

GEC #6, November 16, 2009
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ProtoGENI Spirals 1 and 2



ProtoGENI is Three Things



- Control framework
 - Provide access to GENI resources
- Substrate
 - Providing PCs, switches, **backbone**
- Experiment workflow tools
 - Plan, design, deploy, run, collect, analyze

Control Framework

Main Control Framework

Roles



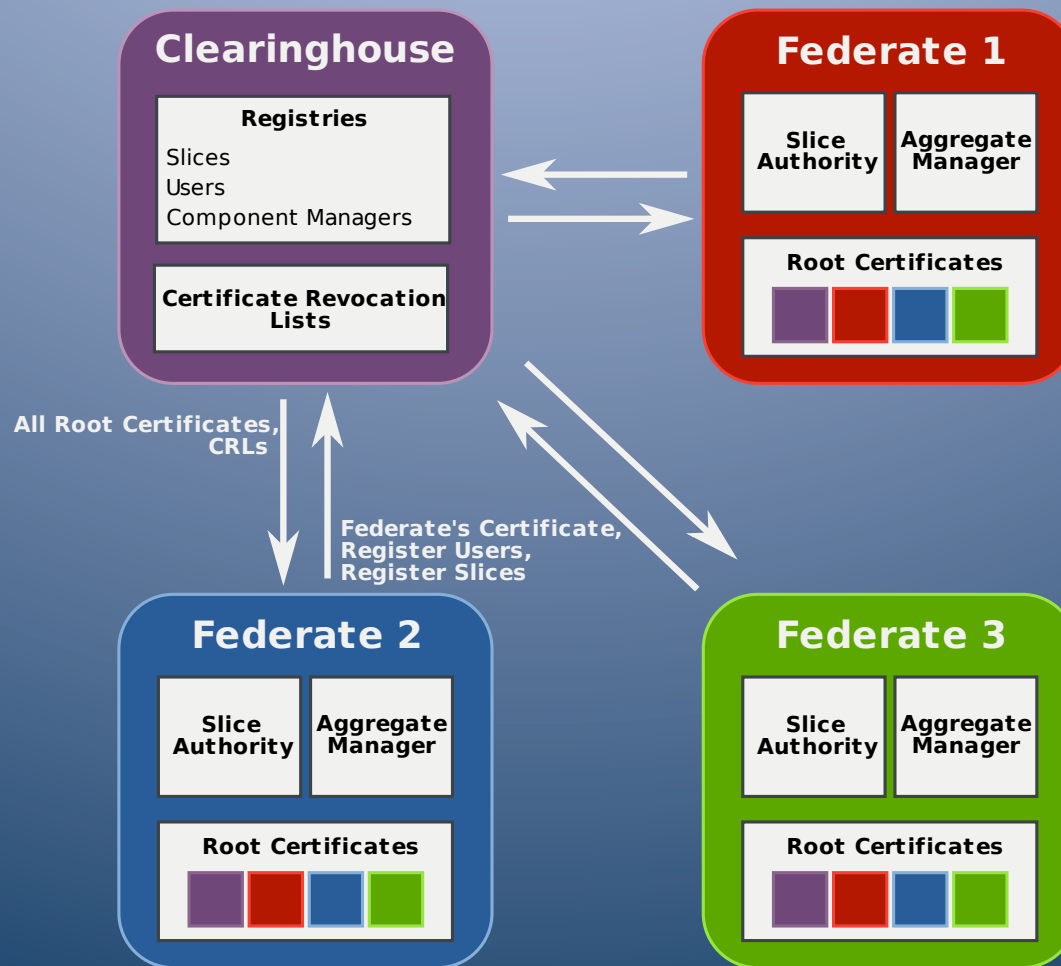
- Defining APIs and data structures
- Providing main implementation of these
 - Current implementation tied to Emulab
 - We will provide a reference CM implementation
- Running a clearinghouse
- Establishing federation

