Modeling Cloud Computing and Cloud Networking with VXDL

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VXDLforum

SAIL

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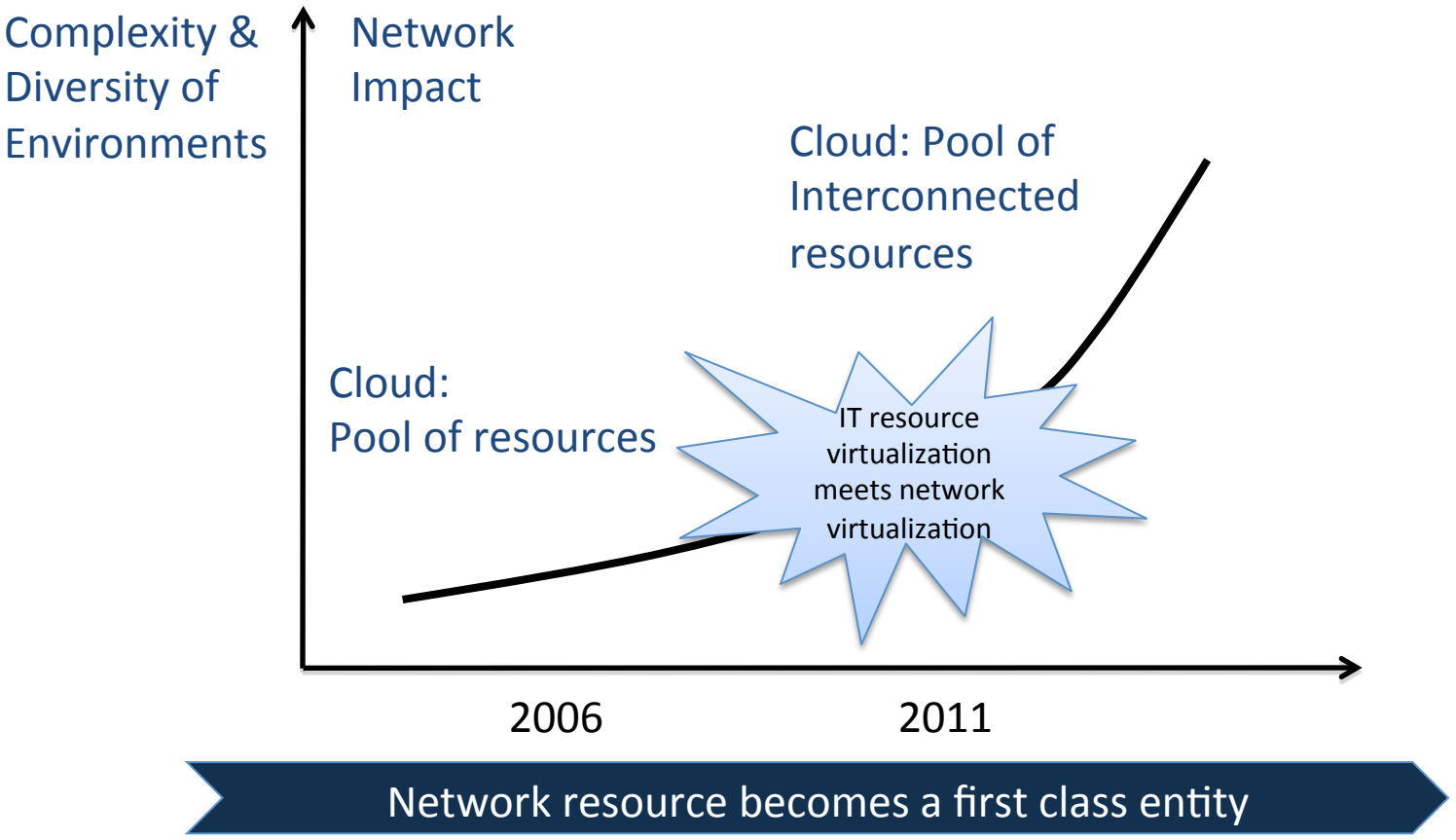
GEYSERS

