



Named Data Networking: Codebase and NDN Resources

milcom

Military Communications for the 21st Century

LAX Marriott, Los Angeles, CA

NDN Codebase Overview

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Military Communications for the 21st Century
October 29-31, 2018 • LAX Marriott, Los Angeles, CA

Infrastructure Software

NFD

NFD-
android

NDN-
RIOT

μNFD

NDN
Tools

NLSR

Repo-ng,
repo-sql

NDN
Control
Center

NDN Libraries

ndn-
cxx

NDN-CCL (JS,
Java, Python)

NAC

ChronoSync

PSync

Vector
Sync

NDN-
RTC

Apps

ChronoChat

ndns

ndncert

ndn-
flow

NdnCon

ndn-fs

ndn-
atmos

Many
others

Evaluation Frameworks

ndnSIM

miniNDN

NDN Testbed

The screenshot shows a web browser window displaying the Named Data Networking (NDN) Project website. The browser's address bar shows the URL `named-data.net`. The website features a navigation menu with links for Project, Architecture, Codebase, Testbed, Publications, and Discussion. The main content area is divided into four columns, each with a header, a description, and a 'Read More' link. The first column is titled 'NDN HACKATHON' and mentions the 6th NDN Hackathon held in May 2018. The second column is titled 'TUTORIAL VIDEOS' and offers videos about the NDN project and technologies. The third column is titled 'THE NDN TESTBED IS GROWING' and describes a shared resource for research purposes. The fourth column is titled 'NDN VIDEO FAQ' and provides video answers to questions about NDN. Below these columns is a section for the 'Named Data Networking (NDN) Project Newsletter for Jan-May 2018', dated May 18, 2018, by CAIDA. To the right of the newsletter section is a search bar and a 'GO' button. Below the search bar is an 'Events' section listing two upcoming events: 'ACM ICN 2018' in Boston, MA, and 'NDN Community Meeting 2018' at NIST, Gaithersburg, MD. At the bottom of the page, there is a 'Community Outreach' section mentioning the 5th NDN Hackathon held in December 2017 at the University of California, Los Angeles.

NAMED DATA NETWORKING

Project Architecture Codebase Testbed Publications Discussion

NDN HACKATHON
See the results of the 6th NDN Hackathon held in May 2018.
[Read More](#)

TUTORIAL VIDEOS
Watch tutorial videos about the NDN project and NDN technologies.
[Read More](#)

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.
[Read More](#)

NDN VIDEO FAQ
Questions about NDN answered on video by faculty, students, staff researchers, and colleagues.
[Read More](#)

Named Data Networking (NDN) Project Newsletter for Jan-May 2018
May 18, 2018 by CAIDA in [Newsletter](#) | Comments Off on Named Data Networking (NDN) Project Newsletter for Jan-May 2018

The NDN project team compiles and publishes this newsletter periodically to inform the community about recent activities, technical news, meetings, publications, presentations, code releases, and upcoming events. You can find these newsletters posted on the Named Data Networking Project blog.

Community Outreach
We held the 5th NDN Hackathon on December 16-17, 2017 at the University of California, Los