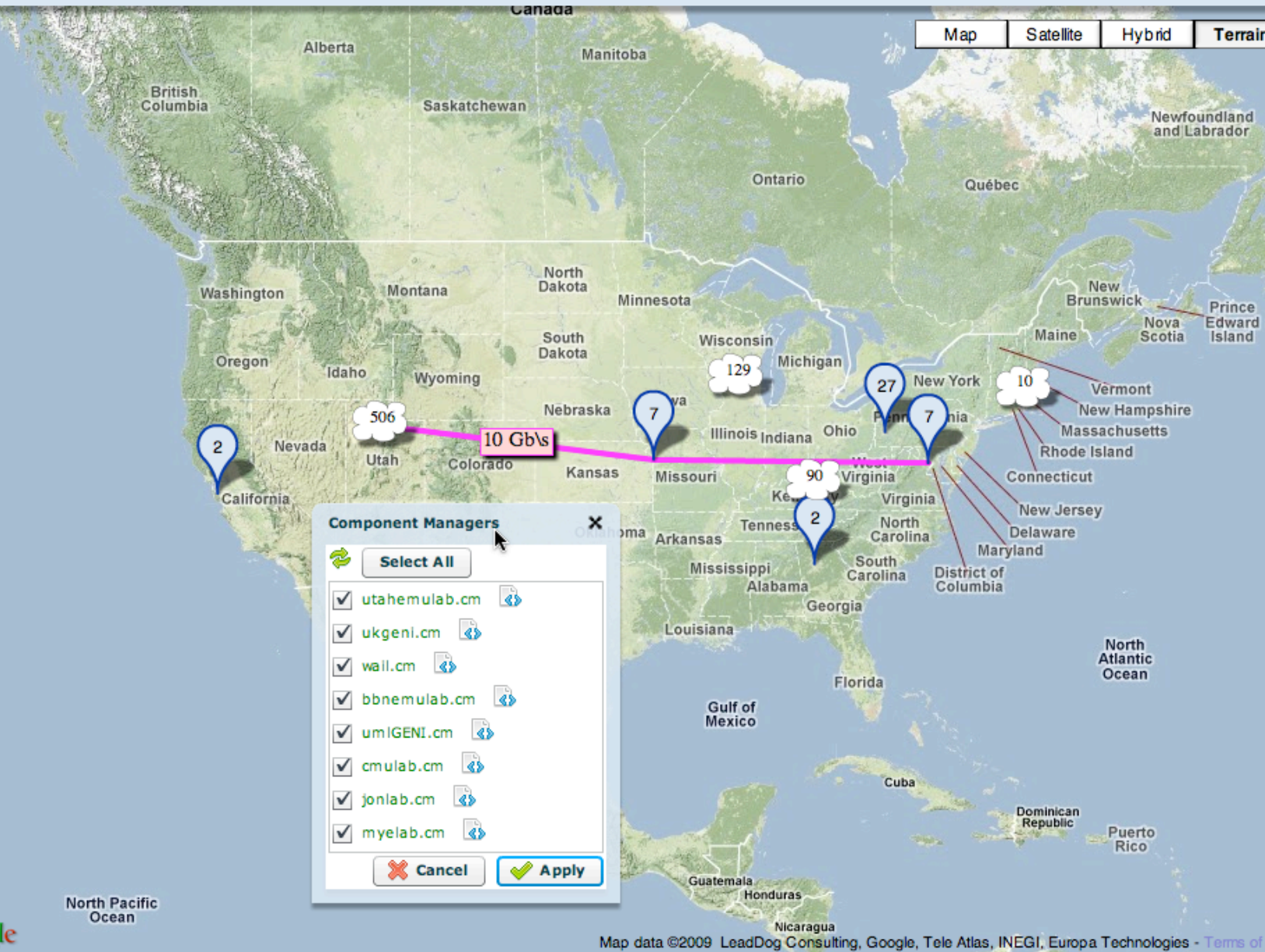
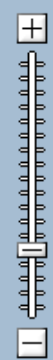
Key APIs and Structures



- (Aggregate) Component Manager
 - More about this tomorrow
- Clearinghouse
- Slice Authority
- RSpec
- Credentials
- Certificates
- All of these on www.protogeni.net

