

Introduction to Bachelor Thesis

Implementation of Session Support in ndnSIM

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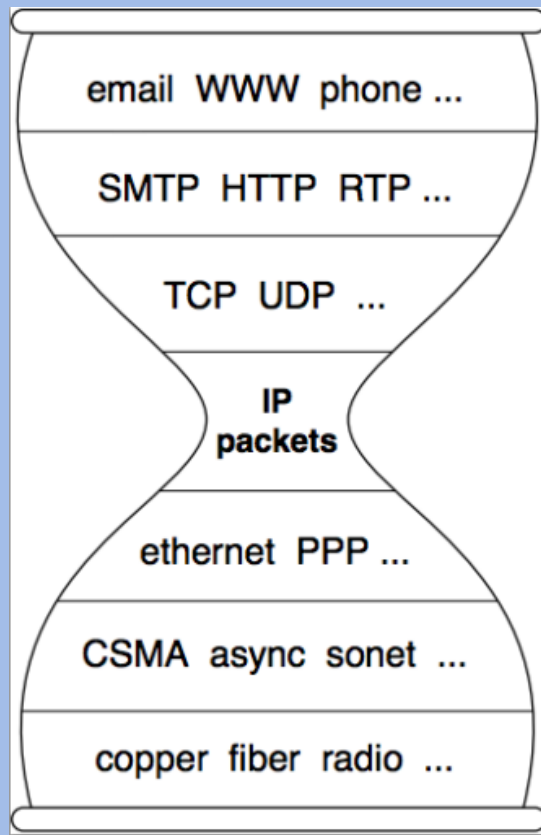
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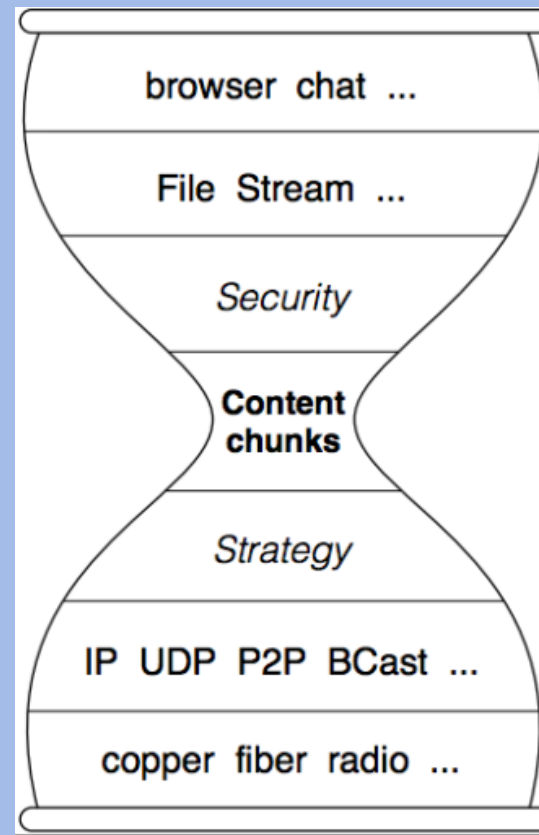
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Current versus Future Internet

