Are you ready for the tutorial?

1. Grab instructions

2. Did you do the pre-work?
   A. Do you have an account?
   B. Have you installed the tools?
      * ssh

3. Connect to the network
   - For today, connect to U. Kentucky's wireless network:

     ukyedu

GENI Portal is at:

http://portal.geni.net

A First Experiment using GENI

Violet R. Syrotiuk

Arizona State University

Based on a presentation by Sarah Edwards and Vic Thomas

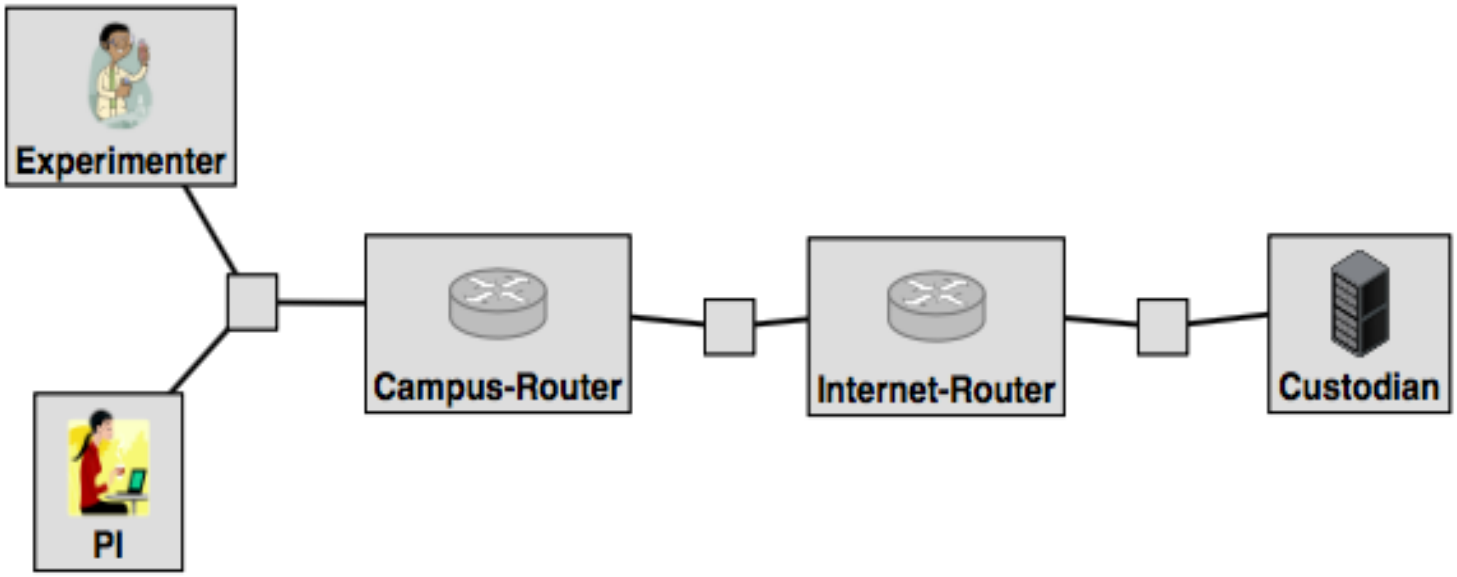
Sponsored by the National Science Foundation

Hands On Exercise

Do a Simple Experiment in GENI

Reserve 5 VMs connected at layer 2.

Run an experiment using Named Data Networking.



Experiment Workflow

- Part I: Design/Setup
- Part II: Execute
- Part III: Finish

Use the GENI Portal and Jacks

geni
Exploring Networks
of the Future

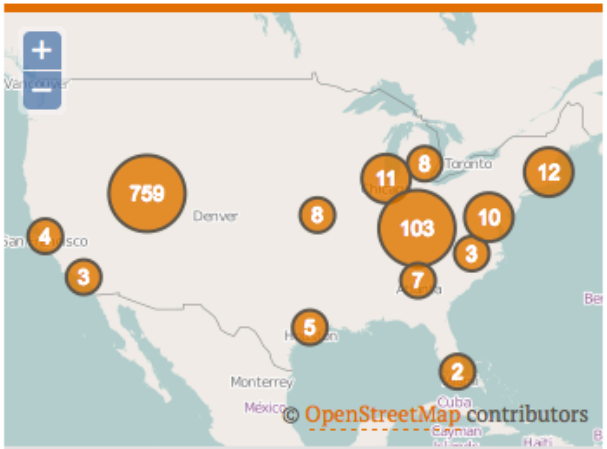
WELCOME TO GENI

GENI is a new, nationwide suite of infrastructure supporting "at scale" research in networking, distributed systems, security, and novel applications. It is supported by the National Science Foundation, and available without charge for research and classroom use.