Federation Structure





Component Managers

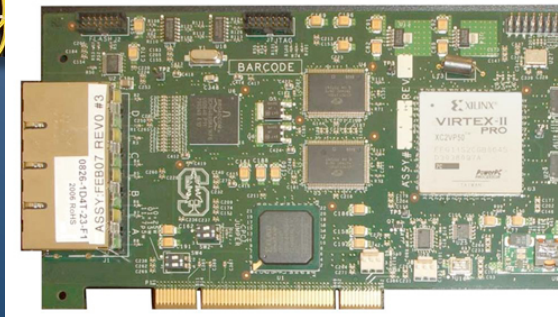
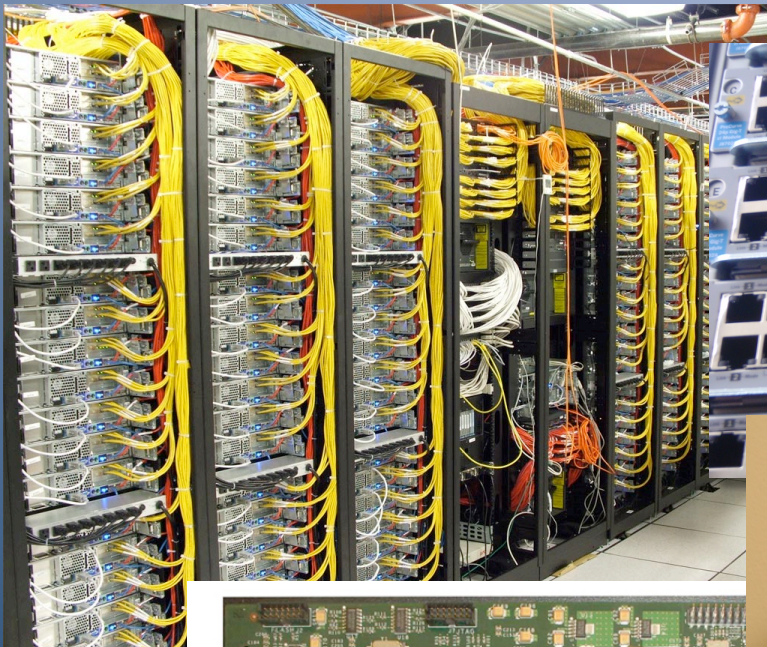
Select All

- utahemulab.cm
- ukgeni.cm
- wall.cm
- bbnemulab.cm
- umIGENI.cm
- cmulab.cm
- jonlab.cm
- myelab.cm

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Substrate

Emulab Controls a Range of Hardware



Sets Up

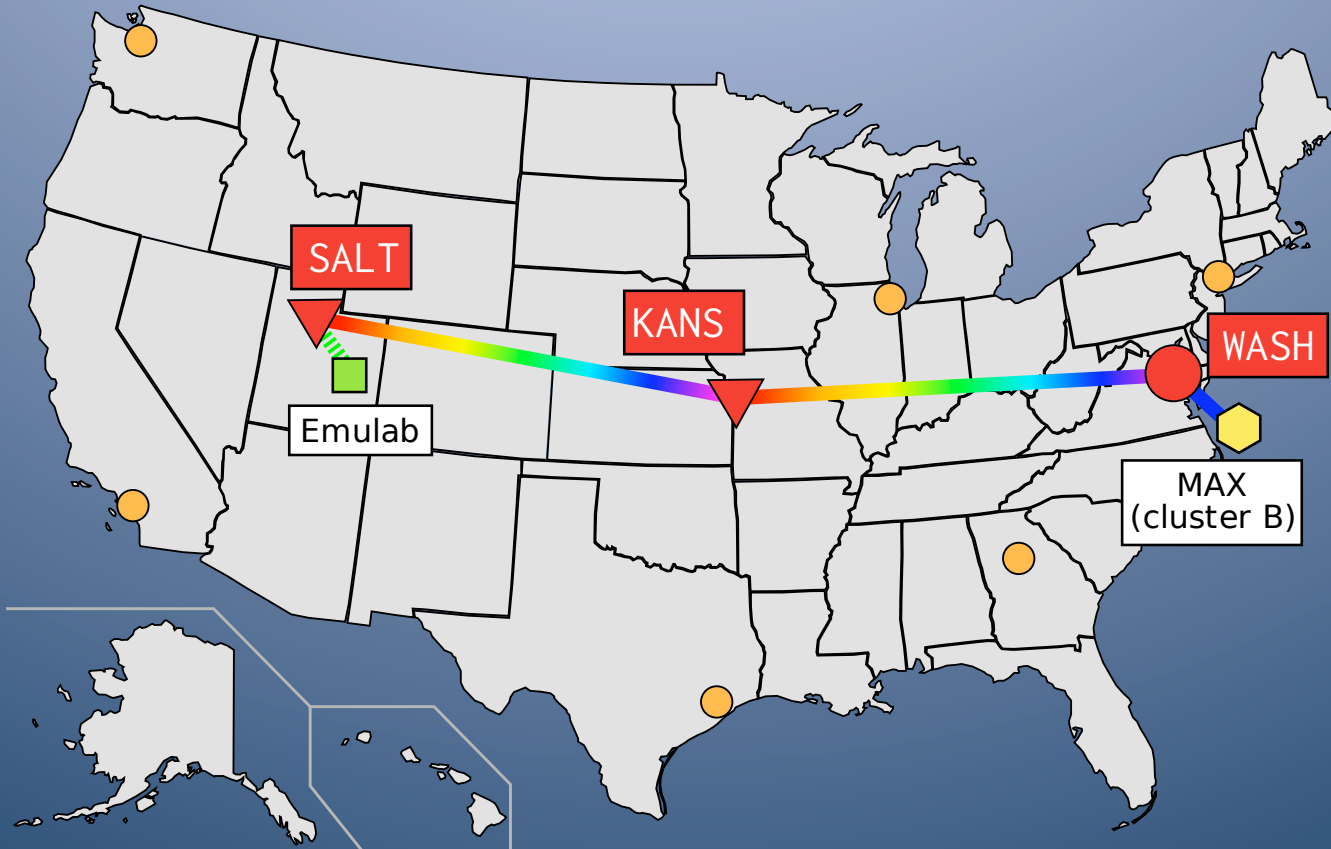
- “Raw” PCs
- Virtualized PCs
 - FreeBSD jails
 - OpenVZ (Linux)
 - Soon Xen
 - Both shared and single-experiment
- Links and LANs
 - Ethernet VLANs (several vendors)
 - 802.11 APs
 - IP-in-IP tunnels
- Wide-area PCs
 - ProtoGENI “edge nodes”
 - RON testbed
 - PlanetLab slices
- Misc. network devices including
 - NetFPGAs
 - Intel IXPs
 - Mica2 motes
 - GNU Radio USRPs
- Access to
 - Serial lines
 - Power controllers










