

EVOLUTION

The Department of Veterans Affairs IPv6 Newsletter

ISSUE 04 September 2011



this issue

IPv6 Inter Agency Meeting P.1
New Federal CIO P.1
IPv6 Happy Eyes P.2
IPv6 Tech Corner P.2

New Federal CIO

On August 4, 2011, the White House announced that it had selected Vivek Kundra's replacement. Vivek Kundra, the first Federal CIO appointed by President Obama, announced his resignation earlier this year to pursue other opportunities. The White House has selected Steven VanRoekel, a former Microsoft executive, as his replacement.

Continued on page 3...

What is IPv6

IPv6 is the next generation Internet protocol developed by the Internet community to replace the current IPv4 protocol. IPv6 provides an almost unlimited amount of address space and has been developed to meet the requirements and performance of today's businesses, governments, and consumers. While IPv4 and IPv6 can operate on the same network, they are not directly interoperable.

Fall 2011 IPv6 InterAgency Meeting – October 12

The VA IPv6 Steering Committee and Digital Government Institute are collaborating to develop and coordinate a two-day Government IPv6 conference program.* The first day of the conference, Wednesday, October 12th, will be held at the VHA National Conference Center in Crystal City, Virginia. The program that day will address the specific needs of IPv6 transition managers designated by each Federal agency.

The second day of the conference, on Thursday, October 13th, will be held at the Reagan Building, Washington, DC. This day will feature Digital Government Institute's annual Government IPv6 Conference and Exhibition, exploring government best practices and lessons learned from both industry and government. The format on the second day is intended to allow our attendees to exchange information and allow interactive discussions; both key features in previous InterAgency meetings. There will also be a broader span of presenters offered by the DGI IPv6 Conference. Please contact the VA IPv6 PMO for more information.

**The VA IPv6 Steering Committee and Digital Government Institute are separate entities and not affiliated in any manner. The two organizations are sharing information to build a content rich, dynamic conference to meet the needs of the public sector IPv6 community.*

IPv6 Transition and the Pursuit of “Happy Eyeballs”

Improving performance for end-users running both IPv4 and IPv6 to ensure better coexistence during the transition to IPv6.

Service providers are beginning the widespread global deployment of IPv6; however, IPv4 will continue until IPv6 is more widely deployed. An IETF draft by Dan Wing and Andrew Yourtchenko of Cisco is helping facilitate the adoption of IPv6 by documenting a methodology to enable more responsive client applications in dual-stack failure scenarios.

Appropriately named “Happy Eyeballs”, the draft describes an algorithm by which a client can quickly determine the best functioning address on a dual-stack server and trend towards using that same address family for subsequent connections.

The result is a dramatically improved user experience when connecting to dual-stack hosts and the intention is to keep the end user’s eyeballs “happy” in the face of problems that may exist when their client application is attempting to establish either IPv4 or IPv6 connectivity.

So why is this important to IPv6 adoption? In order for users to have a positive experience over IPv6, it is essential for them to enjoy nearly identical performance and functionality as with IPv4. A combination of today’s applications, IPv6 tunneling, IPv6 service providers, and some of today’s content providers all cause the user experience to suffer. Further, users will never adopt or remember to include an IPv6

sub-domain for their favorite sites (e.g. ipv6.google.com).

The IETF draft document describes client application behavior when establishing simultaneous IPv6 and IPv4 connections. If connectivity is successful, IPv6 takes precedence and any remaining redundant IPv4/TCP sessions are disconnected. Quick failover from either IPv6 to IPv4 or vice versa, insulates the user from performance problems that occur when only one of the two IP versions is operating optimally in a dual-stack deployment. This solution can greatly reduce connection times in problematic situations -- from minutes to milliseconds, compared to the typical behavior in many implementations today.

Google Chrome and Mozilla Firefox have adopted a similar approach to that of Wing and Yourtchenko. This “IPv4-Fallback” capability has already been shown to alleviate browser interaction difficulties often encountered while using dual-stack network configurations.

Google’s Chrome 11 browser uses a variation of “Happy Eyeballs” that establishes, monitors, and manages simultaneous parallel IP connections. This has already been proven to reduce fallback latency of a problematic IPv6 connection from between 20 and 75 seconds (as is often seen today), to as little as 300 milliseconds.