search this site

Events

September 20-22, 2018
[ACM ICN 2018](#)
Boston, MA

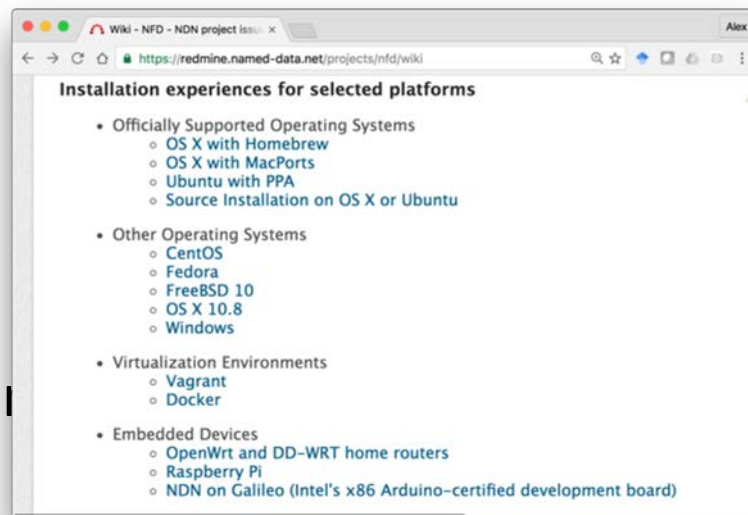
September 18-19, 2018
[NDN Community Meeting 2018](#)
NIST, Gaithersburg, MD

Where to Find Source Code for NDN Codebase

- Github organizations
 - <https://github.com/named-data>
 - NFD, core libraries, and other general use software
 - <https://github.com/named-data-mobile>
 - Android and related software
 - <https://github.com/named-data-iot>
 - IoT related software
 - <https://github.com/named-data-ndnsim>
 - ndnSIM core, example and real simulation scenarios

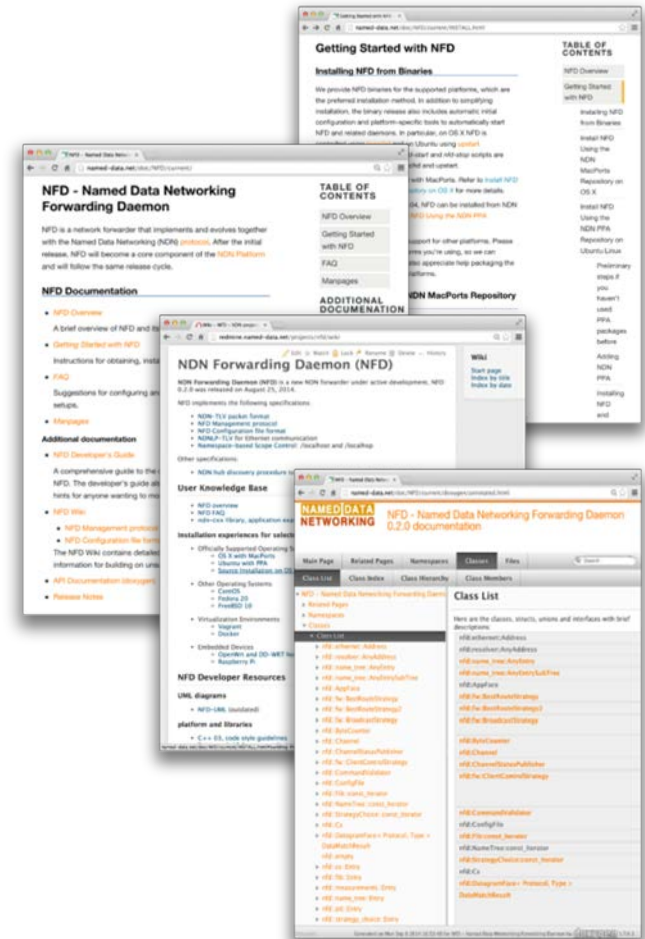
- Desktop Systems
 - Ubuntu, OSX, FreeBSD and other Linux distributions
- Home routers
 - OpenWRT, DD-WRT
- Mobile:
 - Android, iOS (library only)
- IoT:
 - Arduino, ESP8266, RIOT-OS
 - Raspberry Pi (runs NFD, available binary)
- Web browser
 - NDN-JS library + microforwarder

