

Introduction

ndnSIM is

- ✓ an open-source common framework to perform NDN-related experiments
- ✓ a platform to conduct large-scale NDN experiments
- ✓ based on the NS-3 simulator framework
- ✓ implemented in a modular way
- ✓ extensively documented
- ✓ actively supported

ndnSIM can

- ✓ run large-scale experiments in a simple way
 - initial topology and link parameters can be defined in a file
 - stack helpers can adjust parameters of individual or multiple nodes at a time
- ✓ collect detailed traces of NDN traffic flow and behavior of each forwarding component

Why new version of ndnSIM?

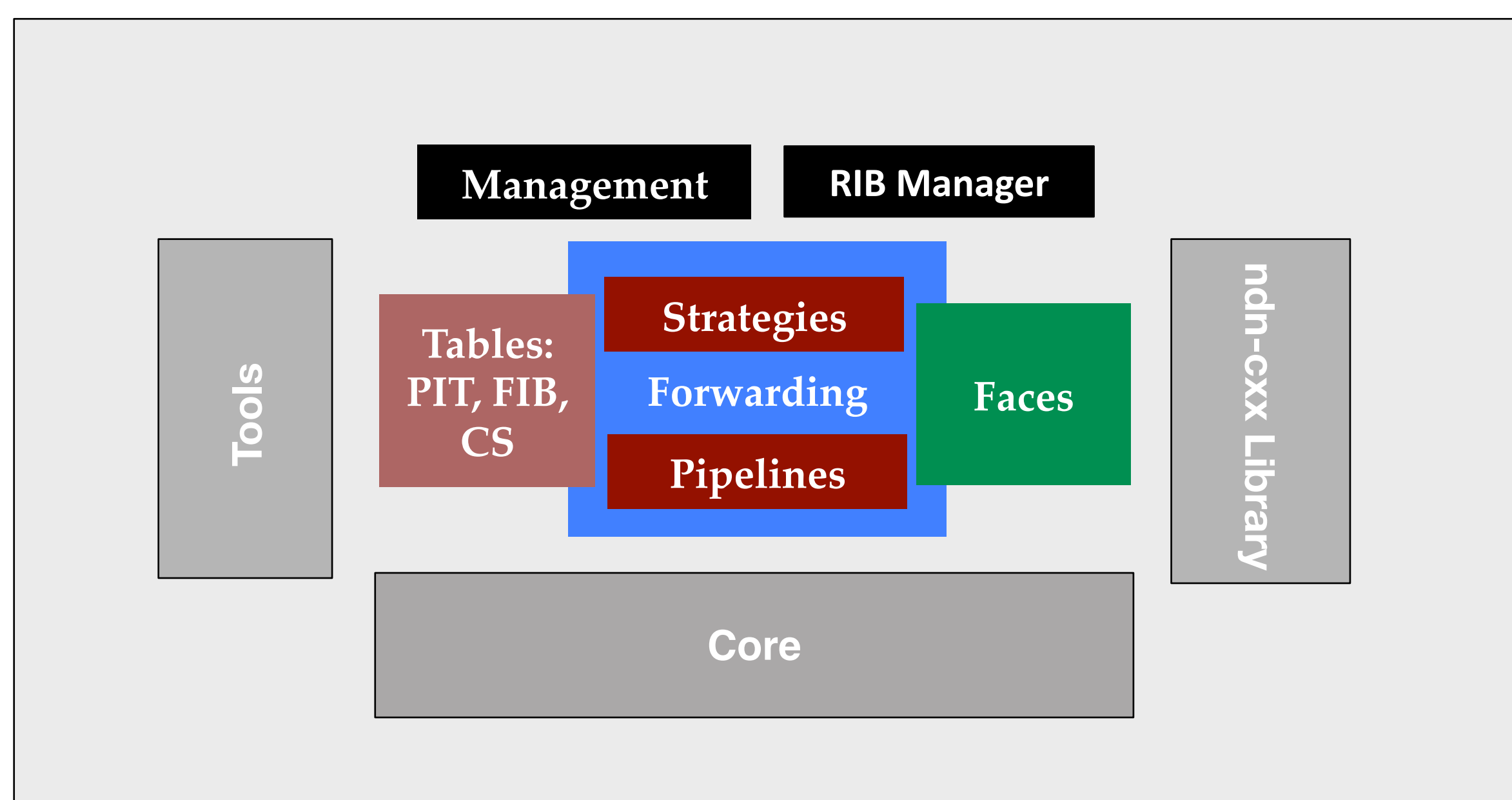
- ✓ Match the simulation platform to the latest advancements of NDN research
 - updated protocol specification
 - new NDN packet format
 - new forwarding strategies
- ✓ Consolidate research and development efforts
 - re-use existing codebases (ndn-cxx, NFD) in ndnSIM
 - allow easy porting of ndnSIM code into real implementations

