

Where In The World Is IPv6?

New standard promises constant connections, but adoption has been uneven

IPv6 WILL SAVE THE INTERNET—eventually.

The Internet needs saving because, eventually, there will need to be enough IP addresses to connect mobile Internet devices for every person on the planet, all computers, and all network devices, with enough space left over to connect TVs, video players, and even alarm clocks to the Internet.

IPv6—the latest Internet layer of the TCP/IP suite—also promises interruption-free connections, improved security, and easier management than its predecessor, IPv4. Internet service providers, mobile computing vendors, and governments are ramping up development and implementation of IPv6.

When will “eventually” happen?

IPv6 is arriving in Europe and Asia, mainly in emerging technology hot spots that lack IPv4 and other legacy networks. It’s also coming to mobile networks because they depend on rapid, reliable connections. But it might not be in U.S. offices for a while.

Most industry watchers agree that organizations must support connections to and from IPv6 networks by 2011, at least at the gateway. This also is the year that IPv4 addresses are expected to run out. But adoption is likely to be slow going until then.

Obstacles include the continued widespread use of IPv4, because upgrading to IPv6 means replacing operating systems and software that isn’t IPv6-aware. This could be anything from management software and monitoring software to middleware applications. Larger companies that haven’t recently updated systems, devices, or software face the highest expenses.

THE LOWDOWN

» **THE PROMISE** IPv6 promises to provide drastically more address space, improved security, and easier management for network administrators. IPv4 allows a maximum of about 4 billion IPv4 addresses, but IPv6 allows for about 340 trillion—a great improvement for Internet and mobile growth. IPv6 also sports IPsec, auto-configuration, and new features for mobile devices.

» **THE PLAYERS** IPv6 is gaining steam in Asia and Europe; the Pacific Rim has been one of the fastest growth areas for IPv6 because the region is experiencing tremendous technology growth. In the United States, the vast IPv4 infrastructure has slowed IPv6 adoption, but the federal government has mandated that applicable federal purchases must support IPv6 to ensure support for future implementations and to overcome IPv4 address allocation issues. Major network and operating system vendors all have built-in support for IPv6, although support from application vendors is lagging.

» **THE PROSPECT** IPv6 is on all software road maps and likely will arrive with mobile devices and ISPs first. It’s prudent to ensure that your core technologies and new infrastructure support IPv6, but unless your organization has a pressing business need, now is not the time to rip out IPv4 and start implementing IPv6.

Major operating system and network device vendors such as Apple, Cisco, Hewlett-Packard, and Microsoft support IPv6, but application vendors are lagging behind, says Adam Powers, chief technical officer of Lancopé, a network behavior analysis vendor.

Monitoring applications, communication suites, and peer-to-peer applications may need to be and upgraded or replaced. These issues will lead many companies to utilize IPv4-to-IPv6 gateways rather than replace IPv4 networks.

THE SECURITY FACTOR

One appeal of IPv6 is that it’s supposed to be more secure than IPv4, because IPsec is built in. But the security benefits of IPv6 only come if partners, clients, and other connecting parties also use IPv6. Many will recall IPv4’s IPsec prob-

lems; it was back-ported to work with IPv4 and put high-performance overhead on routing devices. Troubleshooting and monitoring encrypted packets also were netlesome with IPsec on IPv4, leaving network administrators wary of IPv6’s potential security-induced performance problems.

Before pushing an IPv6 deployment, business technology leaders must thoroughly consider who will have authorization for automatically assigned addresses and configurations, how IP packets will be protected, and what traffic will be exchanged with the Internet.

IPv6 obviates the Network Address Transport protocol, allowing devices to talk directly, as was originally intended in IP design. This will simplify network troubleshooting, but also will require careful network configuration. Many or-

IPv6: Arriving Slowly

1998	2001	2002	2003	2007	2011
IPv6 RFC 2460 published	Cisco implements IPv6 in IOS	Microsoft implements IPv6 in Windows XP operating system	IPv6 functionality added to Japan and South Korea top-level domains	Apple's Airport Extreme uses IPv6 by default	Estimated date that all IPv4 addresses will be allocated

ganizations rely on NAT for security and privacy and will need to thoroughly consider access controls to ensure that moving away from NAT doesn't create new security problems.

For small or home office deployments, installing IPv6 and using stateless auto-configuration may make sense now, because IPv6 simplifies the process.

The trade-off is less control of address assignment and possible

problems with network-discovery tools that scan IP ranges to identify hosts. If nodes are allowed to pull an address from a wide range, as is suggested for security purposes, it may be impossible to identify all nodes on the network because of the vast size of IPv6 subnets.

IPv6 support is coming to the U.S. market in operating systems and network devices. Early adopters have included large Internet properties. For example, Google

launched an IPv6-supported site to prepare for IPv6 connectivity.

Mobile providers, who stand to receive the biggest benefits, are doing the most to get ready for it, but not all mobile apps and handsets support IPv6. Mobile OS vendors such as Nokia are shipping IPv6-compatible devices, but Apple's iPhone doesn't support IPv6, even though its Mac OS X operating system does. —ADAM ELY (aely@nwc.com)