GENERALISED ARCHITECTURE
FOR DYNAMIC INFRASTRUCTURE SERVICES

Generalized Architecture for Dynamic Infrastructure Services

On behalf of GEYSERS Consortium
(presented by Pascale Vicat-Blanc, GEYSERS Dissemination WPL)

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LYaTiss
software & services
for virtual infrastructures

Grant agreement no. 248657

Typical problem we address

“Amazon cloud uses FedEx instead of the Internet to ship data”

The new Amazon Web Services Import/Export service (Provided by FedEX), which became generally available, is at once a convenient method of easing the pain caused by large data transfers and a recognition that the Internet as it stands today doesn't necessarily provide the unlimited, on-demand scalability that cloud computing providers like to promise.

(http://www.networkworld.com/news/2010/061010-amazon-cloud-fedex.html?source=NWWNLE_nlt_daily_pm_2010-06-10)

- Dynamic networks connecting user premises are needed to improve capacity, reliability and reduce costs.

Our Goal

- Bringing optical networks to the cloud

= An architecture for a sustainable future Internet

- http://www.geysers.eu

GEYSERS @ a Glance

- GEYSERS:
  - Generalized Architecture for Dynamic Infrastructure Services
- Instrument: Collab. Project - Large Scale Integrated Project (IP)
- Activity: ICT-2009.1.1 The Network of the Future, FP7 Call 4
- Project duration: 36 months
- Project start date: January 2010
- Project budget: 10.433.205€ (*7.035.000€ EC contribution*)
- Project resources: 947 person months

Emerging services needs

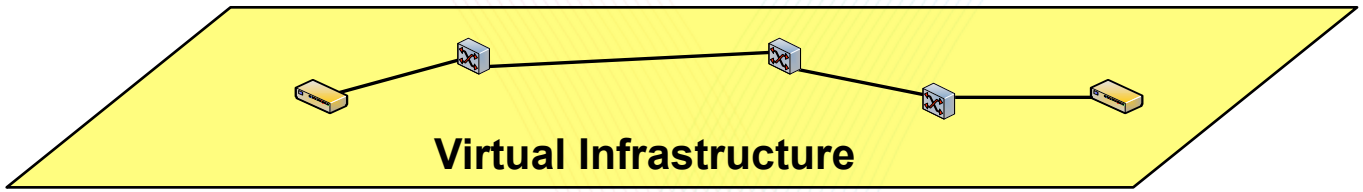
- Customized infrastructures for cloud service providers
- Infrastructure Self-reselling
- Multidomain resource sharing
- Multicast, anycast, assisted unicast
- Remote interactive visualisation and tele-immersion
- Multidomain *Cloud-based* EIS (*Enterprise Information System) load-balancing*
- *Dynamic Enterprise Information System (EIS) Scaling*

What is GEYSERS about?

- A novel architecture and tools for the composition of virtual infrastructures.
- An enhanced network control plane
- A definition of new business roles that impact on legacy infrastructure providers, network & IT operators and application providers.
- An international testbed for prototyping and validating the model and tools

