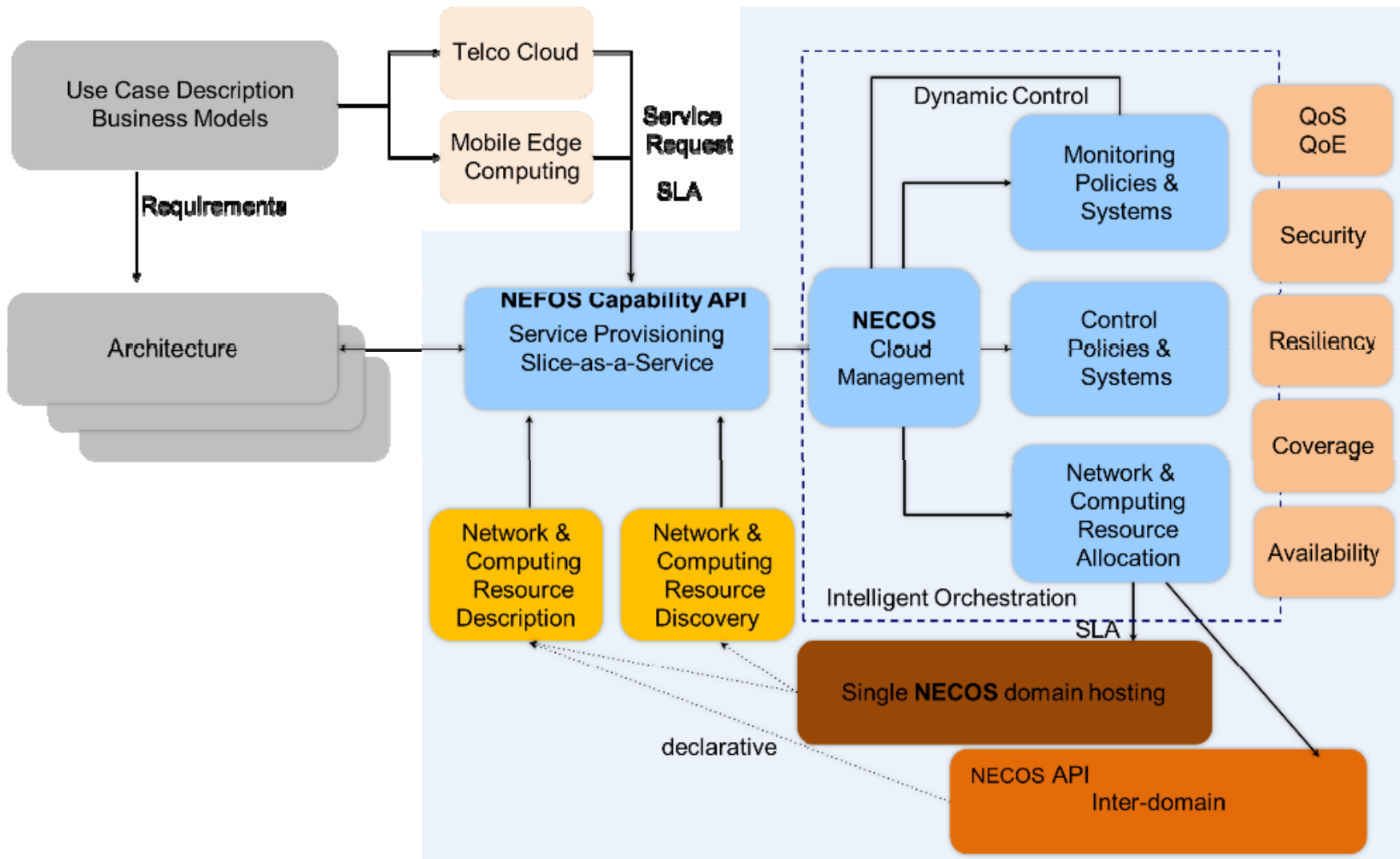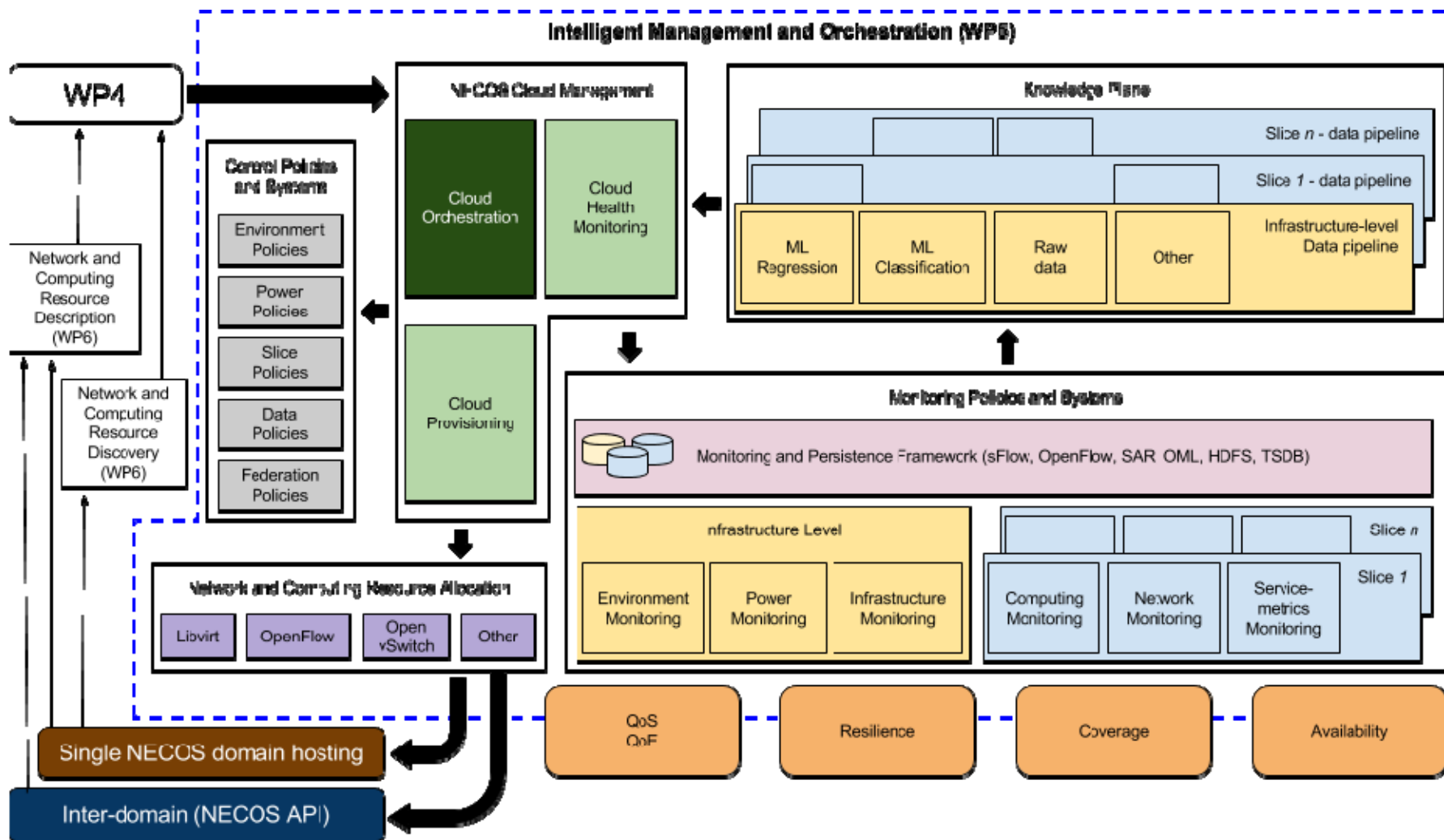*Figure 1.8 -NECOS Advances Beyond the State-of-the-Art*

