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Technology - To Lead Or Follow: Congressional Committee Hearing On IPv6

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The main investigative committee in the US House of Representatives, the Committee on Government Reform, chaired by Hon. Rep. Tom Davis, recently held a full committee oversight hearing on issues relating to the adoption of IPv6 technology in the US. I was present at the hearing. This article captures impressions gathered at this hearing.

INTRODUCTION

In a recent article [[Part 1](#), [Part 2](#)] in Lokvani, I had written about IPv6, the next generation Internet Protocol (IP), which will eventually replace the incumbent IPv4 protocol. IPv6 is beginning to establish strong roots in the rest of the world. However, adoption of this technology has been somewhat lethargic in the United States, the birth place of the Internet. This could have important implications for the US in terms of technology leadership, security, economic and international competitive risks. The Congressional Committee on Government Reform held a full committee hearing titled "To Lead or Follow – The Next Generation Internet and the Transition to IPv6" on June 29th, 2005, to understand these issues, and to hear about the efforts of the federal government to transition to IPv6.

COMMITTEE ON GOVERNMENT REFORM

The Congress divides and distributes its legislative, oversight, and internal administrative tasks among various committees and subcommittees, as a way of effectively tackling the high volume and complexity of its work. The Committee on Government Reform is one such committee, and is the main investigative committee in the U.S. House of Representatives. Among its many responsibilities, this Committee has oversight responsibilities relating to Information Technology and Policy, including oversight of the federal government's migration to IPv6. The Committee is chaired by Congressman Tom Davis who represents Virginia's 11th District. Virginia lays claim to hosting about one quarter of all Internet Service Providers in the world, and to serving as a transit point for about a quarter of all the Internet packets in the world!

NEED FOR HEARING

President Bush's 2003 National Strategy to Secure Cyberspace states that "the United States must understand the merits of, and the obstacles to, moving to IPv6, and based on that understanding, identify a process for moving to an IPv6-based infrastructure." However, a Government Accountability Office (GAO) Report released in May 2005 indicated that civilian agencies in the US Government have not made much progress in IPv6 transition efforts. IPv6 has been embraced more eagerly by many foreign countries than by the US, where the technology was actually incubated. The US has a relative abundance of IPv4 addresses (for



example, about 9 addresses per person on the average, compared to 0.06 addresses per person in China, and 0.006 addresses per person in India), and there has been no compelling economic need in the US to migrate to IPv4 immediately. However, there are active and well-funded initiatives in many countries including China, Japan, and Korea, to transition to IPv6. Congressman Davis emphasized at the high profile IPv6 Coalition Summit held recently at Reston, VA, that "it is vital that the US maintains strong leadership in the Internet and all of the enterprises touched by information technology. China is outspending the US 10 to 1 on the new technology." As Mr. Alex Lightman, one of the witnesses at the hearing pointed out, the US continues to lead the world in areas where the US government showed leadership, whether it is the post office, the interstate highway system, airplanes, laser, radar, computer chips, or satellites. The US has been relegated to the position of a consumer and follower, where our government did not show leadership, including technologies such as color televisions, big screens, HDTV, digital cameras, and DVDs. The US Federal Government is the world's largest purchaser of IT products and services, with expenditures projected to be \$65B in fiscal 2006 and \$90B in fiscal 2010. With such deep pockets, the Government has a significant influence on what technologies end up getting adopted, and has the responsibility to ensure that it acquires the best-of-breed technology and services. The purpose of the Government Reform Committee hearing on IPv6 was to hear about the federal government IPv6 transition efforts, to understand the importance of IPv6 from an economic, technology, security, and international competitive risk viewpoint, and to find out what support the US Government and Congress need to provide in the IPv6 transition.

THE HEARING

This Government Reform Committee oversight hearing titled "To Lead or Follow: The Next Generation Internet and the Transition to IPv6" was a public full committee hearing. The committee members who attended included Chairman Davis who held the gavel and ranking member Hon. Rep. Henry Waxman. In attendance were two panels of witnesses who provided their sworn testimonies related to this hearing. The first panel consisted of senior officials from the federal government: Karen Evans (Administrator for Electronic Government and Information Technology) from the Office of Management and Budget, David Powner (Director of IT Management Issues) from the GAO, Keith Rhodes (Chief Technologist and Director) from the GAO, George Wauer (Director, Architecture and Interoperability) and Major General Dennis Moran (Vice Director of Command, Control, Communication Systems, Joint Chiefs of Staff) from the Department of Defense. The second panel consisted of representatives from the private sector and Internet governing bodies: Jawad Khaki (Corporate VP) from Microsoft, John Curran, Chairman of the American Registry for Internet Numbers, Stan Barber (VP) from Verio, the world's largest IPv6 ISP, and Alex Lightman, CEO of Charmed Technology, Inc., and Chairman of the high profile IPv6 Coalition Summit held recently. The testimonies were followed by question and answer sessions, in which the witnesses answered questions posed by the committee members. There was an audience of about 100 that included representatives from technology companies, government organizations, the media, etc. I was very impressed with the open nature of the political process, and the level of enthusiasm for technology, and the concern for maintaining our technology leadership, that is present in the highest political levels of the country.

