GreenICN's liaison statement to MPEG (m30310)

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The GreenICN project

- GreenICN is a collaborative project funded by the European Commission and the Japanese government
- Duration
  - Started in April 2013
  - To end in March 2016
- Total project value ~6 M€
- Organisation
  - Single work plan
  - Double management structure
- Project web site: http://www.greenicn.org/

GreenICN partners

European Partners

GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN

EU Coordinator

Georg-August-Universität Göttingen (UGO, Germany)
Contact: Xiaoming Fu <fu@cs.uni-goettingen.de>

NEC Europe Ltd. (NEE, UK)

CEDEO (CED, Italy)

Telekomunikacja Polska (Orange Labs, Poland)

University College London (UCL, UK)

Japanese Partners

KDDI R&D LABS

JP Coordinator

KDDI R&D Laboratories Inc. (KDD, Saitama)
Contact: Shigehiro Ano <ano@kddilabs.jp>

NEC Corporation (NEJ, Tokyo)

Panasonic Advanced Technology Development Co., Ltd

University of Tokyo (UTO, Tokyo)

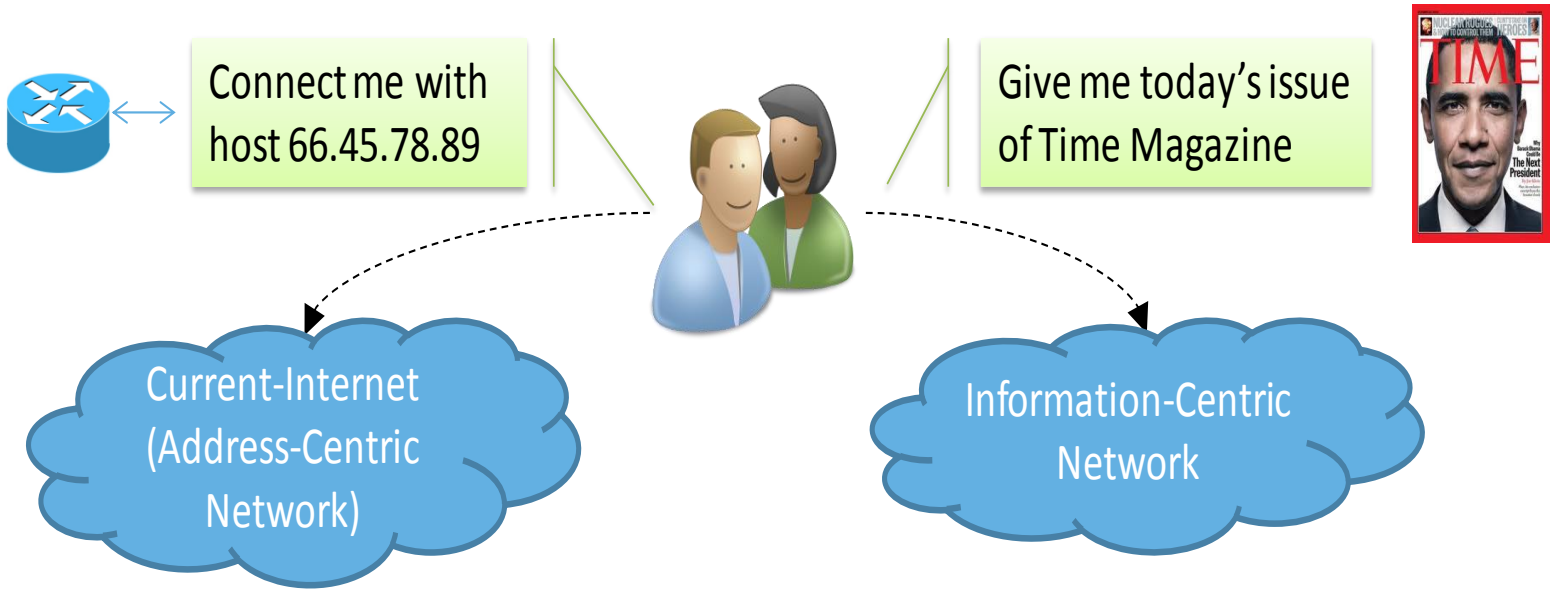
Waseda University (UWA, Tokyo)

