

FOUNDRY
NETWORKS

CASE STUDY: UNH-IOL

University of New Hampshire InterOperability Laboratory and Foundry Networks Team Up to Achieve IPv6 Readiness



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SUMMARY

Foundry Networks delivers high-performance network switching, routing, security, and network traffic management solutions to more than 8,500 customers, which include some of the world's largest service providers, government agencies, high-performance computing sites, universities, and enterprises. As a leading provider of switching and routing solutions, Foundry is found in every field where high-performance computing is important, including e-commerce, entertainment, healthcare, manufacturing, and financial institutions.

Foundry has a reputation for pioneering future-ready solutions, and it has proven itself a leader in converged, next-generation networks—specifically in Internet protocol version 6 (IPv6), the successor to the current data transport mechanism that underlies today's networks.

As evidence of its industry leadership, Foundry is the first company to bring to market a router officially recognized as capable of running IPv6 at wire speed. Foundry worked with the University of New Hampshire InterOperability Laboratory (UNH-IOL) to ensure that its ground-breaking IPv6 products would excel in today's complex networks. Prior to introducing the IPv6 products to customers, Foundry participated in the IPv6 Ready Logo Program, a rigorous IPv6 product testing process spearheaded by the IPv6 Forum and administered in North America by UNH-IOL.

The "IPv6 Ready Phase-2" status is the most demanding certification obtainable today from the IPv6 Ready program, and it is based on very strict requirements formulated by the IPv6 Logo Committee (v6LC). To achieve this status, the UNH-IOL team tests a vendor's equipment with a series of carefully designed, thorough test cases that assess the equipment's compliance and interoperability level with IPv6 standards. All test scenarios must be completed successfully for a product to be certified with the "IPv6 Ready" status.

UNH-IOL completed the IPv6 tests over the Foundry IronWare® chassis system software, which is based on a modular, multi-threaded operating system supported by Foundry's high-end switching and routing systems. These systems include BigIron® MG8, BigIron RX Series switches, and NetIron® 40G router.

INTRODUCTION: GETTING READY FOR IPV6

IPv6 is the "next-generation" Internet protocol, and plans are in place for it to replace the current protocol (IPv4) that underlies today's networking environment. The Internet has run on IPv4 for nearly 20 years, resulting in a shortage, especially outside North America, of the IP network addresses needed by every new device added to the Internet, be it PC, laptop, printer, Web cam or mobile phone.

Moving to IPv6 will lead to improved network security, higher quality of service, and easier routing and configuration processes. In June 2003, the U.S. Department of Defense (DoD) announced its strategy for a complete migration to IPv6 by the year 2008. Migration to the new protocol has been slow in the United States, but industry analysts forecast that IPv6 will eventually replace IPv4, with the two protocols coexisting for a number of years during a transition period. It is imperative that service providers and enterprises are ready for the upcoming changes. Even now, IPv6 capability is essential for companies selling IP devices into non-U.S. growth markets, such as Japan.

BUSINESS CHALLENGE

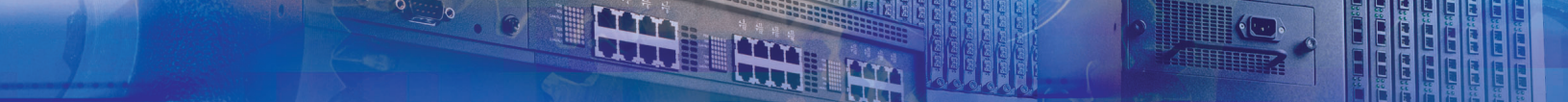
Foundry needed to quickly ensure its IPv6 products would excel in complex networks and interoperate with current and legacy equipment from diverse manufacturers.

TECHNICAL SOLUTION

The "IPv6 Ready" program administered by UNH-IOL supplemented Foundry's own QA efforts by putting Foundry's products through a battery of trials designed to improve the products' performance as needed in real-world, multi-vendor deployments.

RESULTS

Foundry became the first company to bring to market a router officially recognized as fully capable of running IPv6 at wire speed.



“IPv6 is a critical component of Foundry’s overall strategic direction,” says Ahmed Abdelhalim, Foundry product line manager of service provider systems. “We have been shipping IPv6 solutions for more than two years, and this certification demonstrates Foundry’s ongoing commitment to building next-generation products that will enable the exciting next phases of the Internet. We take great pride in having developed an IPv6 router with packet-forwarding rates that have never been demonstrated. We continue to lead this area in high performance without sacrifice, at no extra cost to our customers.”

THE CHALLENGE: EXHAUSTIVE PRODUCT TESTING BEFORE PRODUCTS REACH CUSTOMERS

The IPv6 Ready Logo program, sponsored by the IPv6 Forum, promotes IPv6 as the next generation Internet technology and stimulates the creation of standards-based interoperable implementations throughout the industry. Despite international engineering guidelines, implementing a technology standard inevitably involves some degree of interpretation and, therefore, uncertainty. Would Foundry’s new breed of routers work with any host they are plugged into? How would they interact with other routers in the same network? How could Foundry demonstrate to its customers that its new products will interoperate with equipment already installed in millions of networks all over the globe?

