



IPv6 within Texas Research and Education

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Agenda

- What is LEARN?

What is LEARN?

- LEARN is the Lonestar Education and Research Network
- Consortium of 38 public and private institutions of higher education, community colleges, K-12 public schools, and the National Weather Service in Texas
- We provide high speed optical network services to support research, education, healthcare, and public service missions.

A brief history of LEARN

- In the summer of 2003, the Texas Legislature endorsed the concept of constructing an optical network for Texas.
- In 2003, the Texas GigaPoP was used as the 501(3)(c) non-profit structure for the organization.
- In January of 2004, the officers of the new organization were installed, and the new organization was named LEARN

A brief history of LEARN

- In February of 2005, the Governor of Texas signed the TEF grant that provided the starter funding for the optical network.
- The original network created a backbone that connected Dallas, College Station, Houston, San Antonio and Austin

LEARN optical network today



Layer 2 & 3 history

- LEARN was originally tasked with just providing optical transport.
- In 2006, LEARN started providing switched ethernet services in Houston, Dallas, Austin, and College Station
- In 2008, the switched ethernet service was expanded to San Anotnio, Corpus Christi and Victoria

Layer 2 & 3 history

- In 2007, LEARN partnered with the University of Texas and the North Texas Gigapop to provide aggregation of IP services for connection to the Internet2 and National Lambda Rail research networks.
- North Texas Gigapop, Southeast Texas Gigapop, the University of Texas System, Texas A&M System, and the Texas Tech system all participated in the aggregation

LEARN Layer 2 & 3 today

- In 2009, the LEARN Internet2 and NLR aggregation moved on to dedicated hardware
- In 2010, the North Texas Gigapop merged into LEARN
- Today, LEARN provides commodity internet, intrastate peering, Internet2, and NLR aggregation

LEARN IPv6 history

- NTG, SETG, UT System, and TAMU System each originally acquired a /40 from the 2001:468::/32 owned by Internet2.
- LEARN originally used the UT allocation for the Internet2 and NLR backbone. IPv6 access was limited to the R&E networks
- In April of 2009, LEARN acquired 2607:F928::/32 for use within LEARN.

LEARN IPv6 history

- In 2009, LEARN abandoned the use of the UT Internet2 IPv6 allocation, and started using the 2607:f928::/32
- In 2010, NTG merged with LEARN.
- NTG already had a /32 in use, but was readdressed to the LEARN allocation.
- NTG /32 IPv6 allocation was returned to ARIN in 2012.

LEARN IPv6 today

- Dual stack IPv4 and IPv6 on all production backbone networks:
 - LEARN-DFW commodity
 - LEARN Internet2 aggregation
 - LEARN NLR aggregation
- Routers still managed with IPv4, command and control networks still IPv4 only.

IPv6 connected members

- Baylor College of Medicine
- Sam Houston State University
- Texas A&M University/TAMU System
- University of Houston
- University of Texas – El Paso
- UT Health Science Center - Houston
- UT Medical Branch – Galveston
- University of Texas – San Antonio
- UT Southwestern Medical Center
- University of Texas - Dallas

LEARN IPv6 challenges

- LEARN networks are primarily transit networks, so dual stack was easy to implement
- After dual stack network was implemented, LEARN's focus turned to IPv6 education and awareness

2011 IPv6 panel

- In June of 2011, Bill Darte from the ARIN Advisory Council (Washington University in St Louis), Willis Marti from TAMU, and I led a panel discussion before the LEARN Board of Directors about why IPv6 was important to higher education in Texas.
- IANA IPv4 free pool exhaustion, APNIC stage III IPv4 exhaustion.
- Encouragement to at least get public facing web and mail services dual stack

2011 World IPv6 day

- LEARN participated in the World IPv6 day in 2011.
- The public facing web servers were made available via IPv6 using a web proxy
- SETG, TAMU, and few other LEARN members also participated.

LEARN working groups

- In June of 2011, LEARN formed two working groups:
 - WAN IPv6 working group
 - Campus IPv6 working group
- Activity has been sparse, but we have hopes that activity will pick up in the future



Future Plans for IPv6

- IPv6 workshop planned for December 2012
 - Jeff Harrington of NYSERNET
 - Focus is operational issues
 - IPv6 addressing
 - DNS
 - DHCP/SLAAC
 - Security
- Continued Education and Awareness

Questions?

- <http://www.tx-learn.net>
- Thanks!