Information Centric Networking & GreenICN

- Information Centric Networking (aka Content Centric Networking) or ICN is a promising new paradigm for the delivery of high bitrate real time information
- In ICN the network provides users with named content, instead of communication channels between hosts
- GreenICN aims to accelerate the practical deployment of ICN, addressing how ICN networks and devices can operate in a highly scalable and energy-efficient way
- Project activities include: research, development & trials
- Standardisation is of the highest importance

ICN basics

- In ICN, network transfers individual, identifiable (named) content chunks, instead of unidentifiable data containers (i.e., IP packets)



Project goals/1

1. Reduction of Power Consumption of GreenICN (incl. EU devices)
   - 20% for Normal Days
     - EU: general reduction goal of 20%
     - JP: by 30% by 2030, compared to that in 2003
   - ≥ 40% for Disasters
     - In 2011, people in Tohoku area suffered 3 days of blackout because of the East Japan Earthquake.
     - Reduction to make communication services and related base stations able to operate 3 days in such a scenario.

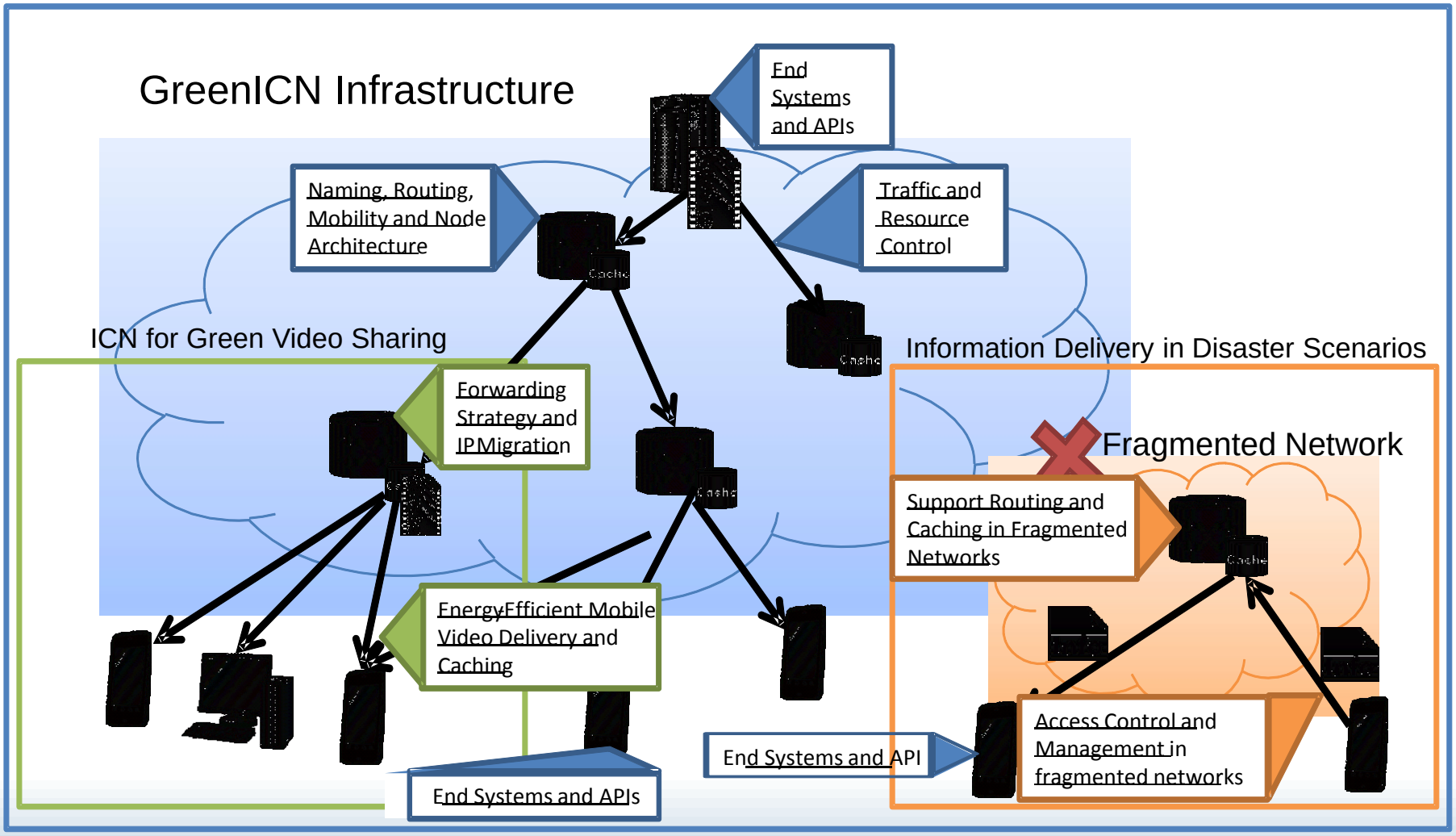
Project goals/2

2. Seamless Services before and after a disaster
   - From 2011 East Japan Earthquake: people want to keep on using terminals and services they are accustomed to and not those specifically designed for disasters
3. Migration Path
   - Friendly coexistence of GreenICN with current IP network
4. Scalability and size of the served content and related names
   - Ability to serve at least current Web contents with off-the-shelf technology

GreenICN work packages

WP	Title
0	Project Management
1	Requirements and Architecture for Green Information Delivery Network
2	Green Disaster Information Delivery and Rescue Management
3	Green Video Sharing
4	Prototype Implementation and Evaluation
5	Dissemination, Standardizations and Exploitation

GreenICN Architecture



Requirements & Architecture for Green Info Delivery

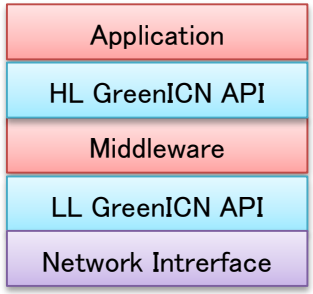
- WP1 seeks to identify use scenarios and requirements and define the GreenICN architecture

