



Table of Contents

Introduction | 1

LEARN's Network Topology.....	1
2022 Executive Committee	2
Letter from the Chair.....	3
Letter from the President & CEO	4
Letter from the CTO	5
Member Organizations	6

Overview & History | 7

Who is LEARN?	8
A Brief History of LEARN.....	8
Organization & Governance	9
Network Infrastructure.....	9
Membership & Network Services	10
Infrastructure Performance	10
Content Peering and Caching	11

Activities & Accomplishments | 12

Beyond Connectivity: LEARN Supporting Community Anchors.....	13
The GPS for the Journey: LEARN's Strategic Planning Initiative	16
Partners in Innovation: LEARN at SC22	22
Innovations, Internships, and Sharing the Knowledge Statewide.....	26
Building Research Innovation at Community Colleges: Strengthening Research in the Lone Star State.....	29
Connecting Texas to Opportunity: Enhancing LEARN's Network Infrastructure	31

Appendices | 34

Board of Directors.....	34
Story Contributors	36
Affiliated Organizations	37

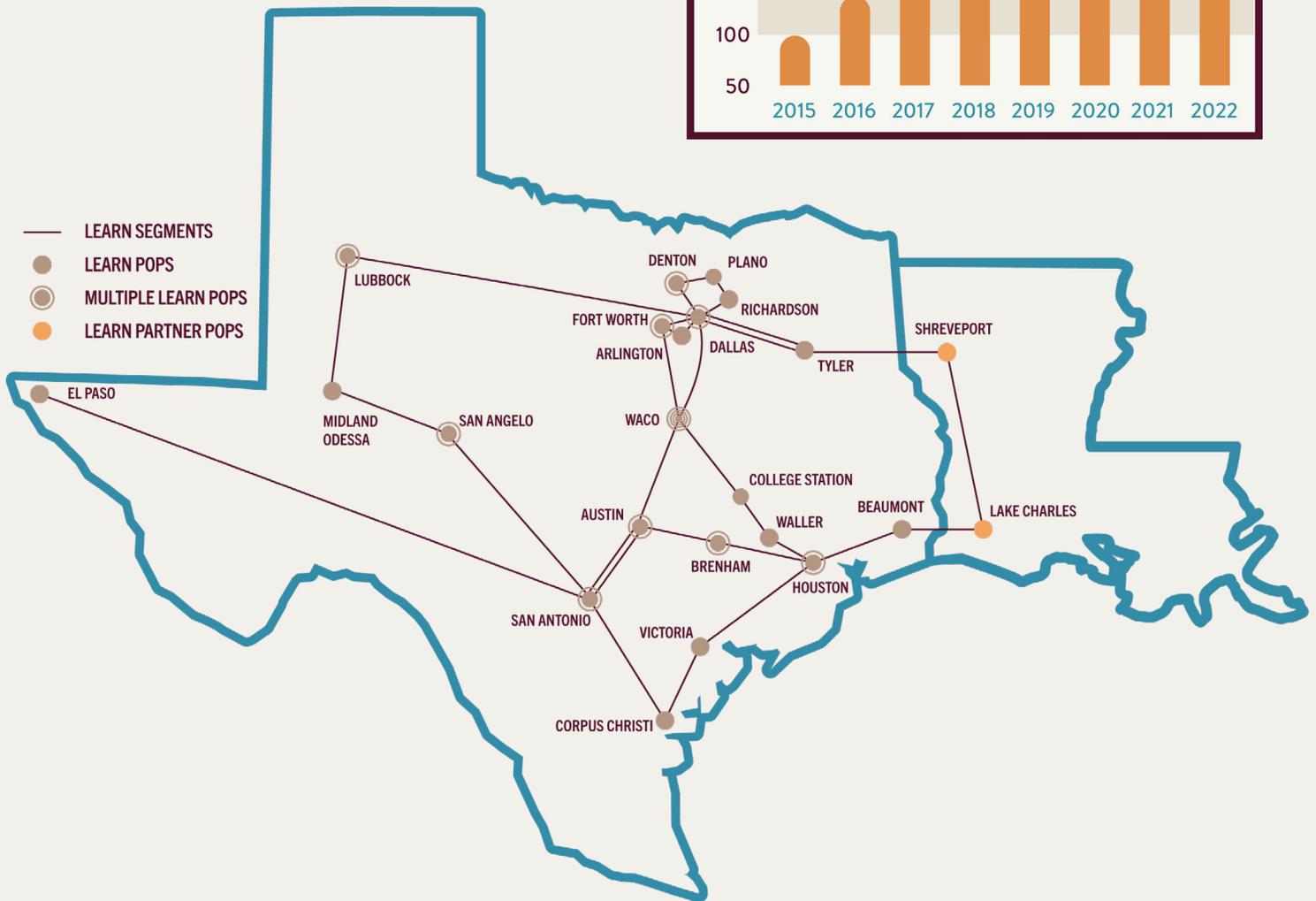
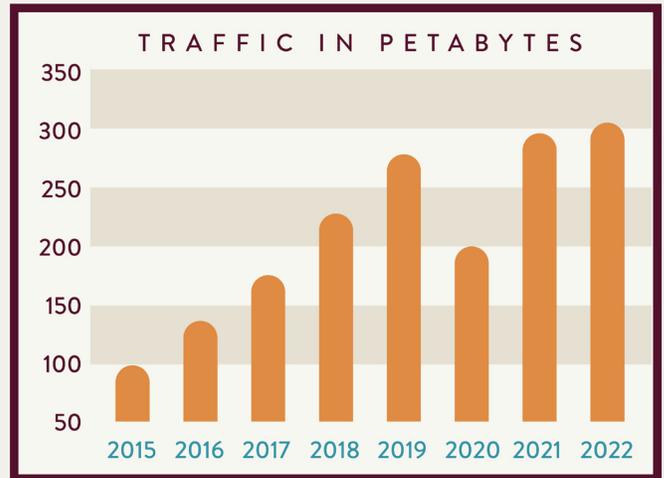
P. O. Box 16920 | Lubbock, TX 79490-6920
P: 806.743.7878
info@tx-learn.net | tx-learn.net

