



University of Victoria



# InstaGENI GENIRacks

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- Small Racks Deployed at a Large Number of Campuses
- Ensure That GENI Control Framework Work Out-of-the-Box
  - ProtoGENI- or PlanetLab-based
  - OpenFlow integrated
  - OpenFlow native on the switches
- Racks Will Be Over Provisioned for Networking
  - E.g., Much More Switch than Host Bandwidth
  - Robust Connection Paths
  - Significant Interconnections With Other GENI Sites
- Designed for Expandability and Leverage
  - Design Provides Lots of Space So Host Institutions Can Add Interesting Equipment

- 80 Gb/s Aggregate Bandwidth
- All OpenFlow Enabled (A Key Resource)
- 24+ Cores
- 100 GB RAM
- 12TB disk
- Remote-Control
- Economical

- 3 ProLiant DL360G6, Quad-Core, Dual-Socket, Dual NIC (1/Gb/s), iLO
  - (8 Cores/Node = 24/Rack)
  - 6 Gb/s Host Bandwidth
- HP ProCurve 6600 switch
  - OpenFlow-enabled, 1U, 40 1 Gb/s ports, 4 10 Gb/s Ports
- KVM, PDU
- Total Rack Space ~7U, Allows 35U For Expansion

- Preconfigured Boot Stick Containing:
  - GENI Aggregate Manager Integrated with OpenFlow
  - ROM for OpenFlow on HP E-Series 6600
  - Experimental, Beta Software
    - Currently In Use In a Number of the GENI Campus Deployments
  - Expectation of On-Going Software Developments, Replacements, Upgrades, Expansion
  - Update process TBA (likely based on PlanetLab process)





- Policy Framework, e.g., You Agree:
  - To Federate Your Rack with One of the GENI Control Frameworks and Aggregate Managers
    - PlanetLab
    - ProtoGENI
    - GENICloud
  - To Run OpenFlow On the Switches
  - To Software License Agreements
    - GENI Public License for ProtoGENI, Nox, PlanetLab
    - HP Software License Agreement for OpenFlow on the 6600

- Initial Rack Design Deliberately Provides Room for Expansion
  - Approximately 35U of Space/Rack
  - Encourage: Lots of Storage, More Compute, More Interconnections, More Innovation With Specialized Devices, Instruments, etc.
- Currently Investigating Making Additional Equipment Available on Favorable Terms for Expansion Under Contract to GPO



- Eight racks in 2012
  - Q1: Utah, Princeton
  - Q2: GPO, Northwestern
  - Q3/Q4: Selected Tranche-1 Sites (negotiated between sites and the GPO)
- 15 in 2013
- Two in 2014

- You **must** agree to the GENIRack agreement
  - Open to all GENI experimenters
  - Adequate connectivity (ideally on NLR or Internet-2)
  - Support on-site maintenance requests from GPO
- You **must** run a GENI Control Framework
  - We will send a boot stick with Integrated OpenFlow and Aggregate Manager
- Your campus **must** agree to host a rack and not pull the plug except for security problems
  - Security protocol with GPO under discussion
  - Likely based on PlanetLab protocol

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- A Multi-Organizational Partnership
- An Opportunity for Innovation
- A Strategy for the Design and Implementation of Novel Experimental Infrastructure for Network Research
- An Opportunity for Additional Partnerships
- A Framework for Interactions Among Partners, e.g., Policy and License Agreements, On Going Communications, Coordination

- To Create A Highly Flexible Large Scale, Distributed Environment To Support Network Research
- To Begin With a Few Select Sites To Create a Prototype
- To Eventually Place Key Resources At As Many Sites As Possible
- To Ensure That Each Site Has A Full Range of Appropriate Rack Based Resources
- To Ensure That Each Site Has a Rich Set of Network Connectivity
- To Explore Novel Designs Optimized for Flexibility, Expandability, Leverage and Innovation Opportunities
- To Create Policies and Processes As a Foundation Ecosystem for Further Development