Agenda

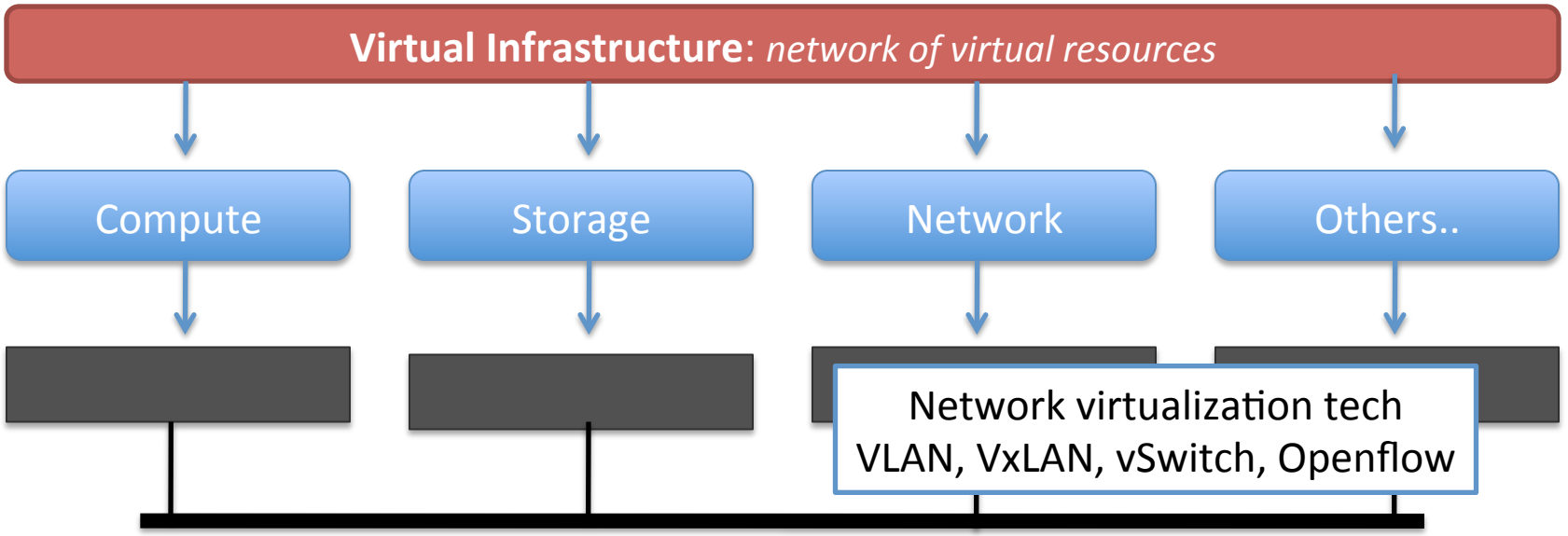
- Cloud Computing and Cloud Networking
  - Virtual Infrastructures: a single point of view
  - SAIL and GEYSERS projects
- Modeling VIs with VXDL
- VXDL in action

Clouds & Network



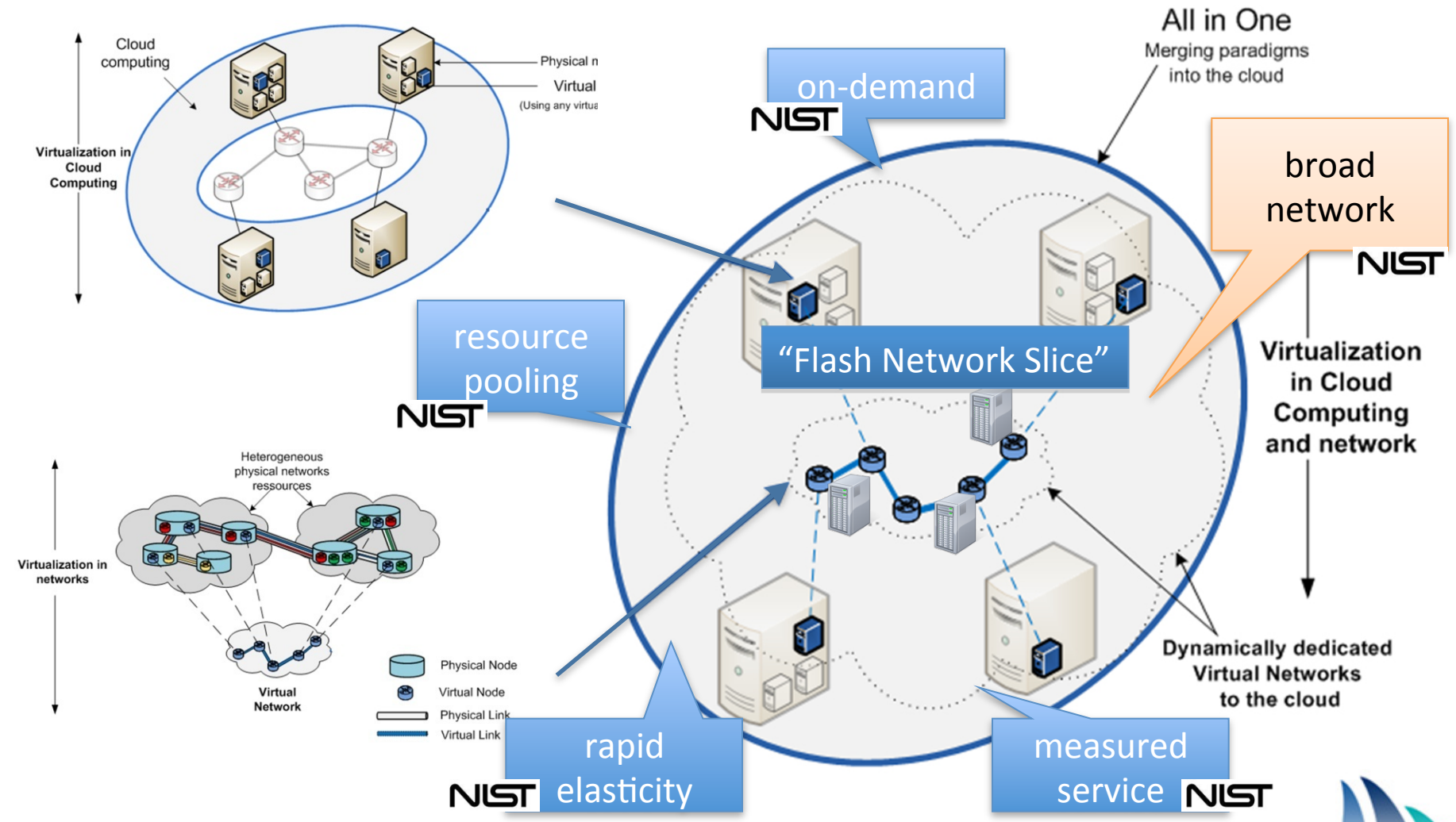
[VXDLforum, 2011]

