

ICN/NDN Efforts at AsiaFI

Jun Bi

Nov. 17, 2011

ICNRG side meeting at IETF8

Taipei

Content

- What is AsiaFI
- AsiaFI NDN BoF/ICN WG
- ICN/NDN Research in China
- ICN/NDN Research in Korea
- ICN/NDN Research in Japan

What is AsiaFI

AsiaFI

- FI community, FI events, FI coordination in Asia
- Organizations (Since 2008 Jan.)
 - General Assembly
 - Board (chairs: Jun Murai, YH Choi, Yan Ma)
 - Steering Group (chairs: Jun Bi, F. Teraoka, CS Hong)
 - Technical Groups
 - Architecture WG -> Future Internet Technology Group
 - Testbed WG
 - Young Researcher Group
 - BoF: NDN BoF -> ICN WG), Mobile BoF
 - Mail Group: NetSci, Recursive Network...
 - Secretariat

AsiaFI

- Events
 - Annual Summer Meeting with School, Workshop, and Group Meeting
 - Winter Meetings with Workshop
 - Workshops
 - Participants (2008-2011)
 - 14 Countries
 - 45 Institutions with MoU
 - 500~1000 Participants(2008~2011)
 - 200~400 Student Participants
- Coordinate FI joint-research/testbed
- www.asiafi.net

Meetings (2007~2009)

- 2007.6 First AsiaFI Preparation Meeting
Seoul**
- 2008.1 AsiaFI Inaguration Meeting
Honolulu**
- 2008.2 AsiaFI School
Seoul**
- 2008.8 AsiaFI School & Workshop
Jeju**
- 2008.10 Workshop on Fundamental Issues of Future Internet
Qingdao**
- 2009.1 AsiaFI School & Workshop
Beijing**
- 2009.3 AsiaFI-APAN Joint Workshop on FI Testbed
Kaohsiung**
- 2009.8 AsiaFI School & Workshop
Jeju**
- 2009.11 AsiaFI-AINTEC Joint Workshop on Future Internet
Bangkok**

Meetings (2010~2012)

**2010.2 AsiaFI School & Workshop
Seoul**

**2010.8 AsiaFI School & Workshop
Yokohama**

**2011.2 AsiaFI Workshop (with APAN-APRICOT)
Hong Kong**

**2011.8 AsiaFI School & Workshop
Daejeon**

**2011.11 AWFIT Workshop (with AINTEC)
Bangkok**

**2012.3 NDN Hands-on Workshop
Seoul**

**2012.8 AsiaFI School & Workshop
Kyoto**

AsiaFI NDN BoF/ICN WG

AsiaFI NDN BoF

- NDN Introduction phase
 - 2010.2.24 AsiaFI/FIF Workshop on Identifiers in Future Internet (WIFI), Seoul (during AsiaFI winter school)
 - Discussion on Name vs. ID
 - 2010.8.24-27 AsiaFI Summer School and Future Internet Architecture Workshop, Yokohama
 - Two Invited talks on NDN at school and FIA workshop
 - AsiaFI NDN BoF meeting on 2010.8.25

AsiaFI NDN BoF

- NDN discussion phase
 - 2011.2.23 AsiaFI Workshop at APAN-APRICOT, Hongkong
 - Invited talk on NDN
 - AsiaFI NDN BoF meeting on 2011.2.24
 - 2011 8.8-8.12 summer school, Daejeon
 - AsiaFI NDN BoF meeting on 2011.8.19
 - Decided to set up AsiaFI ICN WG
 - AsiaFI Steering Group agreed a new ICN WG, and waiting for formal approval by AsiaFI board in Dec

AsiaFI NDN BoF

- NDN collaboration phase
 - 2011.11.12 AWFIT Workshop at AINTEC11, Bangkok
 - <http://www.interlab.ait.ac.th/aintec2011/asiafiws.php>
 - Keynote speech on NDN and how to start your own research on NDN
 - 4 research papers on ICN/NDN
 - Content-Oriented Transport Protocol
 - Could in-network caching benefit Information-Centric Networking?
 - Potential Based Routing for ICN
 - A New Approach to Securing Audio Conference Tool
 - 2012.3.19-21 AsiaFI NDN Workshop, Seoul
 - NDN hands-on training
 - NDN collaboration in Asia: research/testbed