ON THE COVER

"Looking around the table, you have folks from rivaling institutions willing to share and support the idea that we are not just our institution - we are Texans and we want to work together to better Texas."

Bob Hartland,
Baylor University

LEARN's Network Topology



OUR MISSION

Empower non-profit communities to execute their missions through technology and collaboration.

OUR VISION

LEARN will be the most efficient and effective enabler of research, education, healthcare, and public service communities in Texas using technology and shared services.

2022 Executive Committee



Chair
JIM BRADLEY
Sam Houston State
University
shsu.edu



Chair-Elect
KENDRA KETCHUM
University of Texas
at San Antonio
utsa.edu



Past Chair
MICHAEL HITES
Southern Methodist
University
smu.edu



Secretary
MARK STONE
Texas A&M University
System
tamus.edu



Chair, Finance Committee
DOUG FOX
Angelo State University
angelo.edu



Chair, Operations &
Services Committee
BOB HARTLAND
Baylor University
baylor.edu



Chair, Governance &
Participation Committee
SAM SEGRAN
Texas Tech University
ttu.edu



Treasurer & CFO
KERRY MOBLEY
LEARN
tx-learn.net



President & CEO
AKBAR KARA
LEARN
tx-learn.net

Letter From the Chair



JIM BRADLEY

Sam Houston State University

As the 2022 Board Chair, I was especially proud and pleased with the emphasis and outcome of the Strategic Plan. The Board of Directors and LEARN staff spent many hours working on this important initiative. I want to express my gratitude to my friend and colleague, Dr. Michael Hites, Past LEARN Board Chair and Chief Information Officer for Southern Methodist University, for spearheading the strategic planning process. Dr. Hites performed many tasks as part of this engagement; however, his principal work was facilitating guided discussions on organizational priorities and leading an organizational SWOT analysis (strengths, weaknesses, opportunities, and threats) at five regional meetings across the state. Under the guidance of Dr. Hites and LEARN leadership, and with input from 71 participants, I am pleased to report that in the Second Quarter Board Meeting in 2022, the Board of Directors adopted LEARN's Strategic Plan.

I also want to highlight the tremendous effort the Governance and Participation Committee put into revising LEARN's Bylaws, which had not endured such an in-depth review since the organization's inception.

