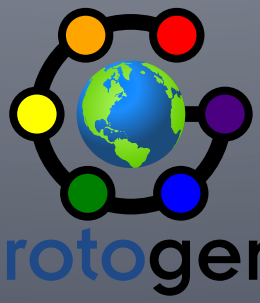
Robert Ricci
ricci@cs.utah.edu

# InstaGENI Overview



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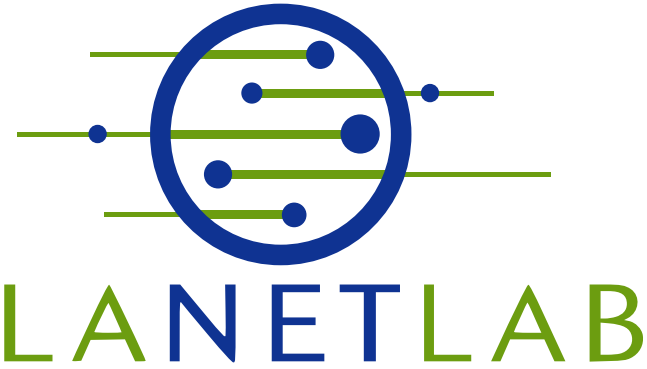
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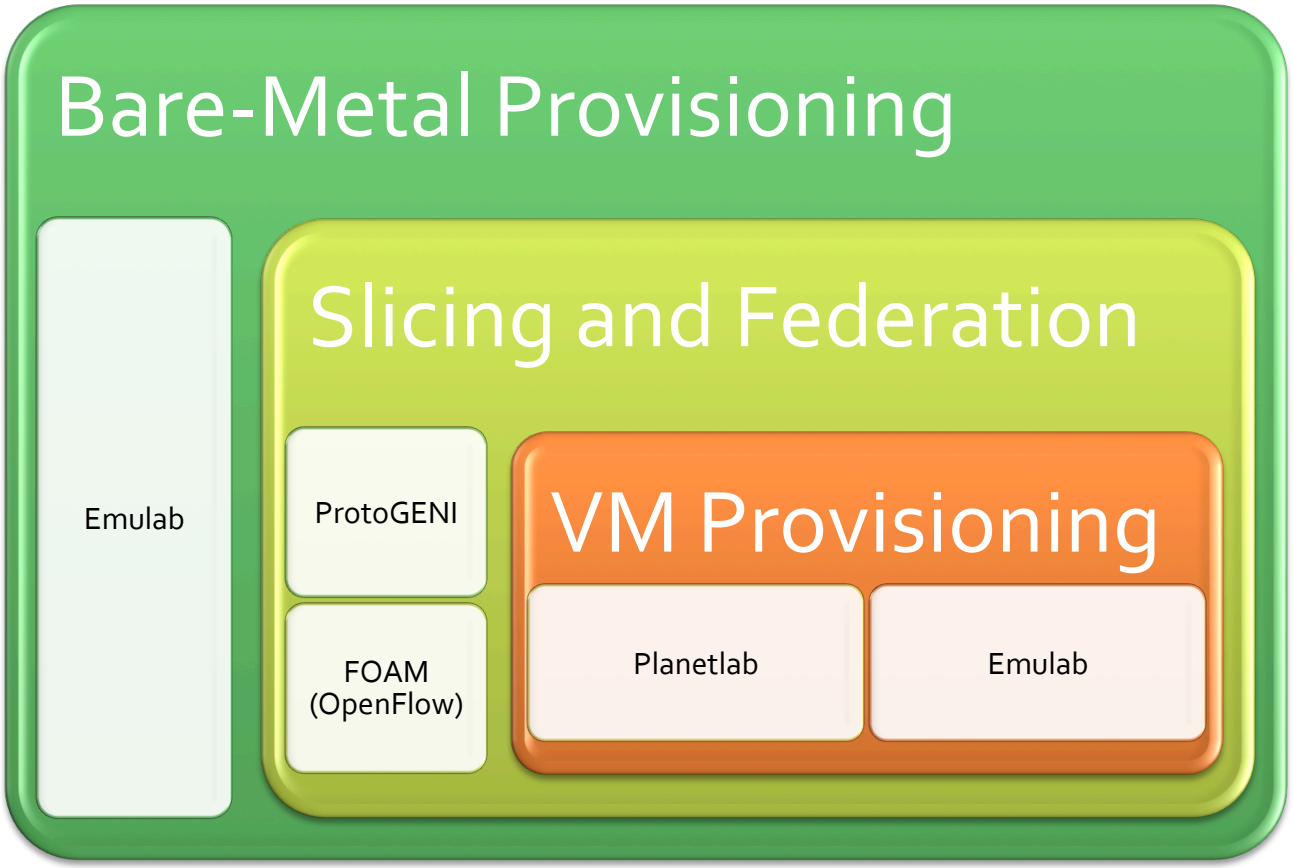
# The InstaGENI rack