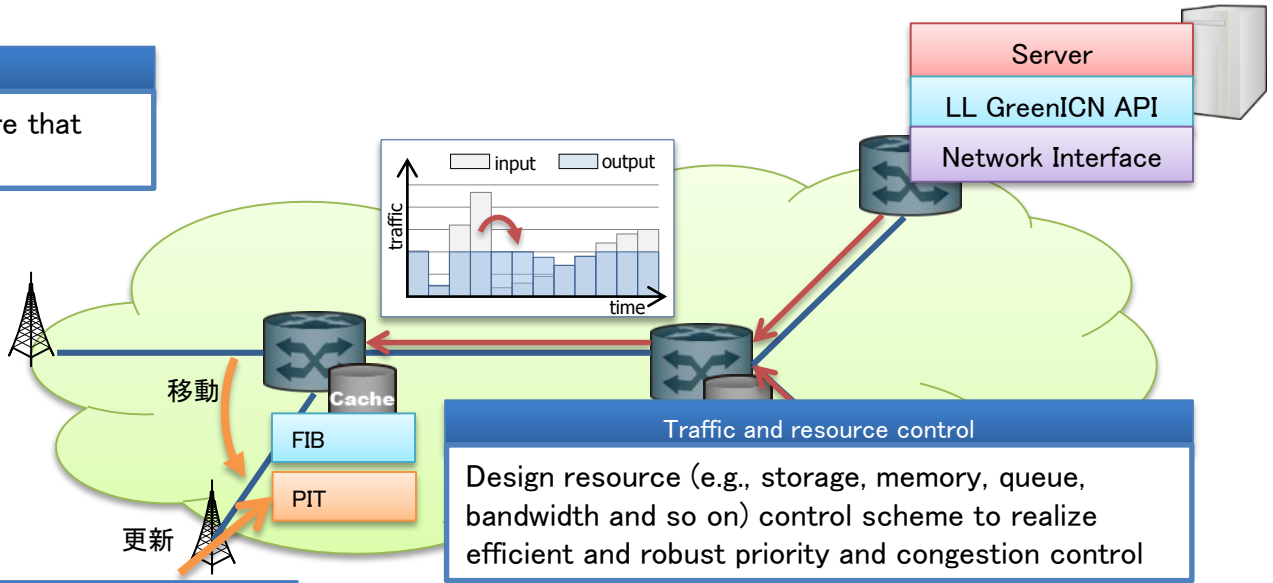
Use scenarios and requirements

Define the overall GreenICN architectural framework to be referenced by the other WPs

GreenICN end systems and APIs

Specify & develop instances in a middleware that optimal exploits the GreenICN features.





Traffic and resource control

Design resource (e.g., storage, memory, queue, bandwidth and so on) control scheme to realize efficient and robust priority and congestion control

Routing and Forwarding Strategies

Design routing, forwarding, naming, mobility and the overall GreenICN node architecture for green information delivery networking.

Green Disaster Info Delivery and Rescue Management

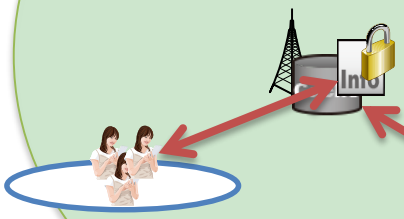
- WP2 seeks to provide support for large-scale energy-efficient disaster information delivery for fragmented/disrupted mobile networks, including routing and cache management algorithm for highly fragmented networks

Framework

Define framework to adapt the WP1 architecture to disaster scenarios

Support Routing and caching in fragmented networks

Investigate energy efficient information delivery mechanisms for fragmented mobile networks



Refugees

Fragmented Network

Access Control and Management in fragmented networks

Design access control and information management in fragmented networks

Implementation and validation of applications for Disaster and Rescue Management

Extend/adapt essential functions to support fragmented networks and design applications exploiting such functionality.

