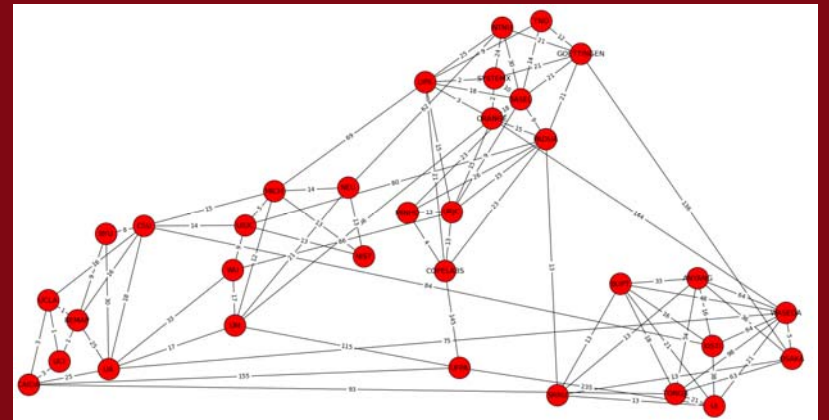


NDN Testbed

Status and Upcoming Changes NDN Retreat, November 2016

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Topics

■ Current Status

■ Upcoming Changes

■ Discussion Topics:

- If you listen to nothing else in my talk, think about this for discussion at the end.
- » How do we get more usage out of the NDN Testbed?
- » What do users need for application support, monitoring and data gathering?

NDN Testbed: November 2016

■ Consists of 33 Gateway Router Nodes

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

■ Presence on 4 Continents and 15 Countries

» North America (13)

- USA (13)

» South America (1)

- Brazil (1)

» Asia (8)

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

» Europe (11)

- France (3)
- Italy (1)
- Spain (1)
- Switzerland (1)
- Norway (1)
- Germany (1)
- Portugal (2)
- Netherlands (1)

Per Site/Node Details

Node Name	OS Version (Ubuntu)	IP Address of gateway router	NDN Default Prefix	Operator Name	Site Email Domains	Operator Email Address
BASEL	14.04.5	192.43.193.111	/ndn/ch/unibas	Urs Schnurrenberger	@unibas.ch	urs.schnurrenberger@unibas.ch
BUPT	14.04.5	114.247.165.44	/ndn/cn/edu/bupt	Junfu Zhou	@bupt.edu.cn	zhoujunfuv5@163.com
TONGJI	14.04.5	202.120.188.176	/ndn/cn/edu/tongji	Dejiang Zhou	@tongji.edu.cn	dejiang_zhou@163.com
ORANGE	14.04.5	193.253.72.45	/ndn/com/orange	Jacky Forestier	@orange.com	jacky.forestier@orange.com
GOETTINGEN	14.04.5	134.76.249.235	/ndn/de/uni-goettingen	Sripriya Srikant Adhatarao	@uni-goettingen.de @cs.uni-goettingen.de	s.adhatarao@stud.uni-goettingen.de
ARIZONA	14.04.5	128.196.203.36	/ndn/edu/arizona	Junxiao Shi	@cs.arizona.edu	shijunxiao@email.ARIZONA.EDU
BYU	14.04.5	128.187.81.12	/ndn/edu/byu	Jeff Andersen	@byu.edu @isrl.byu.edu	andersen@isrl.byu.edu
CSU	14.04.5	129.82.138.48	/ndn/edu/colostate	Susmit Shannigrahi	@colostate.edu	susmit@cs.colostate.edu
ILLINOIS	14.04.5	72.36.112.82	/ndn/edu/illinois	Jongdeog Lee (JD)	@illinois.edu	jlee700@illinois.edu
MEMPHIS	14.04.5	141.225.11.173	/ndn/edu/memphis	Ashlesh Gawande	@memphis.edu	agawande@memphis.edu
NEU	14.04.5	129.10.52.193	/ndn/edu/neu	Ran Liu	@neu.edu	liuranapply@gmail.com
UCI	14.04.5	128.195.4.36	/ndn/edu/uci	Cesar Ghali	@uci.edu	cghali@uci.edu
UCLA	14.04.5	131.179.196.46	/ndn/edu/ucla	Alex Afanasyev	@ucla.edu	alexander.afanasyev@ucla.edu
REMAP	14.04.5	128.97.98.7	/ndn/edu/ucla/remap	Zhehao Wang	@remap.ucla.edu	wangzhehao410305@gmail.com
MICHIGAN	14.04.5	141.212.108.18	/ndn/edu/umich	J. Alex Halderman	@eecs.umich.edu	jhalderm@eecs.umich.edu
WUSTL	14.04.5	128.252.153.194	/ndn/edu/wustl	John DeHart	@wustl.edu	jdd@wustl.edu
URJC	14.04.5	193.147.51.186	/ndn/es/urjc	Pedro de las Heras Quiros	@urjc.es @alumnos.urjc.es	pheras@gsyc.es
SYSTEMX	14.04.5	137.194.54.81	/ndn/fr/irt-systemx	Luca Muscariello	@irt-systemx.fr	luca.muscariello@irt-systemx.fr
LIP6	14.04.5	132.227.62.163	/ndn/fr/lip6	Davide Pesavento	@lip6.fr	davide.pesavento@lip6.fr
NIST	14.04.5	129.6.112.2	/ndn/gov/nist	Charif Mahmoudi	@nist.gov	charif.mahmoudi@nist.gov
INDONESIA	14.04.5	152.118.148.103	/ndn/id/ac/ui	Yudi A. Phanama	@ui.ac.id	yudi.andrean@ui.ac.id
PADUA	14.04.5	147.162.114.18	/ndn/it/unipd	Alberto Compagno	@unipd.it	compagno@di.uniroma1.it
OSAKA	14.04.5	133.1.17.51	/ndn/jp/ac/osaka-u	Yuki Koizumi	@ist.osaka-u.ac.jp	ykoizumi@ist.osaka-u.ac.jp
WASEDA	14.04.5	133.9.73.66	/ndn/jp/waseda	Xiabo Li	@waseda.jp	lxb385@fuji.waseda.jp
ANYANG	14.04.5	210.114.89.49	/ndn/kr/anyang	Euihyun Jung	@anyang.ac.kr	jung@anyang.ac.kr
KISTI	14.04.5	203.253.235.168	/ndn/kr/re/kisti	Alexander Ni	@kisti.re.kr	alexni1992@gmail.com
NTNU	14.04.5	129.241.209.52	/ndn/no/ntnu	Haakon Garseg Mork	@ntnu.no @stud.ntnu.no	haakonmo@stud.ntnu.no
CAIDA	14.04.5	192.172.226.248	/ndn/org/caida	Dan Andersen	@caida.org	dea@caida.org
MINHO	14.04.5	193.136.9.206	/ndn/pt/uminho	Ertugrul Dogruluk	@di.minho.pt @alunos.uminho.pt	id5540@alunos.uminho.pt
COPELABS	14.04.5	193.137.75.171	/ndn/pt/ulusofona/copelabs	Paulo Mendes	@ulosofona.pt	p4035@ulusofona.pt
SRRU	14.04.5	202.29.30.31	/ndn/th/ac/srru	Thongchai Chuachan	@srru.ac.th	thongchai.c@srru.ac.th
UFPA	14.04.5	200.239.93.10	/ndn/br/ufpa	Igor Carvallho	@ufpa.br	igfuca@gmail.com
TNO	14.04.5	134.221.116.42	/ndn/nl/tno	Bastiaan Wissingh	@tno.nl	bastiaan.wissingh@tno.nl

