Research Directions for Using ICN in disaster scenarios

draft-irtf-icnrg-disaster-04

Jan Seedorf

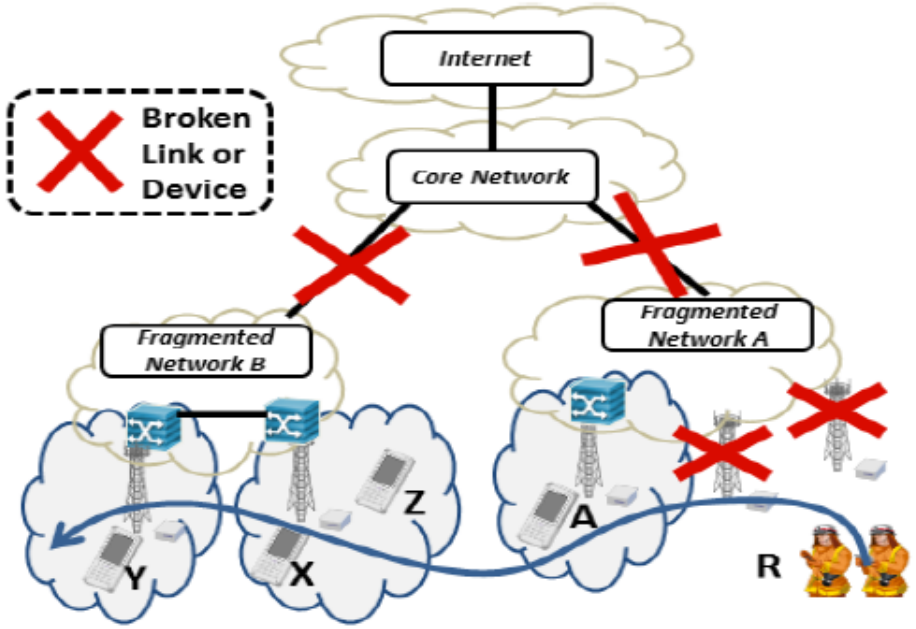
HFT Stuttgart

(on behalf all authors: J. Seedorf, M. Arumaithurai, A. Tagami, K. Ramakrishnan, N. Blefari Melazzi)

Scope of the Document: Scenario and Use Cases

Disaster Scenario

- The aftermath of a disaster, e.g. hurricane, earthquake, tsunami, or a human-generated network breakdown
- E.g. the enormous earthquake which hit Northeastern Japan on March 11, 2011 (causing extensive damages including blackouts, fires, tsunamis and a nuclear crisis)



Key Use Cases (High-Level)

- Authorities would like to inform the citizens of possible shelters, food, or even of impending danger
- Relatives would like to communicate with each other and be informed about their wellbeing
- Affected citizens would like to make enquiries of food distribution centres, shelters or report trapped, missing people to the authorities

History / Status Quo

History

- Multiple initial versions (2013-2016)
  - output of the GreenICN project
- Various feedback incorporated, multiple iterations
- Adopted as RG item in February 2016

Status Quo

- 2017: 1st RG Last Call
  - Detailed Review from Akbar Rahman
  - Comments addressed in version -02
- 2018: 2nd RG Last Call
  - Further Comments from Marie-Jose Montpetit and Vincent Roca
  - Addressed in latest version -04 (see next slides, main points)

Changes / Updates

Comment: Several Typos

Fixed

Changes / Updates

Comment (from both reviewers) : document reads like there are no more open issues

- Added several clarifications in the text
- New Section „Open Issues“

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5.2.  Open Research Challenges

   The proposed solutions in Section 5.1 investigate how ICN approaches
   can in principal address some of the outlined challenges.  However,
   several research challenges remain open and still need to be
   addressed.  The following (incomplete) list summarizes some
   unanswered research questions and items that are being investigated
   by researchers:
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Changes / Updates

Comment: Text on "source/object authentication and content integrity" and on "content-based security“ is misleading

o **Integtity and** Authentication of named data objects: ICN is built around the concept of named data objects. Several proposals exist for integrating the concept of 'self-certifying data' into a naming scheme (see e.g. ~~[RFC6920]).~~ **[RFC6920]).** With such approaches, ~~the origin~~ **object integrity** of data retrieved from the network can be ~~authenticated~~ **verified** without relying on a trusted third party or PKI. **In addition, given that the correct object name is known, such schemes can also provide data origin authentication (see for instance Section 8.3. in [RFC6920])**

Content-based access control: ICN promotes a data-centric communication model which ~~is better suited to~~ **naturally supports** content-based security (e.g. allowing access to content only to a specific user or class of ~~users); this~~ **users) as in ICN - if desired - not the communication channel is secured (encrypted) but the content itself. This** functionality could facilitate trusted communications among peer users in isolated areas of the ~~network.~~ **network where a direct communication channel may not always or continuously exist.**

Changes / Updates

Comment: What about Blockchain-based solutions?

authentication infrastructure being used (e.g., one may switch from a PKI to a web-of-trust model such as PGP). **Note that blockchain-based approaches are in most cases likely not suitable for the disaster scenarios considered in this document, as the communication capabilities needed to find consensus for a new block as well as for retrieving blocks at nodes presumably will not be available (or too excessive for the remaining infrastructure) after a disaster.**

Changes / Updates

Comment: Please clarify on natural disasters being predictable

passively to obtain information exchanged, even after the main disaster itself has taken place. Unlike some natural disasters that are **to a small extent** predictable using weather forecasting ~~technologies and~~ **technologies, may** have a slower ~~onset~~ **onset,** and occur in known geographical regions and seasons, terrorist attacks ~~may~~ **almost always** occur suddenly without any advance warning. Nevertheless, there

Changes / Updates

Comment: Is there still research for combining ICN and DTN?

5.2. Open Research Challenges

- How to best use DTN and ICN approaches for an optimal overall combination of techniques?

Changes / Updates

Comment: What ICN deployment degree is needed?

5.2. Open Research Challenges

- **Specifying for each mechanism suggested to what exact extent ICN deployment in the network and at user equipment is required or would be necessary, before and after a disaster.**

Changes / Updates

Comment: What about old-school AM/FM radio broadcast as a solution?

- Comment not addressed
- Seems somewhat orthogonal to ICN as it is about physical layer
- Opinions?

Changes / Updates

Comment: Please explain the use of IP over ICN and not the opposite?

- The IP-over-ICN approach was not initially in the draft but has been added after comments received from the RG
- RG decision
- Opinions?

Next Steps

Ready to publish?