Virtual Infrastructures



- Attributes
  - IT capacity (RAM, CPU, storage)
  - Communication capacity (bandwidth, latency)
  - Network topology
  - Temporal attributes
  - Geolocation of the entire VI or specific resources
  - …

SAIL project: Cloud Networking Concept



[Dominique Dudkowski - NEC, 2011]

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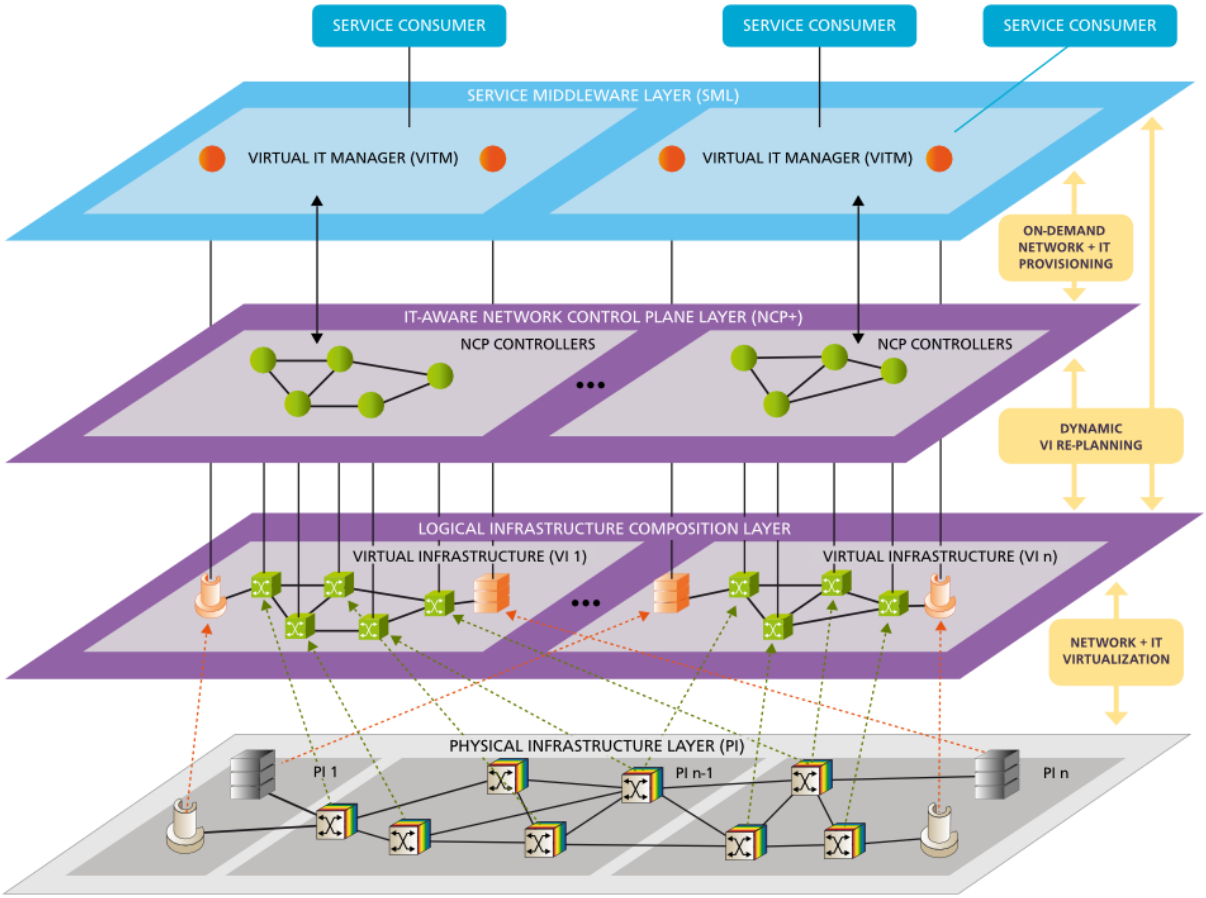
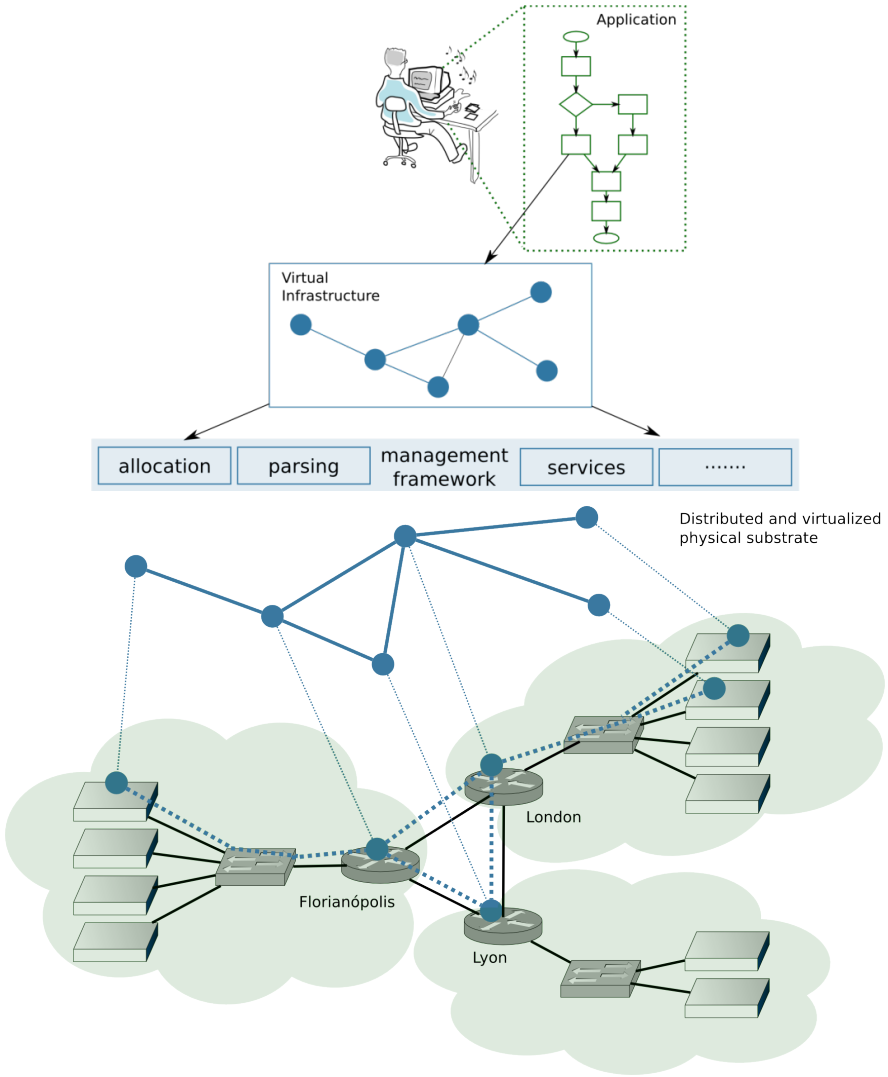
GEYSERS project