Virtual Infrastructure

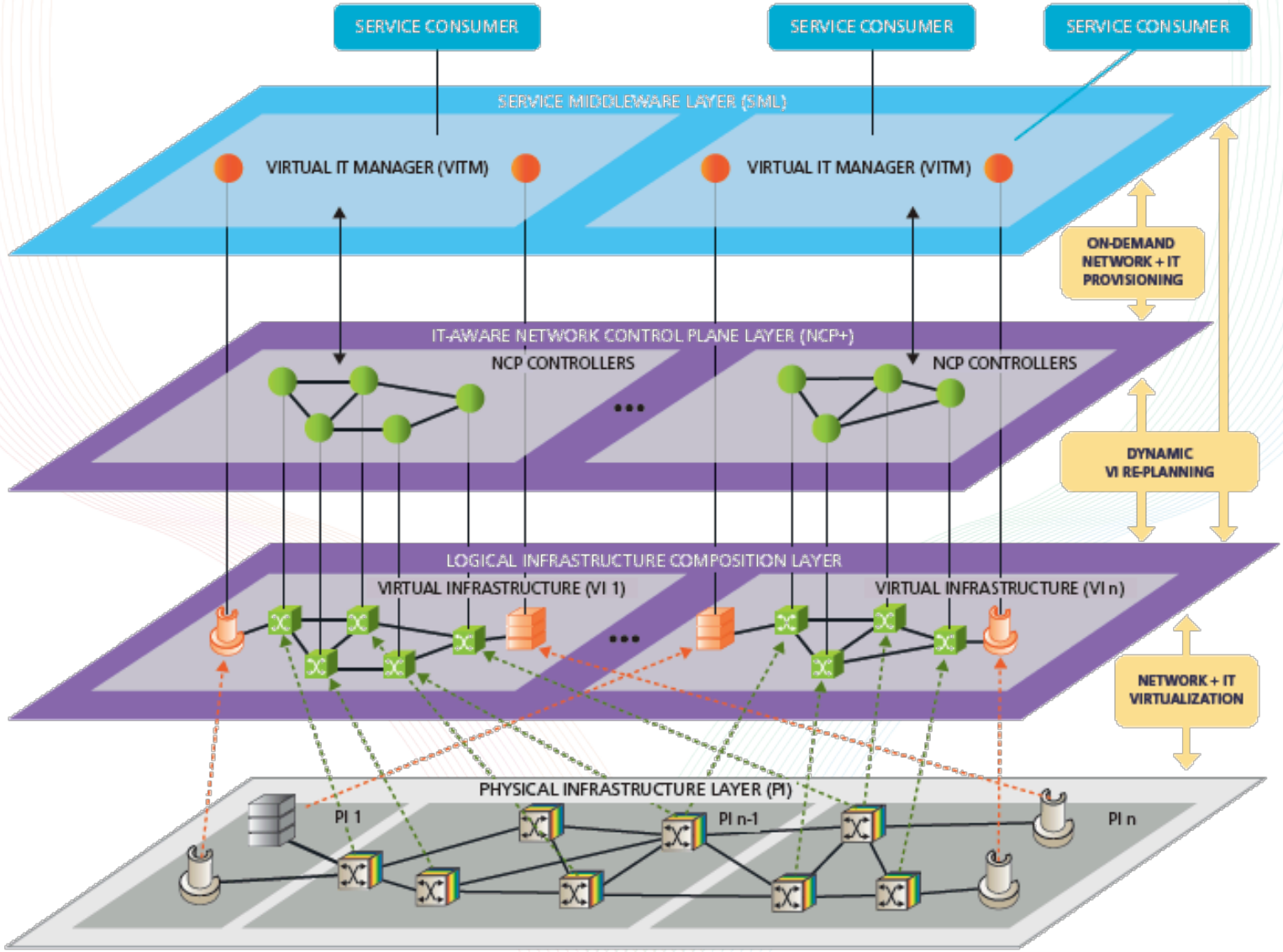
- Virtual Infrastructures vs. Physical optical networks
  - Shared
    - Multiple virtual infrastructures share the resources in the optical network
  - Dedicated
    - Each virtual infrastructure has its dedicated partitioned/ aggregated resources to support
- Virtual Infrastructure Creation Methods
  - Pre-defined
    - Virtual Infrastructures are created before service demands
  - Dynamic
    - Virtual Infrastructures are created on demand



Key points

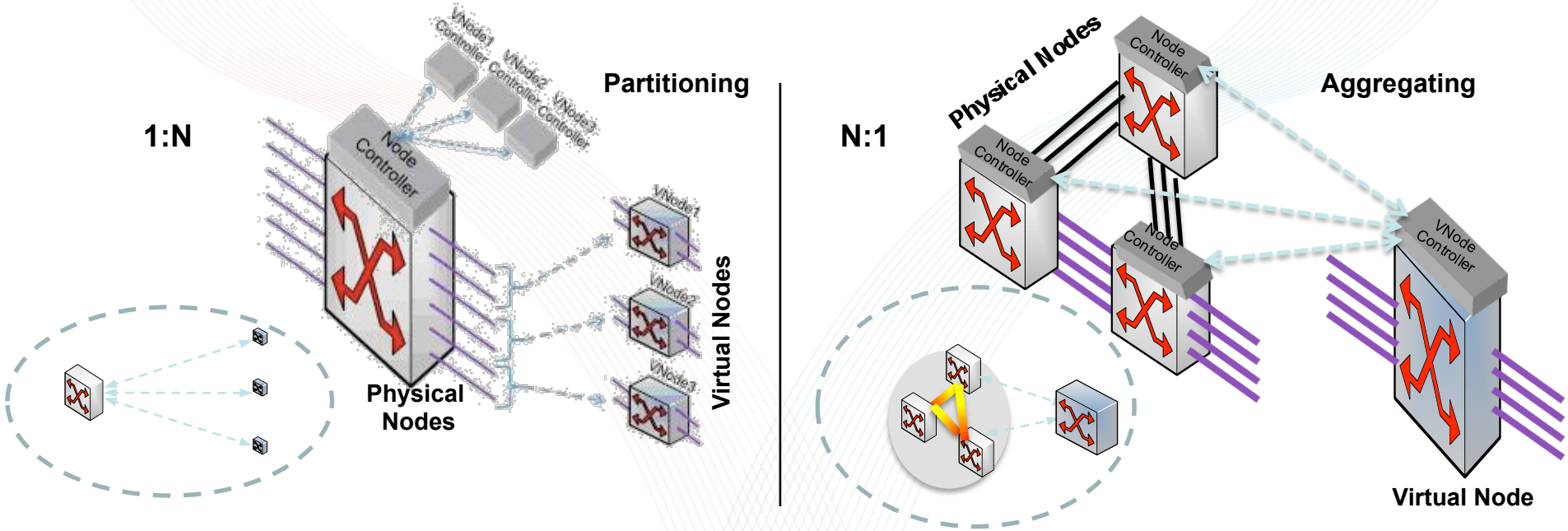
- Optical + IT coupled provisioning
- Infrastructure resource sharing
- Scheduling mechanisms
- New provisioning services (Anycast,…)
- Topology flexibility
- ‘right’ size infrastructure
- Infrastructure re-planning
- Energy efficiency (network + IT)