Continued on page 3...



IPv6 Tech Corner

The IPv6 address can be thought of as two segments brought together in one address. The first set of 64 bits in the address identifies “where you are,” and the second set of 64 bits identifies “who you are”.

There are three distinct types of IPv6 addresses.

- **Unicast** addresses that identify a single interface.
- **Multicast** addresses that identify a group of interfaces. A packet that is sent to a multicast address is delivered to all of the interfaces in the group.
- **Anycast** addresses that identify a set of interfaces. A packet that is sent to an anycast address is delivered to a member of the set.

Other IPv6 Address based terms with which you should be familiar include:

- **Unspecified** is the IPv6 address with all zeros and is never assigned to any node
- **Loopback** is the IPv6 local host address. This is used by a host to send packets to itself.
- **Link-Local** prefix is only valid in the local physical link.

IPv6 does not have broadcast addresses. The broadcast function is provided through the use of multicast addresses.



New Federal CIO

VanRoekel, 41, said he would use his new role as Chief Information Officer to introduce new technologies to improve government service, as well as, focus on cutting costs in an age of austerity.

Mr. VanRoekel is no stranger to the Federal Government. Following his time at Microsoft as Director of Web Services and an assistant to former Microsoft CEO, Bill Gates, VanRoekel became managing director of the Federal Communications Commission (FCC) in 2009.

His current role is as the executive director of citizen and organizational engagement at the U.S. Agency for International Development.

While VanRoekel worked at the FCC, one of his primary jobs was to redesign their basic website and primary web-based face.

While at the FCC, VanRoekel created an iPhone app that allowed ordinary users to submit the information needed to build a website called broadbandmap.gov, which maps Internet connectivity across the country.

VanRoekel said that cybersecurity will be his top priority. Increased hacking has raised concerns as some government departments shift to Google mail, a well-known example of a “cloud” service.

In his new role, VanRoekel will be at the helm of the federal government's IT budget, which is more than \$80 billion per year, and manage marquee technology initiatives such as data center consolidation and “cloud first”. VanRoekel has said that he plans to move ahead with the work started by Kundra, and bring to government the pace of innovation in the private sector.

IPv6 Happy Eyes

Given the resulting positive end user experience, this type of modification will likely be expanded to include additional browsers, applications and operating systems across the industry in the future.

Production quality IPv6 is on the rise and efficient coexistence with IPv4 is essential. As Joel Conover at Cisco wrote in his blog recently, it is only through positive user experiences will a “Network Jumpstart” occur.

The more robust the network, the more people will connect, and the more people who connect, the more robust network becomes.

In order for IPv6 to leave the laboratory and enter the mainstream, the user experience of IPv6 is now more paramount than ever.

“Happy Eyeballs” is among the key innovations necessary to keep the Internet growing, thereby fueling the next wave of IPv6 adoption and expansion.

The IPv6 Q&A Corner

Q: What is the Federal IPv6 directive for 2012?

The Federal CIO released new directives for IPv6 in September of 2010. One of these directives requires agencies to make all of their external and public facing services IPv6 operational by the end of fiscal year 2012.

OI&T is already aggressively working to make all Internet, Web, E-mail and DNS service IPv6 operational by the end of calendar year 2011. Additional services such as IP-video and IP-voice will be made IPv6 operational as well.



VA IPv6 Steering Committee

Steve Pirzchalski

Chairman & VA IPv6 Transition Lead

Wes Crum

IPv6 Transition & Pilots

Juan Adames

IPv6 Security

John DelTognoArmanasco

IPv6 Addressing

Rick Shew

IPv6 Training

Evolution

ISSUE 04 September 2011

Upcoming IPv6 Related Events

Internet2 Fall Member Conference

October 3-8, 2011 Raleigh, NC

VA Interagency IPv6 Meeting

October 12, 2011 Washington, DC

DGI IPv6 Conference

October 13, 2011 Washington, DC

Contact the VA IPv6 Program Office

Derrick Evans: derrick.evans@va.gov (202) 560-7299

Ralph McDonald: ralph.mcdonald@va.gov (301) 427-2179

Get more information on VA's IPv6 efforts at:

<http://vawww.netops.oit.va.gov/IPv6.asp>