fast facts

Project: VIPNet: A Virtual IPv6 Application Testbed
Lead Organization: University of Colombo School of Computing (UCSC)
Country: Sri Lanka
Budget: 40,000.00 AUD

situation

Due to the rapid development of the Internet and use of Information Technology for educational, research, and commercial sectors, Internet Protocol v4, or IPv4, has become a limited resource. While there are some IPv6 solutions available, none of them are being used on a wide scale at the current point in time. Globally, the deployment of IPv6 is delayed primarily due to the lack of supportive applications, security issues and the cost of hardware. In order to develop IPv6 applications, it will be necessary to have a cost-effective test environment to demonstrate how and why to adopt IPv6. While IPv6 emulators are available, they are prohibitively expensive in many markets.

solution

To address issue outlined above, the project team built a low cost IPv6 test bed, which can be used to test IPv6 applications and security issues. This test bed (VIPNet) was motivated by the assumption that the deployment of IPv6 has been delayed primarily due to a lack of support applications, security issues, and the total cost of hardware needed for IPv6 implementation. This last factor can make IPv6 preparations prohibitively expensive for developing countries.

The concept of VIPNet is different from the existing IPv6 test environments. VIPNet has several advantages than most of the existing virtual environments and test beds. Not only is it reliable, but it is user-friendly and possesses the ability to work across multiple operating systems By using the custom VIPNet interface, the required network topology and the machine configurations can be easily specified and deployed using virtual machines. VIPNet is a simple, open source IPv6 application testing and teaching tool IPv6 that application developers and security auditors can use to test their applications and network configurations before investing resources in making changes to their existing systems. Educators, too, may find VIPNet valuable as a research and teaching tool, as it allows them the ability to "explore" IPv6 in a simulated environment.

The project began in summer of 2010 when the project team began participating in IPv6-related training sessions, such as workshops offered during the Association for Computing Machinery's Special Interest Group on Data Communications August 2010 meeting. Back in Sri Lanka, software development took longer than initially expected, as it was necessary to identify an appropriate virtualization technology. Eventually, however, the decision was made to build the test bed using Xen Hypervisor, a virtual machine monitor, and the initial prototype launched in May of 2011.

The first release of the VIPNet is available at http://score.ucsc.lk. VIPNet can be used as an IPv6 application deployment and testing tool as well as teaching tool. The IPv6 teaching materials developed for this project are currently available for use by the public, and more teaching materials will be developed and released in the future. The team also plans to provide training sessions to project partners and host additional training programs for private and government organizations in order to promote the use of the product itself.

broader impact

Since the completion of the original project, the VIPNet team has begun training permanent UCSC staff to support IPv6 environments. VIPNet will be maintained as an open source project. The team believes organizations that support IPv6 activities will be able and willing to provide the necessary financial support for continued program activities. In exchange, VIPNet will continue to be provided to development and educational organizations free of charge.

The team hopes the knowledge gained and software developed over the course of this project will directly help IPv6 application development and educational communities not just in Sri Lanka but worldwide.

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