Reference model

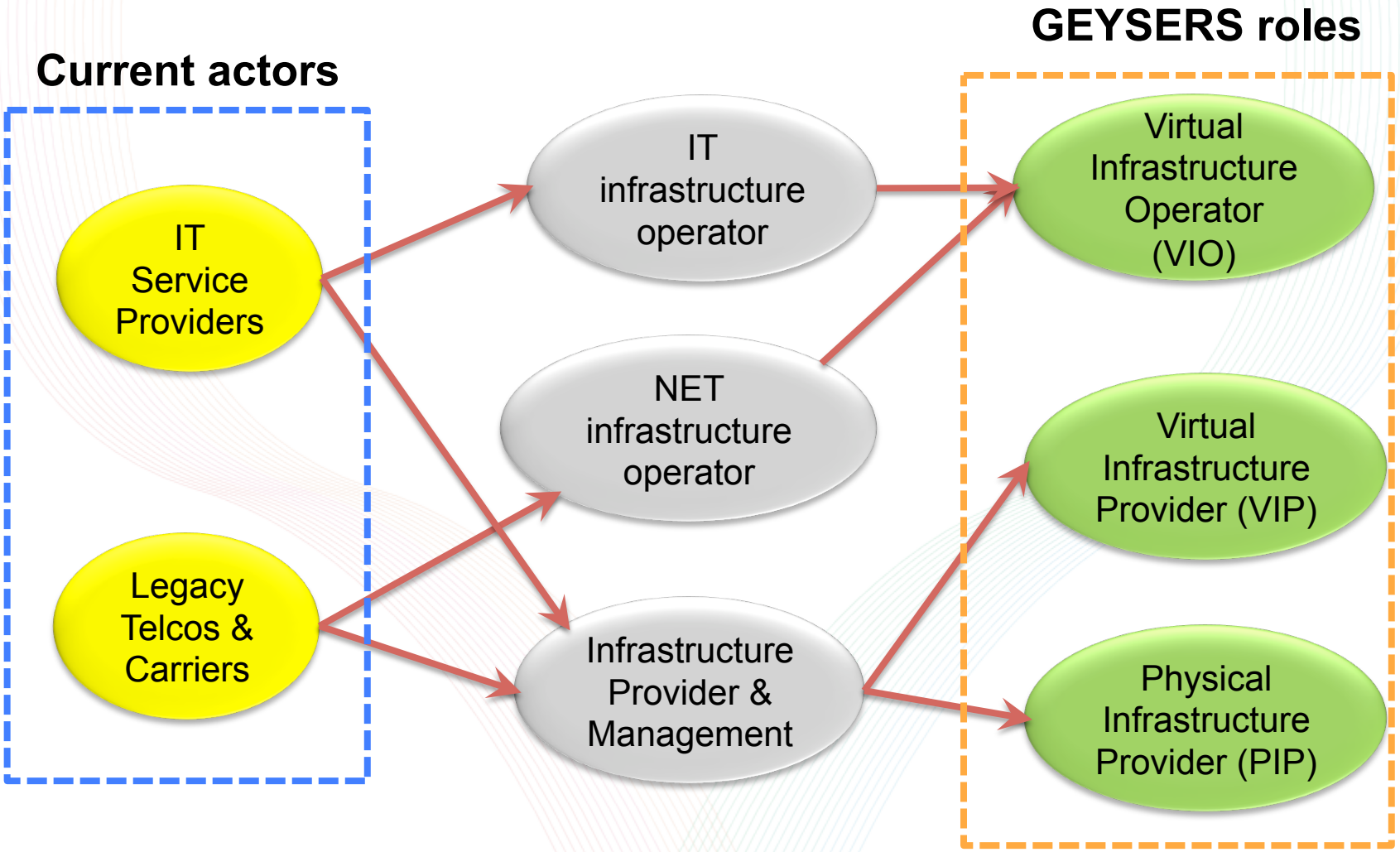


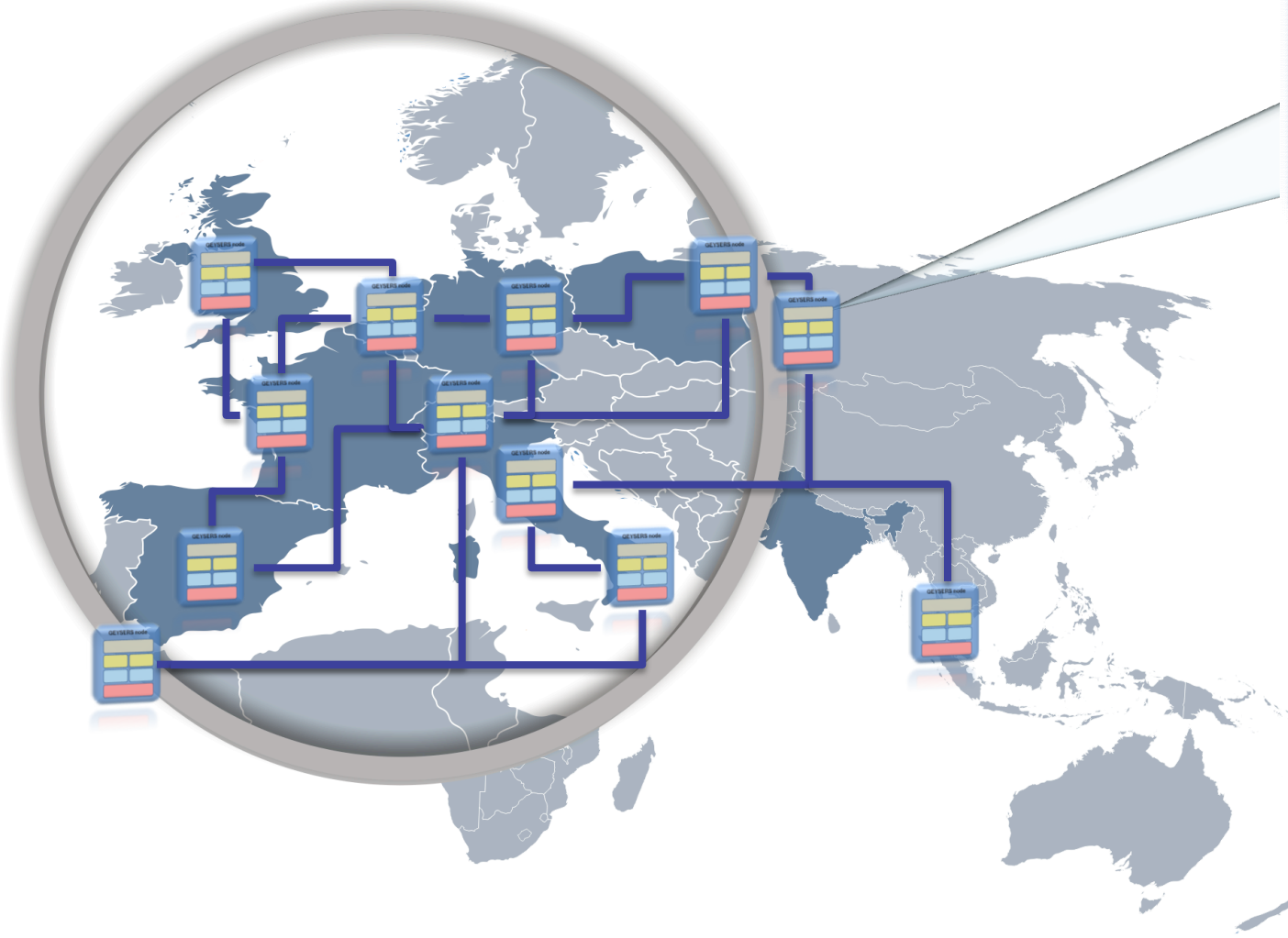
LICL and resource virtualisation

- Optical Network Virtualisation enabled by the LICL
  - Virtual Resources are obtained using one of the following virtualisation paradigms:
    - **Abstraction** (1 PHY to 1 Virtual)
    - **Partitioning** (1:N) – *Direct scope (IaaS)*
    - **Aggregation** (N:1) – *Indirect scope in GEYSERS (NaaS)*