Use GENI

Find out more about using GENI

- Information for GENI experimenters
- Published research that used GENI resources
- Get help using GENI



These are some of the many resources being used in GENI experiments across the country.

http://portal.geni.net

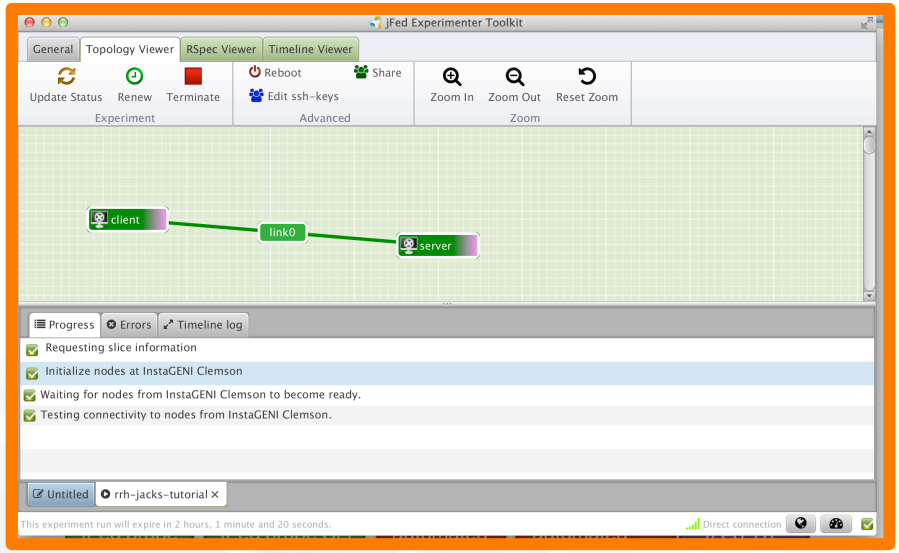
The GENI Portal is…

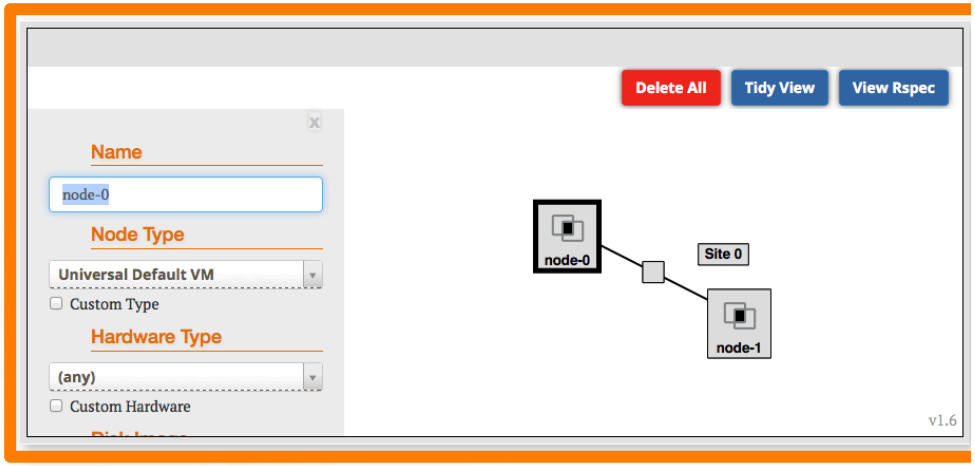
A web-based tool for experimenters to manage **experimenters**, **projects**, and **slices**.

Includes simple tools to reserve **resources**.

Among other things!

Jacks and jFed are …





Graphical user interfaces (GUIs) for:

– **designing topologies** in GENI

– **reserving resources** in GENI

Establish Environment

1 Design the experiment

2. Establish the environment

2.1 Pre-work: Create a GENI account

2.2 Pre-work: Ask to join a project

Project Name: GRW-Summer-Camp-UKentucky

2.3 Generate and download ssh keypair

Click on SSH Keys drop-down under "Your Name"

Ready?

