



End-to-End Internet: IETF Looks at Wireless

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"Our products underlie a global infrastructure, and squabbles over *my* solution to get venture capital for *my* firm have less and less place here," declared Fred Baker, chair of the Internet Engineering Task Force and its steering group, the IESG.

Not that the IETF's 47th meeting in Adelaide, Australia, looked overrun by venture capitalists. Still, as the association that creates Internet standards and related documents, the IETF processes decisions every day that affect the future of too many companies not to make Baker's admonishment meaningful. Venture capitalists are just one source of difficulty as the IETF struggles to retain something technologically unique while it is being co-opted by global economic forces.

Working Groups and Birds of Feather

Three times each year, the IETF holds a meeting where its working groups (WGs) can meet face-to-face to discuss their chartered activities, which are otherwise conducted primarily through mailing lists.

The three annual meetings also include birds-of-feather (BOFs) interest groups to address unchartered activities. If the BOF achieves consensus, it can submit a proposed WG charter and workplan to the directors of one of eight IETF "areas" that

evolved from the original Arpanet Network Working Group.

All meetings are open to anyone who pays the fee to attend, just as the mailing lists are open to anyone who signs up and the RFC standards track and other documentation is available free to anyone who wants to download them; see the sidebar, "Not All RFCs Are Standards (and Internet-Drafts Never Are)."

To Converge or Not

Among the 110 groups meeting in Adelaide, several addressed issues relating to the International Telecommunication Union, and the ongoing convergence between traditional telephony services and the Internet.

For example, the SIP-H.323 Interworking BOF focused on an "Internet-draft" specification for establishing calls between these competing standards. Session Initiation Protocol is an IETF proposed standard RFC for initiating interactive communication sessions between users; SIP is part of the overall IETF multimedia data and control architecture. H.323 is ITU-T's standard for packet-based multimedia communications systems; the first version appeared in 1996, and the H.323 protocol suite supports most current IP telephony networks. Perhaps more important, Microsoft Windows ships

with a built-in H.323 client. However, H.323 has several limitations that inhibit its deployment (notably, a long setup time and large "footprint"), which SIP has overcome in the interoperability implementations that are part of the IETF standards process.

The interworking BOF discussed the possible formation of a WG to speed development of the interworking specification and thereby speed the availability of products that could use SIP. The BOF, however, did not achieve consensus on this point. For one thing, the authors of the interworking draft are also working on the SIP WG standards-track RFCs, so there is some inefficiency in a separate WG.

But the lack of consensus may also represent some ambivalence about convergence altogether. IP telephony stresses the Internet to do things it wasn't designed to do, and the activities to accommodate such applications potentially compromise the features that make the Internet a uniquely interoperable platform.

End-to-End Transparency or "Walled Gardens"

Rapid growth of the market for handheld devices has spawned a different problem. The wireless industry has adopted standards such as the Wireless Application Protocol, which offers browser-like access to a subset of Internet sites that use its protocol suite to meet the bandwidth and screen restraints of handheld devices, while sacrificing interoperability with standard Internet services.

A representative from the WAP Forum gave an overview of the architecture and protocol suite at the 47th meeting plenary. In follow-up questions and discussion, WAP was characterized as "a walled garden" that compromises the "end-to-end principle" of the Internet, which is based on a single addressing scheme and unaltered flow of packets from source to destination. Intranets are one interruption of this scheme. More recently, Network Address Translators have been introduced to overcome the scarcity of addresses arising from IPv4's 32-bit address space.

The plenary also included a presentation of NTT DoCoMo's i-mode

technology, an alternative to WAP. After only a year in service, i-mode has more than 5 million subscribers in Japan and a business model that profitably offers cheap always-on access to sites enabled with the technology.

A third presentation, titled "End-to-End IP Connectivity over 3G Cellular," addressed problems that must be solved to retain the "end-to-end principle" of IP connectivity in third-generation mobile telecommunications systems, which are expected to mitigate the bandwidth constraints on cellular networks.

IAB Workshop Debriefed

The morning after the plenary, the Internet Architecture Board debriefed a workshop held in February on wireless internetworking. The IAB provides architectural oversight for the evolution of the Internet, and one goal of

the workshop was to ensure the suitability of the standard Internet protocols for the wireless environment.