Current Internet



Future Internet



Named Data Networking

- > Based on the original CCNx 0.x code

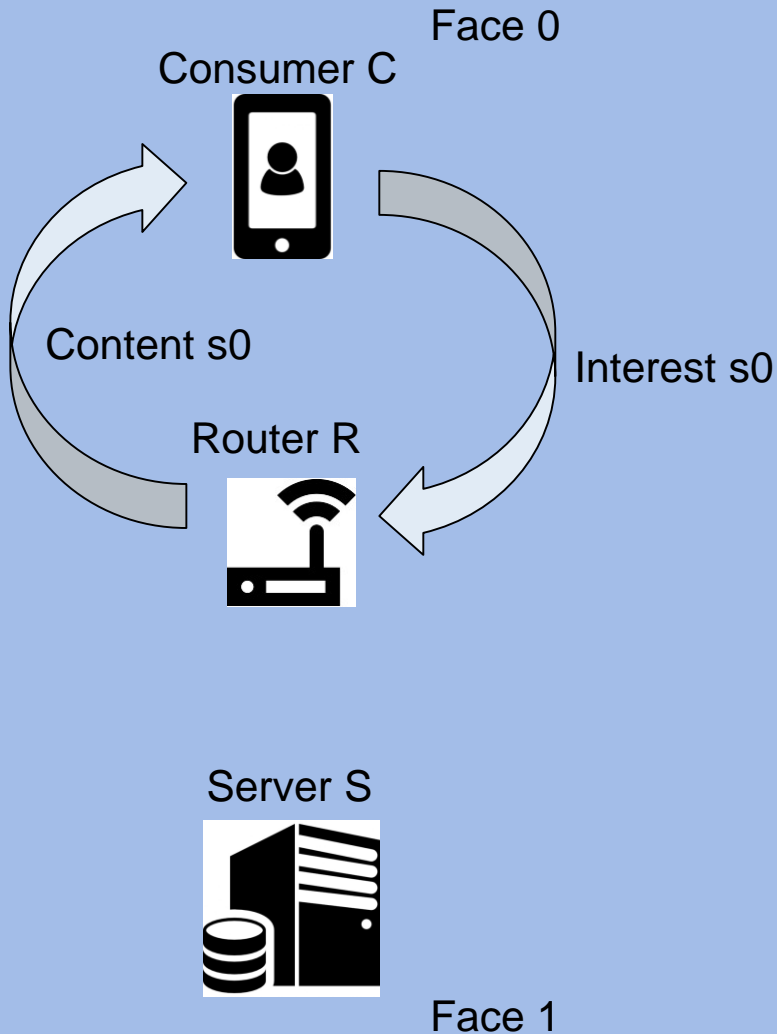
- > Key Architectural Principles
 - End-to-end principle
 - Separating routing and forwarding planes
 - Self-regulation of network traffic
 - Built-In Security
 - Facilitating user choice and competition

Named Data Networking: Architecture

- > Two types of packets:
 - Interest
 - Data

- > Router Architecture:
 - Forwarding Information Base (FIB)
 - Pending Interest Table (PIT)
 - Content Store (CS)
 - Forwarding Strategy

Named Data Networking: Basic Concept (I)



Content Store

Name	Data
/parc.com/videos/WidgetA.mpg/v3/s0	...

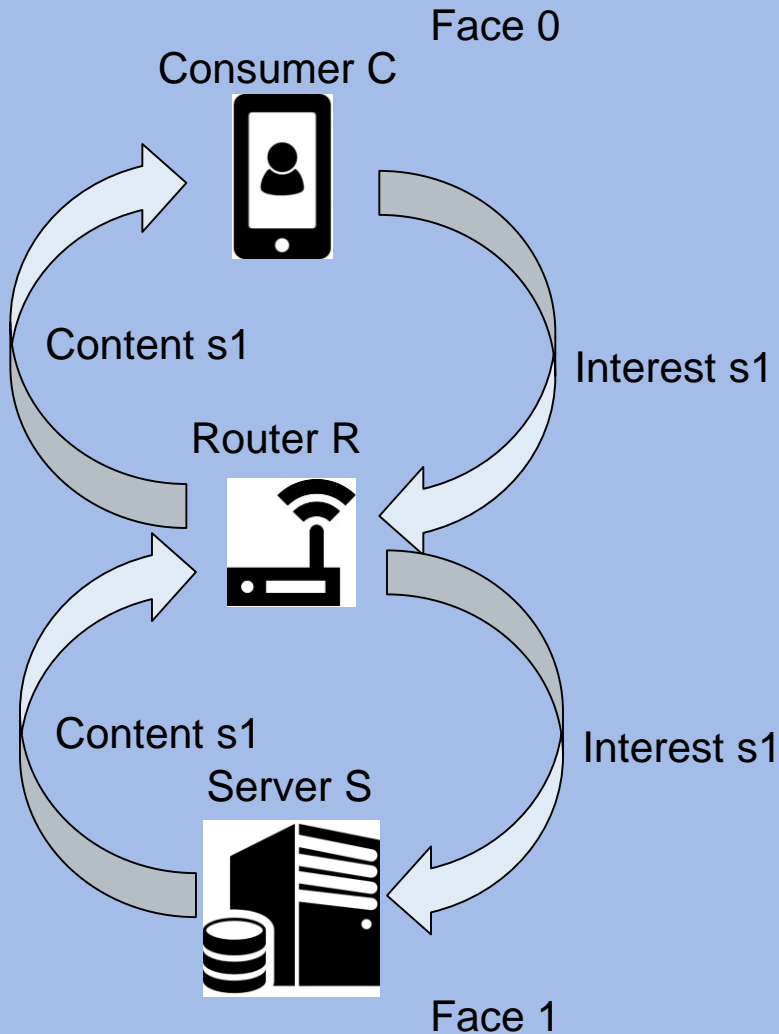
Pending Interest Table (PIT)

