

Internet2 Activities

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Outline

- IPv6
 - Status
 - Outstanding Issues
 - Proposals
 - IPv6 Challenge
- ION Service

What does the end game need to look like (1 ½- 3 yrs)?

- Dual Stack campus networks
 - All public services need to be both v4 and v6 accessible.
 - V4 is not going to disappear.
 - Public vs Private nets?
 - Some of the networks we provision need to be public some private.
- There will remain v4 only networks
- There will be V6 only networks
 - Residence halls perhaps
 - Sensor nets
 - Any new large scale deployment

Current Status

- Wish I had a more positive message but in fact I do not.
 - There is still a reluctance growing out of a lack of perceived need or benefit.
 - Providing the motivation for implementation is the single greatest challenge for IPv6 deployment in the US.

IPv6 Status

- There is a broad ability to route IPv6 traffic
- There is very little actual usage of IPv6
- What are the Issues?
 - Interoperability
 - Education about application and management
 - Time and resources

Outline of the IPv6 proposal

- Software development and deployment activities to allow for interoperability between the existing IPv4 based Internet and IPv6 only segments
- An education program to provide training to R&E and larger community in understanding how to prepare and undertake steps to deploy IPv6
- A staff support program to provide staffing assistance at many R&E anchor institutions prepared to help make their institutions leading examples of the conversion of public resources to v6.

Outline of the IPv6 proposal

- We proposed to:
 - develop production address translation services for deployment across the Internet2 community
 - identify applications that send the most packets across the Internet2 backbone and provide knowledgeable software development resources to modify those applications to work on either IPv4 or IPv6.

Outline of the IPv6 proposal

- We proposed the development and deployment of courses to help institutions understand what is involved in planning for and migrating to IPv6
- We will use funding to provide staff support at multiple institutions to undertake conversion activities.
 - managed by accepting requests from R&E institutions for limited staff support (typically up to 4 person-months) so that campus personnel can be available to undertake conversion activities.
 - We expect to be able to provide support for up to 40 sites under this program

Outline of the IPv6 proposal

- Some of the areas that commentators identified for further research include the following:
 - testing of IPv6's interoperability with existing IPv4 systems;
 - techniques to improve the performance and efficiency of IPv6 for key applications such as VoIP;
 - mobile IPv6 routing;
 - performance in dual IPv4/IPv6 environments;
 - security in dual-stack environments;

Outline of the Stimulus IPv6 proposal

- Some of the areas that commentators identified for further research include the following:
 - intrusion detection techniques for IPv6, including implications for changes in the use of tunneling and NATs;
 - privacy implications of IPv6;
 - secure Border Gateway Protocol (BGP) implications.

How do we make some progress?

- Recognize that v4 is very useful and works remarkably well but it cannot scale to support the Internet for the next 10-20 years.
 - We cannot grow in a v4 environment.
 - We can expand in a dual stack environment
- Find where the motivation for doing the work that is required to get to the goal of full dual stack environments.
 - An argument the WG has been suggesting is the need to interoperate with V6 only networks in Asia and elsewhere.

Joint Projects

- Internet 2 is certainly interested in promoting some joint projects between Internet 2 and the Chinese Research and Education community.
- The work we need to do is find the resources to identify a set of joint activities where our communities can make progress toward making IPv6 a more vibrant part of the network.

Consider again this list.

- testing of IPv6's interoperability with existing IPv4 systems;
- techniques to improve the performance and efficiency of IPv6 for key applications such as VoIP;
- mobile IPv6 routing;
- performance in dual IPv4/IPv6 environments;
- security in dual-stack environments;
- intrusion detection techniques for IPv6, including implications for changes in the use of tunneling and NATs;
- privacy implications of IPv6;
- PKI scalability and trust models;
- secure Border Gateway Protocol (BGP) implications.

Joint Projects

- One need is for data sources to encourage the use of IPv6.
 - Are there information sources that we could jointly work to establish?
- Are there ways Chinese experts in deploying campus level IPv6 implementations could participate in our V6 workshop activity?
 - At least in assisting in developing materials if not in teaching.

Discuss the v6 Challenges

- Continue to have v6 only periods at Joint Techs meetings.
- We generally have significant participation in these events.
- Generally they work well, the single most critical challenge is translation between v6 only hosts and v4 only networks.
 - Generally try IVI with mixed success
 - A big win would be porting IVI to a newer version of Linux
 - Ubuntu 2.6.3.1 for instance.

DCN vs Internet2 ION Service

- “Dynamic Circuit Networking” has come to mean:
 - Any service that establishes a layer 2 circuit on demand across the wide area
 - There are several instances of these networks.
 - SDN, AUTOBahn
- “DCN” has become ambiguous.
 - We need to distinguish the service from the name.
 - We need to distinguish the underlying technology from the name.

Description of ION

- ION can instantly build dedicated circuits across the Internet2 Network as well as partner regional, national and international networks to allow researchers the ability to connect to their colleagues worldwide.
- ION is configured using a simple and secure web interface that requires no Internet2 NOC assistance. The web interface allows users to reserve a circuit in advance or provision it in real time. It also provides the ability to easily save, cancel or modify circuit requests as needed.
- ION offers customized capacity with circuits ranging from 55 Megabits per second (Mbps) to 10 Gigabits per second (Gbps) to meet a researcher's application requirements.
- ION is backed by 24x7 Global Research Network Operations Center support

Rules of Use – Standard Case

- Circuit size is limited to the maximum amount of the Connector's IP bandwidth (e.g. a 1G connector may request a maximum circuit of 1Gbps)
- Circuits greater than 50Mbps in size may be reserved for a maximum of 24 hours.
- Circuits may be scheduled for repeat use

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Rules of Use – Persistent Use

- Each Connector may provision small circuits on a persistent basis, provided the total amount of bandwidth of permanent ION circuits is at, or below, 250Mbps.