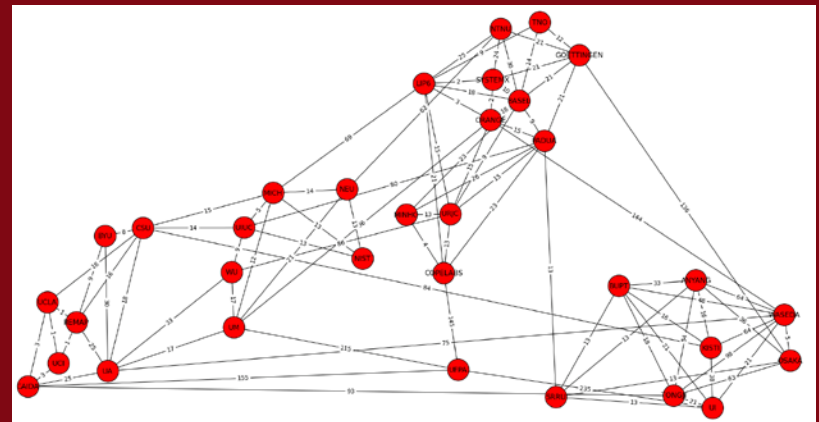


NDN Testbed Status Update March 2017

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NDN Testbed

- **Shared resource for running NDN experiments**
- **Each node runs an NDN software router:**
 - » **nfd** : NDN Forwarding Daemon
 - » **NLSR** : NDN Routing Daemon
 - Recently updated to do Hyperbolic Routing
 - » **Other assorted NDN daemons**
- **Participating sites:**
 - » **Dedicate a machine (real or virtual) to host a node**
 - » **Designate a person as local operator for rare manual intervention and for site-based certificate approval**
- **Managed by NDN team at Washington U.**
- **Usable by All**
 - » **Site-based certificates**
 - » **Network guest certs**
 - » **Many sites support local guest certs**

NDN Testbed: March 2017

■ Consists of 33 Gateway Router Nodes

- » March 2017: 33
- » March 2016: 31
- » March 2015: 24
- » Sept. 2014: 18
- » Nov. 2013: 16

■ Presence on 4 Continents and in 15 Countries

» North America (13)

- USA (13)

» South America (1)