Name	Requesting Face

Forwarding Information Base (FIB)

Name	Face List
/parc.com	0, 1

Named Data Networking: Basic Concept (II)



Content Store	
Name	Data
/parc.com/videos/WidgetA.mpg/v3/s0	...

Pending Interest Table (PIT)	
Name	Requesting Face
/parc.com/videos/WidgetA.mpg/v3/s1	0

Forwarding Information Base (FIB)	
Name	Face List
/parc.com	0, 1

Introduction to SOFIA

- > Paper “SOFIA: Toward Service-Oriented Information Centric Networking” by Wu, Qinghua et al. *IEEE Network* May/June 2014
- > Architecture design based on host abstraction and content abstraction
- > Support various applications beyond content retrieval
- > Separated into service and network layer
- > Applications are built on the service layer and manipulate information over a service session.

Service Session in SOFIA

- > Service Session:
 - Built on service abstraction -> independent from servers that host the service
 - Uniquely identified by a set of two variables: $\langle V_c, X \rangle$
Where:
 - V_c is a virtual service name generated by the Consumer c
 - X is the requested service
- > Service Connection of the Service Session $\langle V_c, X \rangle$
 - Uniquely identified by a set of four variables: $\langle c, S, I_c, I_S \rangle$
Where:
 - S is specified Server that provides the requested service
 - I_c is a locally unique service instance of V_c
 - I_S is a locally unique service Instance of X generated by Server S