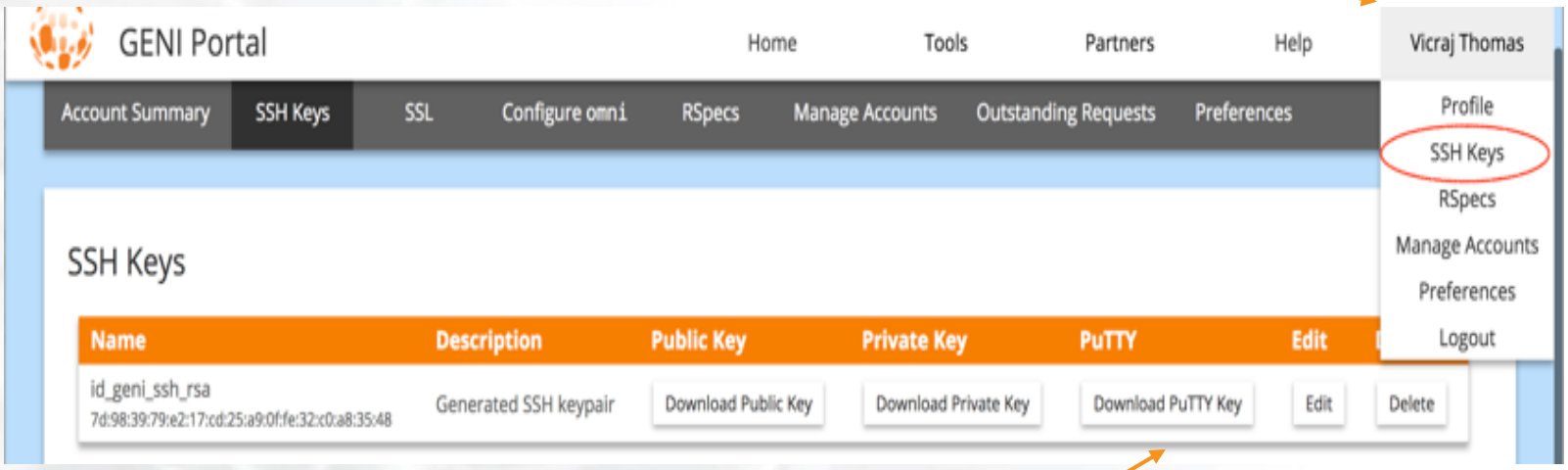
http://portal.geni.net

- Login to the GENI Portal
  - Check if your institution is listed on the Portal
    - If so, log in using your university authentication
  - Otherwise
    - Request an account
- Have you joined the GENI project for the workshop?
  - Click Home➔Projects➔Join a Project

Set?

- Create your ssh keys
  - Look for SSH Keys under your name

- Download your ssh private key



- Windows users:
  - Download your PuTTY key

Generate and download ssh keypair

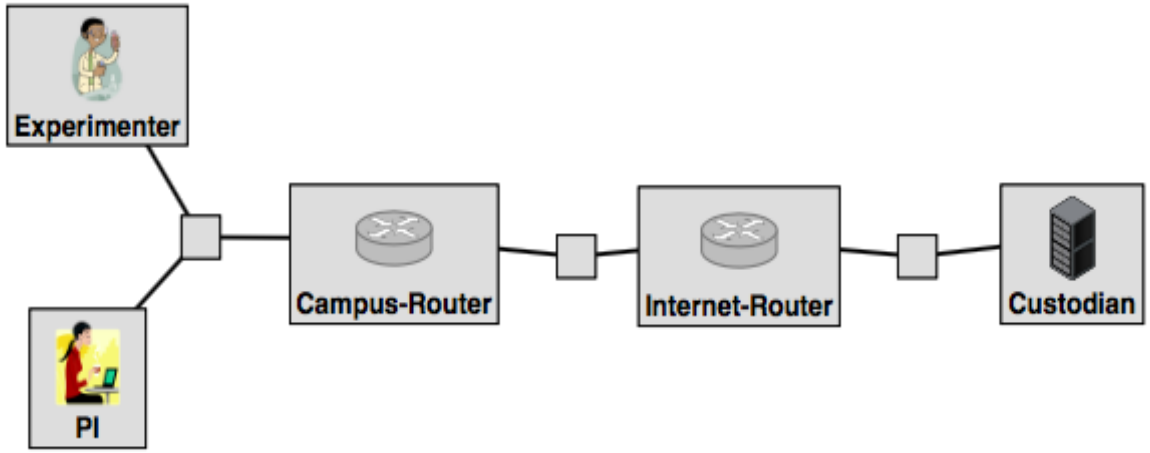
For Windows users:
PuTTY is recommended

PuTTY download:
http://www.putty.org

Mac OS X/Linux users:
On your local machine

```
> mv ~/Downloads/id_geni_ssh_rsa ~/.ssh/.
> chmod 600 ~/.ssh/id_geni_ssh_rsa
> ssh-add ~/.ssh/id_geni_ssh_rsa
```

