Experts’ Perspectives on Delay-Tolerant Networking at IEEE GLOBECOM 2012

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Conceived as a way to build a network across interplanetary space, funded by DARPA as a way to bring reliable communications to the chaos of combat, currently serving applications as diverse as file transfer from the International Space Station and email for reindeer herders, Delay-Tolerant Networking (also known as “Disruption-Tolerant Networking” – “DTN” in any case) has emerged over the past decade as an active field of research and a technology whose potential impact on commerce and industry is only beginning to be understood.

It’s hard to overstate the degree to which today’s world has come to depend on the Internet for ubiquitous access to information and continuous contact with customers, suppliers, friends, and anyone else you can think of worldwide. But even the Internet has limits beyond which it doesn’t perform as well as we’d like, and some of these limits are structural. The Internet protocols are built to rely on – and exploit – continuous and rapid end-to-end data interchange. They work beautifully over the vast network of optical fibers and copper wires for which they were designed, but they work less well when end-to-end data interchange can’t be guaranteed to be rapid and continuous.

As a rapidly growing share of Internet traffic is carried on wireless links, noise-induced data losses and transient lapses in connectivity occur more frequently. Denser wireless infrastructure can mitigate these effects, but only up to a point. Strengthening the protocols themselves can enable successful communication to be sustained even after that point is reached.

Delay-Tolerant Networking (DTN) was developed to sustain successful

communication not only in the Internet but also in environments characterized by large round-trip message exchange latencies – whether those latencies are due to signal propagation delay, transient connectivity loss, or both. The DTN "bundle protocol" utilizes the underlying transport protocols that work best in each environment and bridges between them at the boundaries between environments. This makes DTN particularly helpful for critical systems that must not lose data even when links are briefly disrupted, ranging from tactical military communications to space flight operations.

On Tuesday, December 4, at IEEE GLOBECOM 2012 in the Disneyland Hotel in Disneyland, California, a panel of scientists and engineers will discuss this new networking architecture from a variety of perspectives. The panel will be chaired by Dr. Vint Cerf, Vice President and Chief Internet Evangelist of Google and co-inventor of the TCP/IP protocols that power today's Internet. Joining him on the panel will be myself, providing a technical overview of DTN and notes on NASA's plans for using DTN in flight missions, together with:

- Dr. Kevin Gifford of the University of Colorado, who will outline our current progress in deploying and operating DTN on the International Space Station.
- Dr. Armando Caro of BBN Technologies, who will review operational experiences with DTN in the U.S. Department of Defense.
- Dr. Angela Dalton of the Johns Hopkins University Applied Physics Laboratory, who will discuss the challenges of managing and securing delay-tolerant networks.

Everyone interested is invited to join us for this wide-ranging conversation designed to explore DTN and its promise of a far more reliable way of delivering critical information to today's information-centric world. For more information on IEEE GLOBECOM 2012, please visit http://www.ieee-globecom.org/ *[1] or feel free to contact Heather Ann Sweeney of IEEE ComSoc at* h.sweeney@comsoc.org *[2]. All website visitors are also invited to network with colleagues and peers, share their professional experiences, or address IEEE GLOBECOM 2012 issues through the conference's Facebook, LinkedIn and Twitter pages.*

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