

# Introduction to the GENI Desktop and GEMINI I&M Services

Jim Griffioen and Hussamuddin Nasir  
Laboratory for Advanced Networking  
University of Kentucky  
Lexington, KY

# Collaborators

- Indiana University - GEMINI
- University of Utah - Flack, Insta/ProtoGENI
- GPO - GENI Portal
- UNC RENC I - iRods, ExoGENI

# Historical Perspective

- **EduLab MC Web Server:** Web page available on the Measurement Controller node. Designed to make it easy for users to see what is going on in their experiment.
  - Sub-Goals:
    - ◆ Automate the task of dynamically deploying an instrumentation and measurement infrastructure within a GENI slice.
    - ◆ Provide users with a convenient and simple-to-use interface to the measurement infrastructure.
    - ◆ Allow users to customize the interface.
    - ◆ Provide a way to save/archive measurements
- **INSTOOLS Portal:** Web-based GUI providing access to all MC's in a slice.
- **GEMINI Portal:** Web-based GUI providing access to INSTOOLS and LAMP measurement data across all Global Nodes (GNs)
- **(\*Relatively New\*) GENI Desktop:** Extensible web-based GUI providing a windowing system for interacting with GENI tools. Supports single sign-on to all GENI tools.

# GENI Desktop Uses

- Login to "GENI"
  - Create slices
  - View slice topology
  - Ssh to slivers (nodes)
- 
- "Instrumentize" a slice (with measurement services)
  - View measurement data
  - Archive measurement data

# GENI Desktop Features

- Single sign-on to various GENI tools
- Interoperates with the GENI Portal, Flack, and iRods
- Supports InstaGENI and ExoGENI racks
- Access to all slices owned by user
- Slice creation/modification via Flack
- A windowing system interface
- Logical, Geographic, and List view of slice
- Single abstraction for interacting with a slice.
- Can be used with/without instrumentation.
- Quick access to (instantiated) resource details.
- Ssh access to a set of nodes.
- Ability to run commands across sets of nodes.
- Ability to upload files to sets of nodes.
- Optional instrumentation of a slice
- Quick access to, and visualization of, commonly used measurement data.
- Ability to drill down to additional measurement information
- Ability to control active and passive measurements
- Ability to record notes about an experiment via a CMS
- and several other features.

# Welcome Page and Slice List



**Welcome to the GENI Desktop.**

Logged in as gec16a from uky\_emulab\_net. [Logoff](#)

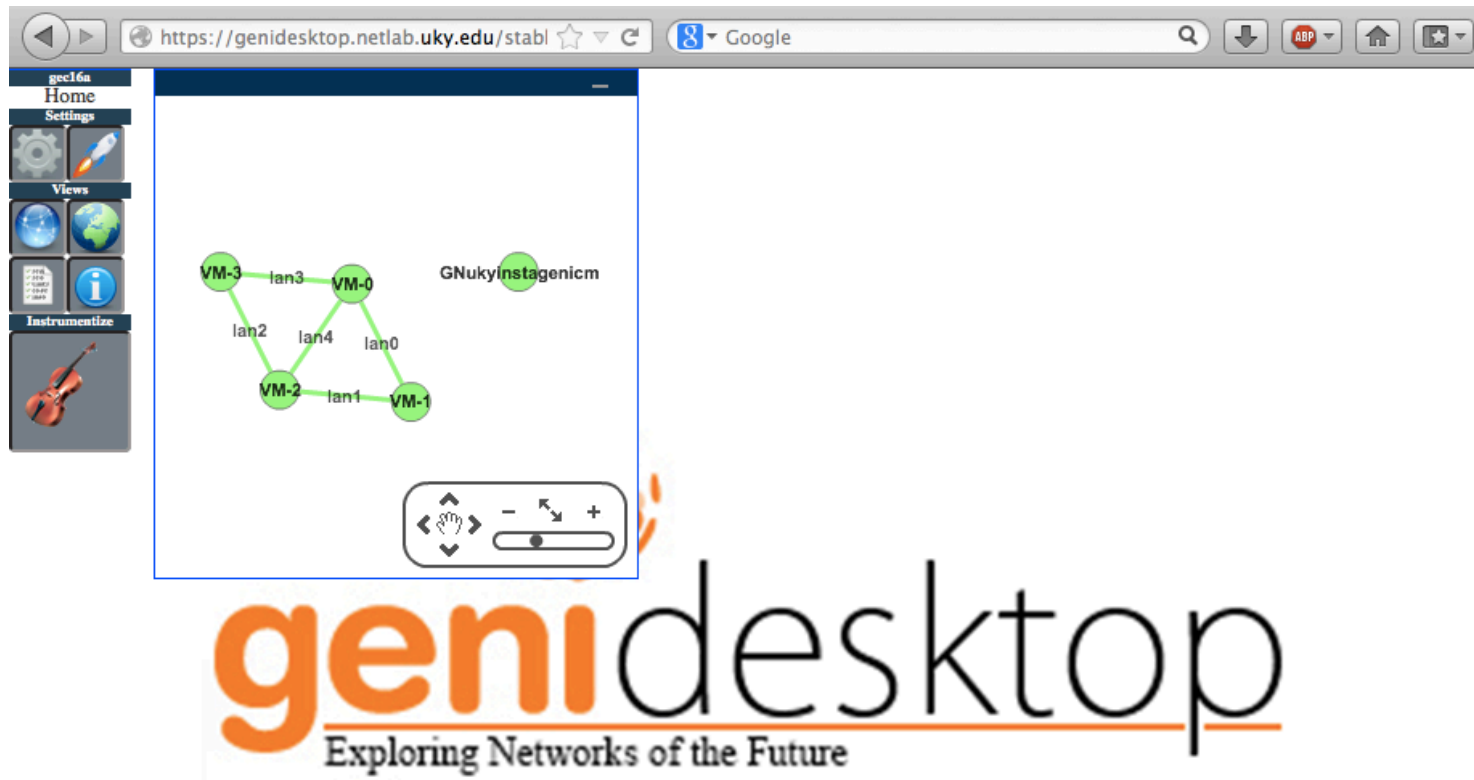
**Available Slices**  
[gree13sc](#)