Since its first release

- ✓ ndnSIM has been a useful tool by many researchers around the globe
- ✓ 32 (known) forks on GitHub
- ✓ ndnSIM mailing list has over 300 subscribers
- ✓ More than 100 papers have been published based on research done using ndnSIM

NFD and ndn-cxx Integration Into ndnSIM 2.0

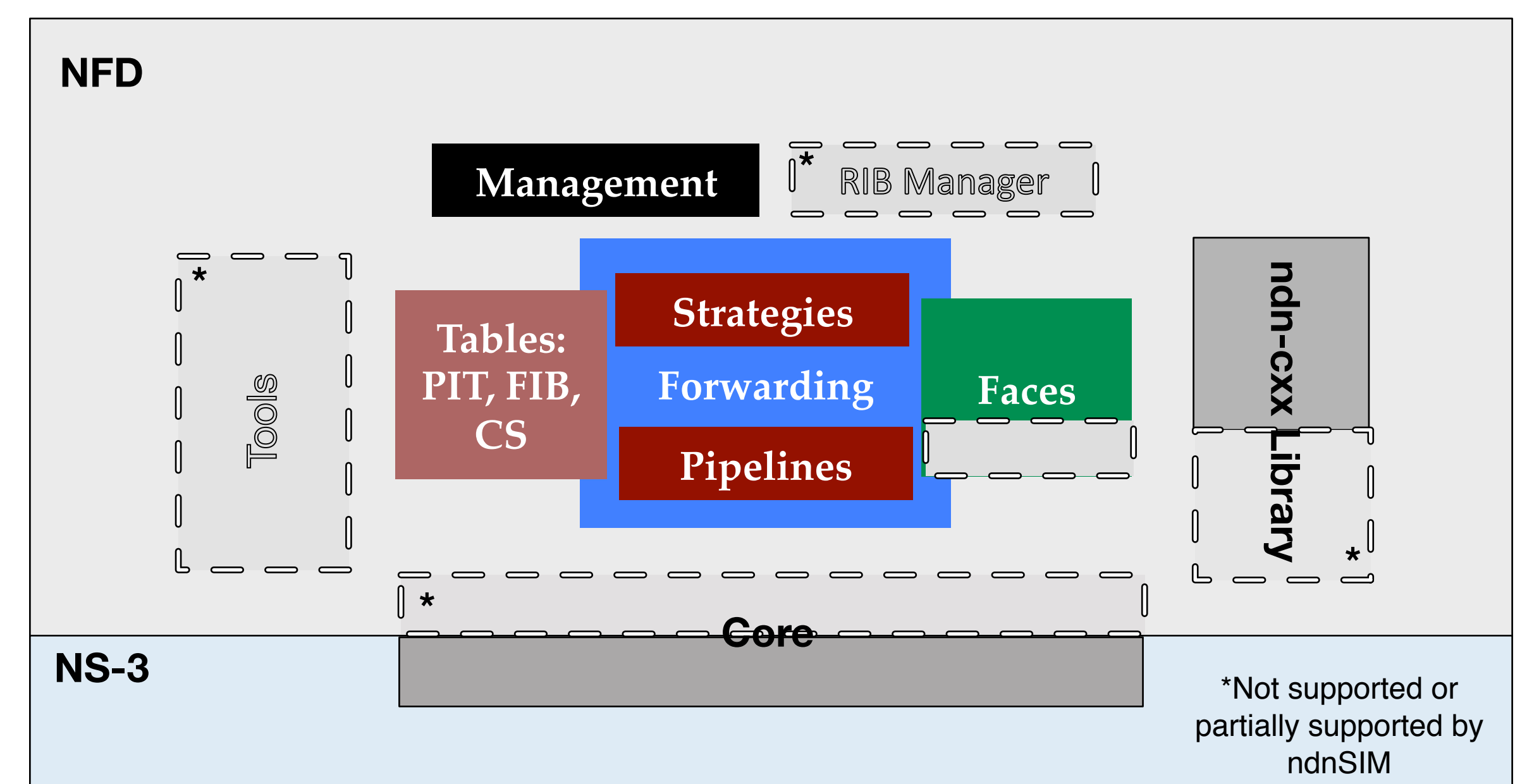
Major Components of Named Data Networking Forwarder (NFD)