Similarly, the Operations and Services Committee had a busy year. The committee evaluated, reviewed, and approved a Voice over IP (Session Initiation Protocol, or SIP) service, which is now offered and available to the entire LEARN community. The committee also began a pilot of LEARN's Network Operations Center (NOC) as a service to determine if this will be viable to the LEARN community.

The Finance Committee works diligently yearly to provide oversight and direction on LEARN's operating budget, and 2022 was no exception. The members of the Committee also stepped up to join the broader membership of an Ad Hoc Committee, working on planning the next stages of the financial future of LEARN.

We operate in an ever-changing environment. Technology is changing, the competitive landscape is changing, and it is important for LEARN to evolve with the changes. The strategic planning work has primed LEARN to increase collaborations that deliver on the ability of the group, leveraging the strength of the collective and focusing on several key strategic initiatives lined up for 2023.

The Board of Directors shares the sentiment with me that we want to communicate LEARN's benefits and value to the public, and I hope this report will achieve that and help to tell LEARN's story better.

It has been my sincere pleasure to have this opportunity to serve LEARN and my amazing colleagues across the many member organizations.

**“WE ALL SERVE THE HIGHER CAUSE OF RESEARCH
AND EDUCATION FOR THE PEOPLE OF TEXAS.”**

LEARN is an exceptional organization staffed by a team of terrific people who are truly dedicated to our mission. I have felt very fortunate to have the opportunity to work with them as Chair. I am proud of what LEARN accomplished in 2022 and look forward to a bright future for LEARN.

Letter From the President & CEO



AKBAR KARA
LEARN

Dear Board of Directors, Colleagues, and Friends of LEARN,

I am delighted to share with you our annual report. This year has been remarkable for our collaboration, as we have achieved significant milestones and overcome challenges. I am deeply grateful for the dedication and resilience of our team, who have delivered high-quality services and programs to our diverse community of stakeholders. The stories in this report will shine a light on our notable successes and milestones.

One of our significant accomplishments this year was the development and adoption of our Strategic Plan by the LEARN Board on June 16, 2022. This plan reflects the input and feedback from our directors, campus technologists, staff, and other stakeholders who participated in five regional meetings and the Second Quarter June Board Meeting. The plan will guide our strategic investments in infrastructure and innovation for the next five years, ensuring that we align with the needs and expectations of our community.

LEARN had the honor of being a major contributor to the success of an international conference, SuperComputing 2022 (SC22). As a platinum sponsor, our team volunteered and provided expertise and resources in enabling ultra-high bandwidth for SC22 in Dallas. Our technical team was recognized for supporting cutting-edge technologies to break bandwidth speed records from prior conferences. LEARN also facilitated our Fourth Quarter Board Meeting attendees to partake in the SC22 keynote address, exhibitions, and social events.

Another highlight of this year was the expansion of our human network, which fosters collaboration

and knowledge-sharing among our stakeholders and partners. We have created opportunities for learning and exchange through our community roundtables and technical workshops. These events have provided valuable insights and best practices for enhancing end-to-end performance, maximizing the impact, and advancing research and education. We also welcomed Dallas College as a governing participant.

We have also experienced growth in our infrastructure and an increase in the number of entities served this year. We have responded to various requests from our stakeholders, including projects that enabled mission-critical services such as low-latency transport and IP services, attack mitigation, and IP-based telephony transport for campuses. We have also supported projects that received grants from the National Science Foundation Campus Cyber Infrastructure program. Additionally, we have welcomed non-profit organizations and municipal entities to our network.

I am also proud to report that our financial position and fund balances for infrastructure refresh remain strong, allowing us to continue our mission into the future. Looking ahead, we are excited about the opportunities and challenges. Our goal is to continue to invest in our infrastructure, grow our human network, and enhance our portfolio while maintaining the high level of service that our stakeholders have come to expect from the LEARN team.

These achievements would not have been possible without guidance from a very engaged community. As we progress, I want to express my deep gratitude to our talented team, the Board of Directors, and the leaders who fuel our endeavors and ideas. I am thankful for your trust and confidence in LEARN as your partner in research and education.

I look forward to working with you as we continue to pursue our goal of empowering discovery and learning through technology and collaboration.

ONWARDS!