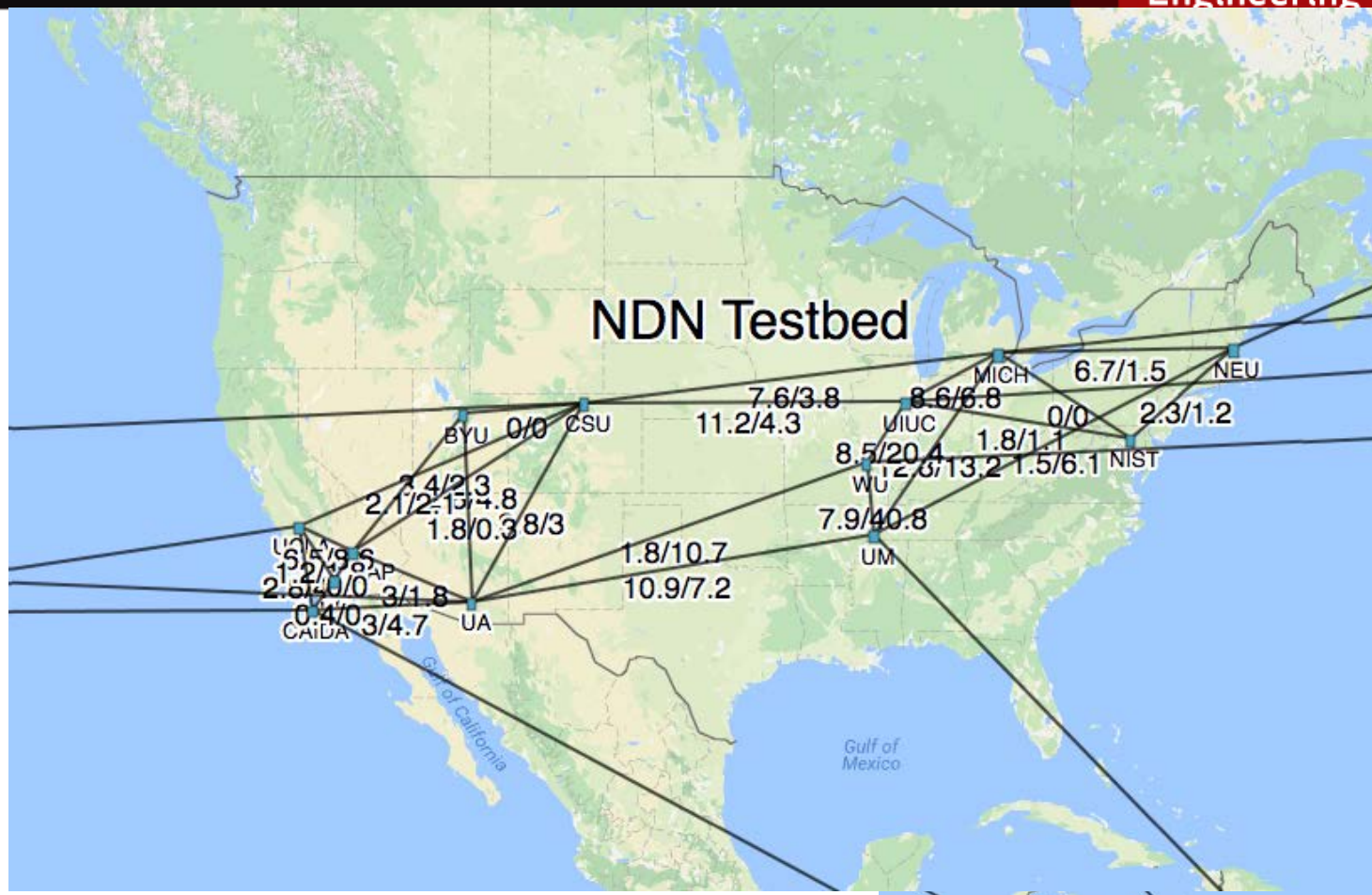
- Brazil (1)