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

- Still needs to be added into the packages repo...

» Monitors things like:

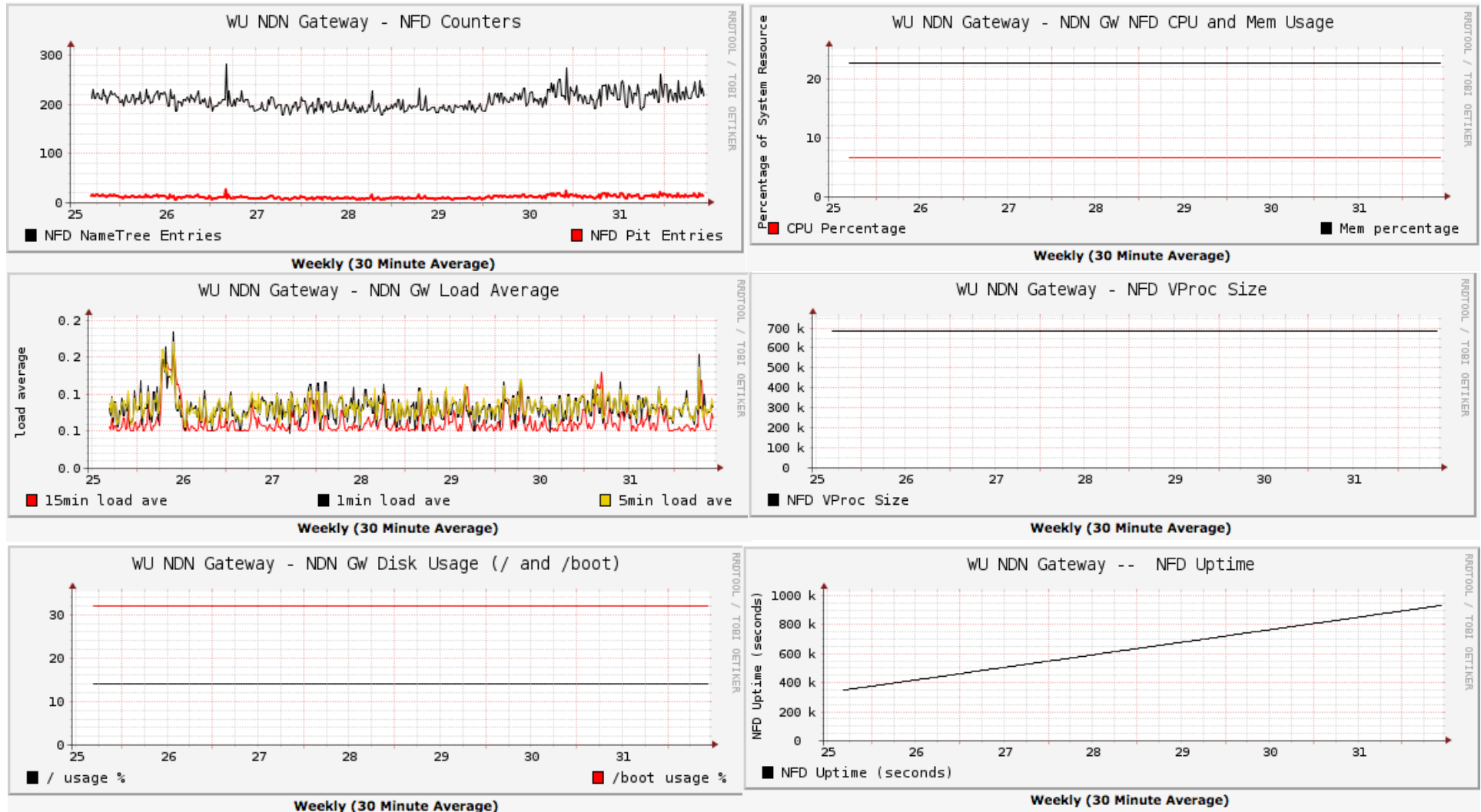
- Load average, / and /boot disk usage
- NFD process size, uptime, PIT counter, NameTree counter
- Etc...