There were many presentations and lots of discussion, particularly around the idea of losing end-to-end connectivity in the Internet. IAB member Steve Deering told me afterward that some people feel the Internet is already so chopped up that you wouldn't be able to develop an application like the Web any more.

One participant suggested that the IETF should not let the requirements of handhelds overrun protocol development when, in fact, the biggest wireless applications area may end up being in machine-to-machine environments. Fred Baker noted that the IAB had invited representatives from NASA and the air traffic wireless applications to present at the workshop to address this issue specifically.

"Killer App" for IPv6?

One reason for the focus on handhelds, however, could be the potential of wireless devices as "the killer app" for IPv6. This next-generation version of IP requires changes to existing infrastructure in exchange for a bigger IP address space and other advanced features. IPv4 can't accommodate the number of addresses required for projected wireless devices, and efforts to accommodate IPv4's address scarcity are already spawning technologies like NATs, which interrupt end-to-end connectivity for application support.

With some market forecasts projecting the number of handhelds to exceed 500 million by 2003, an end-to-end Internet will need a 128-bit address space.

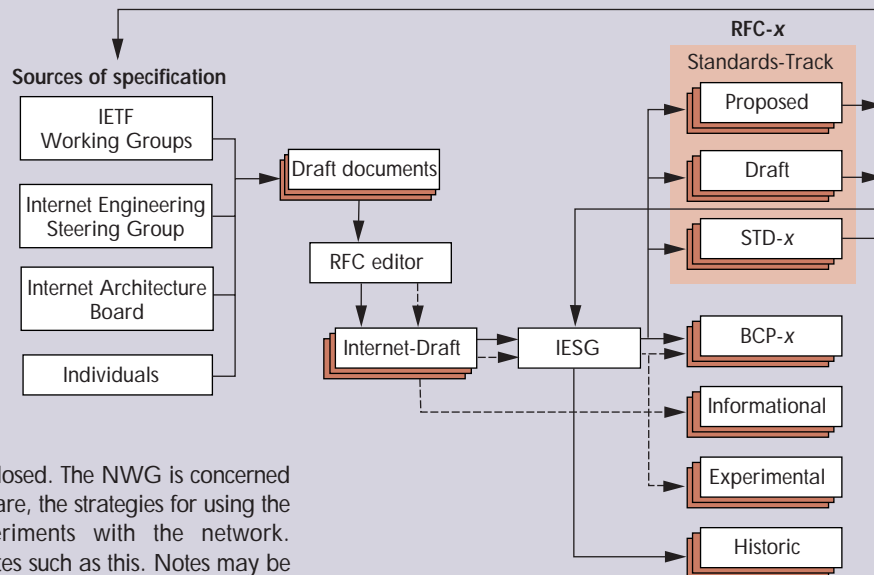
Linda World is the managing editor of *IEEE Internet Computing*.

Not All RFCs Are Standards (and Internet-Drafts Never Are)

The Request For Comments series of Internet standards-related documents began in 1969, as part of the Arpanet project. RFCs 1 and 2 were memos titled "Host Software," written by, respectively, Steve Crocker of UCLA and Bill Duvall of SRI. In RFC 3, "Documentation Conventions," the authors were identified as two among five members of the Network Working Group: "Membership is not closed. The NWG is concerned with the [Arpanet] Host software, the strategies for using the network, and initial experiments with the network. Documentation is through notes such as this. Notes may be produced at any site by anybody and included in this series."

More than 30 years and 3,000 RFCs later, the process has been formalized considerably to support the growth and importance of the Internet as a global communications data infrastructure; it is nevertheless a remarkably open and inclusive process.

Anyone can submit a document to the RFC editor (a function of the Internet Society). Internet-Drafts are not archival documents, but the I-D directory provides a temporary repository for authors to solicit comments on documents they may eventually wish to submit to the IESG for



publication as RFCs. Unrevised documents in the directory have a maximum life of six months.

The standards-track subseries of RFCs was established in 1992 (RFC 1311), but the RFC process as a whole accommodates "off-track" technical specifications that are either experimental or informational as well as "Best Current Practice" documentation to develop consensus on policy and operational issues.

Current I-Ds and all RFCs can be accessed and downloaded from the IETF website at <http://www.ietf.org>.