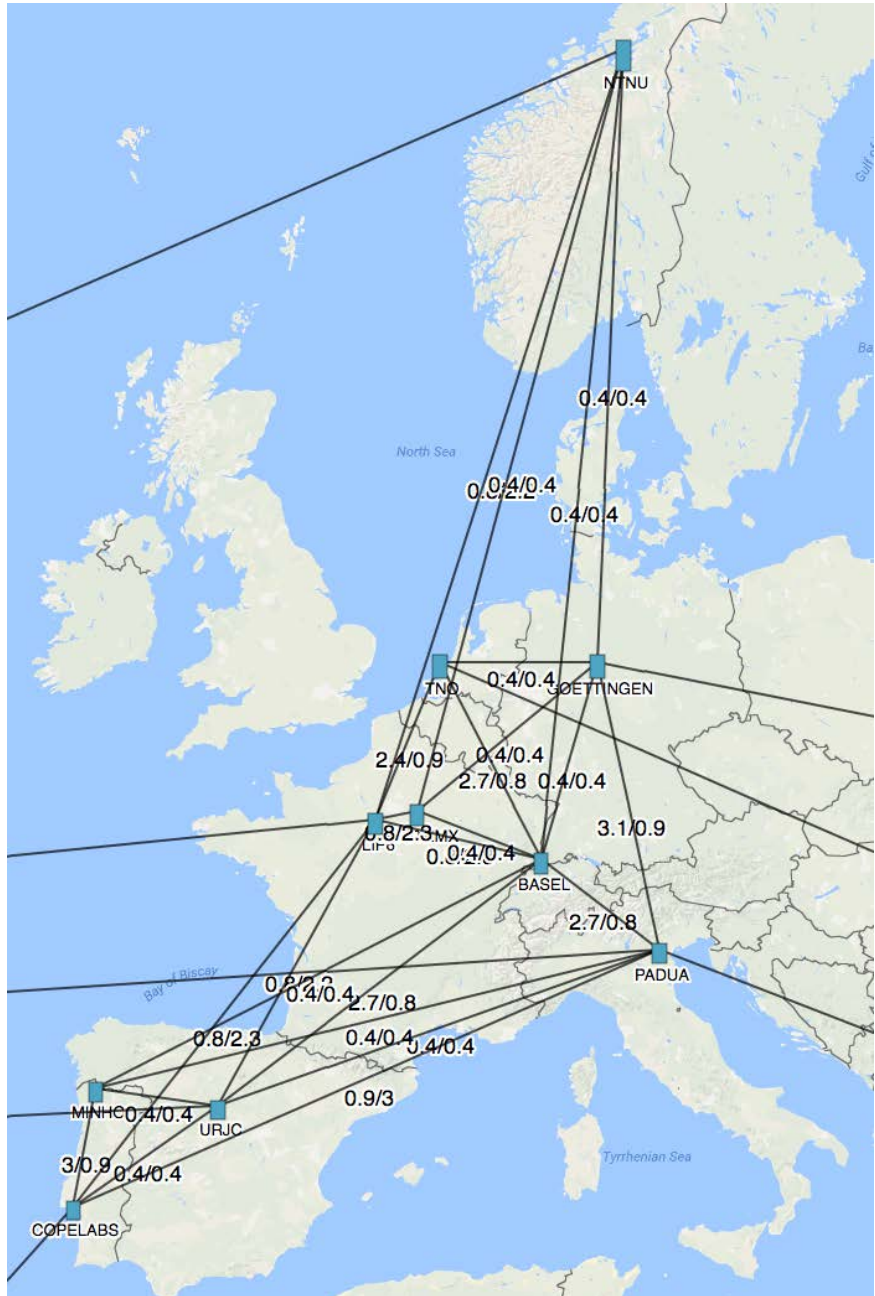
» Asia (9)

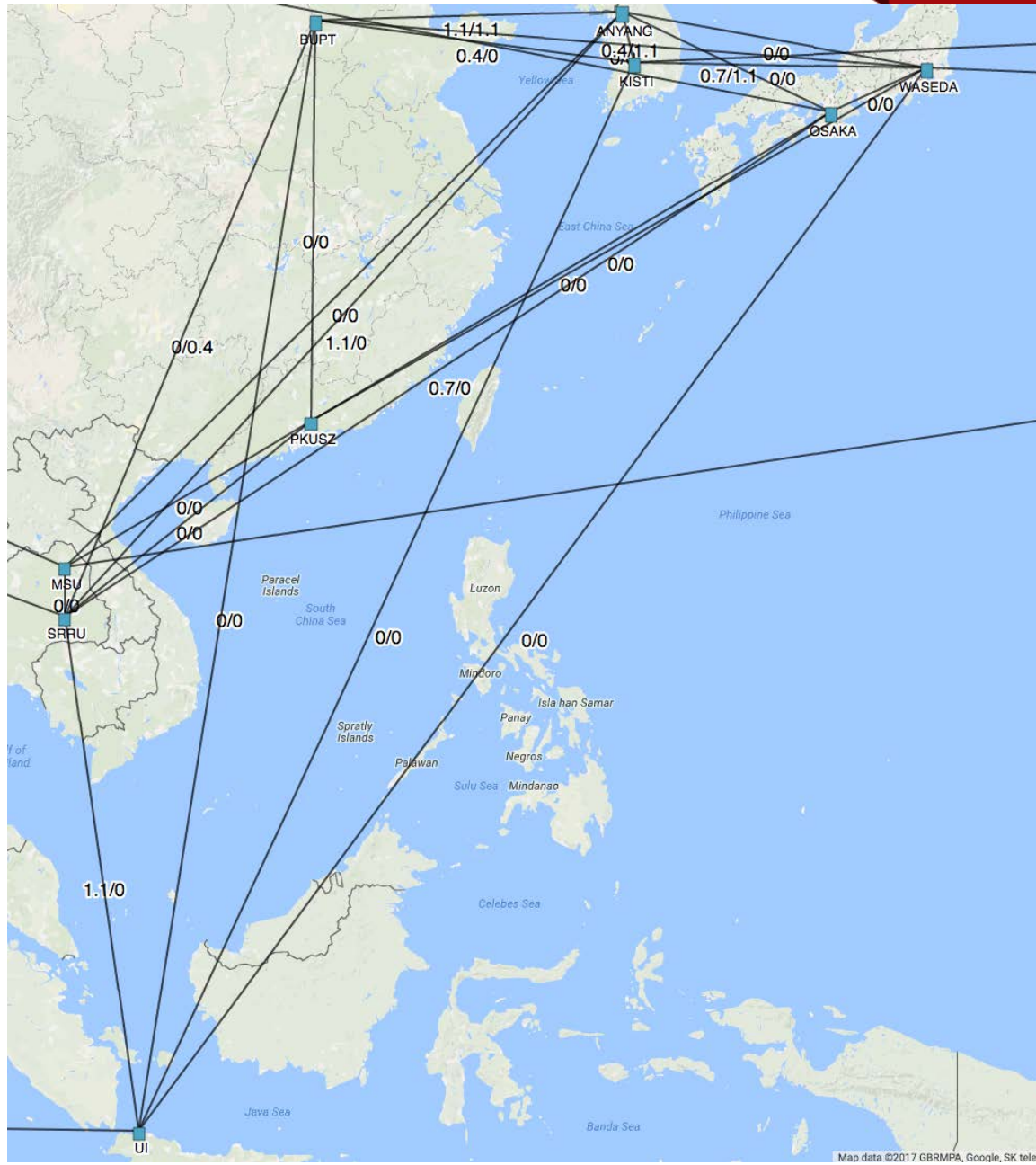
- China (2)
- S. Korea (2)
- Japan (2)
- Indonesia (1)
- Thailand (2)