<https://redmine.named-data.net/projects/nfd/wiki>

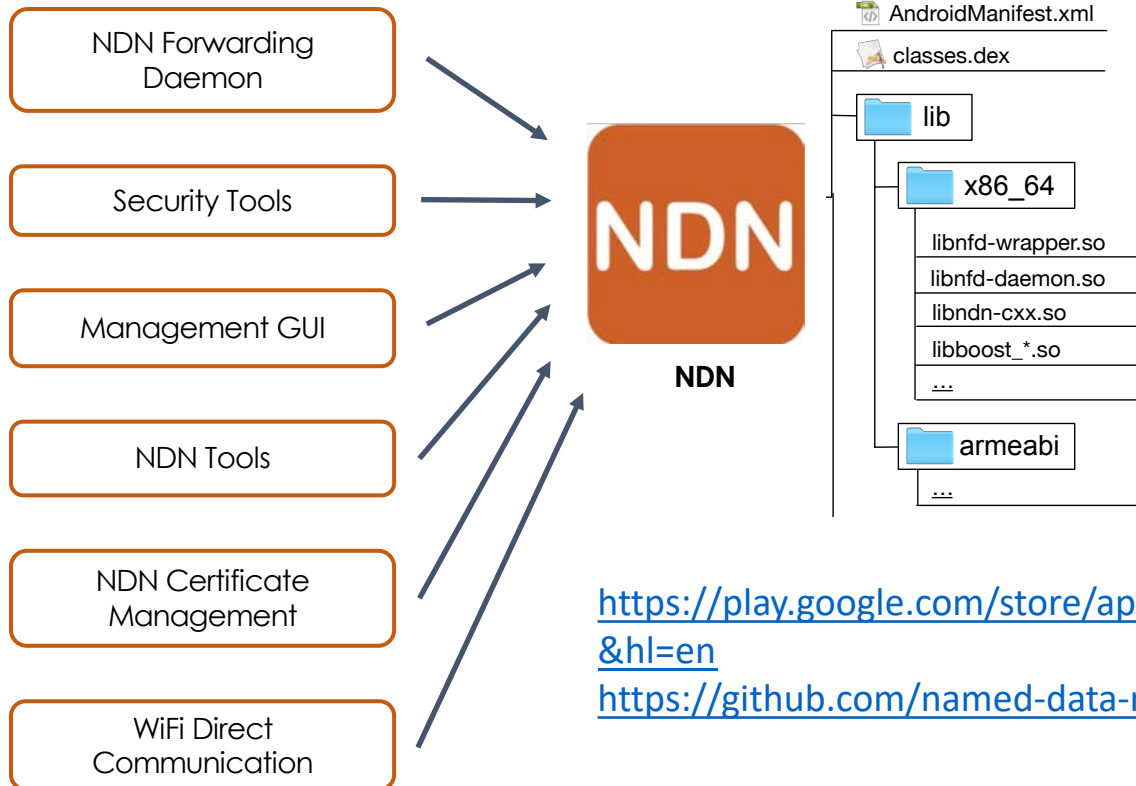


NDN Forwarding Daemon (NFD)

- The reference implementation of NDN forwarder
- <https://named-data.net/doc/NFD/current/>
 - Overview
 - Getting started
 - NFD Developer's Guide
 - Manpages
 - Wiki
 - API documentation (doxygen)
- Feedback, suggestions, and contributions are welcome.



NDN-Android: NDN Stack for Android



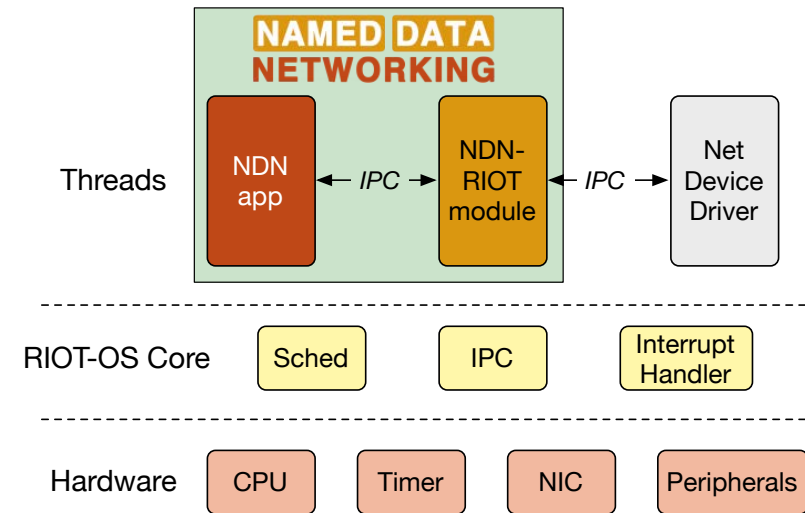
- Embeds actual NFD, compiled using NDK
- Works with all (non-rooted) Android devices

