

IPv6 Home Networking Messaging Guide

Home Networks: Prepare your home for the next generation Internet so all your devices can connect and communicate.

IPv4 address exhaustion is a watershed moment in the industry. The Internet is rapidly running out of IPv4 addresses and those addresses will likely be depleted this year. Mobility, video, virtualization, and the consumerization of IT are imposing increasing demands on the network and every device that uses an IP address must eventually support IPv6. Cisco as an organization is committed to supporting the transition to IPv6 in all its products and services it provides to service providers, enterprise and consumer customers. IPv6 is foundational to the next generation Internet, enabling a range of new services and improved user experiences.

As ISPs begin rolling out IPv6 service to their customers, consumers will need new routers and gateways that support IPv6 to participate in this next generation Internet. This month, Cisco will begin enabling IPv6 across its consumer line of routers, including the Linksys E4200 Maximum Performance Dual-Band Wireless-N Router. It is critical that consumers begin looking for products and devices that support IPv6 or can be updated to IPv6. Cisco has been and will continue to be a leader in the development of IPv6, so consumers can feel confident that home networking products from Cisco will provide top line performance now as well as providing a foundation for the future.

1. Cisco has an approach for customers to preserve (this isn't a Y2K scare), and prepare (make a plan) in order to prosper (enabling the benefits of the next generation Internet).
2. Cisco has been a pioneer in IPv6 development and as such (Rome wasn't built in a day), we have been select and specific in enabling IPv6 across thousands of products in our enterprise, business and service provider portfolio. As the IP leader, we have a global responsibility for everything from the core through data center into the home. We will begin to roll out native IPv6-supported home networking products in June.
3. World IPv6 Day is the world's first "experiment" around IPv4 and IPv6 content behavior. Cisco is a key participant in this activity (sponsored by the Internet Society). Using information gathered on World IPv6 Day, Cisco anticipates completing its rollout of IPv6-supported home networking routers through the end of the 2011 calendar year.

Now is the time to formulate an IPv6 transition strategy for your home network. Cisco recommends a three-phase transition strategy:

- **Preserve** your current investments in IPv4 as you transition to IPv6-supported products.
- **Prepare**—Cisco Linksys home networking products provide native support for IPv6 as well as IPv4, ensuring your network is ready for the next generation of technologies.
- **Prosper**—Take advantage of the next generation Internet at home, which includes new applications incorporating video, mobility, energy management and cloud services, providing for a better home networking experience.

Home Networking IPv6 Q and A

Q. If I don't upgrade or have an IPv6-supported router/gateway, when will my Internet connectivity be impacted?

A. Connectivity will be impacted when websites begin to offer services, content, etc. that is only available via IPv6. Cisco anticipates that IPv6-only websites will not be widespread for several years. However, there may be specific popular sites that offer extra content or services via IPv6 exclusively within the next 12-18 months. Because IPv4 addresses are now scarce, ISPs will be employing new mechanisms that allow one IPv4 address to be shared among multiple homes, which may impact connectivity. As this occurs, many ISPs plan to offer IPv6 at the same time, so that users may continue to have their own IPv6 address, which does not need to be shared. It is important that the gateway support IPv6 in order to take advantage of this IPv6 service as it arrives.

Q. If Cisco is supporting IPv6 and World IPv6 Day, why does Linksys not have any product that supports native IPv6 right now?

A. One of the goals of World IPv6 Day is to "smoke out" problematic implementations of IPv6 that have been introduced over the past decade. Content providers are worried that if they enable IPv6, any number of implementation problems that haven't been thoroughly tested in the past will give their users a bad experience. This is why the major websites have banded together to do this at the same time, so that no single website is stepping out alone. We will know far more about what works and what doesn't work well after June 8, and be able to incorporate that into our products firsthand. Our plans are to provide a firmware update on our Linksys E4200 on June 24 and the rest of the Linksys E-series lineup by end of the 2011 calendar year.

Q. Why is it okay that the new E-Series routers don't have IPv6 yet?

A. We are introducing native IPv6 capability into the high-end home networking product first, verifying its functionality, proving its stability, and then planning to reuse the base code into the other products. While many of the base IPv6 specifications have been available for years, the IETF published RFC 6204, which defines the basic requirements for an IPv6 home router, as recently as April 2011. IP is one of the most important protocols to the Internet, and IPv6 is the biggest change in IP in over 30 years. We want to be careful that the implementations we ship work well and adhere to the latest standards so that we do not hinder the adoption of IPv6 by content providers and ISPs.