Applications/Service Providers

Service Orchestration, Deployment, Execution, Global manifest

Northbound Capability APIs

Dynamic Programmable Federation APIs

Virtual Infrastructure Management & Control

Control Elements for VMs
Creation of groups of VMs, Orchestration, multi goal optimisation, Resources Virtualisation Functions, Virtual Machines management (QoS, rapid movement, monitoring, federation), VMs Information Base, Service-awareness Enablers, Execution Environments Management, Network Services, Self-management Functions, OPEX Management

Network Manager
Network Monitors, Virtual Network Embedding, Virtual Network Provision

Cloud Manager
Cloud Monitors, Virtual Cloud Provision

Dynamic Programmable Federation APIs

Infrastructure Resource Layer

Slice I   Slice II   Slice N

Virtual Machine

Virtual Node Switch

Virtual Edge Point

Physical Infrastructure

Network Device
Network Device
Network Device
Server Node
Server Node
Server Node
IoT Node
IoT Node
IoT Node

Figure 1.1 - NECOS - LSDC Architecture

Use Case 1 – Telco-Clouds
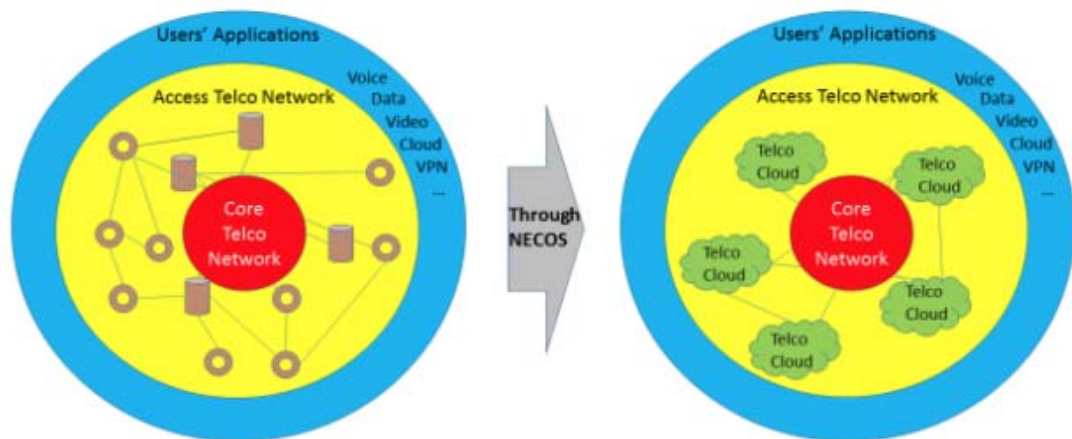
Figure 1.2- The evolution of the Telco's network fostered by the NECOS concept of Telco-Cloud
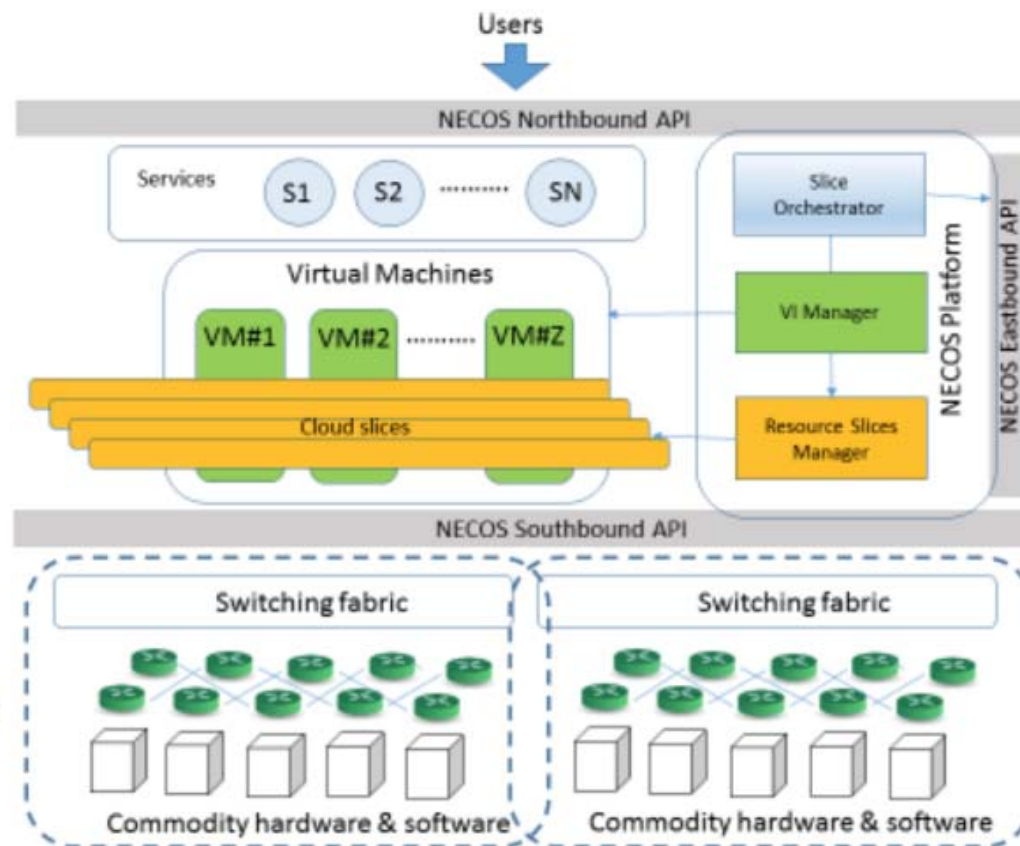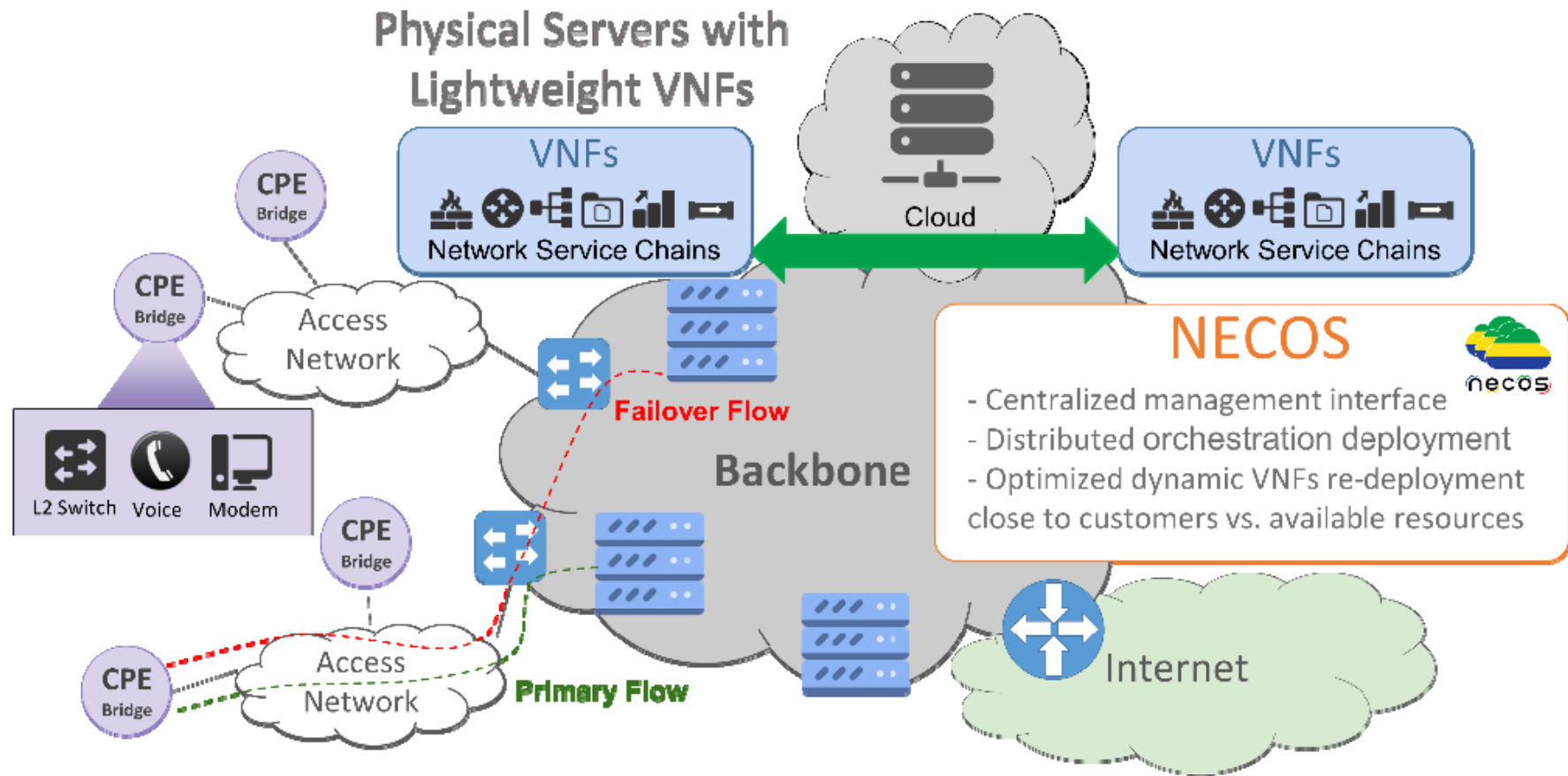

