A BROADBAND INFORMATION RESOURCES INC. Publication

www.screenplaysmag.com

ScreenPlays

February 2009 STRATEGIC INFORMATION FOR THE BROADBAND MARKETPLACE Magazine

Market-Disrupting Power of IPv6 Starts to Turn Heads, but Barely

Applications Potential of Device-to-Device Connectivity Revolutionizes Business Models

By Fred Dawson

Amid ongoing and astonishing indifference to the rapid exhaustion of IP addresses under the current IP version 4 domain, there are some signs that key players with stakes in Internet connectivity are starting to pay attention to the need to implement the next-generation IPv6 protocol.

In January, for the second year in a row, the Consumer Electronics Association held a session devoted to IPv6 at CES, marking an escalation in evangelization of the importance of looming Internet addressing and applications issues to the consumer electronics industry. And, for the first time, the American Registry for Internet Numbers (ARIN) had a booth at the event.

Significantly, notes Limor Schafman, president of Keystone Tech Group, a consulting firm, this past fall the CEA's magazine Vision featured an article on the importance of IPv6 to the consumer electronics industry. Where, in 2007, there was a general sense that IPv6 was an "esoteric subject that some guy in the company" was working on, participants in recent conferences including CES seemed much more directly engaged in IPv6-related strategies, Schafman says.

Interestingly, consumer electronics suppliers are well ahead of service providers in implementing IPv6 support. Industry officials say most mobile phones produced in the past two years are IPv6 enabled, as are computers and other devices supplied by Apple and several Japanese manufacturers. But the key to activating IPv6 in these and future devices is network implementation of the protocol, which looks to be a long time coming, notwithstanding ARIN's warnings that all available Internet numbers under the current IPv4 address system will be used up by 2012.

ARIN's tracking of Internet address usage indicates that only about 12 percent of the total of approximately 2.7 billion addresses made available for public use under the 32-bit IPv4 numbering system remain to be assigned. The percentage in the fall was about 15 percent. With just 20 percent of the world's population currently connected to the Internet, there's no doubt that address depletion is on the horizon.

But many observers say the ARIN perspective on how fast the IPv4 system will run out of steam is well off the mark, given the fact that about a third, or some 1.3 billion addresses, of the total possible IPv4 addresses were set aside for testing and future use and another huge percentage of addresses previously assigned are not currently in use. Efforts to release these numbers into the public domain could extend the life of IPv4 many years beyond 2012.

But whether such efforts will succeed, especially given the perceived benefits of conversion to IPv6, is anybody's guess, and, in any event, even if they do, the fact is the old system will run out of steam sooner or later. What's really at stake irrespective of when IPv4 addresses are exhausted is the business environment that has grown up around the Internet as we know it today. For all concerned, and especially service providers, IPv6 is a Pandora's Box which promises to vastly accelerate the disruptions to old business models already underway in the current Internet environment.

Presently, far more devices are Internet connected than there are individual public addresses owing to use of a private addressing technology known as Network Address Translation (NAT), which assigns individual addresses to any number of devices that are connected to a device that has a public Internet address. With IPv6, which uses a 128-bit numbering system to support trillions of possible public addresses, all devices would be directly connected to the Internet and, therefore, with each other, allowing for a much more wide open interplay of communications and applications than is possible today.

Cody Christman, director, product engineering, Global IP Network, NTT America

Cody Christman, director for product engineering at NTT America's Global IP Network unit, cites one example of what this level of device interconnectivity could mean in the mobile domain. "Mobile IPv6 has Routing Optimization (RO), which eliminates the triangular routing we're accustomed to in the IPv4 world," Christman says. "If you and I are based in Denver and we both go to Las Vegas

and try to connect with each other over the Internet, that call is going to be routed from Vegas to our home agents back in Denver and then back to Vegas. IPv6 RO allows automatic updating of address bindings between devices and mobile nodes so that the call would be connected directly over the nodes in Vegas."

What this means is that devices could identify their locations without use of GPS (Global Positioning System). Mobile phones loaded with the same application would automatically discover each other and establish ad-hoc networks for content sharing, game participation and social networking irrespective of who their service providers are.

IP multicasting and new approaches to securing content are intrinsic to IPv6, whether over mobile or fixed networks. Consequently, the ability of any device to independently connect directly to any content or e-commerce source and to be individually authenticated by that source could set in motion an entirely new approach to doing business over the Internet.

Consultant Wayne Homren, principal at Command Information, notes in his contribution to the Vision magazine feature that each IP stream from a server in a typical IPv4 network connects to just one end device, whereas each stream from an IPv6 server can connect to millions of devices. Moreover, an IPv6 server can generate 5,000 streams compared to 300 to 500 streams from an IPv4 server, which translates into one IPv6 server connecting to billions of users.

Needless to say, IPv6 poses a deep threat to the traditional middle-man role. But, given the likelihood that wireless giants moving to all-IP 4G mobile services in the years immediately ahead will exploit IPv6 to create new services and applications for end users, fixed service ISPs who resist IPv6 could find sticking with IPv4 to be a greater risk.

Service providers are beginning to get it and to take steps toward enabling network support for IPv6, Chrisman says. "The past year was extremely successful for us," he comments, noting the role his company plays as a provider of an IPv6-enabled global backbone. Many local access providers who are customers of NTT America have upgraded their IPv4 links to connect with NTT's dual stack of IPv4 and IPv6 circuits so that, in the future, they can exploit IPv6 once they've added their own IPv6 circuits. "And some of our customers have already added additional circuits to support IPv6," he adds.

"IPv6 is definitely on most people's radar screens," says Christman, who has spent much of the past year appearing on panels at events like CES here and abroad to help educate the ecosystem. "We haven't been delivering a 'sky-is-falling' type of message. We've tried to talk about benefits above and beyond address exhaust, about live commercial implementations and unique applications."

At CES Christman described how the IPv6 all-fiber local access network operated by local exchange carriers NTT East and NTT West in Japan is being used to support Hikari-TV, the IPTV service offered by the service provider NTT Plala, which is just one of many service providers that operate over the unbundled fiber network. The NTT FLETS Hikari Next Network, as it is known, was launched in March 2005 and now covers about 89 percent of the population with a penetration of over 10 million subscribers.

Hikari-TV, launched in March 2008 provides several hundred thousand subscribers a wide range of services, including 76 cable TV channels, retransmitted terrestrial broadcast channels, over 10,000 VOD titles and over 13,000 karaoke channels, Christman says. Superficially there's nothing all that unusual about the service, but, from an operational standpoint, it's benefitting greatly from use of IPv6.

"IPv6 supports a simple hierarchal network configuration," he says, "which makes the service cheaper to deploy and reduces long-term op ex. There are no NATs involved and no DHCP (Dynamic Host Configuration Protocol) required to get to scale. It greatly simplifies delivery of applications like IPTV, VoIP and peer-to-peer. And it's a very robust platform that allows you to deploy applications with security on a per-device basis. IP SEC is a standard component."

Schafman, who also heads the Israel IPv6 Forum, agrees with Christman that there needs to more focus on applications, such as the earthquake alert system implemented over IPv6 in Japan (see July ScreenPlays, p. 16). "Very few people are looking at what can be done at the applications level," she says. "On the network level you need the support, and you need it in the devices, but, then you need to think creatively." ■