Letter From the CTO



TODD HORKMAN
LEARN

While I reflect on 2022, I am directed beyond the technical accomplishments the staff performed, many of which will be highlighted later in this report. I gravitate to several key areas I believe are pivotal to the future success of LEARN.

First, I am grateful for having a fully staffed team of technical professionals in the network and systems engineering fields. At the beginning of 2022, we recruited three network engineers new to the LEARN team, who have hit the ground running. When I look at our technical staff, we have a very diverse and talented team who not only contributes individually but collaborates strongly together. I have witnessed the team bond and evolve into a dynamic group of innovative and forward-looking technologists.

This team has been an integral part of the next area: strategic planning. While the LEARN team and membership embarked on updating the strategic plan for LEARN, the technical staff not only contributed to that effort but also took the strategic theme into their daily activities. The team looked across our network and system infrastructure and challenged each other to think of how we should design for the future needs of our membership. It is easy to be focused on upgrading core components, but a more challenging task is to question if the overall design is best for the future. Specific areas the team looked at are the overall internal network design across our data centers for hosting internal systems and network management, automation, configuration management, secured remote access, and improved redundancy while balancing the ability to scale quickly.

In addition to the internal work, the team used this strategic approach to update the Technology Roadmap document and draft a detailed RFP for the Packet

Platform Refresh. Significant effort was made in updating the Technology Roadmap, which guides our technical decision-making, to ensure alignment with the recently updated strategic plan goals and modernize the technical content. LEARN is faced with a significant upgrade of our packet platform, which provides layer 2 and layer 3 routing services for our statewide network. The network engineering team took it upon themselves to challenge the current design and look for ways to improve connectivity capabilities and right-size for the future to balance scale and investment. The team is reviewing the RFP responses and developing documentation to guide our future packet platform recommendation. Both efforts received tremendous support and participation from our Technical Advisory Group and are critical to the future of our statewide network.

As we direct our attention to the technical challenges on the horizon, we see several substantial and complex initiatives. The Packet Platform recommendation and refresh, Next Generation network planning, and large member-based projects will all require strong project management disciplines to optimize our staff resource utilization and ensure we deliver on our objectives. I look forward to these challenges and how our technical staff will respond. This is undoubtedly an exciting time for the LEARN membership and team.

LEARN's technical staff brings their knowledge and collective expertise to the table during a meeting at DataBank in Plano, TX.



Member Organizations

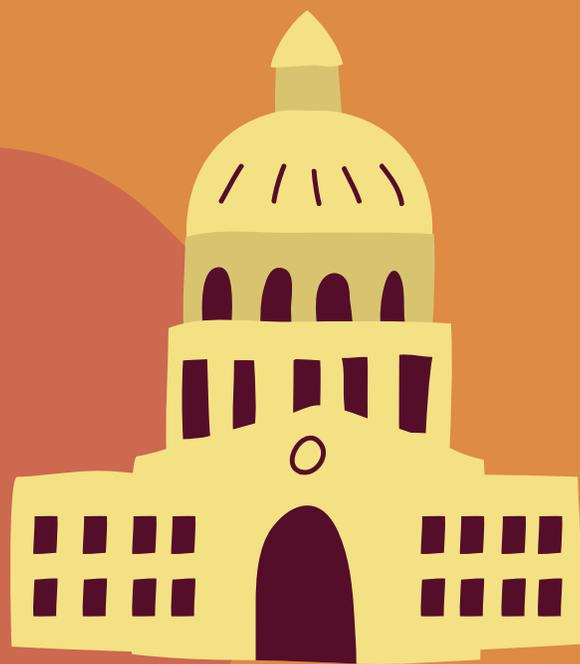


Angelo State University
Baylor College of Medicine
Baylor University
Blinn College
Collin College
Dallas College
Lamar University
National Oceanic and Atmospheric Administration (NOAA)
Parker University
Prairie View A&M University
Rice University
Sam Houston State University
South Plains College
Southern Methodist University
Tarrant County College District
Texas A&M Health Science Center
Texas A&M University
Texas A&M University-Corpus Christi
Texas A&M University System
Texas Christian University
Texas Education Telecommunications Network (TETN)
Texas State University

Texas Tech University
Texas Tech University Health Sciences Center
Texas Tech University Health Sciences Center El Paso
Texas Tech University System
Texas Woman's University
Trinity University
University of Houston System
University of North Texas System
University of Texas at Arlington
University of Texas at Austin
University of Texas at Dallas
University of Texas at El Paso
University of Texas at San Antonio
University of Texas Health Science Center at Houston
University of Texas Health Science Center at San Antonio
University of Texas Health Science Center at Tyler
University of Texas MD Anderson Cancer Center
University of Texas Medical Branch
University of Texas Rio Grande Valley
University of Texas Southwestern Medical Center
University of Texas System



Overview & History



WHO IS LEARN?