https://play.google.com/store/apps/details?id=net.named_data.nfd&hl=en

<https://github.com/named-data-mobile>

NDN-RIOT: NDN for RIOT-OS

- Optimized for IoT apps
- Support
 - Data-centric security
 - Stateful NDN packet forwarding
 - Replaceable forwarding strategies
 - 802.15.4 and Ethernet
- Simple application APIs
- Several simple examples to get started



- ndnping, ndnpingserver
 - Reliability testing tools
- ndncatchunks, ndnputchunks
 - Segmented file transfer between a consumer and producer
- ndnpeek, ndnpoke
 - Transmit a single packet between a consumer and a producer
- ndndump, dissect, wireshark-dissect
 - Debug NDN packet flow
- repo-ng, repo-sql: NDN repositories providing managed persistent storage

TCPDUMP

WIRESHARK

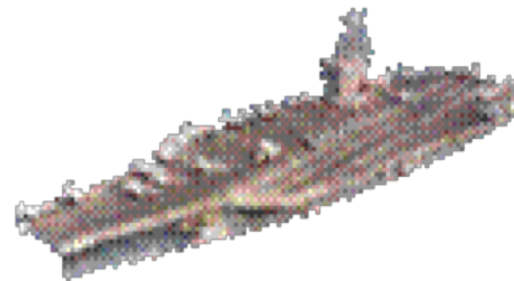




<https://github.com/named-data/NFD>



NFD: NDN Stack



NAC: Name-Based
Access Control

<https://github.com/named-data/name-based-access-control>

NDN Sync

<https://github.com/named-data/ChronoSync>
<https://github.com/named-data/PSync>

NDN Repo

<https://github.com/named-data/repo-ng>

ndn-cxx library and security tools

<https://github.com/named-data/ndn-cxx>

NDNCERT: automated certificate
provisioning

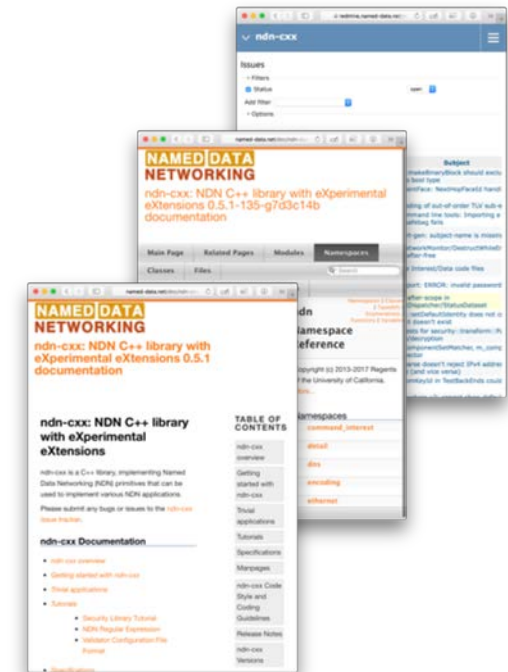
<https://github.com/named-data/ndncert>

NDN tools: Maintenance and
Debugging

<https://github.com/named-data/ndn-tools>

ndn-cxx: NDN C++ library with eXperimental eXtensions

- C++14
- The reference library and security library implementation
- Used in: NFD, NLSR, ndn-tools, ChronoChat, etc.
- <https://named-data.net/doc/ndn-cxx/current/>
 - Overview
 - Getting started
 - Trivial applications
 - Tutorials
 - Specifications
 - Manpages
 - API documentation (doxygen)
- Feedback, suggestions, and contributions are welcome.