Figure 1.3– Enablers of NECOS driven by Use Case 1

Use Case 1 – Telco-Clouds
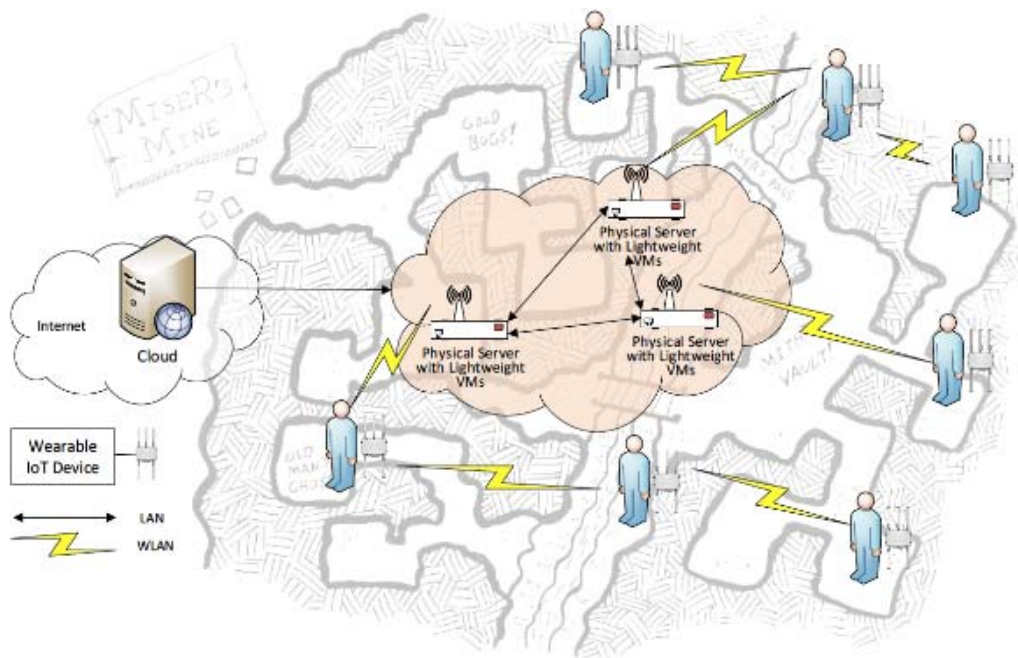
Use Case 2 - Mobile Edge Computing