LEARN: Lonestar Education and Research Network (LEARN) is a consortium of 43 organizations throughout Texas that includes public and private institutions of higher education, including community colleges, the National Oceanic and Atmospheric Administration (NOAA), Texas Education Telecommunications Network (TETN), and K-12 public schools. The consortium, organized as a 501(c)(3) non-profit organization, connects its members and over 300 affiliated organizations to statewide resources through high-performance optical and IP network services to support their research, education, healthcare, and public service missions. LEARN is also a leading member of a national community of advanced research networks, providing Texas connectivity to national and international research and education networks, enabling cutting-edge research that is increasingly dependent upon sharing large volumes of electronic data.

Providing Texas connectivity to national and international research and education networks

A BRIEF HISTORY OF LEARN

In early 2003, a series of meetings of research universities and health science centers in Texas were held to forge a shared vision of creating a unified high-performance optical network for higher education that could partner with an emerging national network dedicated to research. Overcoming the legacy of competition among the attendees with the fiscal and organizational challenges that laid ahead, the universities and health science centers soon reached a consensus that it was strategically important to create an organization dedicated to high-performance networking in Texas.

In the summer of 2003, the Texas Legislature endorsed the concept by proposing an initial investment of \$7.5 million to construct the proposed optical network for Texas. That concept was fleshed out as LEARN worked with the offices of the Governor, Lieutenant Governor, Speaker of the House, and the Department of Information Resources (DIR) to study the merit of authorizing a Texas Enterprise Fund (TEF) grant for the optical network project.

In the fall of 2003, the nascent LEARN organization, realizing that it was imperative to have a legal structure around which to center its operations, decided to use the existing Houston-based Texas GigaPOP as the 501(c)(3) structure for the new statewide organization. The following January, officers of the new organization were installed

at its first Board Meeting on the Southern Methodist University campus in Dallas with the new organization being officially named “LEARN: Lonestar Education and Research Network.” Thus, LEARN was officially created with a 30-member Board of Directors.

That year, the elected leadership officers announced that the State of Texas would fund a TEF grant to provide the initial capital funds to acquire dark fiber and equipment or leased wavelengths for a “triangle” backbone connecting Dallas, College Station, Houston, San Antonio, and Austin with additional connections to El Paso, Lubbock, Denton, Tyler/Longview, Beaumont, Galveston, and Corpus Christi.

On February 28, 2005, the Governor signed the TEF grant agreement to provide \$7.28 million in funding for the optical network project. LEARN now had the organizational, political, and financial means to begin deploying the optical network for Texas.

Since its founding, LEARN has expanded both its membership and services. It now connects hundreds of thousands of students enrolled in higher education and Texas public schools. Over 300 organizations rely on LEARN, either directly or indirectly through LEARN partners, for vital connectivity to local, statewide, national, and international network services.

ORGANIZATION & GOVERNANCE

LEARN's Board of Directors governs the overall affairs of the corporation, with committees advising the Board on specific operational and policy issues. The standing committees of the Board include Executive, Finance, Governance and Participation, Operations and Services, and Audit. The Board also creates ad hoc committees when deemed necessary.

Within the authority delegated by the Board, the Executive Committee governs the affairs of LEARN in between the quarterly meetings of the full Board of Directors. The elected officers of the Executive Committee are comprised of the President and CEO, Chair, Chair Elect, Past Chair, Treasurer, and Secretary. Other than the President and the Treasurer, the officers are elected from the members of the Board of Directors. The Executive Committee is also comprised of the Chairs of the Finance, Governance and Participation, and Operations and Services committees.

The day-to-day business of LEARN is managed by the President and CEO of the corporation, who is elected by the Board of Directors. The President and CEO leads the organization, represents LEARN at the state and national levels, and employs and supervises professional, technical, and administrative staff to conduct and manage LEARN's operations.