Backbone With Internet2



- Installing equipment in Internet2 POPs
- Wave network provides 10Gb between POPs
- Building layer-2 topologies on top of wave
- Connecting as many federated facilities as possible
- Providing connectivity to other GENI projects
- Making all of this available to researchers

Current Footprint



- | | | |
|---|--|--|
|  High-degree node |  Internet2 POP |  10Gb Layer-1 λ (dedicated) |
|  Low-degree node |  Regional Network |  10Gb Layer-2 Ethernet (shared) |
|  Other I2 router site (future expansion) |  Campus/Lab |  10Gb Layer-1 patch (dedicated) |

Experimenter Tools

Experimenter Tools

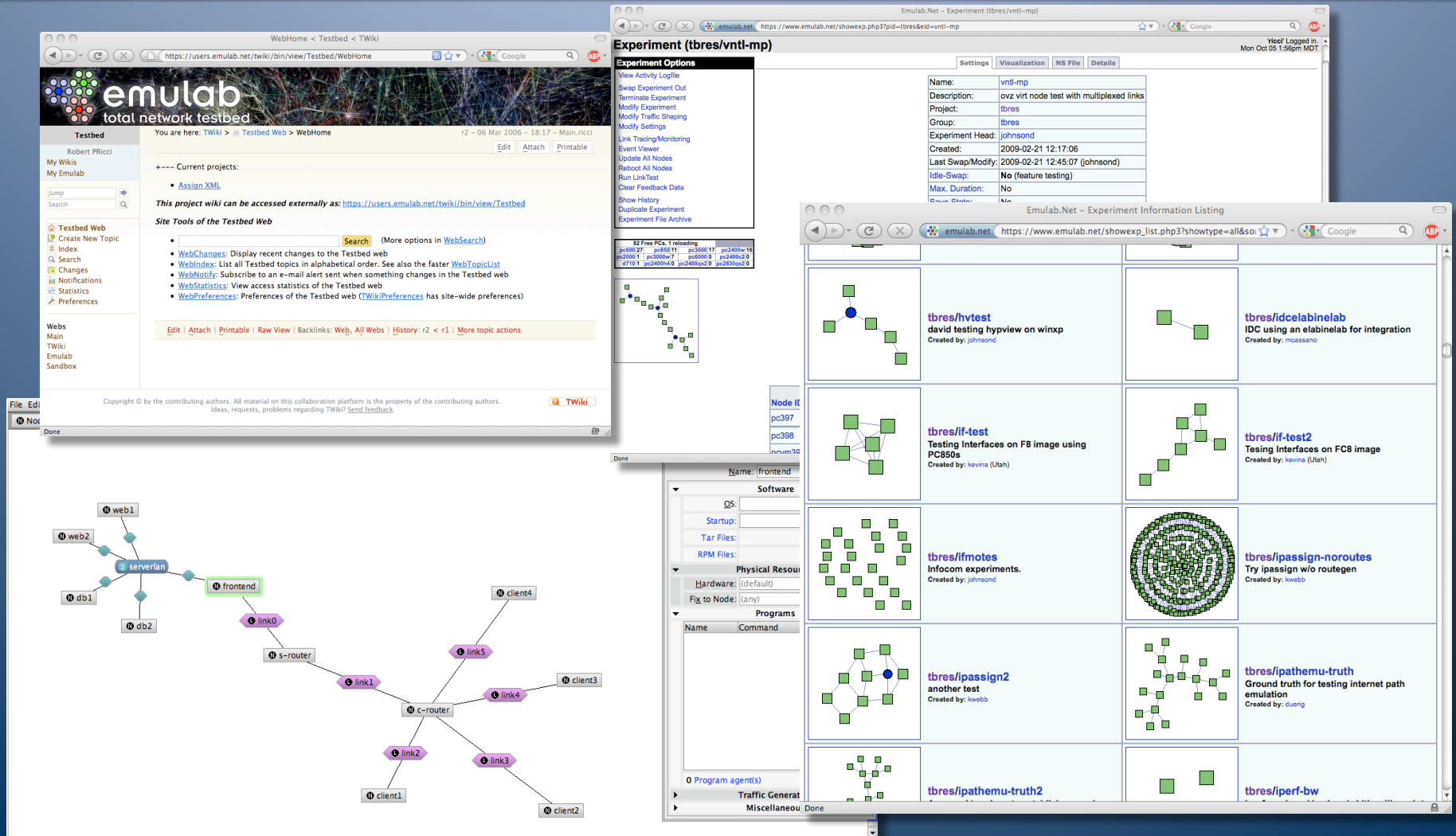


- New Spiral 2 project
- Most access to ProtoGENI is now through API
 - You'll hear more about this tomorrow
 - "raw" mode – little configuration of resources
- Putting the Emulab interface back on top
 - "cooked" mode – much more configuration
 - And now you'll have access to the whole federation
- We'll try to encourage most experimenters to use the Emulab interface

Emulab Handles

- Account management
- Software installation
- Disk loading
- Event system
- Host network configuration
- Collaboration tools
- Scripting of experiments
- ... and more

Some of the Emulab tools



The screenshot displays the Emulab web interface with several key components:

- WebHome < Testbed < TWiki**: The main navigation area at the top left.
- emulab total network testbed**: The main header with navigation links like "Testbed Web", "Index", "Search", "Changes", "Notifications", "Statistics", and "Preferences".
- Current projects**: A list of active projects, including "Assian XML".
- Site Tools of the Testbed Web**: A section with links for "WebChanges", "WebIndex", "WebNotify", "WebStatistics", and "WebPreferences".
- Experiment (tbres/vntl-mp)**: A detailed view of an experiment with options like "View Activity Logfile", "Swap Experiment Out", and "Terminate Experiment".
- Experiment Information Listing**: A table listing various experiments such as "tbres/hvtest", "tbres/dcelabineLab", "tbres/lf-test", "tbres/lf-test2", "tbres/lfnotes", "tbres/lfpassign-noroutes", "tbres/lfpassign2", "tbres/lfpathemu-truth", "tbres/lfpathemu-truth2", and "tbres/lperf-bw".
- Network Diagram**: A central diagram showing a network topology with nodes like "web1", "serverlan", "db1", "db2", "frontend", "link0", "s-router", "link1", "link2", "link3", "link4", "link5", "c-router", "client1", "client2", and "client3".
- Node Configuration**: A panel for configuring a node named "frontend", showing software, physical resources, and programs.

www.protogeni.net
www.emulab.net