- Designed for easy deployability
  - Power: 220V L6-20 receptacle (or two 110V)
  - Network: 10/100/1000 Base-T, 10G option
- Designed for re-purposing the hardware
  - Balanced nodes
- Designed for remote management
  - HP iLO on each node
- Designed for flexible networking
  - 4 1G NICs/node, 20 1G NICs, v2 linecards OpenFlow switch
  - Modular switch with spare slots

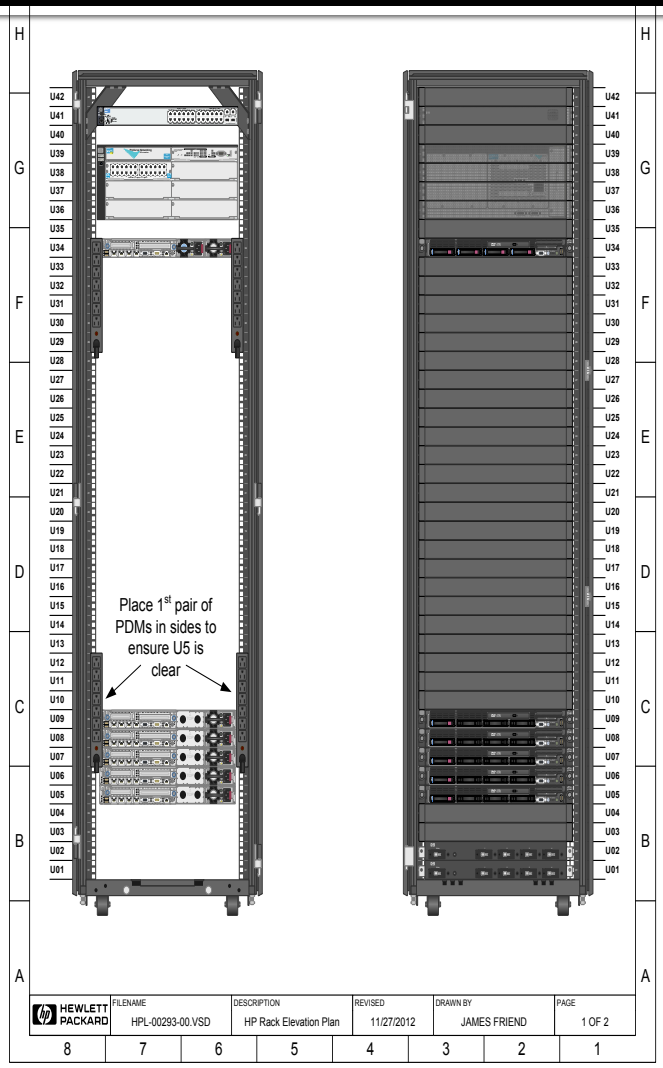
# Nested Software



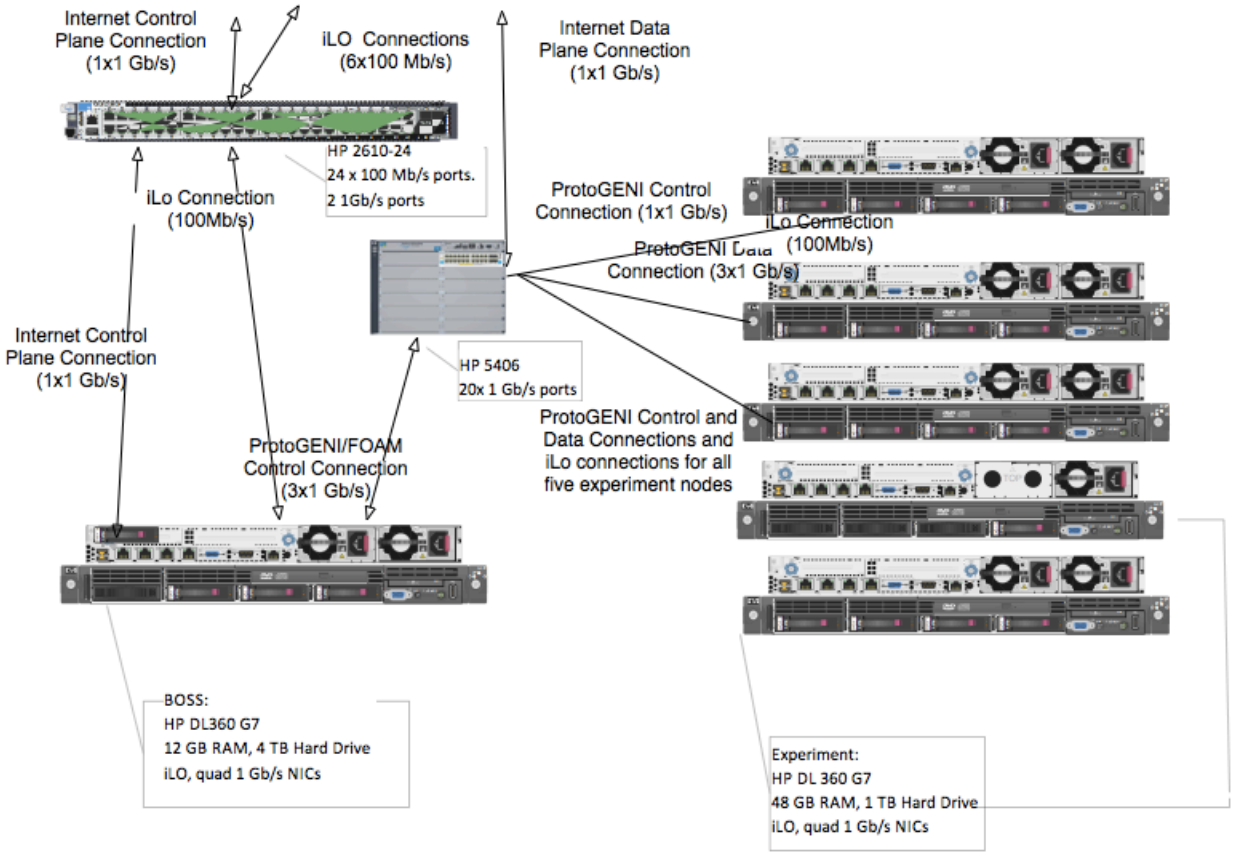
# InstaGENI rack hardware

- Control Node for ProtoGENI Boss, ProtoGENI users, FOAM Controller, Image storage…
  - HP ProLiant DL 360G7, quad-core, single-socket, dual NIC (1 Gb/sec), 12GB RAM, 4TB Disk (RAID), iLO
- Five Experiment Nodes
  - HP ProLiant DL 360G7, six-core, dual-socket, quad NIC (1 Gb/sec), 48GB RAM, 1TB Disk, iLO
- OpenFlow Switch
  - HP E 5406, 20 1 Gb/s, v2 linecards
  - Hybrid mode
- Separate control switch