The Technical Advisory Group (TAG) is comprised of technical experts from each of the organization's member institutions. TAG representatives are appointed by the LEARN Board Member from the institution they represent, and the group elects a TAG Chair annually. TAG is an advisory body to the Board, LEARN's President and CEO, and Chief Technology Officer and serves an important role in helping shape LEARN's architecture, operations, and portfolio of services.



2022 TAG Chair
JORGE CABALLERO
Texas Tech University
Health Sciences Center
El Paso

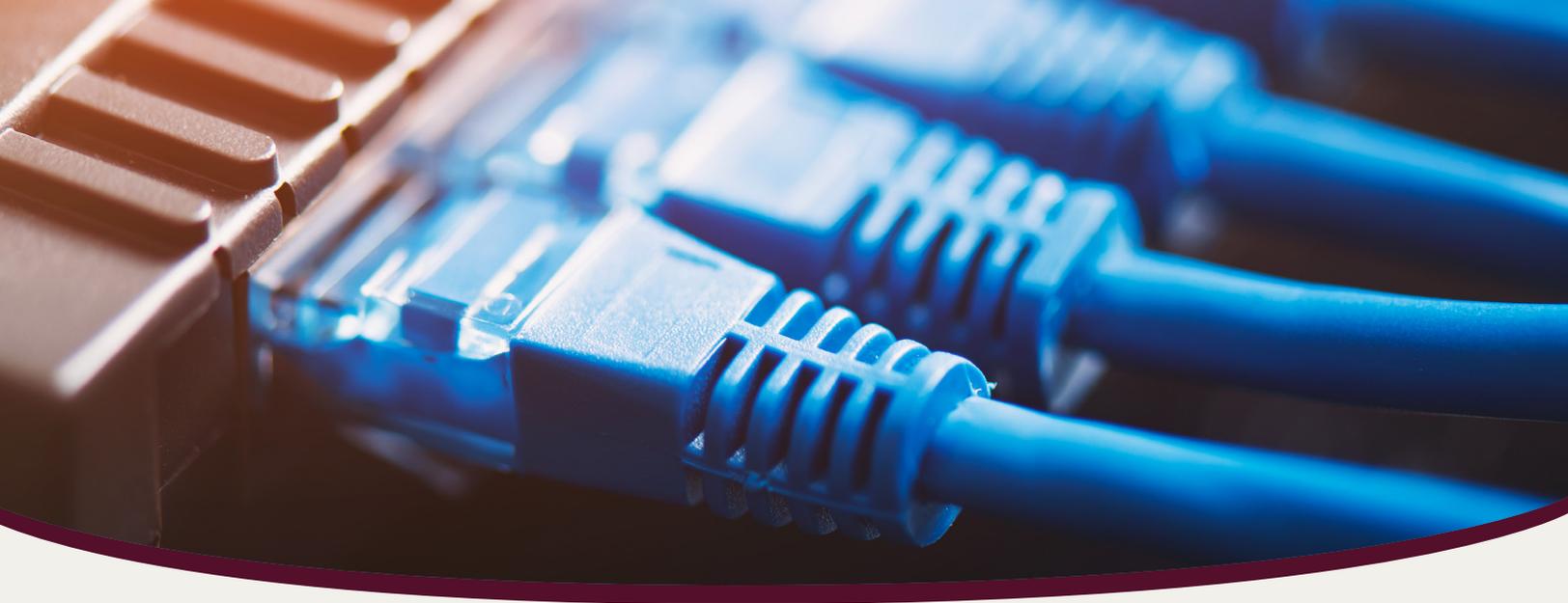
NETWORK INFRASTRUCTURE

LEARN's footprint spans over 3,200 miles across the state, connecting over 280 direct or affiliated organizations east to west from Beaumont to El Paso and north to south from Amarillo to Brownsville. LEARN is built on dense wavelength division multiplexing (DWDM) optical technology, providing the capability to transport multiple high-capacity signals over a shared optical fiber by using the different color wavelengths of laser light. DWDM is state-of-the-art technology that is very scalable and permits LEARN to leverage its initial investment in optical fiber by adding additional capacity at marginal costs. LEARN has grown to 38 DWDM on-ramps within Texas.