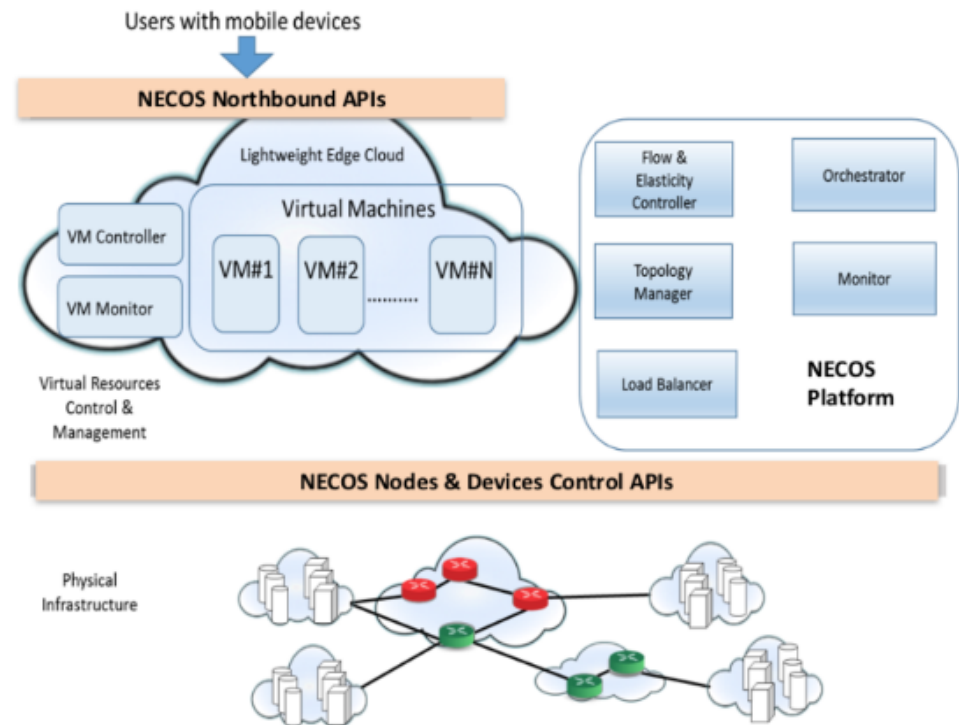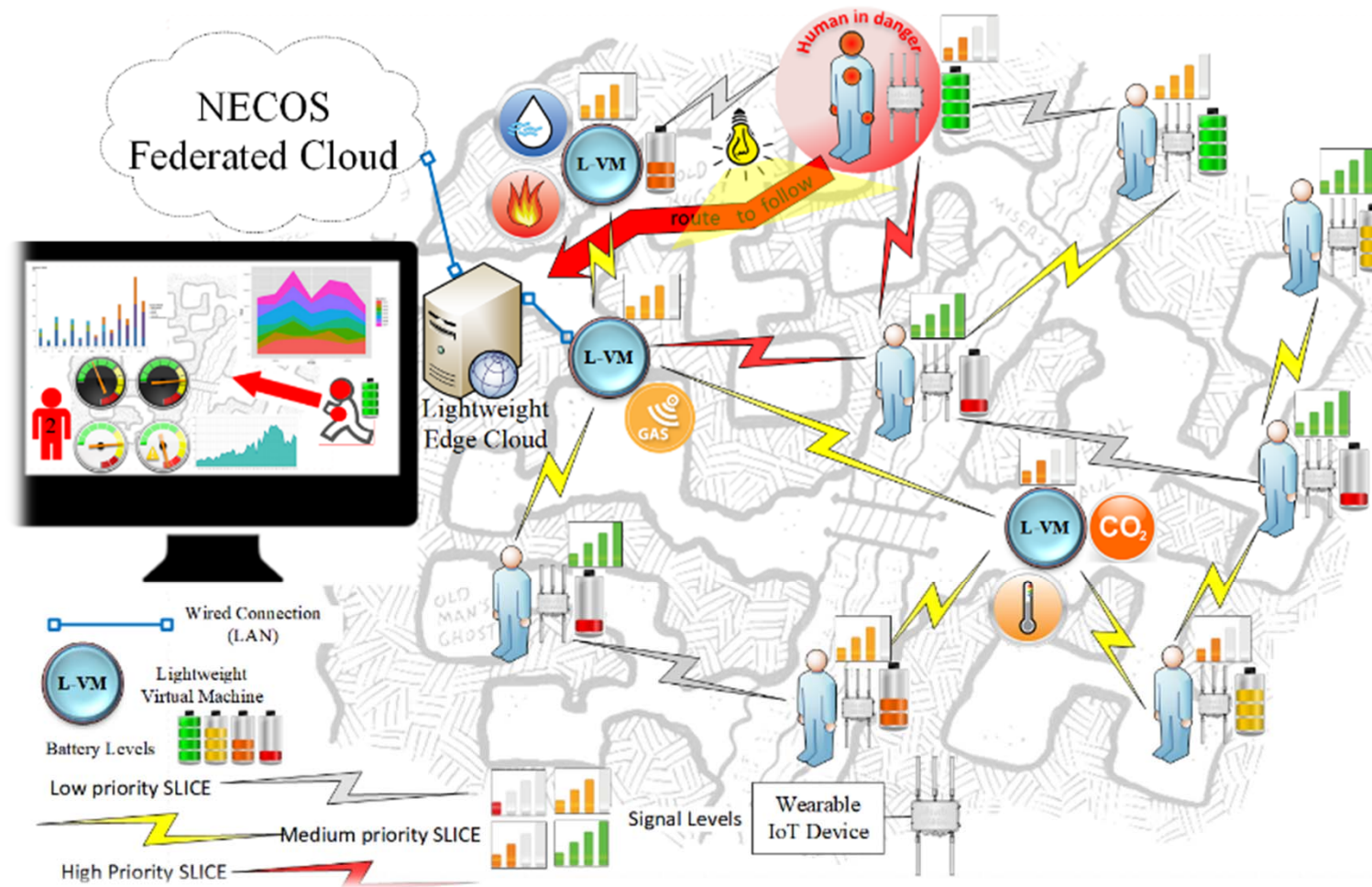Figure 1.4 - Application point of view of Use Case 2