- Generalized Architecture for Dynamic Infrastructure Services
- A novel architecture capable of
  - Seamless and coordinated provisioning of optical & IT resources
  - End-to-end service delivery
- A novel mechanism to partition infrastructure resources and compose logical infrastructures



Virtual Infrastructures: players involved

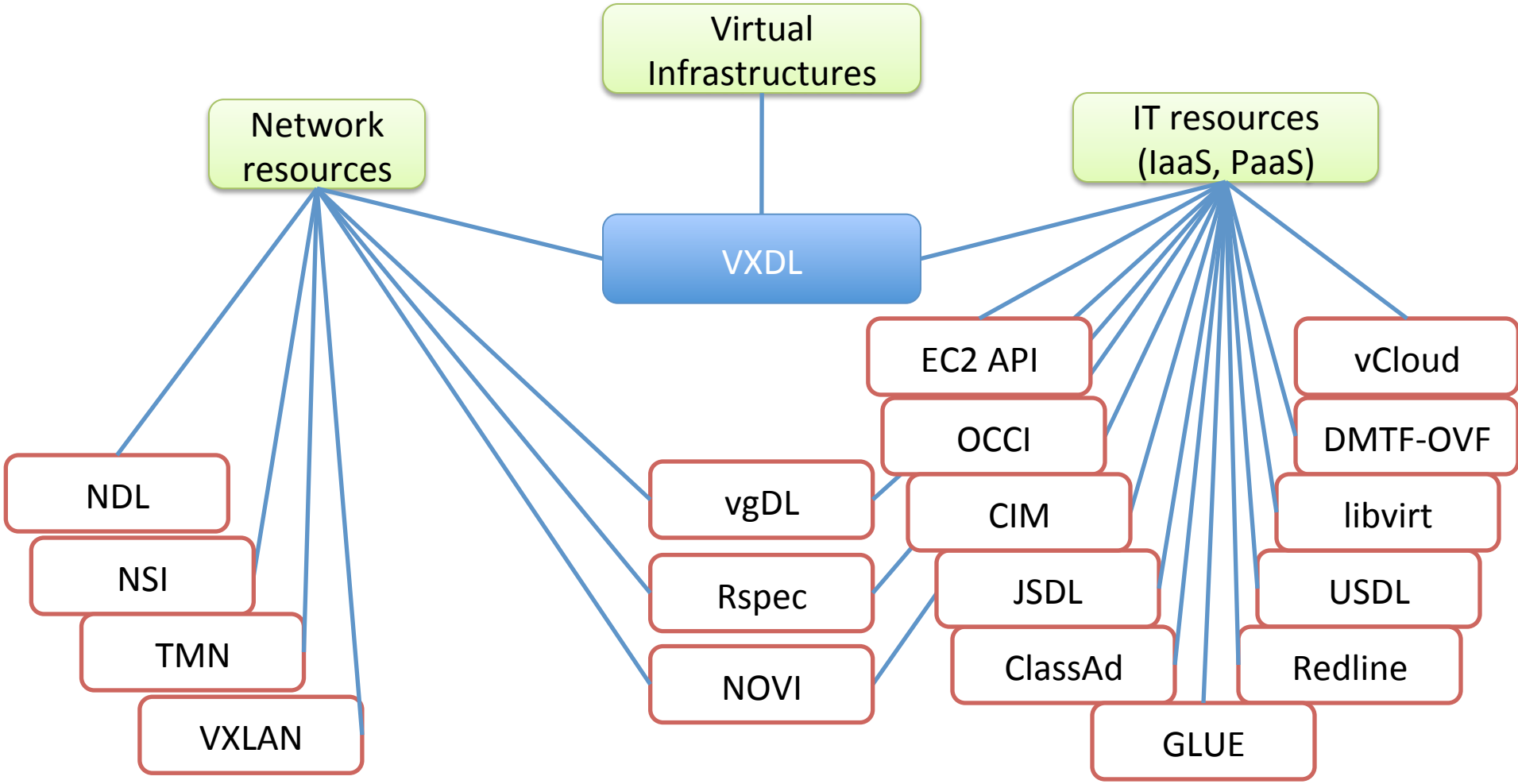


- Users
  - No knowledge about physical substrate composition
  - Difficult for composing and representing VIs
  - Many providers
- Providers
  - No consensus (standard) in resources exposition