Challenges for NFD Integration

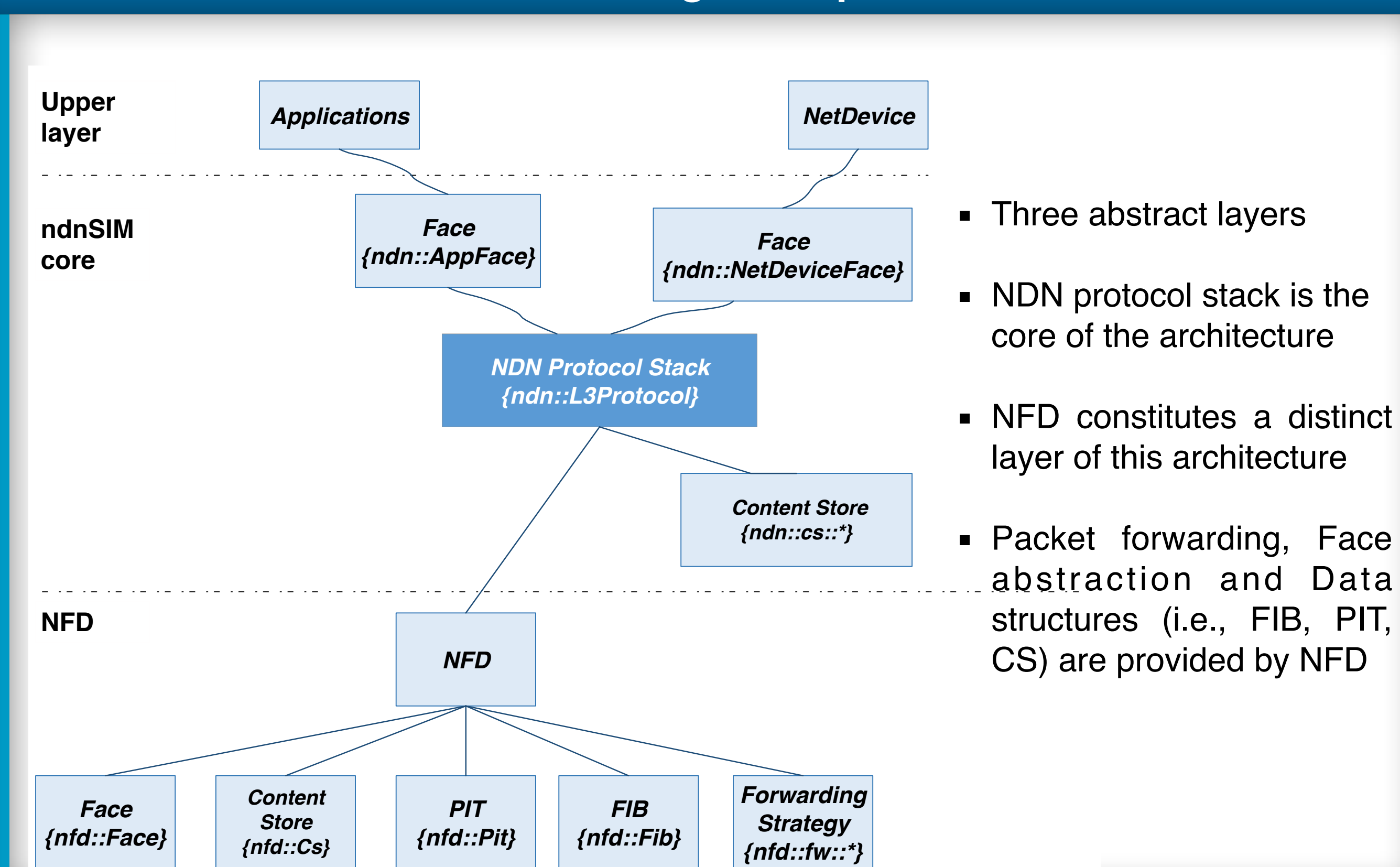
- Core elements must be switched to NS-3 routines
 - event scheduling
 - absolute and relative time operations
 - logging
- Events in NFD should be hooked up with tracing facilities of NS-3
 - tracing of traffic flow, CS, PIT, FIB
- NFD stack configuration needs to be streamlined with ndnSIM helper
 - configure node parameters, set up and update FIB, forwarding strategy, etc.
- New tracing points needs to be added
 - in forwarding pipelines
 - in CS, PIT, FIB
- Crypto overhead should be minimized