» Europe (10)

- France (2)
- Italy (1)
- Spain (1)
- Switzerland (1)
- Norway (1)
- Germany (1)
- Portugal (2)
- Netherlands (1)





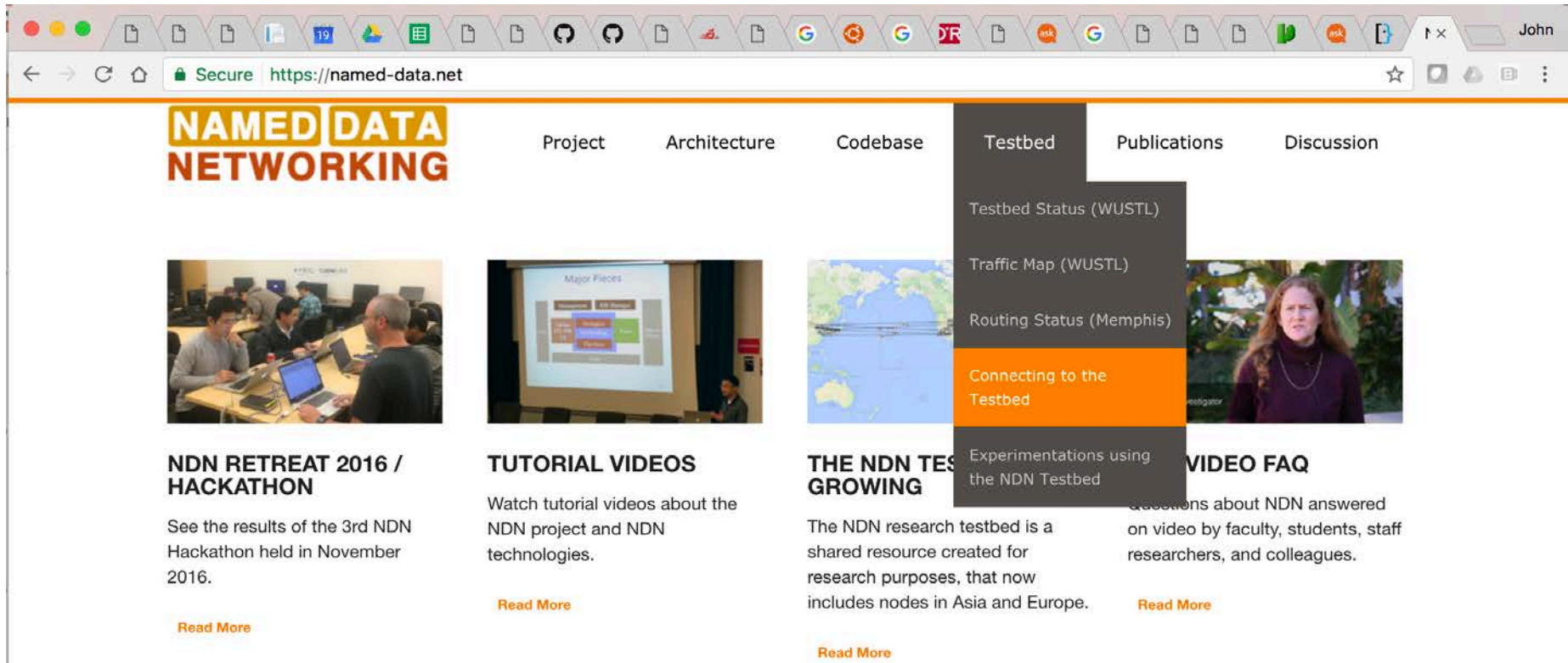


Joining the NDN Testbed

■ Who should join?

- » **Groups from Universities, Companies and Gov. Agencies**
 - Who are interested in NDN R&D
- » **We look for a PI with an NDN interest/commitment**
 - We are leary of requests like
 - “I’m a graduate student doing a project”

Joining the NDN Testbed



The screenshot shows a web browser window displaying the NDN Testbed website. The browser's address bar shows the URL <https://named-data.net>. The website features a navigation menu with links for Project, Architecture, Codebase, Testbed, Publications, and Discussion. The Testbed link is highlighted, and a dropdown menu is visible with the following items: Testbed Status (WUSTL), Traffic Map (WUSTL), Routing Status (Memphis), Connecting to the Testbed (highlighted in orange), and Experimentations using the NDN Testbed. Below the navigation menu, there are four content cards: 1. NDN RETREAT 2016 / HACKATHON: See the results of the 3rd NDN Hackathon held in November 2016. 2. TUTORIAL VIDEOS: Watch tutorial videos about the NDN project and NDN technologies. 3. THE NDN TESTBED IS GROWING: The NDN research testbed is a shared resource created for research purposes, that now includes nodes in Asia and Europe. 4. VIDEO FAQ: Questions about NDN answered on video by faculty, students, staff researchers, and colleagues. Each card has a 'Read More' link.

■ How to request to join?

» <https://named-data.net/ndn-testbed/policies-connecting-nodes-ndn-testbed/>

- Email link to make a request to join

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■ How to request to join?

- » <https://named-data.net/ndn-testbed/policies-connecting-nodes-ndn-testbed/>
 - Email link to make a request to join

■ What happens next?

- » A questionnaire to fill out will be emailed to you
- » Request is reviewed by an NDN project committee
- » When approved we work with you to install and connect your node.

Status Monitoring Sites

■ Node and Prefix Status

» http://www.arl.wustl.edu/~jdd/ndnstatus/ndn_prefix/tbs_ndnx.html

■ Bandwidth

» <http://ndnmap.arl.wustl.edu/>

■ Routing Status

» <http://netlab.cs.memphis.edu/script/htm/ndn-status/status.htm>

■ Cacti graphs

» <http://ndndemo.arl.wustl.edu/cacti/>

» Expanded, but continues to be a work in progress

» Data collected through NDN Interest/Data packets.