Another reason is simply because there is not a widely deployed, end-to-end IPv6 network yet (even though there are regional deployments). There are four basic areas where IPv6 support is required for the home:

- 1) Endpoint devices (for example, PCs, phones, tablets, etc.)
- 2) An IPv6 broadband access network
- 3) An IPv6 Internet (including websites with content)
- 4) Home routers

Without all four areas, IPv6 is likely not to be used. To date, endpoint devices represent the bulk of IPv6 deployment. Home routers and Internet are following quickly with IPv6 capability. Broadband access networks will be the last to mass deploy IPv6 services (even though there are significant IPv6 deployments from major service providers available now).

Q. Will your new line of Linksys E-Series Routers fully support IPv6?

A. By Fall 2011, all new Linksys Routers will support IPv6. Select Linksys routers have supported IPv6 as part of 6-to-4 tunneling for several years, which has allowed testing of IPv6, but we recommend that this only be used by advanced users who are aware of its limitations. Users should work with their ISPs for a supported form of IPv6.

Q. You mentioned that the E4200 will have firmware support for native IPv6 in the spring – is this still happening?

A. Yes, the plan for the Linksys E4200 is to have firmware available for download at no cost and planned for June 24, 2011 worldwide.

Q. What if a user has an IPv4 router and websites and client devices are using IPv6 – will users be able to access those sites and use those client devices on a home network?

A. If the home router is IPv4 only, then the answer is NO. However, if the ISP serving the end user supports a technology known as “6rd,” the end user can access IPv6 services by obtaining a home router that also supports 6rd (an example is the E4200). Consumers should know that most websites are dual-stack, so if you can’t use IPV6, you can fall back to IPv4. This will be the case for a while, until we start to see IPv6-only content and applications appear.

Q. What is “6rd”?

A. To enable IPv6 devices in the home to access IPv6 services outside the home, the E series routers will support a special feature known as 6rd (rd = Rapid Deployment). Using 6rd, an IPv4 connection is established between the home router, acting as a 6rd CE (Customer Edge) device, and a 6rd BR (Border Relay) device (which is deployed by the ISP). After the connection is established, IPv6 devices in the home can connect to IPv6 websites (the connection allows IPv6 to be carried over IPv4 via a tunneling mechanism). The IPv6 devices in the home will benefit from full IPv6 connectivity via this “rapid deployment” scenario.

Cisco engineers authored the 6rd specification, which is officially known as RFC 5969 “IPv6 Rapid Deployment on IPv4 Infrastructures (6rd)” and which was formally approved in August 2010.

Q. Which sites are using IPv6 now?

A. Here are lists of websites that are supporting IPv6:

http://www.ipv6forum.com/ipv6_enabled/approval_list.php

http://www.sixxs.net/wiki/IPv6_Enabled_Websites#General_Web_Sites

<http://www.worldipv6day.org/ipv6-enabled-websites/index.html>

<http://www.worldipv6day.org/participants/index.html> (participants in the World Test day)

Q. Which client devices are using IPv4 and IPv6?

A. IPv6 support has been in Mac OS X since the release of 10.3 – IPv6 is also in iPhones and iPads. Microsoft Windows releases have supported IPv6 since Vista (but there are also upgrades to support IPv6 in Windows 2000 and XP). Android based devices also support IPv6. In addition, there are also Linux 2.6, FreeBSD, and Solaris. Essentially all major OS in use for the past 12-18 months have had production quality IPv6. Of course, client devices are only part of the IPv6 story.

Q. Do the Linksys E2000 and E3000 support IPv6 today? I understand there are ways to make the E2000 and E3000 support IPv6 – how does this work?

A. The hardware is capable of supporting IPv6, but due to memory limitations, some other features may need to be sacrificed in order to add IPv6. End users who feel confident in modifying their E2000 or E3000 routers for IPv6 can do so via publicly available third party firmware.

Q. What if I have an older Linksys Router, such as a WRT54G; will I have support for IPv6?

A. We have no current plans to provide IPv6 to our older wireless-G or wireless-B routers. If customers have older wireless products, they may want to consider upgrading to a new wireless-N router. This will provide the IPv6 support they will need for future-proofing their home network, while also providing the networking bandwidth to connect multiple devices such as computers, game consoles, tablets, Internet-enabled TVs, smart phones, etc., to the internet and to each other. Older wireless-G routers may not be able to provide the support to stream multiple video streams simultaneously, seamlessly. As customers upgrade their mobile phones every few years and even their computers every few years, consumers should consider upgrading their home router so that they are getting the latest technology to connect all the new devices they are bringing into their home.



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