**Create New Slice**



List of Slices

# Logical Topology View



# I&M Traffic View

The screenshot displays the GeniDesktop web interface. At the top, a browser window shows the URL <https://genidesktop.netlab.uky.edu/stable/>. The interface includes a sidebar with navigation options: Home, Settings, Views, and Renew Cert. The main content area is divided into two sections. On the left, a network diagram shows four virtual machines (VM-0, VM-1, VM-2, VM-3) connected to a central node labeled 'GNukyinstagenicm'. The connections are labeled 'lan1', 'lan2', 'lan3', and 'lan4'. On the right, a grid of performance monitoring graphs is displayed. The graphs are organized by VM: VM-0 (Total CPU Utilization, IOP Traffic, IP Traffic), VM-2 (Total CPU Utilization, IOP Traffic, IP Traffic), and VM-3 (Total CPU Utilization, IOP Traffic, IP Traffic). Each graph shows data over time, with a legend indicating Incoming Traffic (green) and Outgoing Traffic (blue). The 'genidesktop' logo and the tagline 'Exploring Networks of the Future' are visible at the bottom of the interface.



# The GENI Desktop

## Unifying Abstraction

- **Goal:**
  - Support multiple ways to “visualize” a slice, and
  - Make it easy to apply an operation to a subset of resources within a slice.
- **Common Requirement:**
  - **Select Resources:** Provide a unified well-known way to select resources, regardless of the “view” of the slice.
  - **Apply Operations:** Provide a unified well-known way to apply an operation to a set of resources.
- **Idea:** Use an abstraction familiar to users
- **Solution:** Model the interface after the well-known file browser interface. The analogy is selecting files in a file browser and applying an operation (regardless of the “view” - e.g., list view, icon view, detailed view, etc.)

# Two Phase Initialization

- **Phase I: Initialize access to MP nodes**
  - Load software onto GN to allow it to act as a proxy for reaching MP nodes
  - GENI Desktop does this step for you if it has not yet been done.
  - Available services include:
    - ◆ Slice visualization
    - ◆ MP information visualization
    - ◆ Ssh access
    - ◆ File upload
    - ◆ Run commands
- **Phase II (Optional) : Initialize Instrumentation and Measurement Services**
  - Load software on GN and MPs needed to instrumentize and view measurement data
  - Available services include:
    - ◆ View commonly used active and passive traffic graphs
    - ◆ View detailed node information and less frequently used graphs
    - ◆ Configure instrumentation and measurement system
    - ◆ Archive measurement data

# Slice/Topology "Views"

## ○ Three types of Views

### □ Logical View

- ◆ Provides a logical view of the topology and links between nodes. Nodes and links can be selected to identify a set of nodes/links.

### □ Geographic/Map View

- ◆ Provides a map view of the topology showing the geographic location where nodes are located and the links connecting them. Nodes and links can be selected to identify a set of nodes/links.

### □ List View

- ◆ A textual list of the nodes and links in a slice. Nodes and links can be selected to identify a set of nodes/links. The list can be filtered (searched) to reduce the number of nodes/links displayed.

## ○ Observations

- There is a single unified interaction model
- Selecting nodes/links in one view selects the same nodes/links in another view.
- Logical and Geographic views make it easy to visualize the topology and interconnections between nodes.
- The List view is useful for large topologies because the topology can be quickly filtered to nodes/links of interest.

# Demonstration

# Tutorial and Exercises

You will work through a set of exercises. We will give you an overview and examples, but **NOT** step-by-step instructions. The goal is for you to try out things on your own.

# Tutorial and Exercises

Start the Tutorial by Going To:

[http://groups.geni.net/geni/wiki/GENIExperimenter/Tutorials/GENI\\_Desktop\\_and\\_GEMINI](http://groups.geni.net/geni/wiki/GENIExperimenter/Tutorials/GENI_Desktop_and_GEMINI)

# Thank You!

# Questions?

This material is based upon work supported in part by the National Science Foundation under grant number CNS-0834243. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of GPO Technologies, Corp, the GENI Project Office, or the National Science Foundation.