» Monitors things like:

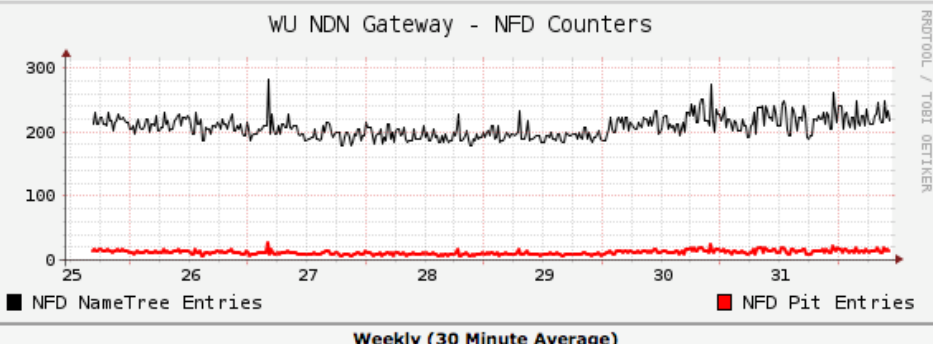
- Load average, / and /boot disk usage
- NFD process size, uptime, PIT counter, NameTree counter
- Etc...

» User: guest

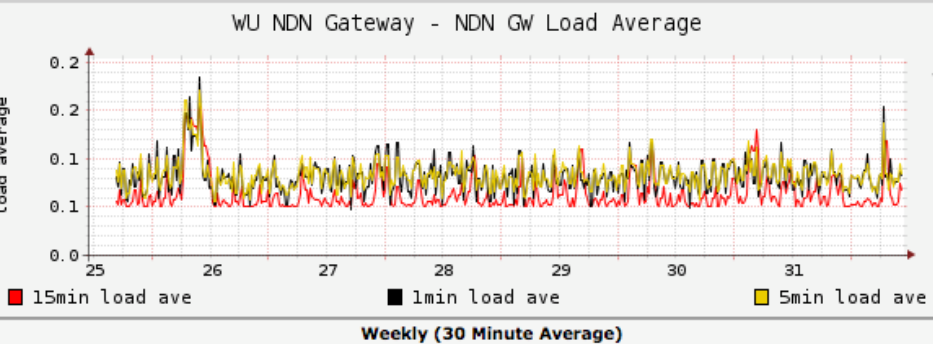
» PW: ndnTest

» Examples on next slide...