We need a language for modeling VIs

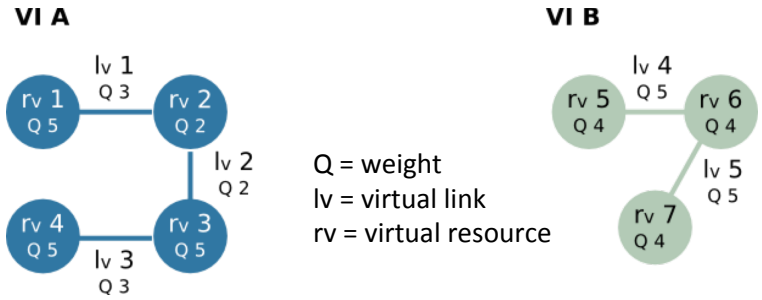
- ✓ Formal, abstract and high-level specification
- ✓ Maximize compatibility
- ✓ Simplify the design process
- ✓ **Design once, provision and run it on any platform**

Related work: models and APIs



VXDL: Virtual Infrastructure Description Language

- High-level language for describing dynamic VIs
- Same simple grammar to describe IT and network resources
- Describes a weighted graph
- Syntax XML



[Koslovski, Vicat-Blanc, Charão, Int. Conf. on Networks for Grid Applications - GridNets 2008]

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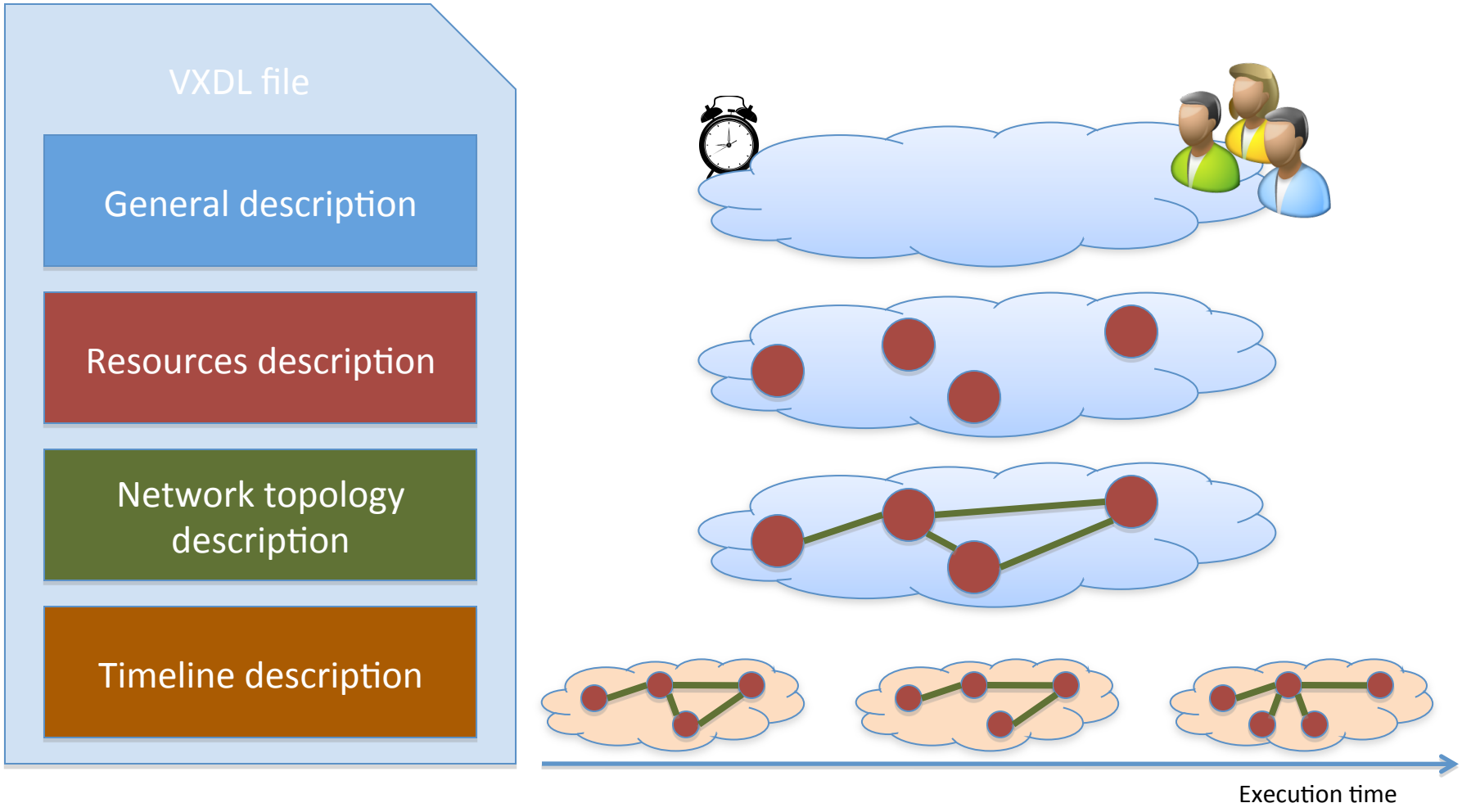
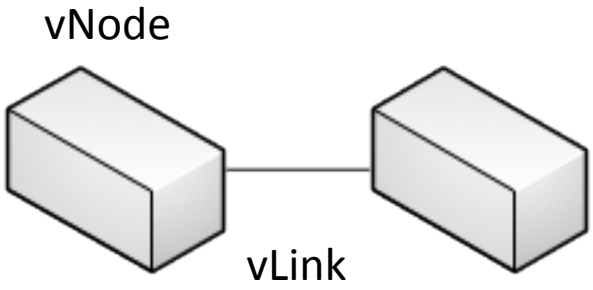
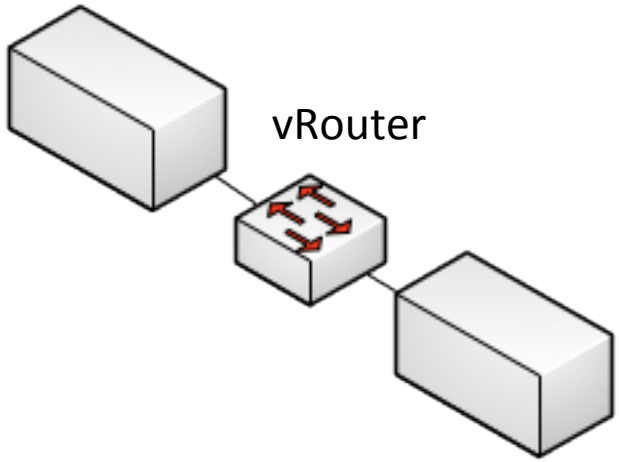
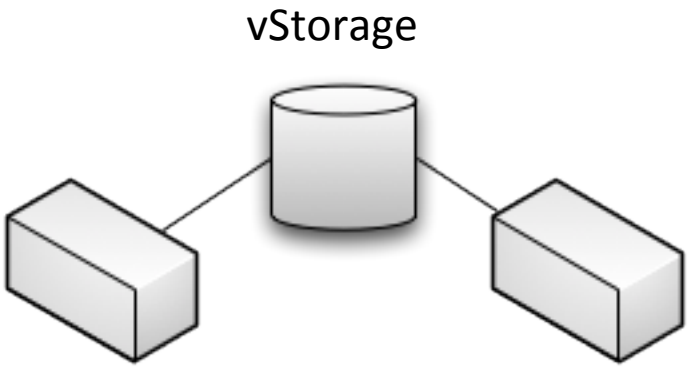
VXDL: a language for describing VIs