AsiaFI NDN Workshop

- Organizers: SNU, AsiaFI NDN BoF/ICN WG
- Helps from PARC, UCLA, Colo state univ.
- Draft Program
 - 2012.3.19 NDN Hands-on Workshop I
 - Setting up CCNx, Write Simple CCNx Application, Students take some homework
 - 2012.3.20 NDN Research Workshop
 - Open research issues, Joint research topics, NDN testbed collaboration
 - 2012.3.21 NDN Hands-on Workshop II
 - Students show homework, Advanced programming on NDN
- <http://www.asiafi.net/meeting/2012/index-ndn-workshop.htm>

AsiaFI ICN WG Draft Charter

- Goal
 - Organize ICN related tutorial/workshop
 - promote discussions/joint research
 - coordinate prototyping/testing
- Scope
 - ICN Research (Architecture /Routing/Forwarding/Caching/Application)
 - ICN Prototyping, Test-bed
 - Special focus on NDN in the current phase: NDN-Asia
- Chair: Jun Bi, Co-chairs: Hitoshi Asaeda/Kideok Cho
- <http://www.asiafi.net/org/ndn/>

ICN/NDN Research in China

NDN Research in Tsinghua Univ. (CN)

- NDN Audio Conference Tool
 - Joint research with UCLA, PARC
 - SIGCOMM-ICN 2011 paper
 - ACT: Audio Conference Tool Over Named Data Networks
- Caching in ICN
 - Paper submitted to IEEE comm magazine ICN
 - ICN Caching: Scenario, Formulation and Evaluation
- HTTP-NDN translation gateway
 - Joint research with Huawei
 - Testbed in Tsinghua campus network for NDN routing/forwarding study

Workshop on Content Oriented Network Architecture and Technologies (CN)

- Hosted by China Mobile in Beijing, Sep. 19, 2011
- Participants
 - Universities: Tsinghua, BUPT
 - Research Institutes: CATR, ICT CAS, IOA, CAS
 - Service Providers: China Mobile, China Telecom
 - Vendors: Huawei, ZTE
- Topics
 - Introductions on ICN projects around the world
 - Introductions on domestic content oriented projects
 - Requirements from ISP, e.g, structured vs flat name
 - Content lookup chipset and ICN impact on equipment

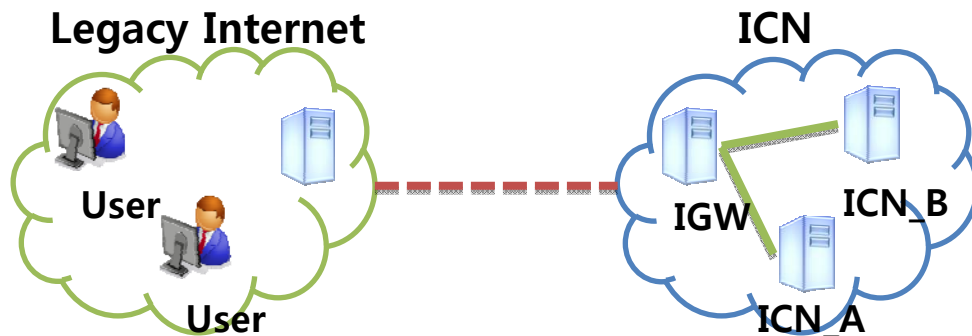
ICN/NDN Research in Korea

ICN Research Topics in SNU (KR)

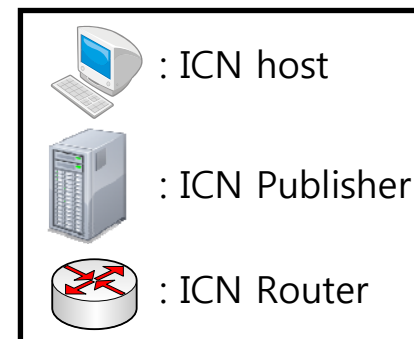
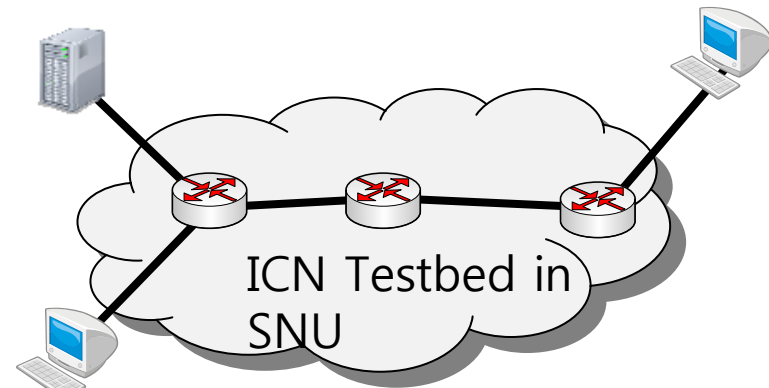
- Scalable Content Routing & Efficient Caching
 - FIB size reduction of an ICN router for the scalable inter-domain routing
 - Autonomous/cooperative caching algorithms for ICNs
 - Cache replacement metrics for ICNs
- ICN over Wireless Networks
 - Exploit the broadcast medium for efficient content retrieval in wireless environments (cooperative approach)