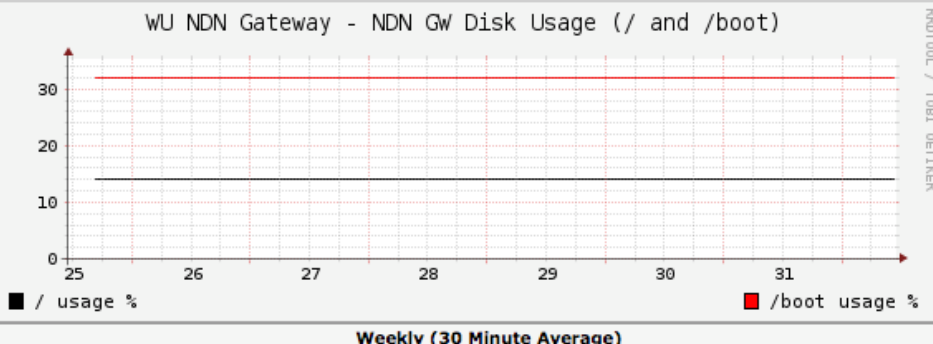
Cacti graph examples



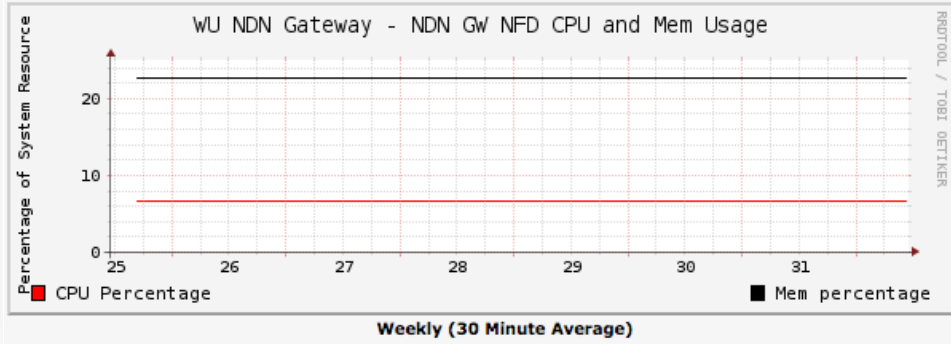
Weekly (30 Minute Average)



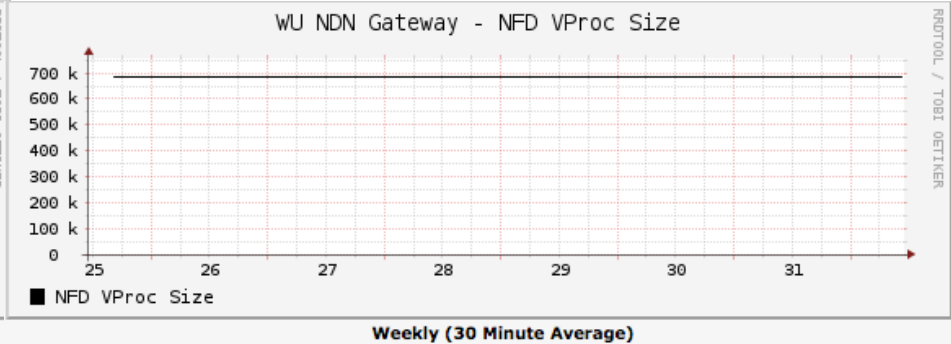
Weekly (30 Minute Average)



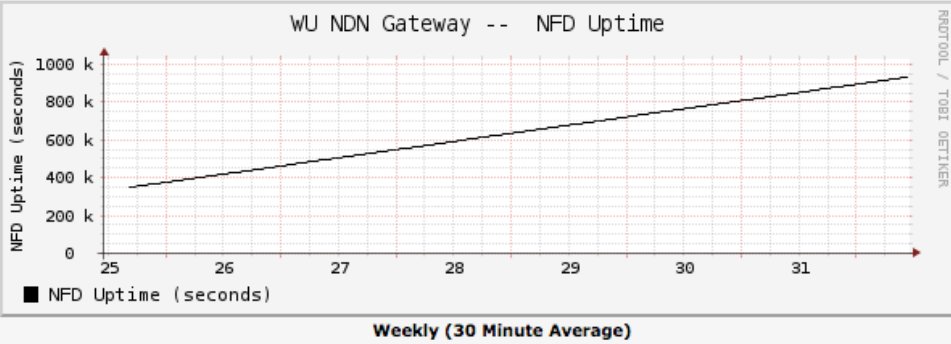
Weekly (30 Minute Average)



Weekly (30 Minute Average)



Weekly (30 Minute Average)



Weekly (30 Minute Average)

Management Change: Ansible

■ Previous Management

- » Via git, ssh and lots of hands-on updates.

■ New Scheme: Ansible

- » <https://www.ansible.com/>
- » Management, Provisioning and Deployment engine
- » One point of control
 - Uses ssh to connect to remote nodes.
- » Playbook for maintaining NDN Testbed
 - Defines tasks:
 - Install packages and daemons
 - Configure
 - Start/Restart
- » Each node has a defined set of variables
 - Used as parameters to Templates to generate conf files

Coming Soon: Expansion into Amazon AWS

- **AWS AMI for NDN gateway node and client.**
 - » Develop for use across range of AWS instance sizes.
- **Maintain 1 NDN GW in each of 12 regions**
 - » Regional gateway nodes maintained via Ansible
- **Develop Ansible playbook for**
 - » Deploying NDN clients in AWS
 - » Deploying NDN GWs in AWS
- **All Ansible playbooks for AWS and all AWS AMIs to be made available to the NDN community**

Questions?