Obtain Resources



Open the instructions for this tutorial at:

http://voip.netlab.uky.edu/grw2018ky/

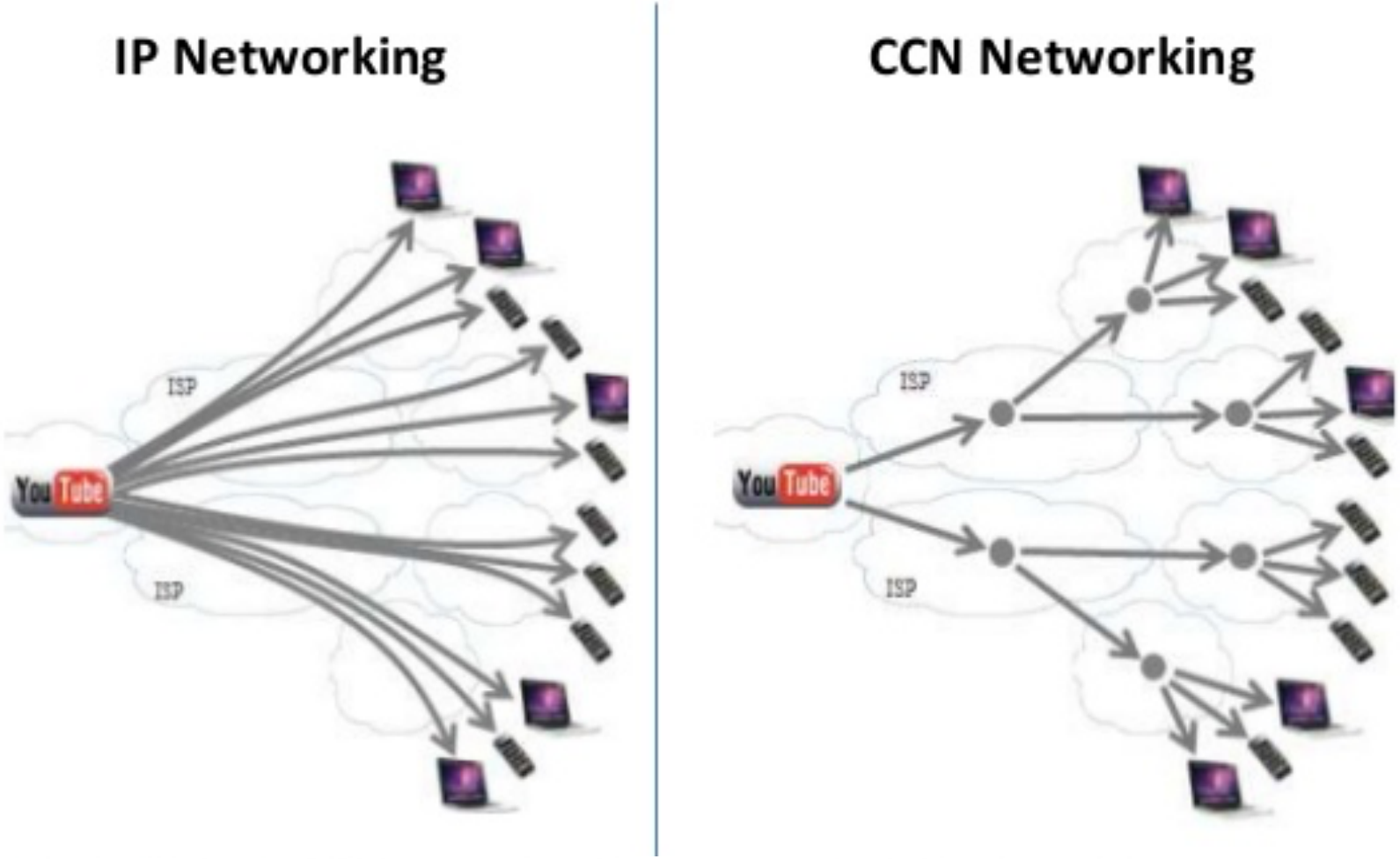
Create a slice

Bind to an aggregate and reserve the topology

Wait for the resources to be ready!