Service Session in SOFIA: Establishing a service session

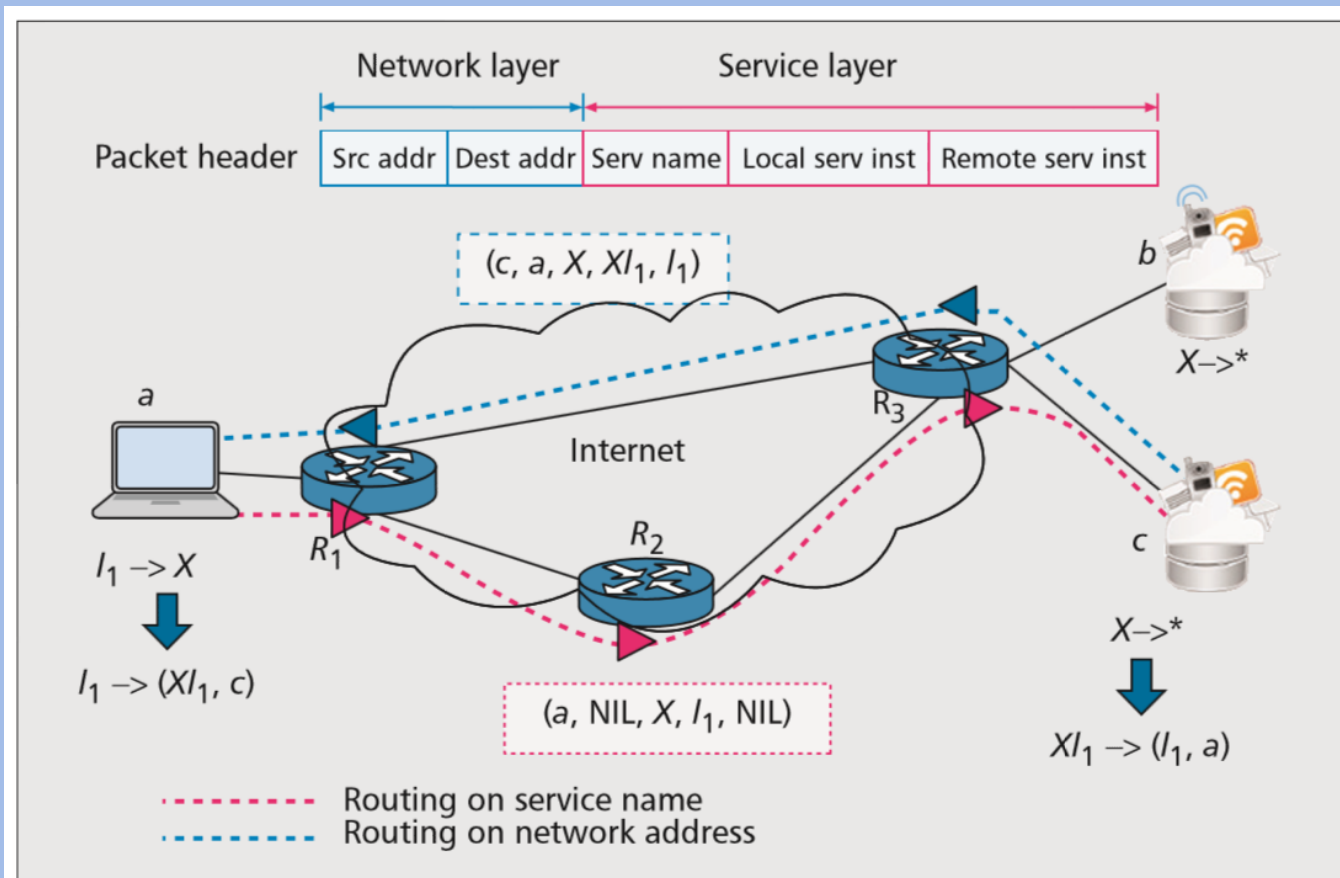


Figure 1. The process of establishing a service session.

Named Data Networking Simulator: ndnSIM

- > Based on Network Simulator NS-3
- > Current version: 2.1
- > To be maximally realistic it uses Implementations of:
 - ndn-cxx library (NDN C++ library)
 - NDN Forwarding Daemon (NFD)

- > Documentation is available (quality currently unknown)
- > Small, active community
- > Several code examples for different topologies (grid, bottleneck, etc.)

**Thank you for your kind attention.
Any questions?**

References

- > www.named-data.net (April 2016)
- > www.ndnsim.net (April 2016)
- > Braun, Torsten et al. 2011. Service-Centric Networking. In *2011 IEEE International Conference on Communications Workshops (ICC)*.
- > Jacobson, Van et al. 2009. Networking named content. In *Proceedings of the 5th international Conference on Emerging Networking Experiments and Technologies* (Rome, Italy, December 01 - 04, 2009). CoNEXT '09. ACM, New York, NY, 1-12.
- > Wu, Qinghua et al. 2014. SOFIA: Toward Service-Oriented Information Centric Networking. In *IEEE Network May/June 2014*.