IETF Veteran Recommends Reducing Protocol Complexity, continued

Ross Callon, IETF veteran, at the IETF 96 Plenary.

do something, but it also wouldn't have happened if we had 20 or 30 ways to do something."

Callon made a strong case for the IETF being wary of creating too many unnecessary standards, and he urged each individual participant to focus on this problem. He said it can't be solved by the IETF leadership, but instead needs a bottom-up solution.

"The IETF needs to find a way to avoid frivolous standards," he said. "It is to the advantage of all of our companies and all of our research organizations and all of our government agencies that the Internet continues to grow. I'm asking everybody to think about this when a Working Group is considering a protocol: Is it really needed or can we use an existing tool?"

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THE STORY OF AN RFC ABOUT ALTERNATIVE NETWORKS

By Jose Saldana, Andres Arcia-Moret, and Ioannis Komnios

DURING IETF 89 IN MARCH 2014, THE FIRST MEETING OF THE GLOBAL ACCESS to the Internet for All (GAIA) Working Group drew members from academia, industry, and the breadth of nongovernmental organisations interested in providing universal Internet access for a wider community—all of whom were eager to help in bridging the digital divide.

The outcomes of that first meeting can be summarized by three types of challenges: geographic, motivated by the need to connect rural and remote areas; technological, given the need for a common set of technologies that enable a better utilization of scarce resources; and socioeconomic, based on the need to study affordability models for disconnected people.

These challenges can be translated into the following directions:

- Exploration of new technologies for wireless access, such as TV White Spaces or Wi-Fi long distance, that ease rural and remote network deployments.

- Changes in the regulatory space that has been reported to have more priority than adoption of technology itself, particularly in the so-called Global South.

- Extension of successful self-sustainable alternative business models that are created from communities themselves and that promote the benefits of localized services.

- Exploitation of the advances in working areas that facilitates better sharing of a common pool of resources, such as delay-tolerant networking, opportunistic communications, information-centric networking, and software-defined networking. Strategies based on these technologies should result in more-efficient bandwidth use in restrained scenarios.

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The idea to write a document that studies community-driven networks arose in the GAIA mailing list in May 2014. Such a document was seen as useful for bringing connectivity to rural areas, which is in line with GAIA's stated objective "to document and share deployment experiences and research results to the wider community through scholarly publications, white papers, Informational and Experimental RFCs …".

The first Internet-Draft, draft-manyfolks-gaia-community-networks, was submitted in June 2014, and its first versions were intended to cover deployments known as community networks.

The draft triggered questions in the mailing list on the scope of the document, including should it be limited to community networks or be broader? Eventually, a consensus was reached. It was decided that (1) the document would characterize and classify network deployments that differ from mainstream ones in which a company deploys the infrastructure connecting users, who pay a subscription fee; and (2) the document would refer to these networks as Alternative Networks.

One of the main topics of discussion was related to the classification itself. Conversation surrounded the criteria we should use, the categories to consider, and which networks could fit inside each of the categories. The result was a fruitful discussion about the terms to be used for each of the criteria and the categories. For reasons of clarity, several examples and references were also included, as well as a summary of the classification criteria for each network type.

As the document evolved, people with experience in real deployments participated in the discussion and provided useful input. Their input was included in an informative section about the technologies employed in these networks. An index of terms was also included in order to clarify key terms, such as urban, rural, digital divide, and underserved area.

In March 2015, after several iterations, the Internet-Draft was adopted. It became RFC 7962 in August 2016.

RFC 7962 describes the different types of Alternative Networks that stem from the networking visions of independent initiatives all over the world. These initiatives rely on cooperation rather than competition and employ different governance and business models.

While the solutions and classifications expressed in the document are not limited to low-income regions or the Global South, emphasis is given to these regions. In 2014, the World Bank reported that 31% of people from low-income regions have an Internet connection, versus 80% of people from high-income regions. In response, the document's proposed solutions will more likely have a strong impact in terms of connectivity in low-income regions.

The core category of Alternative Networks identified in the document is community networks, that is, networks owned by the community that provide coverage to underserved areas and that reach tens of thousands of users (e.g., Spain's GUIFI. net). The main goal of a community network is to provide affordable Internet access for all. To achieve that, community networks rely on the independent and decentralized collaboration of community members, thereby reducing initial capital expenditure and, eventually, operational expenses, while maintaining Internet connections where there are no business cases for mainstream operators.

> **All in all, RFC 7962 constitutes a good starting point for the GAIA Research Group.**

Other types of Alternative Network deployments that aim to bridge the digital divide include:

- Wireless Internet service providers that are operated by independent organizations different from the main operators.

- Shared-infrastructure models, which are commonly found in the Global South where a number of simultaneous users share low-cost femtocells (e.g., 3G access).

- Crowdshared approaches that allow virtual network operators to piggy-back on an existent Internet connection in home routers and provide a public network that consumes only a small fraction of the available bandwidth.

- Rural utility cooperatives, such as electric cooperatives, which collocate their own fiber-based broadband and a low-cost Internet service for communities.

- Testbeds that were initially built as research infrastructure in academic environments and that ended up in noncentralised models, where local stakeholders assume part of the network administration.

All in all, RFC 7962 constitutes a good starting point for the GAIA Research Group—it documents a number of deployments for providing Global Access to the Internet for All based on the input of experienced researchers and practitioners, who have participated in the successful deployments of Alternative Networks. Most important, RFC 7962 presents the socioeconomic aspects of networking, thereby obtaining the attention of communities seeking to create and manage computer networks for the people by the people.