GEYSERS actors and roles





GEYSERS node

Service Middleware Layer

Network Control Plane (GMPLS+/PCE+)

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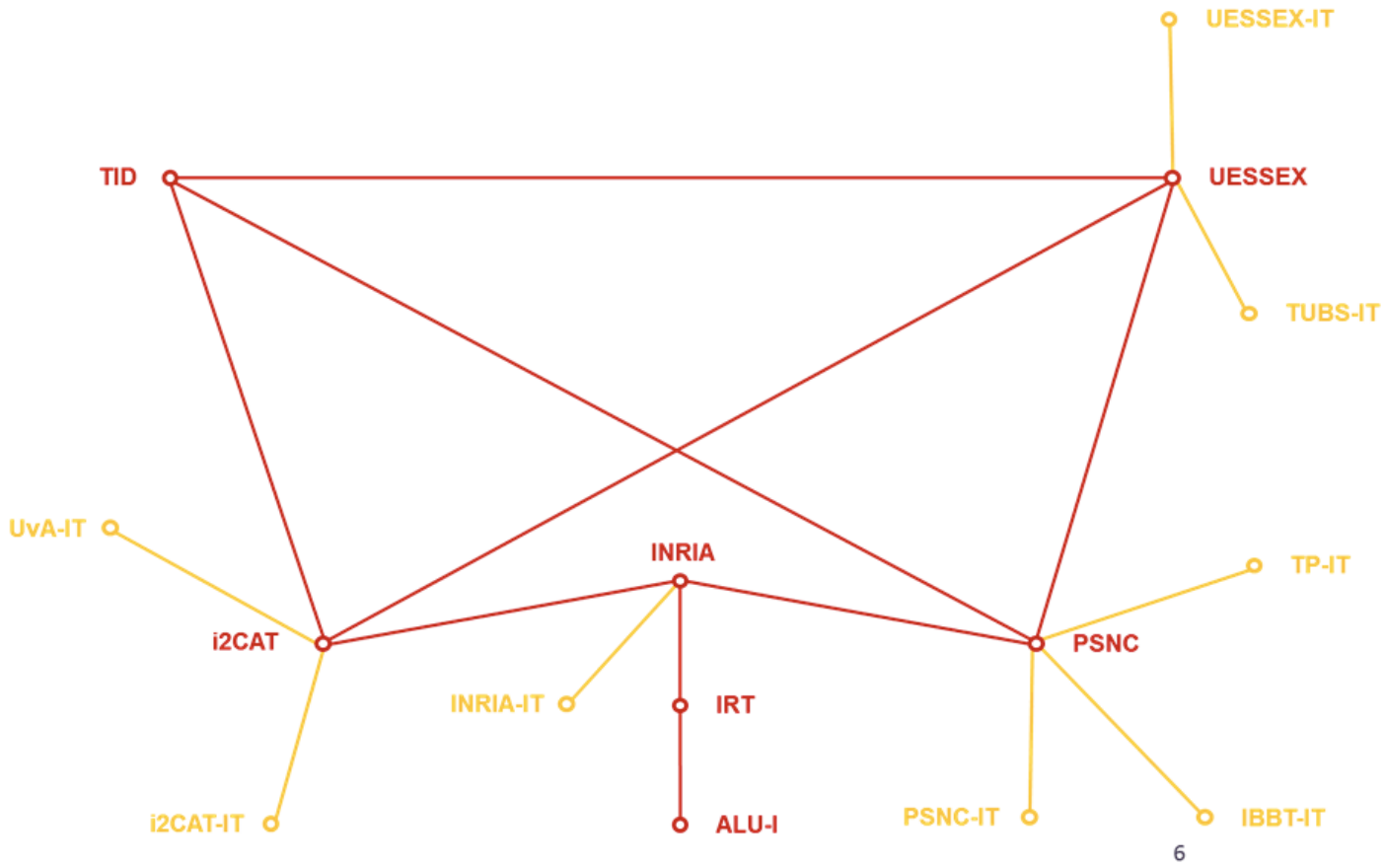
Virtual Infrastructure

Virtual Infrastructure

Physical Infrastructure (Optical+IT)

Testbed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Many Thanks

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www.geysers.eu

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