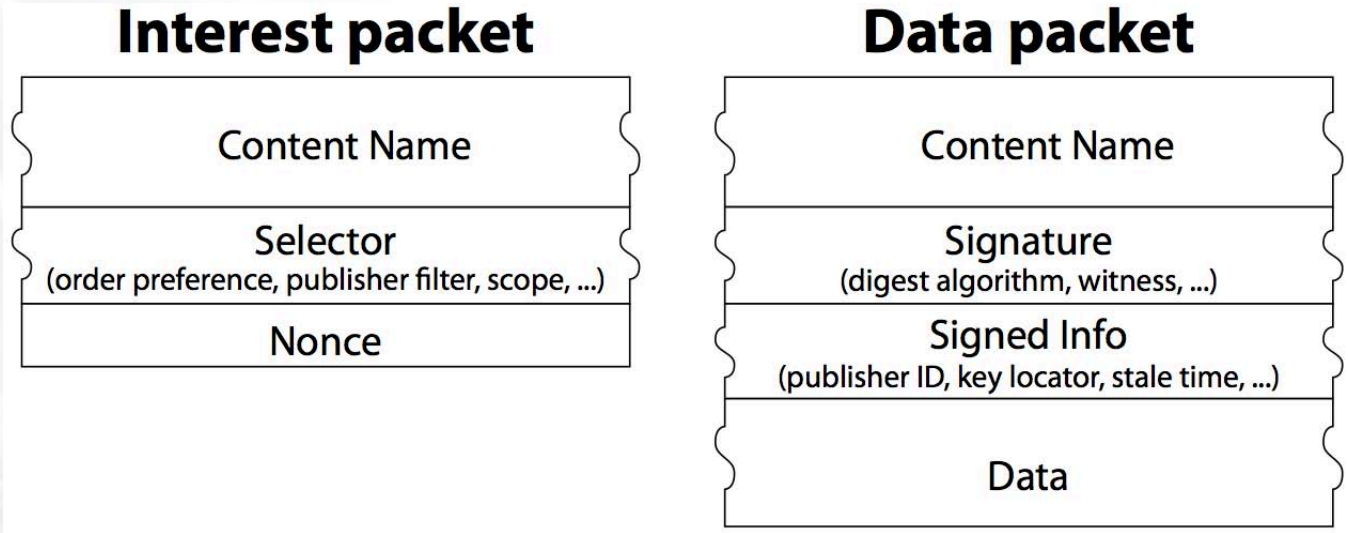
Named Data Networking

- A new paradigm in content centric networking:



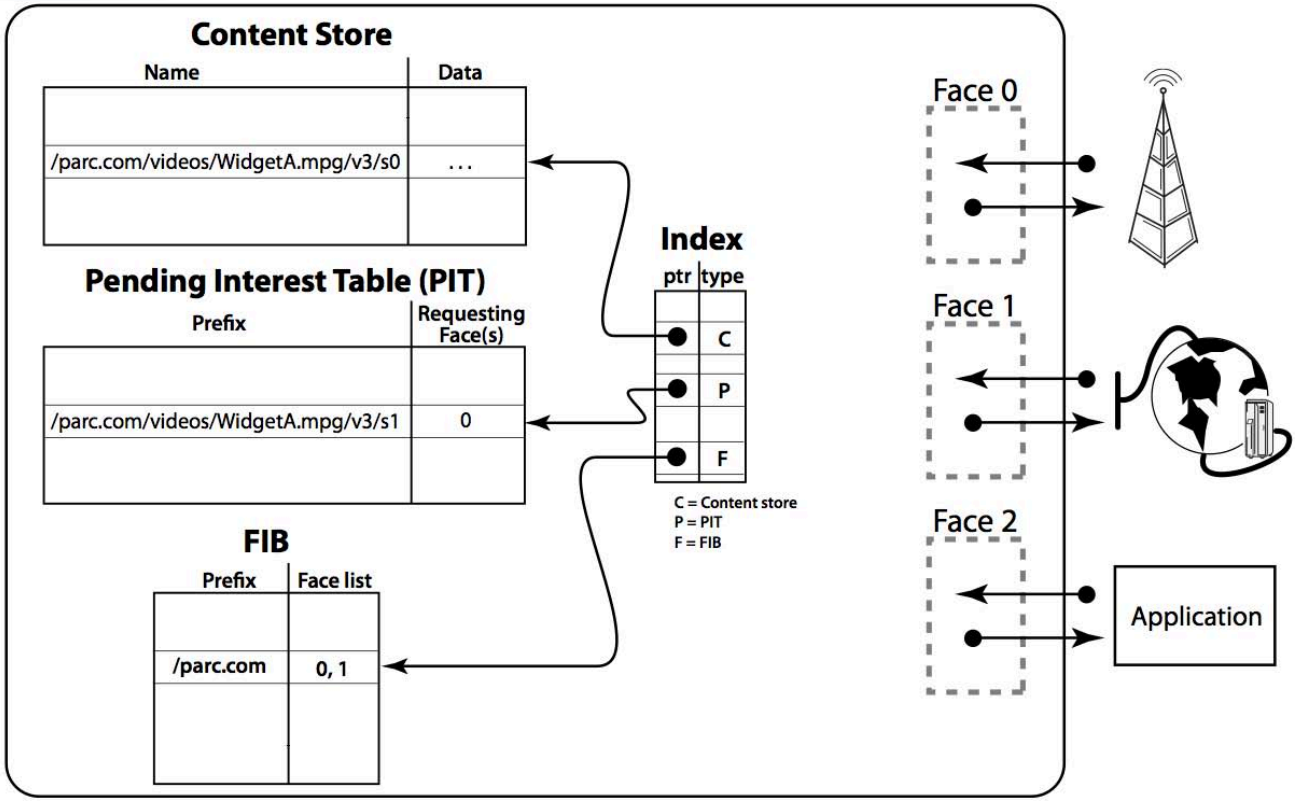
Named Data Networking

- Packet types:



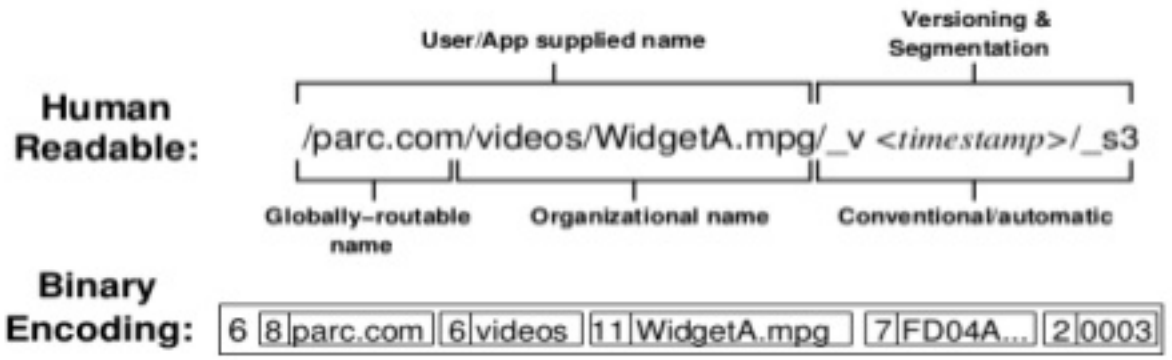
Named Data Networking

- Forwarding engine:
  - Communication is driven by the receiving end, the data consumer

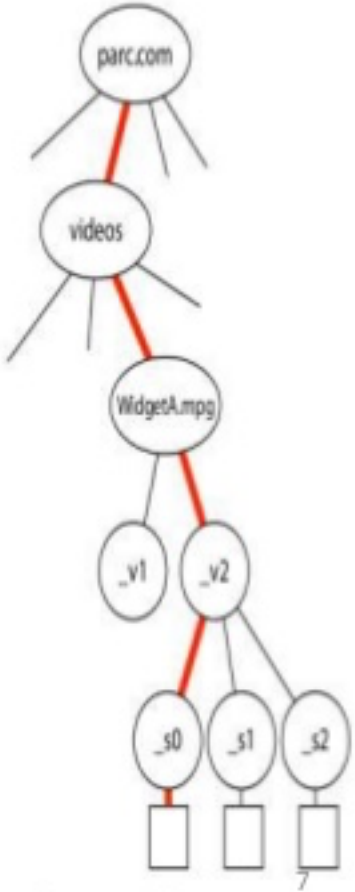


Named Data Networking

- Naming/hierarchical addressing:



Address Structure

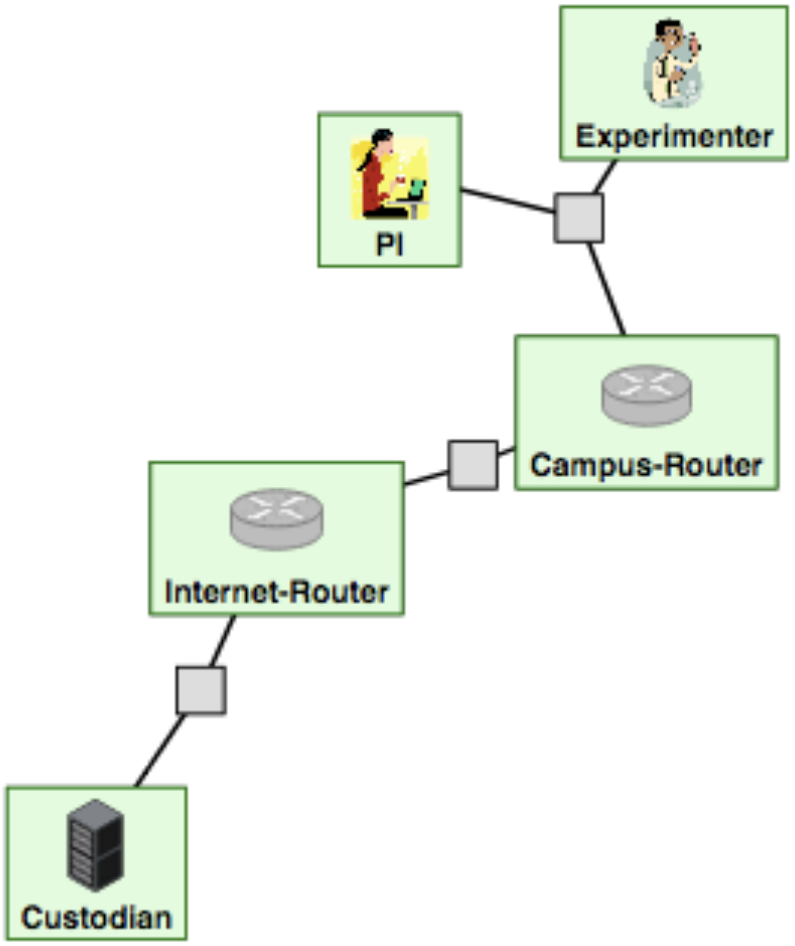


Query Traversal

Named Data Networking

- Routing:
  - NDN uses name prefixes instead of IP prefixes
  - Name prefixes are broadcast via routing protocols
  - Each node builds its FIB on receiving prefix

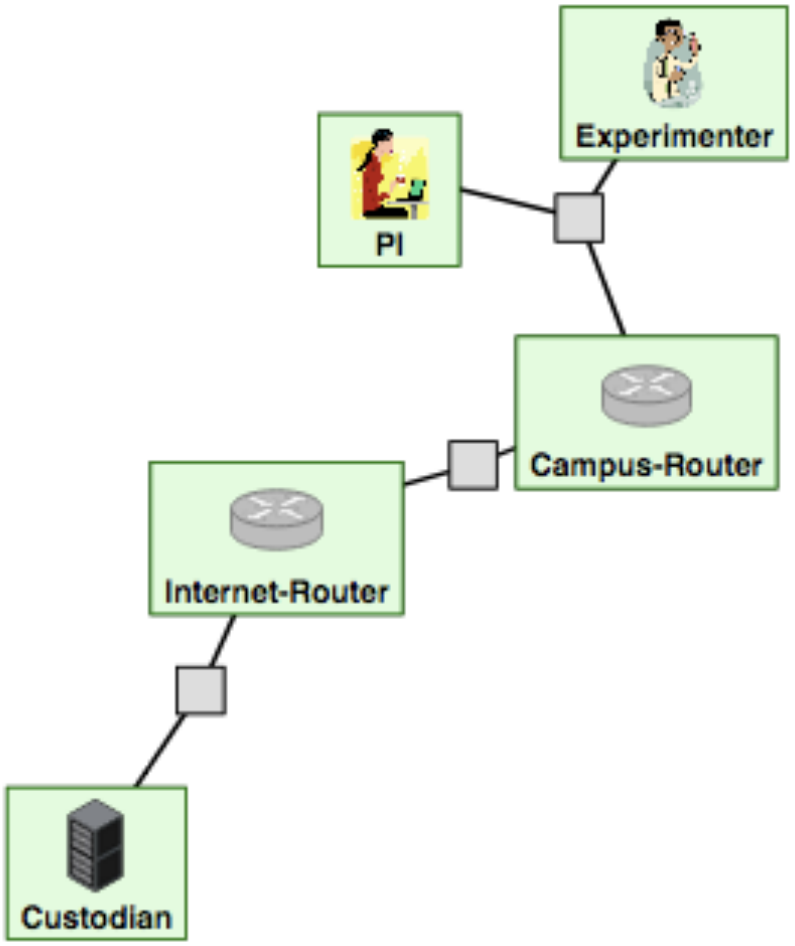
Execute Experiment



There are 5 nodes:

- A data source, Custodian; it holds data in the namespace /nytimes
- Nodes Internet-Router and Campus-Router that forward Interest and Data packets
- A principal investigator (PI), and an Experimenter, are consumers

Execute Experiment



Configure and initialize:

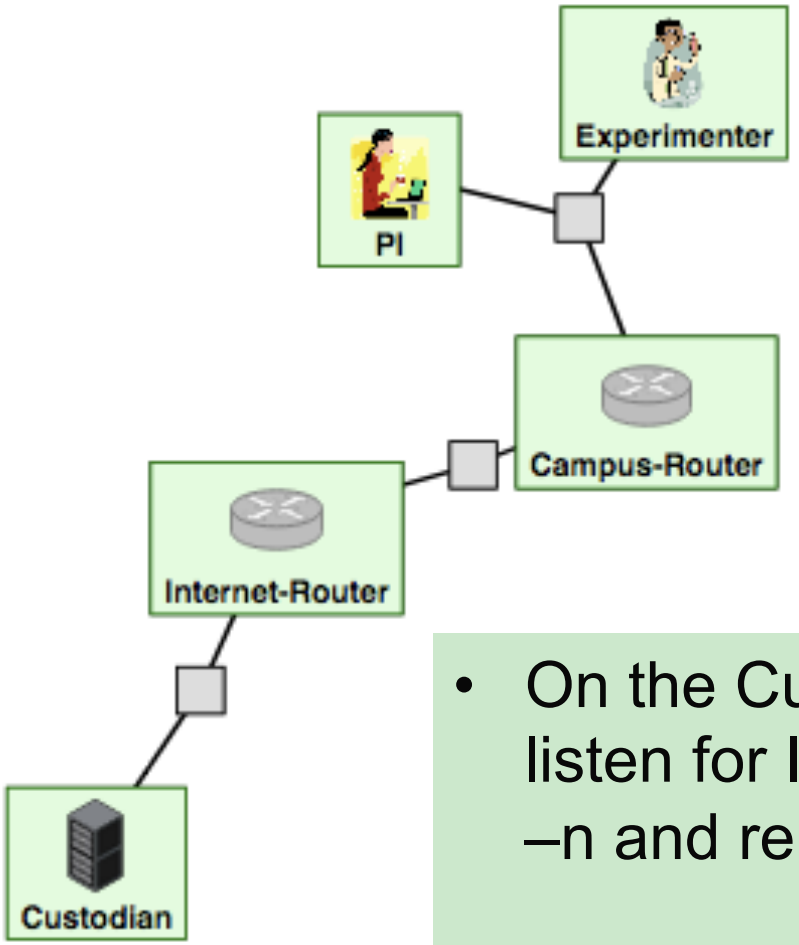
- Logon to the Custodian node and run the script in /local/ install_script.sh

  $ cd /local

  $ sudo ./install_script.sh

- This will start the NDN daemon on this node

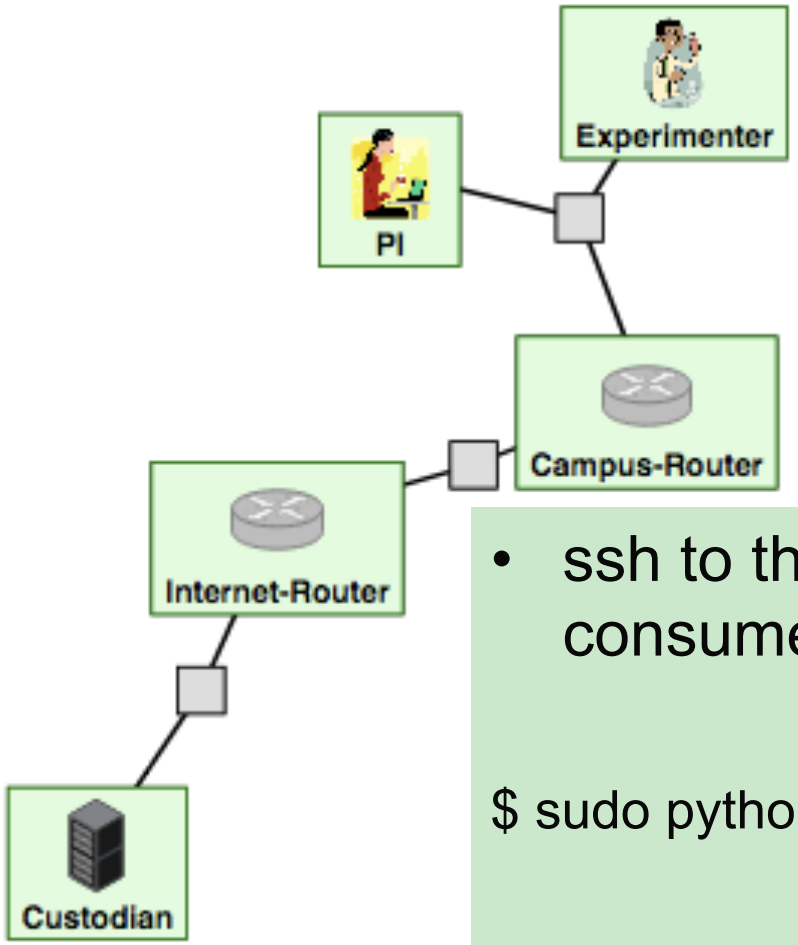
Execute Experiment



- On the Custodian, start the producer; it will listen for Interest packets in a namespace –n and reply with Data packets

$ sudo python /local/producer.py -n /nytimes

Execute Experiment



- ssh to the Experimenter and start the consumer:

$ sudo python /local/consumer.py -u /nytimes/science

- Repeat from the PI; how did the time to process the Interest change?

Finish Experiment

project
resource
experimenter
aggregate
slice

When your experiment is done, you should always release your resources.

- Normally this is when you would archive your data and the experiment
- Delete your resources at **each** (here one) aggregate

Congratulations!

You have…

- Run your first GENI experiment!
- Exercised your knowledge of GENI terminology
- Used the GENI Portal and Jacks

Welcome to GENI!