Mini-NDN: A Lightweight and Scalable Mininet based Emulation Environment for NDN

Ashlesh Gawande, Lan Wang
Need for Mini-NDN

- Shared emulation environment (ex: Emulab)
  - Problems with many users, long wait time
- Simulation environments (ex: ndnSIM)
  - Real world applications may need to be modified
  - NFD version may not be the very latest commit on Github
  - Cannot interact directly in real time (visualization is possible)
- Introducing Mini-NDN, Mininet based network emulator
Mini-NDN challenges

- **Usability**
  - Must be easy to configure and use
  - Support new use cases easily
- **Scalibility**
  - Mini-NDN runs actual instances of NFD, NLSR
  - Number of nodes emulated $\propto$ CPU power
Mini-NDN features

- Topology can be configured using a simple topology file
  - Can be generated via GUI
- Experimental framework is provided to write new experiments
- Mini-NDN cluster edition is developed to scale Mini-NDN across a cluster

```
Write and run desired experiment:
sudo minindn --experiment myOwnExp
```

```
[nodes]
h1: NDNAp cpu=10
h2: _ cpu=10
h3: NDNAp cpu=10

[links]
a:b delay=10ms
t:c delay=10ms
```
Mini-NDN use cases

- Evaluation of HR
  - Emulate Testbed for preparation of deployment
- Evaluation of PSync and Chronosync
- Evaluation of NDN-BMS
- Being used to test NLSR patches on gerrit

**NDN-Robot**

Patch Set 4: Verified-Integration+1

NLSR tester bot:

All tests passed!

4 node convergence test

4 node mcn failure convergence test