OBSERVATIONS FROM THE HEARING

Here are some of my observations from the hearing:

- This hearing was extremely important because this probably represents the first significant action relating to IPv6 occurring at the highest levels of our Government, that is in some sense the equivalent of Prime Minister-level actions taking place in some of the Asia Pacific countries.
- The most important outcome of the meeting in my opinion was the announcement by Hon. Karen Evans, Office of Management and Budget that a soon-to-be-issued policy memorandum will set a firm date of June 2008 as the date by which ALL federal agencies' network infrastructure must be using IPv6. This should provide a significant impetus to the IPv6 transition efforts.
- Another important outcome was the firm reaffirmation by the Department of Defense (DoD) of the serious interest in and need for IPv6 in the US Armed Forces. During a question and answer session, one of the Department of Defense witnesses affirmed that IPv6 is an operational imperative from the DoD's perspective. The US Department of Defense, which incubated today's Internet, has been one of the leading champions of IPv6 adoption in the US. The armed forces of many of the coalition partners of the US are beginning to follow the lead of the US DoD in IPv6. The DoD has established target dates and road maps to guide its transition to IPv6, and is the government department with the most to show in terms of IPv6 transition. The DoD panelists also offered some guidance to other government departments by explicitly identifying the DoD's IPv6 management strategy (Y2K-like model with a clear target date) as an important factor contributing to its comparatively higher levels of success in IPv6 transition.
- Mr. Jawad Khaki, Corporate Vice President, Windows Networking and Device Technologies, Microsoft, who now also serves on the FCC Technical Advisory Council, identified the importance of a proactive national policy to promote IPv6. He also described Microsoft's long association with IPv6 and its commitment to the promotion of IPv6 adoption. Mr. Khaki mentioned that Longhorn, the next generation Windows operating system, will be fully IPv6-capable.
- One point that triggered some interesting discussion is the fact that anyone who asks for IPv4 addresses today can get it, even though there is no question that IPv4 address space is limited. One could argue that anyone who asks for IPv4 addresses gets it today, because nobody probably applies for large address blocks (knowing well they won't get them). One panelist offered an example of a hypothetical next generation automobile industry project requiring millions of IPv4 addresses that can't proceed because such large allocations are not feasible. The limited address space of IPv4 in effect stifles thinking and innovations. IPv6 can open up new possibilities with its nearly unlimited address space. Another panelist offered an analogy between attempts to use address conservation technologies to prolong the life of IPv4, and DOS memory management techniques. It would have been possible to keep coming up with clever and ingenious coding techniques to get around the memory limitations of DOS and prolong its life, but who would disagree that we are better off with Windows than DOS? In a similar vein, we can keep working around

the address space limitations of IPv4 with clever technical patches, but breaking free of the old mold and opening up new possibilities using IPv6 will probably lead to better innovations. We want to enable the development of the next Skype, not waste our resources patching Soviet-era PBX-like telephony (an analogy alluding to peer-to-peer communications vs. NAT that a panelist suggested).

· Another recurring theme at the hearing was the possibility of losing the technology edge to others by being slow in the adoption of IPv6. If we allow others to adopt IPv6 first, they will be the ones building the killer apps and the ones defining the course of the technology. For example, what if China uses its commercial and diplomatic weight to build support for its own version of IPv6 and associated security protocols? What if the European Union or China redefines IPv6 security protocols to suit their political and cultural preferences?

· Rep. Davis's mentioned that this was just the first of several planned hearings on IPv6 to understand the security ramifications, economic implications, and global competitiveness of falling behind in IPv6 transition. This seems to indicate that the ball will continue rolling.

More information on this hearing including detailed testimonies may be found at the Government Reform Committee web site:
<http://reform.house.gov>.

(Dr. K. Arvind received his PhD and Masters in Computer Science from the University of Massachusetts at Amherst, and his B.Tech in Electronics Engineering from the Indian Institute of Technology, Madras. In addition to active involvement in software R & D, he has published technical papers, participated in standards efforts, and spoken at a number of conferences. He has served in various companies in the Networking industry including Digital Equipment Corporation, 3Com, and Tenor Networks. He currently serves as a Consulting Engineer/Architect at Enterasys Networks, Andover, MA, and can be reached at karvind@enterasys.com.)

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