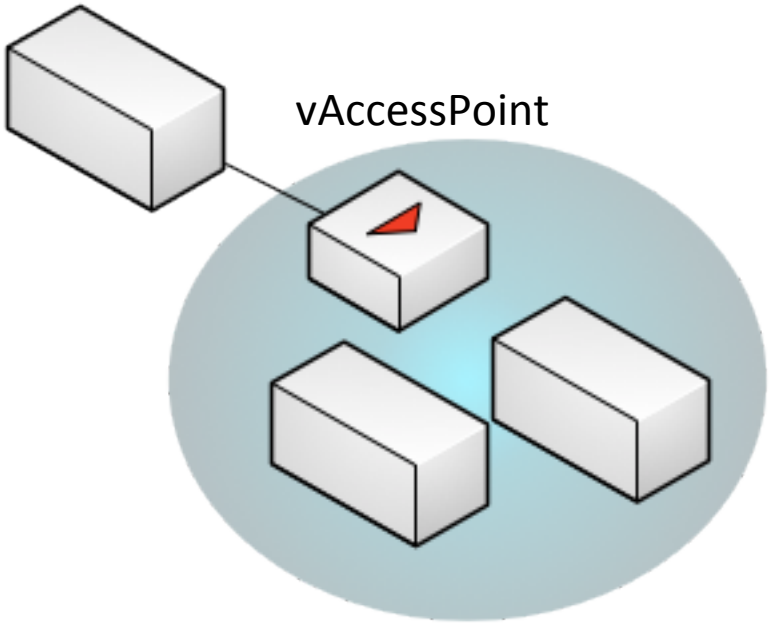


VXDL – basic components

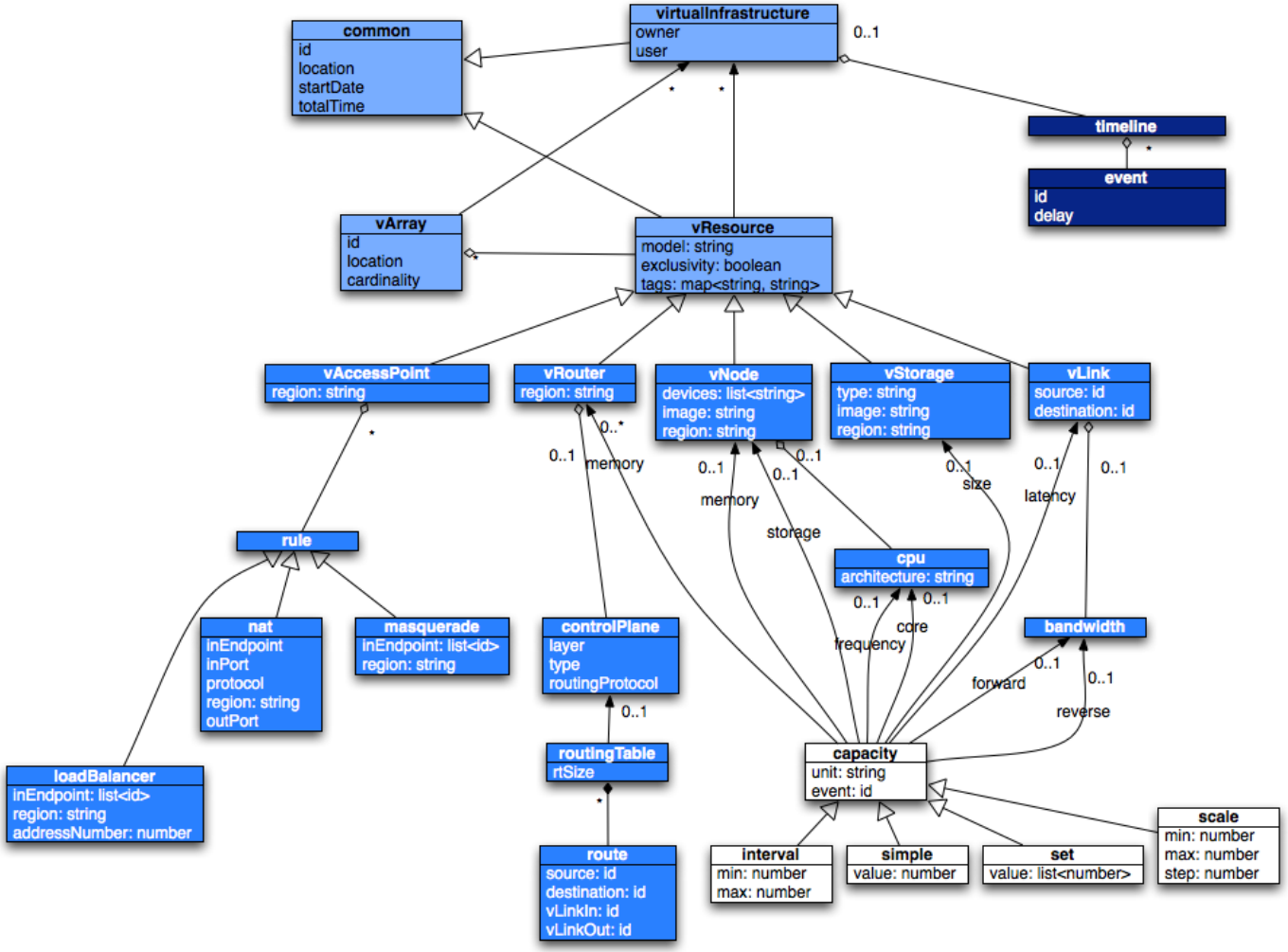






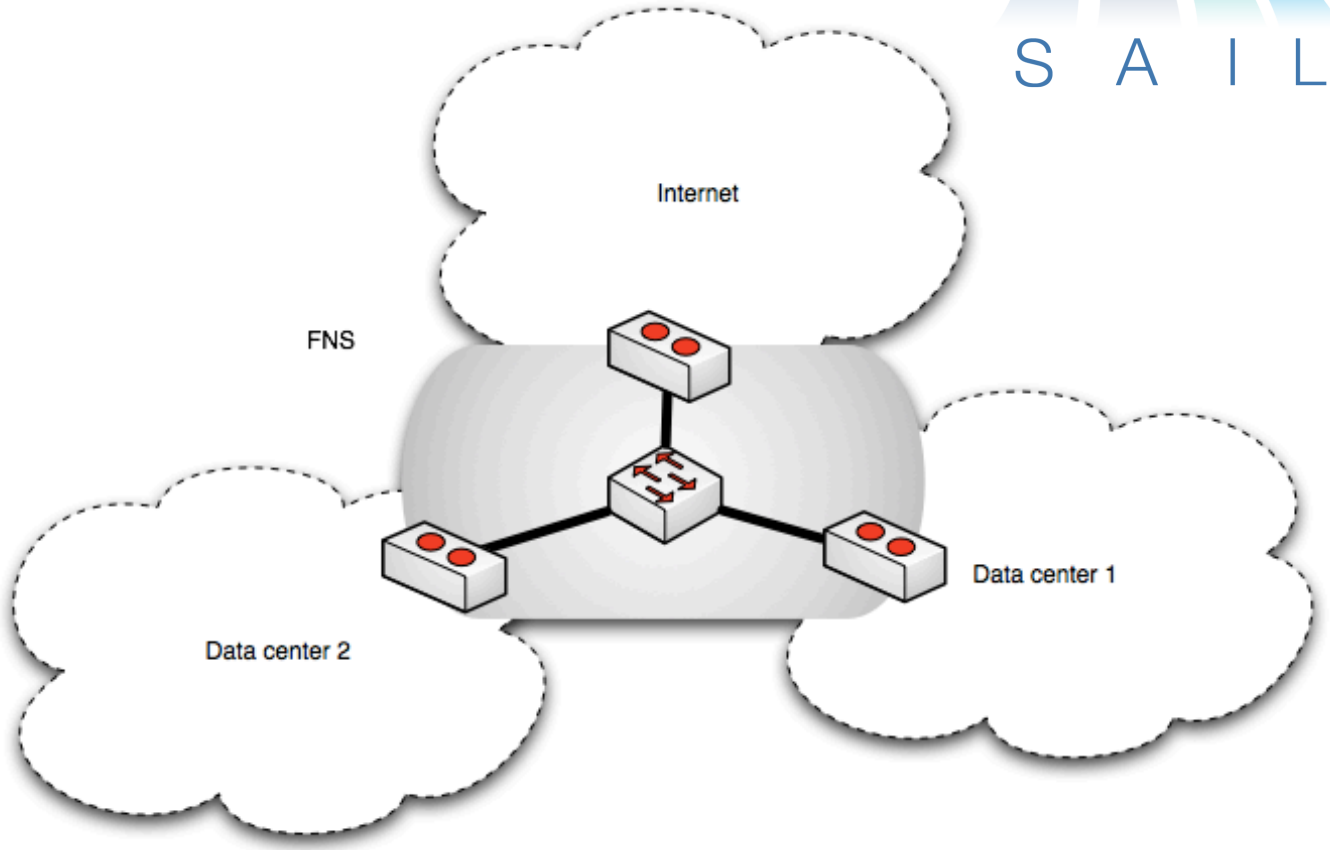


VXDL – UML diagram (version 2.0)



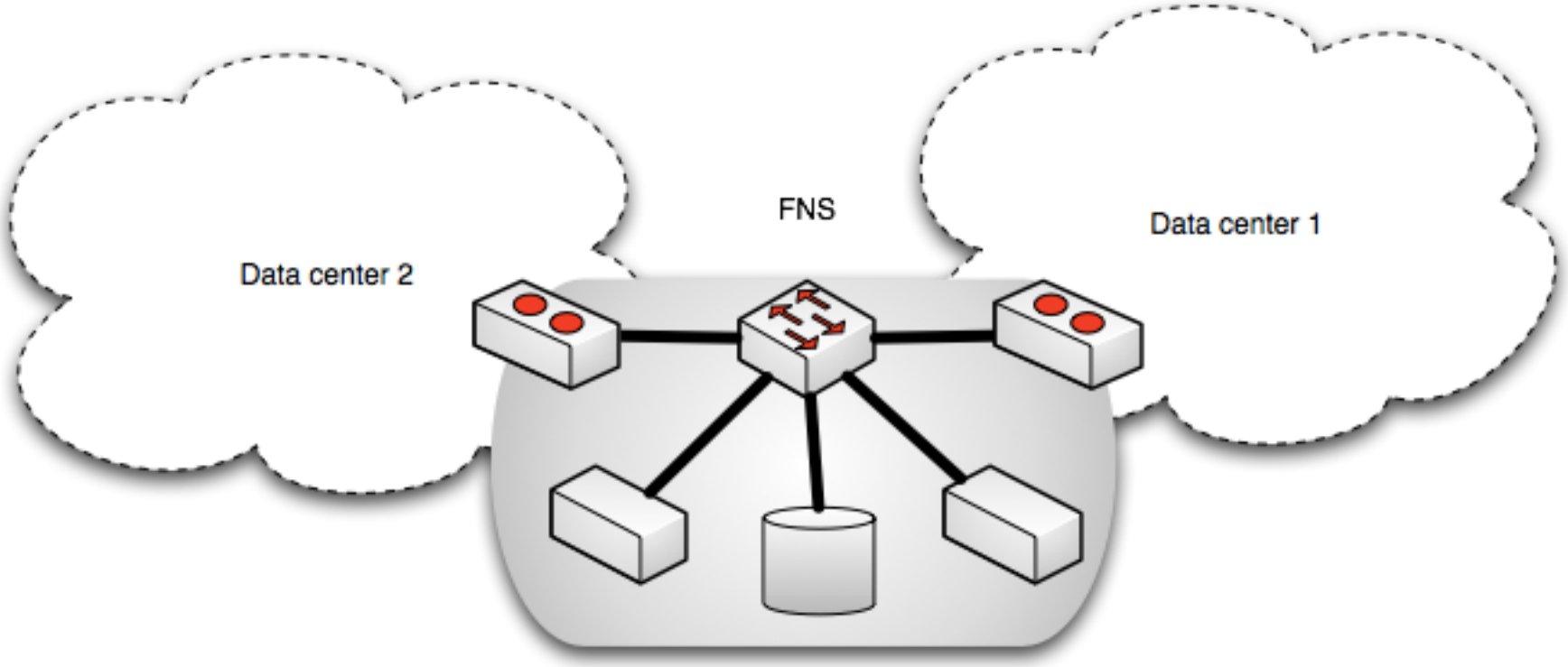
VXDL model of Flash Network Slice application (SAIL)

- 2 Data centers
- 1 Internet access
- VXDL ™ model



VXDL model of Flash Network slide with computing capacities

- 2 Data Centers + 1 vStorage + 2 vNodes
- In Network Data store and processing



VXDLforum

An open forum for discussions and improvements of VXDL

Mission: produce, update and disseminate specifications and open source software for portable and interoperable Virtual Infrastructures

www.vxdlforum.org

contact@vxdlforum.org

Join the discussion!

Conclusion

- VXDL is a unifying language
- VXDL enables the interaction between users and providers: high-level specification

- Starting with VXDL we can build a large consensus on
  - The need for modeling networks of virtual resources
  - A modeling language for virtual networks and virtual infrastructures

Thank you

Questions?

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