NDN Common Client Libraries (NDN-CPP, NDN-JS, jNDN, PyNDN)

- C++, Java, Python, JavaScript, C#, Squirrel
- Used in: NDN-RTC, NdnCon, NFD-Android, etc.
- <https://named-data.net/codebase/platform/ndn-ccl/>
 - NDN Common Client Libraries API
 - NDN-CPP API
 - PyNDN API
 - NDN-JS API
 - jNDN API



- Remotely accessible network testbed
 - Operated and maintained by Applied Research Lab in Department of Computer Science and Engineering at Washington University in St. Louis
 - Real Hardware for running repeatable network experiments and producing trusted results. (NOT simulations)
- Use for NDN
 - NDN installed on each host/VM
 - NFD performance study
 - NDN Testbed Emulation to test new releases
- To join
 - <https://onl.wustl.edu/>
 - And “Get an account”



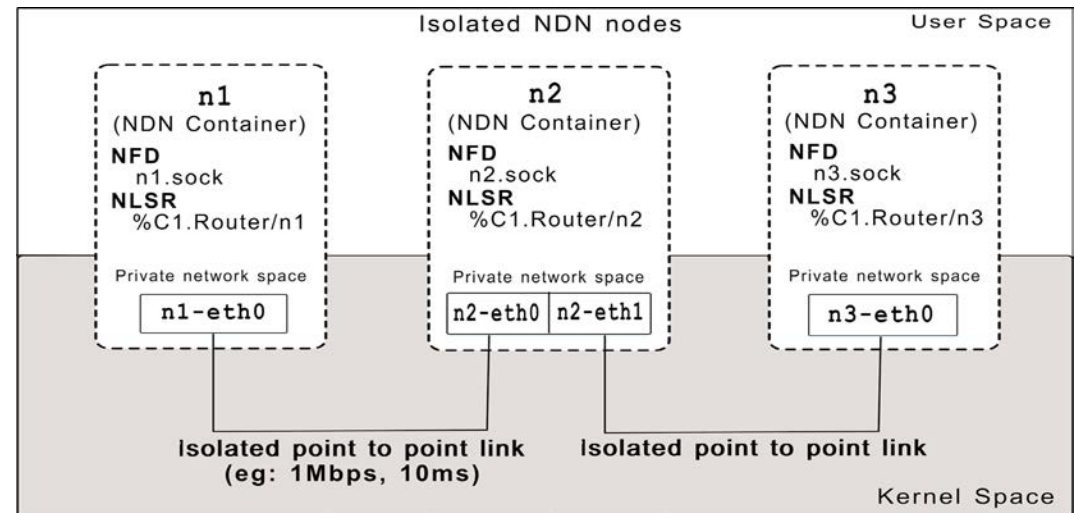
MiniNDN: NDN Emulation Framework (Based on MiniNet)

<http://minindn.memphis.edu/>

Runs actual instances of NFD, NLSR

Medium-scale evaluations

- Easy to configure network emulation
- Runs any real application
- Number of emulated nodes \propto CPU power
- Cluster edition can be used to scale emulations



ndnSIM: NDN Simulation Framework (Based on NS-3)

- Fully integrated with NDN prototype implementations: NFD & ndn-cxx
- Large scale evaluations
- Provide interoperability between simulation and prototyping
- Enable a two-way of experimentation and evaluation
- Enable high-fidelity NDN simulations
- 1500+ nodes with WiFi channels in the evaluation of NDN for vehicular networking

<https://ndnsim.net/>