LEARN's network relies on agreements with the private sector that provide the long-term use of optical dark fibers and/or long-term leases of optical wavelength capacity. When dark fiber is conveyed via an indefeasible right to use (IRU) agreement, LEARN provides the infrastructure to "light" the fiber and can add additional capacity as needed without having to revise a contract with the fiber owner. In wavelength capacity agreements, the service provider provides the infrastructure and bandwidth under the terms and conditions of the agreement.

Deploying LEARN-owned high-performance routers at its 27 strategically located Points of Presence (POPs), LEARN makes it possible for its members and affiliates to bridge the last mile with their own network connections. In most cases, LEARN's network segments are protected through rings that ensure continued operation of the network in case of a fiber cut or other disruption to a segment.

Several university members, as well as the Texas Education Telecommunications Network (TETN), operate their own networks as overlay on LEARN, which in turn are linked into LEARN's statewide fiber and packet infrastructures at LEARN POPs. LEARN collaborates closely with those other organizations to ensure that high-performance networking is made available at the lowest cost, most reliable, and highest performance level possible.



MEMBERSHIP & NETWORK SERVICES

Voting member organizations are entitled to appoint an individual to the Board of Directors and to acquire network services from LEARN. Network services are designed and provisioned based on the needs of individual members through collaboration between members and LEARN staff.

Network services, which are funded by the members who consume the services at rates which are set by the Board, sustain current and future network requirements, including capital refresh at periodic intervals to sustain the state-of-the-art network.

NETWORK SERVICES INCLUDE:

- Blended and Resilient Commodity Internet
- Cloud Bridge (Enhanced access to Amazon Web Services (AWS), Azure, Google Cloud Platform (GCP), Oracle Cloud)
- Content Provider Peering and Caching
- Cross-Connect and Colocation
- Dedicated Transport
- Distributed Denial of Service (DDoS) Mitigation
- Local Switching
- Managed Services (Border Router, WAN)
- Multiprotocol Label Switching (MPLS) Transport

- National Research and Education Networks (NREN)
- Session Initiation Protocol (SIP)
- Unmetered Network Services (UNS)

LEARN is currently listed as a telecommunication/Internet service provider with the Universal Service Administration Company (USAC). Becoming a USAC telecommunications/Internet service provider allows LEARN's school, library, and rural health members to receive significant discounts through the Universal Services Fund.

The Board and the staff are committed to ensuring LEARN remains the trusted and preferred means by which its members obtain network services in Texas. There is a broad consensus among LEARN members that the organization has a unique role to play in the state in providing highly reliable, cost-effective network services to higher education, K-12, research institutions, healthcare, city and county governments, libraries and museums, not-for-profits, and public service entities. LEARN is a trusted partner and convener in these communities.

INFRASTRUCTURE PERFORMANCE

LEARN deploys and operates a sophisticated state-of-the-art fiber-based optical and IP network throughout the large state of Texas. The "carrier grade" optical and packet switching technology is highly reliable and capable of provisioning high-speed bandwidth between LEARN members in Texas cities and smaller communities throughout the state. While bandwidth capacity is important, LEARN recognizes that the reliability of the

network is just as important to the daily operation of its members who depend upon the network for most of their service functions. The LEARN Network Operations Center (NOC) is an around-the-clock service providing network monitoring, alarm management, and customer communications. This is accomplished both automatically and proactively, utilizing LEARN's automated tools and monitoring systems that are available to NOC personnel to open tickets and notify engineers for resolution.

NOC personnel will open tickets, triage the issue, contact third-party providers, and notify LEARN engineers for remediation and resolution. Additionally, tickets can also be opened by technical staff at member organizations by either emailing or calling the NOC directly. The NOC and LEARN Engineering Team will be able to respond to network issues when they arise.

A critical component of LEARN's network reliability toolset is a comprehensive database of hardware assets, network configuration, circuits, and other strategically important data that is essential to LEARN's overall strategy of continuously improving the operational performance and efficiency of its growing network. That database contains information such as the physical location, acquisition date, service records, contract expiration dates, projected replacement cycle, etc. This information is also being used as the primary data source for our automation initiative to ensure accurate configurations across our network infrastructure.