» User: guest

» PW: ndnTest

» Examples on next slide...

Cacti graph examples



Upcoming Changes: Guest Certificates

- **Currently you request a certificate in your "home" gateway router's domain**
 - » My main cert is: /ndn/edu/wustl/jdd

- **What if you are developing an application that you need to test across the NDN Testbed?**
 - » For prefix registration you need a cert in the domain of each gateway where you want to attached a client.
 - » You need Guest Certificates.
 - » Currently being tested on a small number of sites.

Upcoming Changes: Guest Certificates

■ Normal cert request

- » Go to <http://ndncert.named-data.net>
- » Enter your email address
- » Site: Automatic
- » Submit

**NAMED DATA
NETWORKING**

[Request NDN Certificate](#)

[List of issued certificates](#)

[Help](#)

NDN Certifications

Hello, please enter your email to begin NDN Testbed certification. ([How it works and what to expect](#))

Email address:

jdd@wustl.edu

Site:

Automatic

Upcoming Changes: Guest Certificates

■ Guest cert request

- » Go to <http://ndncert.named-data.net>
- » Enter your email address
- » Select Site
- » Submit

**NAMED DATA
NETWORKING**

Request NDN Certificate

List of issued certificates

Help

NDN Certifications

Hello, please enter your email to begin NDN Testbed certification. ([How it works and what to expect](#))

Email address:

jdd@wustl.edu

Site:

- ✓ Automatic
 - /ndn/edu/wustl (Washington University in St. Louis)
 - /ndn/edu/illinois (University of Illinois)
 - /ndn/edu/colostate (Colorado State University)
 - /ndn/edu/ucla (University of California, Los Angeles)

Upcoming Changes: User Accessible Repos

- **Currently repo-ng on each GW node stores Keys**
 - » Not usable by end users.
- **Experimenting with user accessible repo-ng**
 - » Run as separate repo from Key repo
- **Issues:**
 - » Storage maintenance
 - » Certificate needs (Guest certificates)
 - » Accessibility
 - Producing
 - Consuming
 - » ...

Upcoming Changes: Ansible

■ Current Management

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

■ Changing to Ansible

- » <https://www.ansible.com/>
- » Management, Provisioning and Deployment engine
- » One point of control
 - Well almost for us...
 - Uses ssh to connect to remote nodes.
 - Which we don't have for NIST node.
 - Developing playbook for maintaining NDN Testbed
 - Separate playbook to maintain NIST node
- » Each node has a defined set of variables
 - Used as parameters to Templates to generate conf files
 - Sample on next slide
- » Packages also maintained through playbook

Sample Ansible host variables (WU)

```
# file: host_vars/WU
ansible_host: wundngw.arl.wustl.edu
site: /edu/wustl
default_prefix: /ndn/edu/wustl
advertised_prefixes: [/ndn/edu/wustl]
router_name: wundngw
neighbors:
  MEMPHIS: {link_cost: 17}
  ARIZONA: {link_cost: 33}
network_regions: [/ndn/edu/wustl]
hr_radius: 123.456
hr_angle: 1.45
```

Upcoming Changes: Expansion into 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**

Discussion Topics

- **There are currently 31 different people who have NDN certs.**
 - » Several people have multiple certs.
- **How many of you have developed an application that has been used on the NDN Testbed?**
- **How many of you have used the NDN Testbed?**
- **How do we get more usage of the NDN Testbed?**
- **What do users need for application support, monitoring and data gathering?**