Figure 1.5 - Enablers of NECOS driven by Use Case 2

Use Case 2 - Mobile Edge Computing

Kick-Off

- At UPC, Barcelona (21-22/Nov)

- Representatives from all partners

- Key alignment discussions, brainstorming, and decision making

Visit to Telefonica headquarters and 5TONIC lab at IMDEA (Madrid, 23-24/Nov) for further discussion on the vCPE Telco Cloud use case
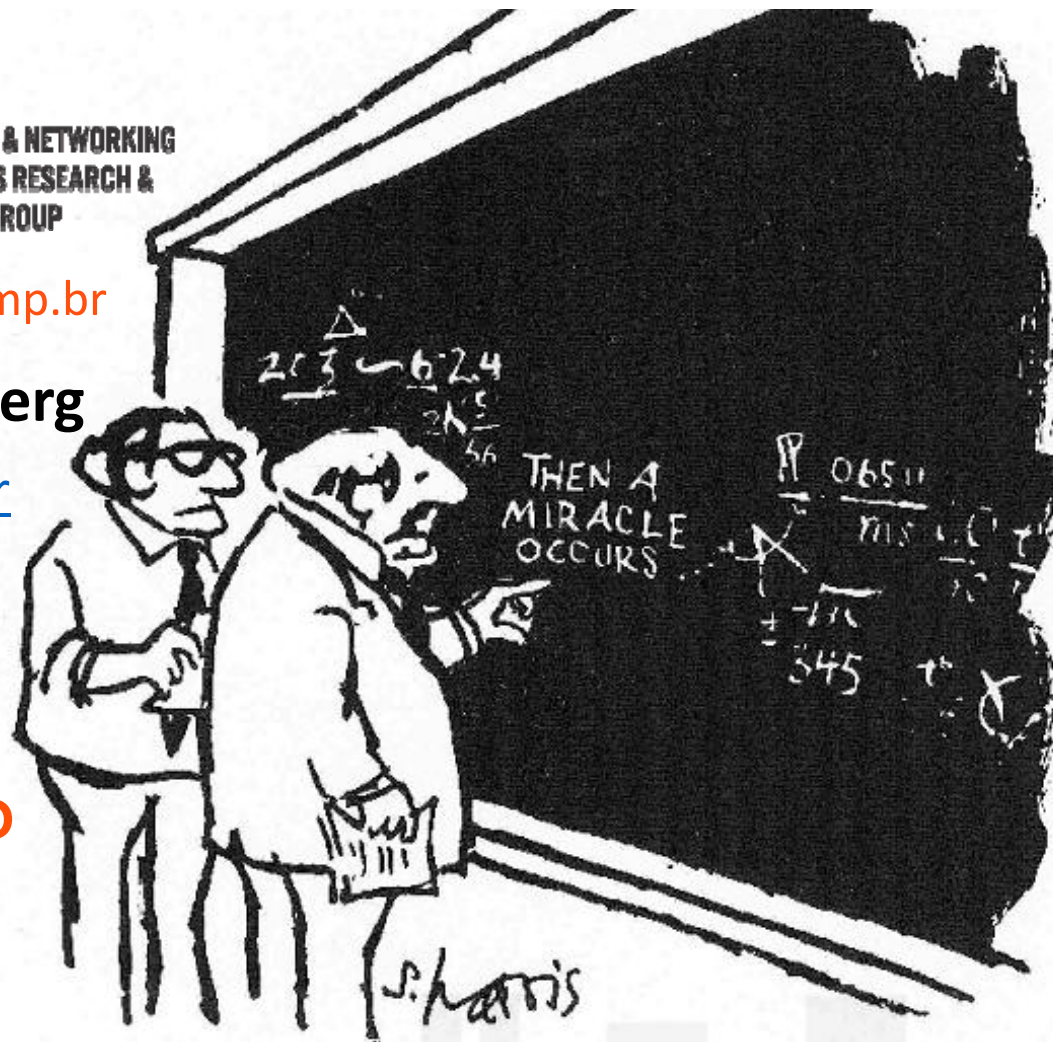
http://www.intrig.dca.fee.unicamp.br

Christian Esteve Rothenberg

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Thanks!
Obrigado!
(More) Questions?

"I think you should be more explicit here in step two"