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IPv6 Transition: Preparing For The Big Shift

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Information managers are frequently asked the question, "should our organization IPv6?" Much of the motivation behind the question is due to a push by technology rags and industry pundits who see IPv6 (Internet Protocol version 6) as the future of networking. Unfortunately, few resources exist to assist an organization in planning a network transition to IPv6.

IPv6 is a suite of protocols for the network layer. In some cases, existing IPv4 (Internet Protocol version 4) gateways are used to interconnect IPv6 nodes. IPv6 comes in two flavors, native and 6to4, which of course causes some confusion to the uninitiated. Native IPv6 works independently of the existing IPv4 infrastructure, and 6to4 is a transition mechanism that provides a way to connect IPv6 end-site networks by tunneling over the existing IPv4 Internet. Most IPv6 allocations in the wild are /48. That gives any organization, corporation or individual home user the power to network up to 1,208,925,819,614,629,174,706,176 computers -- which is by all accounts a very big number. This would allow individuals or organizations to network everything they own.

Network infrastructure is very important, as it provides the owner permanent resources to platform information infrastructure such as workstations, file storage systems and servers across departments. A /48 allocation would provide network administrators peace of mind, because it means they wouldn't have to worry that their network infrastructure would have to be renumbered if the existing IPv4 pool became

congested. Network administrators know the costs savings associated with having a fixed infrastructure.

There are "6to4" tunnel and native ISPs that provide a /48 Ipv6 allocation. Unfortunately, though, there are not many of them. Leading ISP help desks in the United States and Canada have no idea what IPv6 is. Some companies providing IPv6-compliant TCP/IP stacks fail to answer their email when presented an IPv6 query.

Europe, however, is a very different story. The European Commission, along with the government of Japan, has been active in sponsoring and promoting the transition to IPv6. The main focus of this growth is to ensure that the IPv4 distribution nightmare that left Europe, Asia and Africa with an infrastructure shortage is not repeated. Many in the networking community claim that the early days of IPv4 address distribution were flawed and favored U.S. network infrastructure, leaving most of the world with a shortage of numbers to meet existing demand.

The fallout resulting from the mismanagement of the IPv4 address space prompted the European Commission and Japan to make addressing a national priority. At the head of this crowd you'll find Latif Ladid laying the foundation for IPv4's burial. "Bluntly speaking, it's the end of the end-to-end model," said Ladid of IPv4. Ladid, the IPv6 European task force Chairman for Ericsson Telebit in Denmark, proudly claims that IPv6 "is about inventing a new future."

Ladid feels the current Internet has reached the end of its lifespan and needs a serious overhaul to meet the demands of future applications and technology. IPv6 solves the scaling issues of today's Internet and supports new features while enhancing others, including larger address space, end-to-end connectivity, plug & play autoconfiguration, built-in security, mobility, multicast, anycast and support of larger data packets.

My recent investigation of IPv6 was reminiscent of Alice's adventure in Wonderland. Businesses interested in making the transition should expect a trail of confusion. If you don't talk the talk that is "IPv6 speak," it's going to take time to navigate this endless protocol jungle.

Ladid agrees that more can be done to educate organizations in making the transition, saying, "Lack of knowledge and education is the biggest barrier to

wider deployment." Vint Cerf, a senior vice president with WorldCom and chairman of the Internet Corporation for Assigned Names and Numbers, a Department of Commerce contractor charged with the administration of the U.S. internet domain system, thinks more can be done to educate business and consumers.

"I think the IPv6 community does need to help alert the business community as to the current state of implementation and use of IPv6," said Cerf, "and the IPv6 forum has sought to do this." Much of the problem associated with an IPv6 transition involves motivation, he added. "Users will not begin to use [IPv6] until there is clear utility in doing so and it satisfies an interest or requirement that the user has."

The motivation has not been lost on some organizations that are positioning themselves for the IPv6 transition. Sony recently announced future PlayStations will be IPv6 compatible, and Ladid expects much of the push toward IPv6 in consumer electronics to be driven by the gaming and entertainment industries. "These are the areas where Peer-2-Peer applications will predominate", he said, "as you need an IP address for each appliance like the Sony PlayStation or the Microsoft Xbox."

Cerf cautions the industry that the best method to effect a transition in a business environment is to consider operating in dual mode. Running both protocols is possible with the Windows XP system and Linux. Users behind a Network Address Translation (NAT) could see operational advantages by incorporating public IPv6 address space along with their existing private address infrastructure. NAT is a method of connecting multiple computers to the Internet (or any other IP network) using one IPv4 address, and was designed as a solution to the shortage of existing address space. NAT has many limitations when it comes to Peer-2-Peer solutions that IPv6 could easily fix.

Network administrators should also ensure that any version of IPv6 used in a production environment is RFC 3041 compliant. Early implementations of IPv6 violated user privacy by assigning interface identifiers derived from a hardware address allowing the tracking of equipment. RFC 3041, titled "Privacy Extensions for Stateless Address Autoconfiguration in IPv6," is an algorithm that generates randomized interface identifiers and temporary addressees during a session, eliminating the concerns privacy advocates had with

earlier IPv6 versions.

Of course, finding IPv6 providers is not easy. There are very few lists available. However, if your ISP does not offer IPv6, you can always use an IPv6 tunnel broker.

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