ICN Testbed (KR)

- ICN-legacy Internet Interworking Testbed
 - Gateway-based approach



- Large-scale ICN Testbed
 - Seoul National University
 - KT (ISP), Samsung (Device Manufacturer), PARC (US)



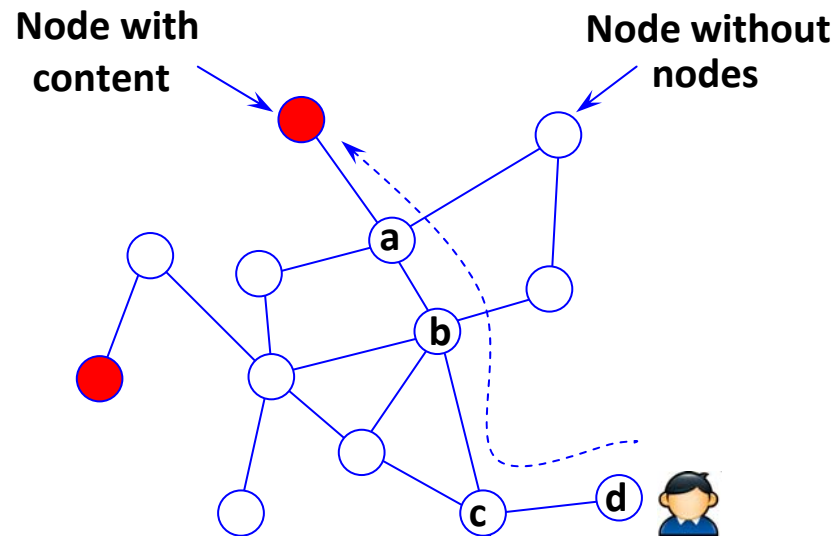
ICN/NDN Research in Japan

Recent Work Items for ICN Related Topics in AsiaFI (JP)

- Cache Aware Target identification (CATT)
 - NICT
 - S. Eum, K. Nakauchi, T. Usui, M. Murata, N. Nishinaga, “Potential Based Routing for ICN”, Asia Workshop on Future Internet Technologies (AWFIT2011), November 2011.
- CCNx testbed on top of ns-3 over PlanetLab
 - Keio University cooperating with INRIA

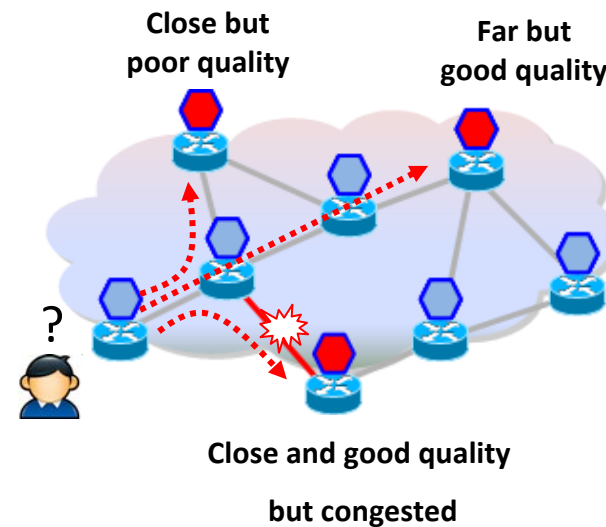
Cache Aware Target idenTification (JP)

- ① All ICN nodes are capable of caching contents, how to select a caching spot?



- ✓ Nodes: ①, ②, ③, and ④ are cacheable.
- ✓ Which one choose?
- ✓ How about ② ? – Topology aware caching.

- ② How to intelligently locate a content that is distributed in the caches?



- ✓ Routing mechanism (locating a content) should respond to the caching mechanism.
- ✓ Potential based approach.

Thank You!