# InstaGeni Rack Diagram

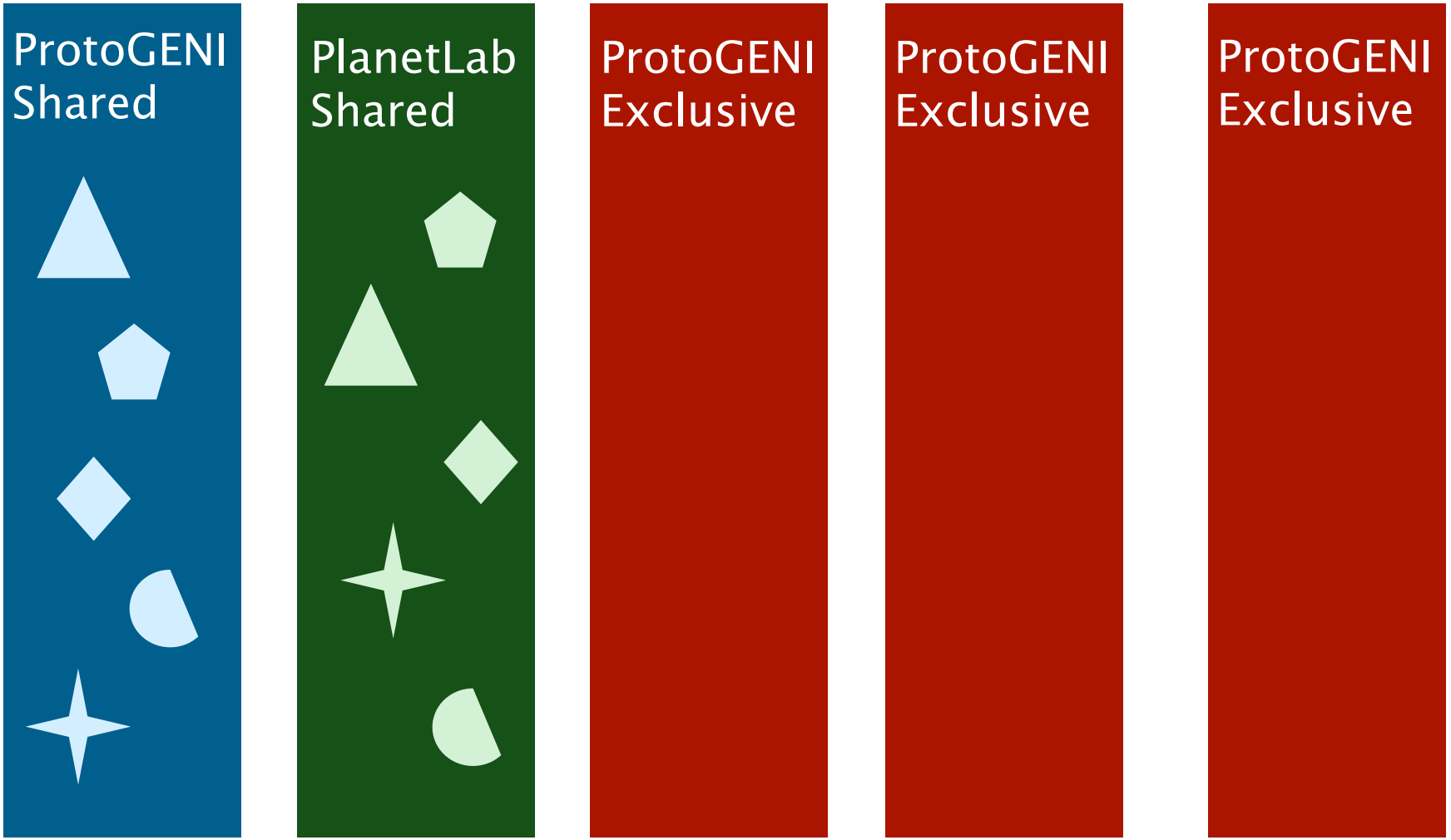


# Rack Topology



# Photos

# (rE)Provisioning Nodes



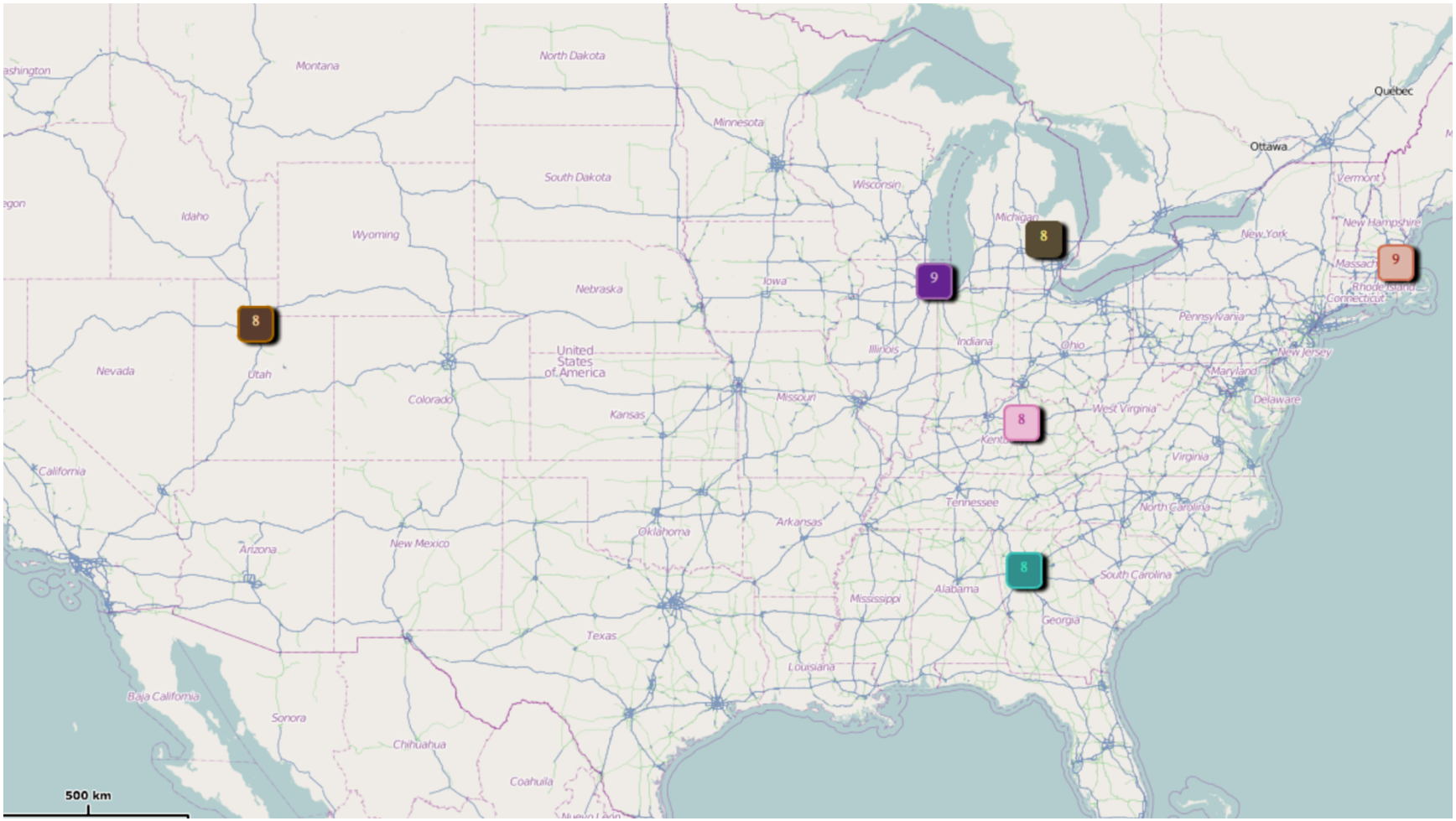
# Networking off the rack: Software support

- Two types of paths: IP and native layer 2
- For IP:
  - Control node needs public IP
  - Public IP for workers treated as reservable resources
- For layer 2:
  - Supports automatic provisioning and "stitching"
  - Can produce or consume VLAN labels
  - Can also support statically configured shared VLANs
  - OpenFlow FOAM/Flowvisor discovery and policies
- Supports history lookup, emergency shutdown

