Large-scale International Ipv6 Testbed

Results in Brief

Dual IPv4 and IPv6 multicast deployment

Deployment of both IPv4 and IPv6 multicast has been made possible within the 6NET project to allow the distribution of identical content only once in the dual-stack networks. The network itself can handle subsequent duplication and transport to the intended receivers.

DIGITAL ECONOMY

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While the existing Internet Protocol version 4 simply cannot support an Internet scaling to many billions of globally connected hosts, Internet Protocol version 6 provides a 128-bit address space. During the design of IPv6, the Internet Engineering Task Force took the opportunity to make further improvements beyond providing a unique address for about 340 undecillion hosts. Extensible and highly adaptable to future requirements, IPv6 will have to co-exist however with IPv4 for many years; thus finding ways for the two to interoperate is of great importance.

Within the European 6NET project, dedicated transition techniques were developed to address multicast issues. If all parties intending to communicate have applications and host operating systems that support the same Internet Protocol, there is usually no serious issue arising during data delivery. On the other hand, a multicast source can stream to both an IPv4-only and IPv6-only group to allow all users to reach it. If

the multicast source cannot be made dual-stack, hosts that support only the other protocol will not be able to access it, unless some translation is performed somewhere on the path in between.

Research work at the UNINETT laboratories focused on deploying multicast in dual-stack networks. In this case, one would preferably deploy both IPv4 and IPv6 multicast using a PIM-SM (Protocol Independent Multicast-Sparse Mode) domain with Rendezvous Points. IPv4 multicast addresses were embedded into IPv6 by prepending them with a specific /96 IPv6 multicast prefix, such that for each one there would be a respective IPv6 multicast address. Subsequently, an IPv6 host in PIM-SM domain could receive and send to any IPv4 group by using the respective IPv6 group.

With the Rendezvous Point for the prefix used as the gateway, a video conference with multiple participants deploying both IPv4 and IPv6 would be supported as well as two-way connectivity. This gateway could for instance be placed on the border between an IPv4-only and an IPv6-only network, but it could also be placed within a dual-stack network. Such a single gateway was successfully deployed as a service to the entire 6NET and M6BONE network.

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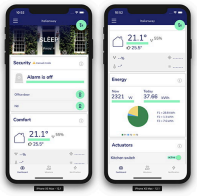

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6NET

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