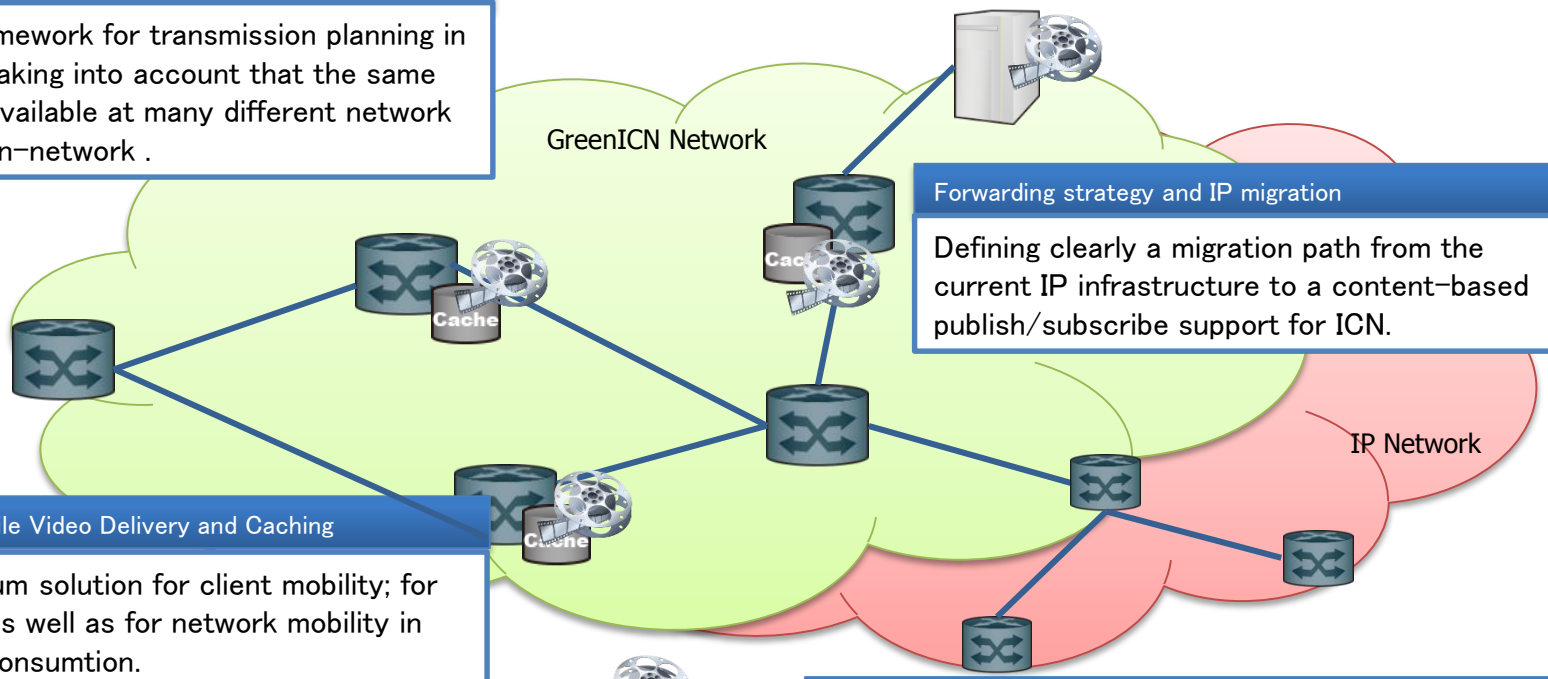
Rescuers

ICN for Green Video Sharing

- WP3 seeks to define a framework for collaboration and sharing incentives in order to achieve energy-efficient video delivery towards the access network

Framework

Designing the framework for transmission planning in space and time, taking into account that the same content may be available at many different network locations due to in-network .



Forwarding strategy and IP migration

Defining clearly a migration path from the current IP infrastructure to a content-based publish/subscribe support for ICN.

Energy-Efficient Mobile Video Delivery and Caching

Investigate optimum solution for client mobility; for content mobility as well as for network mobility in terms of energy consumtion.

Implementation and validation of applications for Video Delivery

Extending/adapting essential functions to support video delivery and design applications exploiting such functionality.

Prototype, Validation and Evaluation

- WP4 goals:
  - Implementation and validation of device-side ICN and middleware functionality
  - Implementation and validation of network-side ICN functionality
  - Implementation and validation of applications for Disaster and Rescue Management.
  - Implementation and validation of applications for Video Delivery

Details of Task 4.1

- Prototype and test Green ICN peer from MXM reference SW and feed relevant results to MPEG
- Middleware (w/ Green features) to be released as OSS (specific parts may not be released)
- Development tightly coordinated with ICN network
  - Specification and development of MW on Linux, Mac, Windows PC and integration with ICN
  - Revision/optimization of MW & porting to the green test environment (breadboard-level), and integration with ICN
  - Revision/tailoring to final deployment environment of MW, porting to the green test environment (e.g. tablet) and integration with ICN

Dissemination, standardisation & exploitation

- WP5 goals
  - Dissemination
  - Standardization
  - Exploitation

Collaboration opportunities

- GreenICN is interested in MPEG standards, e.g.
  - MPEG-7
  - MPEG-21
  - MPEG-M
  - MPEG-DASH
  - MMT
  - Green MPEG
- We plan to
  - Study your standards and asses their suitability
  - Submit reports on the use of your standards
  - Propose additional requirements where appropriate