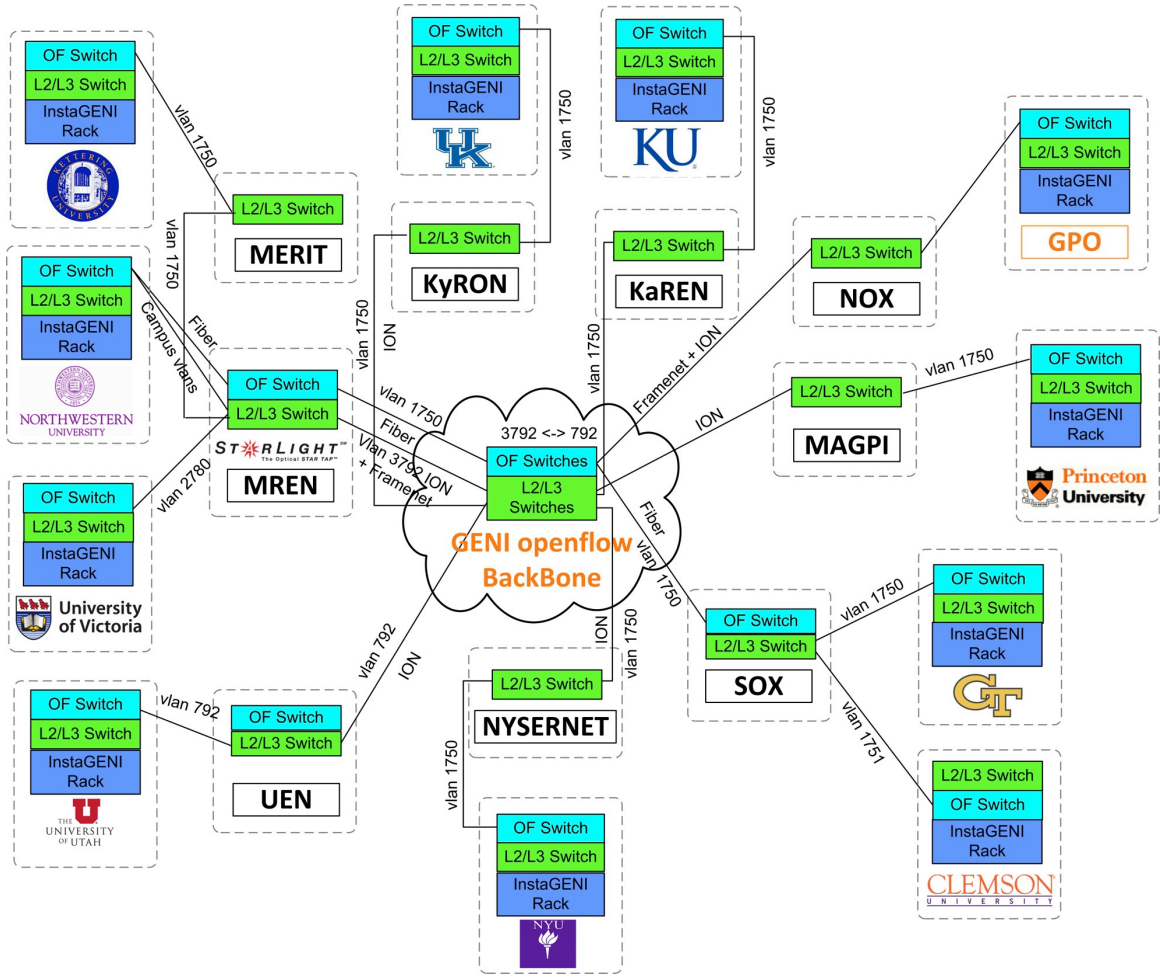
# Contact Information

- Overall project lead
  - Rick McGeer rick.mcgeer@hp.com
- To buy: your HP SLED representative
  - SLED lead: Bill Burns bill.burns@hp.com
- To arrange connectivity
  - Joe Mambretti: j-mambretti@northwestern.edu
- To find out about the software
  - Robert Ricci ricci@cs.utah.edu

