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# Interconnecting Cloud Computing Clusters using Bandwidth on Demand Networks

Daniel Romão, Ralph Koning

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UNIVERSITEIT VAN AMSTERDAM



System and Network  
Engineering

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# Why?

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- A flexible cloud computing system benefits from a flexible network
  - Integration with existing BoD systems
    - Easy provisioning of multi-domain links
  - Better bandwidth management
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# GENI Project

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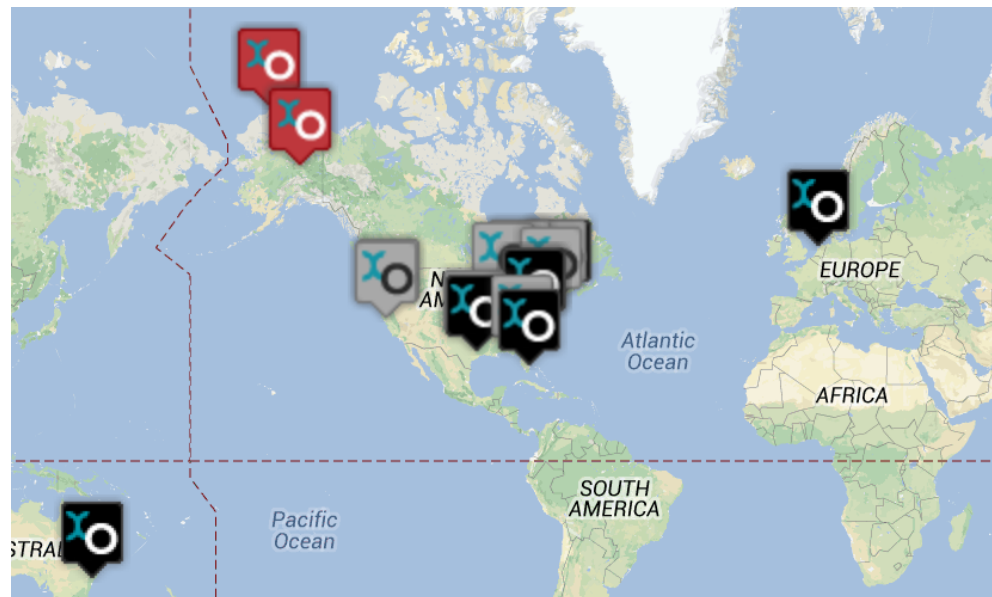
- GENI: Global Environment for Network Innovations
  - US Research project on Future Internet
  - Different interconnected network testbeds, e.g. PlanetLab, ExoGENI, InstaGENI, ...
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# ExoGENI

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- A multi-domain infrastructure as a service testbed
- Federated testbed, distributed across the globe





# ExoGENI

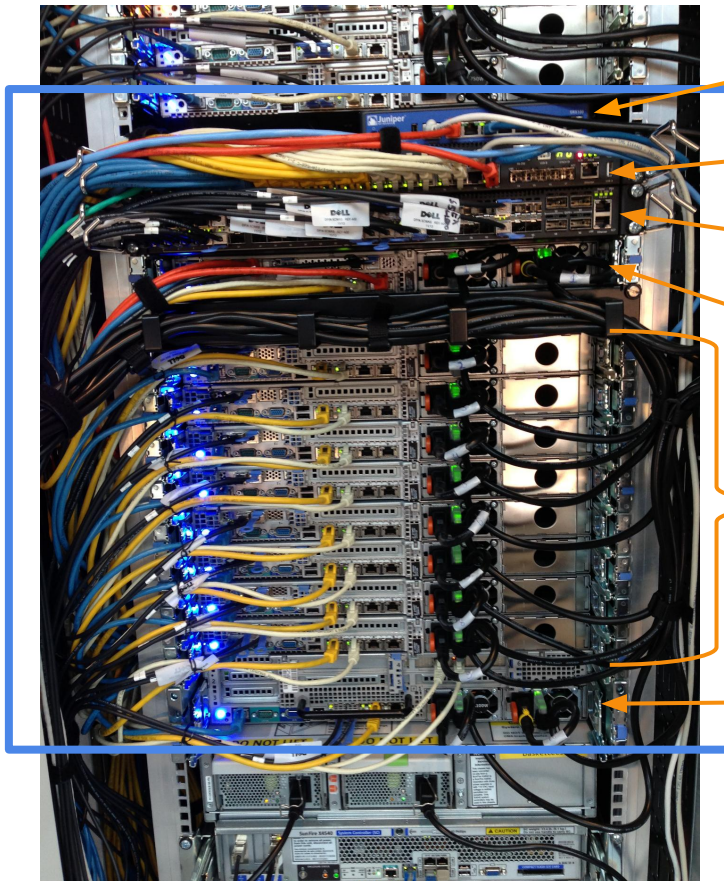
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- ExoGENI
    - Is a network of standard OpenStack cloud sites deployed at campuses
    - Layered orchestration software (ORCA) manages multi-cloud slices and integrates with GENI
    - Circuit backplane for L2 network connectivity
    - Configurable/flexible L3 connectivity
    - GENI experimenter testbed as well as a platform for computational science
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# The ExoGENI Rack

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VPN Gateway - Juniper SRX100

Management Switch - Dell Force10 S55

OpenFlow Switch - Dell Force10 S4810P

Head Node - Dell R620

Compute Nodes - 8 x Dell R620

Storage Node - Dell R720



# Network Service Interface

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- NSI is designed to allow Grid, Cloud and other applications to manage network connectivity
  - NSI also supports provider-to-provider circuit request
  - NSI can also allows existing BoD systems to interoperate
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# Network Service Interface

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- Oriented to creating and managing L1/L2 connection-oriented circuits
    - Bandwidth guarantees
  - Supports scheduling and multi-operator environments
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**Thank you  
and demo time!**



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