“Laboratories like the UNH-IOL provide an indispensable service for us,” Abdelhalim says. “We have to ensure each device meets compliance and that when you put a new router into your network it will work with Foundry because both devices are standards-compliant and interoperability-tested.”

THE SOLUTION: UNH-IOL AND THE IPV6 READY LOGO PROGRAM

Foundry has been a member of various UNH-IOL technology testing groups since 1997. For the IPv6 certification tests, Foundry knew it was in good hands with UNH-IOL. The interoperability lab team administers a rigorous body of IPv6 tests approved by industry association IPv6 Forum through the laboratory’s IPv6 Consortium. To achieve IPv6 Ready Phase-2 status, Foundry sent the BigIron MG8, BigIron RX Series switches, and NetIron 40G routers to the UNH lab in Durham, NH.

As administered by UNH-IOL IPv6 Consortium, the “IPv6 Ready” logo program consists of almost 400 test scripts that put IPv6 devices such as switches, servers, and routers through a battery of trials that can greatly improve the products’ ability to perform in real-world, multi-vendor deployments. The tests include self-test, conformance, and interoperability segments. To display a gold IPv6 Ready logo, a product must complete all the test items in the program successfully. The logo is available for hosts, routers, operating systems, and protocol stacks.

Foundry was tested in environments with the leading vendors. “We found the test procedures administered by UNH-IOL to be rigorous, detailed, and very thorough,” says Abdelhalim. “The tests have been very reliable, and the UNH’s engineering team was very effective.”

The gold IPv6 Ready logo plan covers IPv6 functionality including IPv6 headers, IPv6 address auto-configuration, address resolution, fragmentation, redirect, path Maximum Transmission Unit (MTU) discovery, router discovery, prefix discovery, and Internet control messaging protocol (ICMP) version 6. It also addresses Layer 2 address resolution and neighbor discovery specifications for IPv6, such as router advertising, error message processing, and reachability timeout between two or more devices.

UNH-IOL engineers Timothy Winters and Erica Williamsen worked closely with Foundry’s IPv6 engineering team to resolve issues and refine how Foundry implemented the standard.

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— Ahmed Abdelhalim,
Product Line Manager
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Foundry Networks, Inc.



“We took the Foundry equipment through the logo test suite’s five sections until it passed 100 percent,” Williamsen says. “As for the few problems we saw, we were able to pinpoint them, and in almost every case, we were able to address them on the spot. Going beyond conformance, we identified issues that would improve the product. A switch was dropping a specific packet, for example, because a previous customer had requested this feature. Once the context changed to IPv6, that feature became a bug. Would Foundry have spotted it on its own? Probably, but identifying it during logo verification may have saved the engineering team trouble, time, and money.”

THE RESULTS: FOUNDRY IS FIRST TO MARKET WITH A “IPv6 READY” WIRE-SPEED ROUTER

Having earned the gold IPv6 Ready logo, Foundry can assure customers that its newest, high-performance routing and switching devices will perform in mission-critical networks today and for years to come. Through the UNH-IOL, Foundry galvanized engineering resources at one of the largest multivendor IPv6 test beds in North America. Foundry jump-started its IPv6 conformance and quality assurance testing, slashed costs and time to market, and leap-frogged competitors.

At UNH-IOL, Foundry worked closely with the engineers who helped define the international requirements for the IPv6 Ready Logo Program. These engineers have been testing IPv6 conformance and interoperability and debugging products from every major company in networking since the late 1990s. This certification reinforces Foundry’s leadership position in delivering future-ready solutions for converged next-generation networks.

“The UNH-IOL engineering team offered expert advice and worked very closely with our engineers,” says Abdelhalim. “The results were shared with the Foundry engineering team, allowing us to achieve compliance in a very short timeframe. Foundry has had a close and very productive relationship with the UNH-IOL for eight years. We are eager to continue that relationship for years to come.”

ABOUT THE UNH-IOL

Established in 1988, the UNH-IOL is a non-profit organization housed in 32,000 + square feet of laboratory space offering comprehensive interoperability and conformance-based testing in 19 data communication technologies. Test solutions created at the UNH-IOL offer a set of methods to increase interoperability through protocol operations, signaling, point-to-point and multi-system scenarios. For more information, visit the UNH-IOL website at: <http://www.iol.unh.edu>.

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Foundry Networks, Inc. (Nasdaq: FDRY) is a leading provider of high-performance enterprise and service provider switching, routing and Web traffic management solutions including Layer 2/3 LAN switches, Layer 3 Backbone switches, Layer 4 – 7 Web switches, wireless LAN and access points, access routers and Metro routers. Foundry’s 9,000 customers include the world’s premier ISPs, Metro service providers, and enterprises including e-commerce sites, universities, entertainment, health and wellness, government, financial, and manufacturing companies. For more information about the company and its products, call 1.888.TURBOLAN or visit www.foundrynetworks.com.