NFD Integrated into ndnSIM 2.0



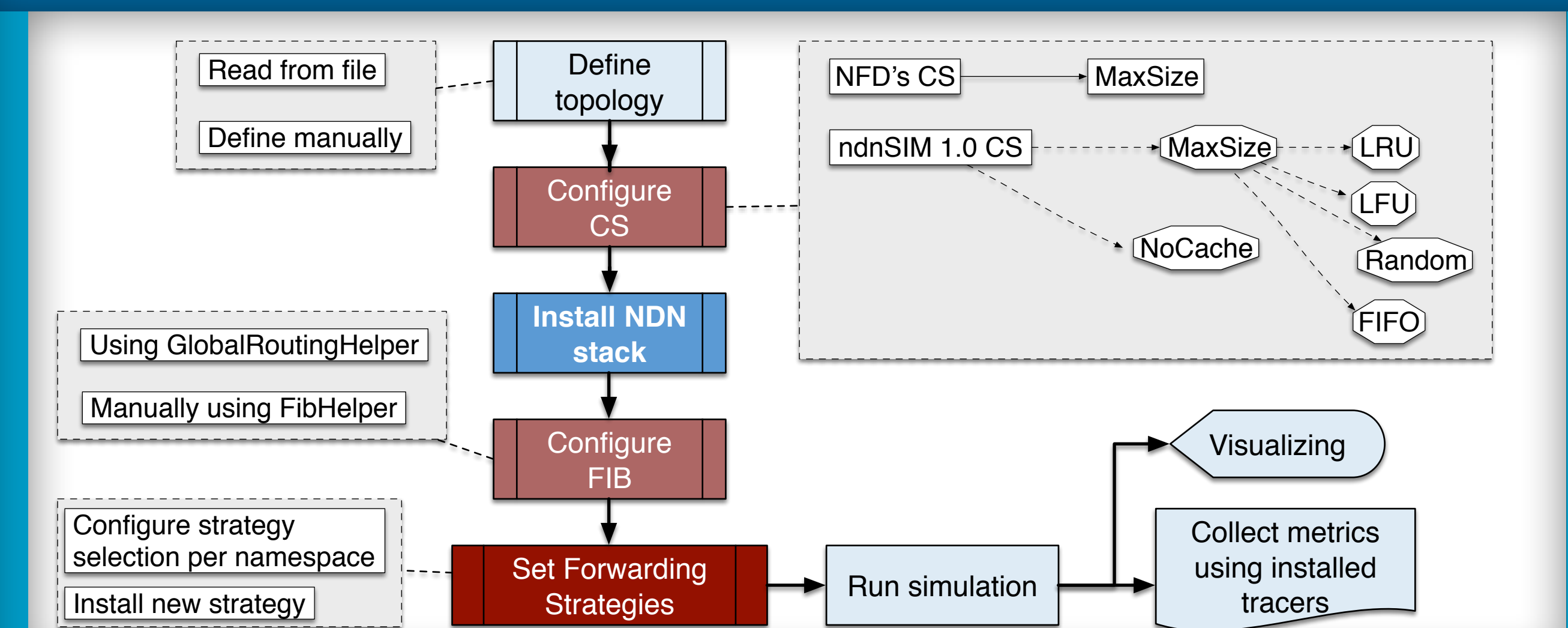
- Management
 - Everything except stripped down FaceManager
 - **NDN stack, FIB, strategy, and global routing helpers**
- Tables
 - Everything from NFD
 - **CS from ndnSIM 1.0**
- Faces
 - Only face abstraction and internal faces
 - **AppFace**
 - **NetDeviceFace**
- Core
 - everything, except, scheduler, logger, io
 - **NS-3 specific scheduler and logger**
- Forwarding
 - Everything from NFD
- ndn-cxx Library
 - NDN and NFD management abstractions
 - wire format
 - security library
 - (partially) utils

ndnSIM Design Components



- Three abstract layers
- NDN protocol stack is the core of the architecture
- NFD constitutes a distinct layer of this architecture
- Packet forwarding, Face abstraction and Data structures (i.e., FIB, PIT, CS) are provided by NFD

ndnSIM simulation scenario



Additional Documentation

- Technical Report
 - <http://named-data.net/techreport/ndn-0028-1-ndnsim-v2.pdf>
- Detailed documentation and examples can be found on the ndnSIM website:
 - <http://ndnsim.net/>
- Source code:
 - <https://github.com/named-data/ndnSIM>