# Current Sites



# InstaGENI Network

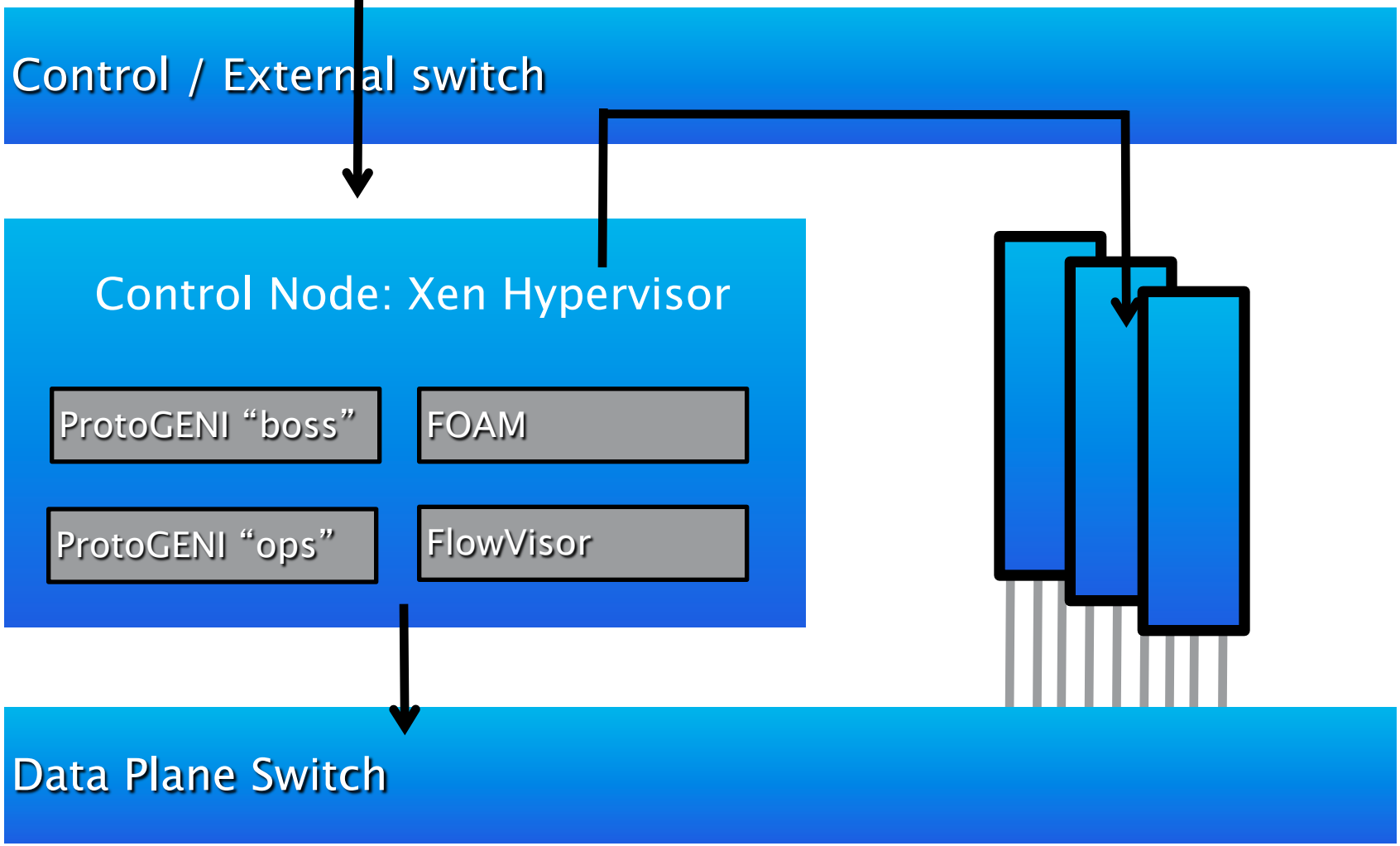


# Extra slides

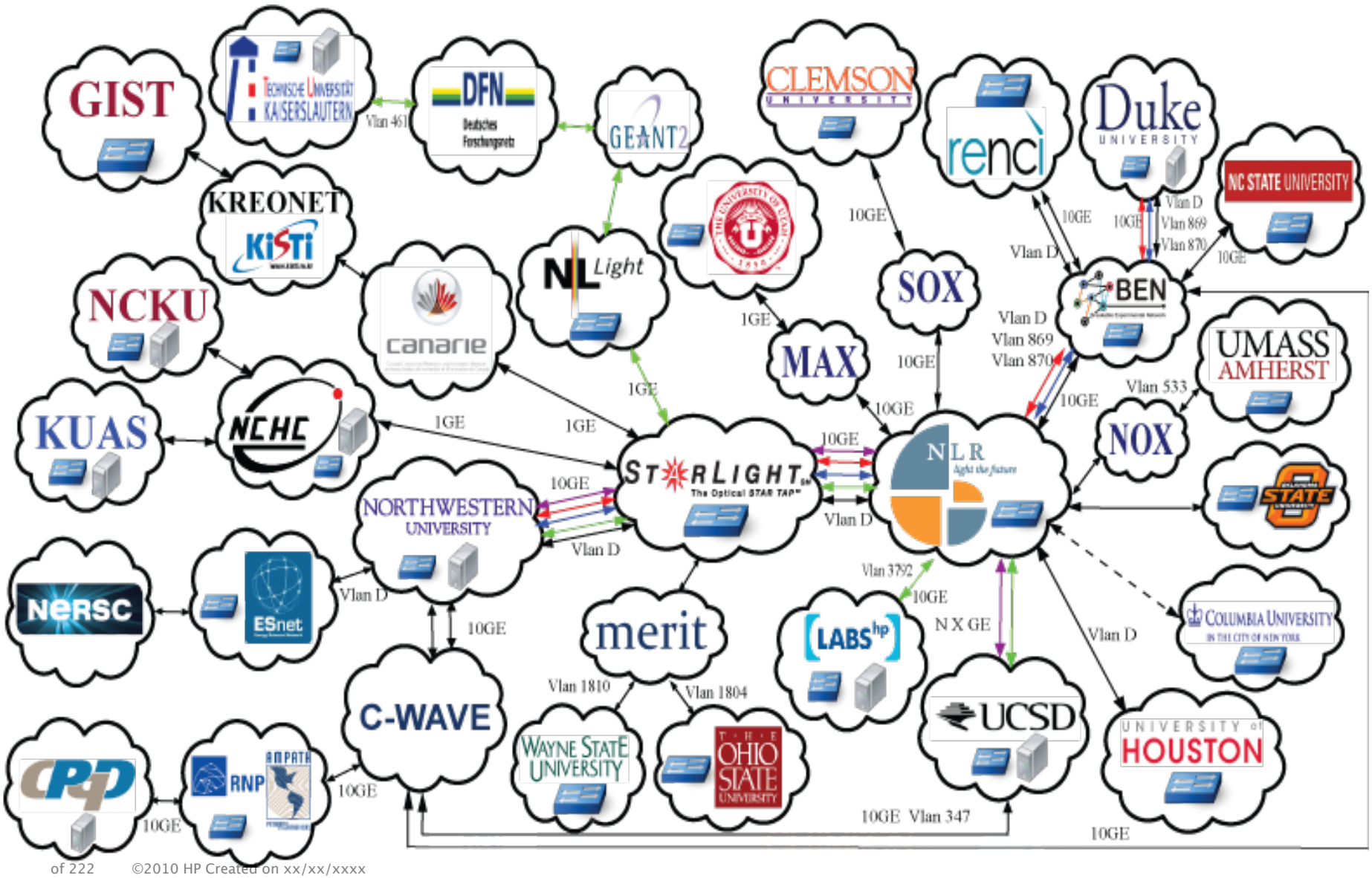
# Networking off the rack: Physical connectivity

- Connections to ION, regionals, campus resources, etc.
- You tell the rack:
  - What ports you plugged into
  - Where they go
  - What VLAN tags are legal on them
  - OpenFlow: Flowvisor / FOAM

# Control Infrastructure



# Selected Other Interconnections



# Future Rack Options (under development)

- "Good": GENI-funded rack configuration
  - 1 control node, 5 workers (60 cores)
- "Better": A full rack
  - 1 control node, 20 workers (240 cores)
- "Best": A multi-rack system
  - Specifications under development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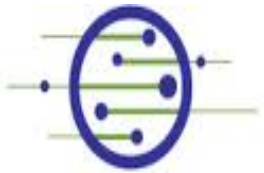
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# Basic Philosophy

- Don't build a cloud, or a cluster, testbed, build the *platform* on which those things can be built
- This happens to meet the needs of both CS researchers and computational users
- Don't think of InstaGENI as a cloud: think of it as a *meta-cloud*

# Computer Systems Research, 1980-2010

- 1980-~1995: The desktop was the experimental system
  - Ex: Original URL of Yahoo! was akebono.cs.stanford.edu/yahoo.html
  - Sometimes "servers" used to offload desktops
- ~1995-~2005: Used servers primarily because desktop OS unsuitable for serious work
- ~2005-: Need clusters (and more) for most any experiments

# Software Architecture