ACM ICN
2022 OSAKA

NAMED DATA
NETWORKING

Mini-NDN: Overview, Getting Started, Example Scenario

Tutorial: NDN Evaluation Tools: ndnSIM and Mini-NDN

Outline

- **Overview**
- Getting Started
- Example scenario
  - Getting started
  - Prepare environment
  - Writing scenarios
  - More

Overview

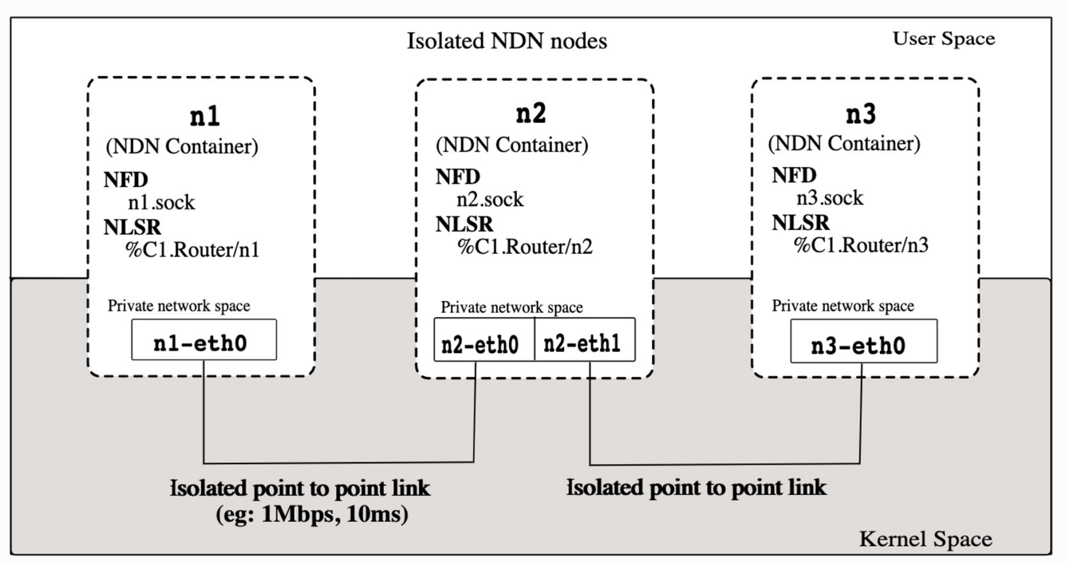


Figure: Relationship between Minindn and Mininet

- Mini-NDN is a Mininet based network emulator
- Provides quick and easy environment for testing, experimentation, and research on the NDN platform
- A full NDN network can be run on a single system (laptop, server, etc.)
- Each node in the network can run forwarding, routing, and NDN applications
- Independent of changes in NDN platform

Current Status

- Actively maintained

Getting Started

- Works on the following Linux distributions:
    - Ubuntu 20.04 (recommended)
    - Debian 11 (WiFi scenario does not work)
    - Fedora 33 (WiFi scenario does not work)

- Dependencies
    - Mininet
    - Mininet-WiFi (optional)
    - NDN Packages
        - NDN Forwarding Daemon (NFD)
        - Named Data Link State Routing (NLSR)
        - NDN Essential Tools (ndn-tools)
        - NDN Traffic Generator
    - Infoedit

Installation

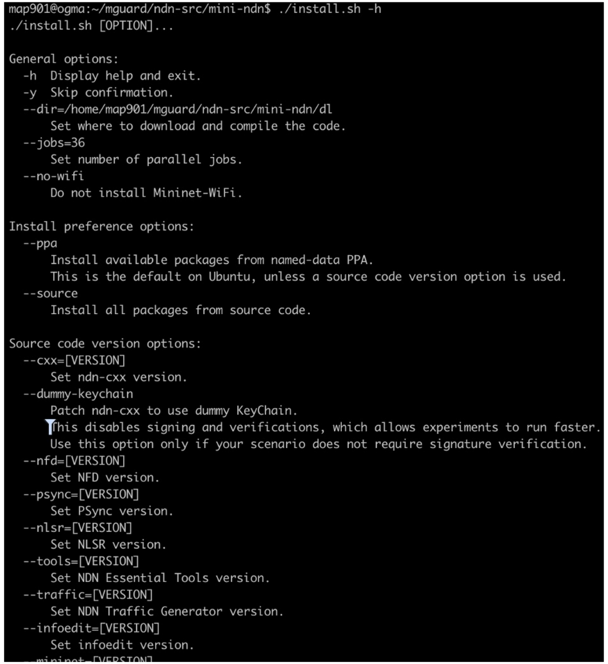
Step 1: `git clone git@github.com:named-data/mini-ndn.git`

Step 2: `./install.sh`

Some of the notable features offered by installation script (install.sh)

- NDN packages (NFD, NLSR, ndn-cxx..) from source
  - `./install.sh --source`
- NDN packages from PPA
  `./install.sh --ppa`
- Applying dummy keychain (`--dummy-keychain`)
  - Skip signing and verifications to run experiments faster
  - Only use if experiments doesn’t require signature verification
- Install without wifi module (`--no-wifi`)
- Install specific version of NDN package when installing from source
  - `--nfd=[VERSION]`

`(./install.sh -h -- view all the flags)`



```
map901@ogma:~/mguard/ndn-src/mini-ndn$ ./install.sh -h
./install.sh [OPTION]...

General options:
  -h  Display help and exit.
  -y  Skip confirmation.
  --dir=/home/map901/mguard/ndn-src/mini-ndn/dl
      Set where to download and compile the code.
  --jobs=36
      Set number of parallel jobs.
  --no-wifi
      Do not install Mininet-WiFi.

Install preference options:
  --ppa
      Install available packages from named-data PPA.
      This is the default on Ubuntu, unless a source code version option is used.
  --source
      Install all packages from source code.

Source code version options:
  --cxx=[VERSION]
      Set ndn-cxx version.
  --dummy-keychain
      Patch ndn-cxx to use dummy KeyChain.
      This disables signing and verifications, which allows experiments to run faster.
      Use this option only if your scenario does not require signature verification.
  --nfd=[VERSION]
      Set NFD version.
  --psync=[VERSION]
      Set PSync version.
  --nlsr=[VERSION]
      Set NLSR version.
  --tools=[VERSION]
      Set NDN Essential Tools version.
  --traffic=[VERSION]
      Set NDN Traffic Generator version.
  --infoedit=[VERSION]
      Set infoedit version.
  --mininet=[VERSION]
```

Installation (cont..)

- Using Container/Virtualbox
- Easy way to install and play
- System requirement/Recommendation
  - At least, CPU core count (default 4 cores) and RAM (default 4GB)

Using Vagrant

- Simple way
  - Pre-compiled Mini-NDN box:
    - Steps:
      - Choose your installation folder
      - copy the Vagrantfile there
      - run `vagrant up`
- Hard way
  - Why? → pre-compiled Mini-NDN box may not have latest dependencies
  - Steps:
    - Grab a vagrant box
    - run vagrant up
    - Follow the installation instruction from the previous slide

Installation (cont..)

Using Docker

Verification

```
sudo python examples/mnndn.py
```

Features

-

Documentation and Examples

- Detailed documentation: ***https://minindn.memphis.edu/***
    - **Includes:** installation guide, writing basic examples, links to source code and many more
- Source code: https://github.com/named-data/mini-ndn
- Examples: https://github.com/named-data/mini-ndn/tree/master/examples
- Mailing List: https://www.lists.cs.ucla.edu/mailman/listinfo/mini-ndn