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

<table>
<thead>
<tr>
<th>Node Name</th>
<th>OS Version (Ubuntu)</th>
<th>IP Address of gateway router</th>
<th>NDN Default Prefix</th>
<th>Operator Name</th>
<th>Site Email Domains</th>
<th>Operator Email Address</th>
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<tbody>
<tr>
<td>BASEL</td>
<td>14.04.5</td>
<td>192.43.193.111</td>
<td>/ndn/ch/unibas</td>
<td>Urs Schnurrenberger</td>
<td>@unibas.ch</td>
<td><a href="mailto:urs.schnurrenberger@unibas.ch">urs.schnurrenberger@unibas.ch</a></td>
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<td>Junfu Zhou</td>
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<td>TONGJI</td>
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<td>/ndn/cn/edu/tongji</td>
<td>Dejiang Zhou</td>
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<td>ORANGE</td>
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<td>GOETTINGEN</td>
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<td>@tno.nl</td>
<td><a href="mailto:bastiaan.wissingh@tno.nl">bastiaan.wissingh@tno.nl</a></td>
</tr>
</tbody>
</table>
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

WU NDN Gateway - NFD Counters
- NFD NoneTree Entries
- NFD Pit Entries

Weekly (30 Minute Average)

WU NDN Gateway - NDN GW NFD CPU and Mem Usage
- CPU Percentage
- Mem percentage

Weekly (30 Minute Average)

WU NDN Gateway - NDN GW Load Average
- 15min load ave
- 1min load ave
- 5min load ave

Weekly (30 Minute Average)

WU NDN Gateway - NFD VProc Size
- NFD VProc Size

Weekly (30 Minute Average)

WU NDN Gateway - NDN GW Disk Usage (/ and /boot)
- / usage %
- /boot usage %

Weekly (30 Minute Average)

WU NDN Gateway -- NFD Uptime
- NFD Uptime (seconds)
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
Upcoming Changes: Guest Certificates

**Guest cert request**

- Go to [http://ndncert.named-data.net](http://ndncert.named-data.net)
- Enter your email address
- Select Site
- Submit
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/](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)

```yaml
---
# file: host_vars/WU
ansible_host: wundngw.arl.wustl.edu
site: /edu/wustl
default_prefix: /ndn/edu/wustl
advertised_prefixes: [/ndn/edu/wustl]
routing_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?