The vast majority of LEARN's network topology is designed to provide network rings that serve as protected paths for members in the event of a failure in the network infrastructure. If one leg of the ring suffers a fiber cut or equipment failure, the network automatically reconfigures itself to use the other leg of the ring to maintain connectivity. This redundant design is a key element of the network's performance, but despite the network design, failures of a network segment do occasionally occur. To reduce the time required to get the segment back into operation, LEARN acquired and strategically deployed critical infrastructure spares throughout the network. Additionally, LEARN maintains maintenance and support agreements for its critical infrastructure with the vendors of both the fiber paths and the network gear.

The results of LEARN efforts to provide a highly reliable network to its members in 2022 were as follows:

- Layer 1 Dedicated Transport Services on LEARN's Backbone – **99.99%**
- Layer 2 IP/MPLS Transport Services on LEARN's Backbone – **99.99%**

- Routed Layer 3 IP Services on LEARN's Backbone – **99.99%**
- Connection Gateways to Dedicated Research and Education Backbones: Internet2 and ESnet – **100%**
- Commodity Internet Services – **100%**
- Content Peering & Caching – **100%**

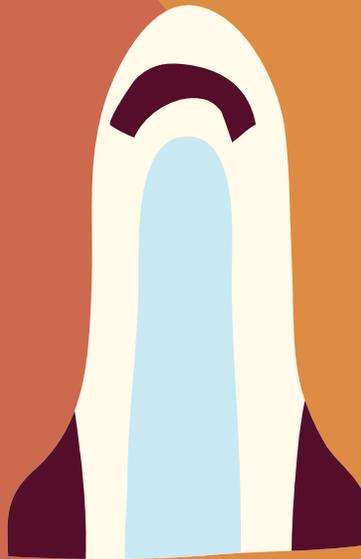
CONTENT PEERING & CACHING

While these performance levels are very favorable compared with other telecommunications providers, LEARN's goal is 100% reliability on all of its services. To that end, LEARN will continue to improve its technology, tools, training of its staff, and cooperation with its members/partners and network staff as it has done since the organization's inception.

Chris Ott, Senior Systems Engineer, and David Nichols, Network Engineer, work together to ensure LEARN continues to provide a highly reliable network to its members.



Activities & Accomplishments





Beyond Connectivity

LEARN Supporting Community Anchors

By Therese Perlowski



As LEARN expands and adds new members, the impact of the organization’s work reaches deeper into Texas communities. Two members, the [City of Bryan](#) and [Odyssey Academy](#), shared how LEARN offers not only connectivity but flexibility, personal and customized support, and essential industry knowledge above and beyond expectations.

CITY OF BRYAN, TEXAS

Home to more than 85,000 residents, the City of Bryan joined LEARN just over three years ago in 2019. As a city government, it is always looking to support other local and nonprofit organizations and heard about LEARN through a contact at Texas A&M University. Intrigued by the prospects of better connectivity and a Texas-based team, the City of Bryan made the move to LEARN’s powerful network.

In addition to the network being cost-effective, fast, and stable, LEARN was flexible with the city in configuring its service. Cray Crouse, Chief Information Officer for the City of Bryan, explains, “One of the main benefits of partnering with LEARN is the ability to connect through city-owned fiber to Texas A&M University. This allows the opportunity to manage and monitor known physical pathways and respond quickly as necessary.” Beyond excellent connectivity, Crouse shares that LEARN’s staff and their “personal proactive” touch is a true differentiator.

“WE DON’T FEEL LIKE WE ARE DEALING WITH A NAMELESS, FACELESS ORGANIZATION WHERE YOU GET A BIG CALL CENTER FOR SUPPORT.”

The LEARN team goes out of their way to be helpful and provide thorough, excellent communication.” When performing routine maintenance on its routers, the city experienced some issues. LEARN identified the problem immediately and reached out to help troubleshoot and support. “Even though it was after-hours, the LEARN team was ready to assist and stayed engaged throughout the entire process until a solution was found that resolved the issue,” explains Crouse.

The City of Bryan continues to look for ways to expand its work with LEARN by adding connectivity to additional facilities and exploring Distributed Denial of Service (DDoS) protection for the future. “It makes so much more sense for us to work [with] a local, education-based network,” emphasizes Crouse.

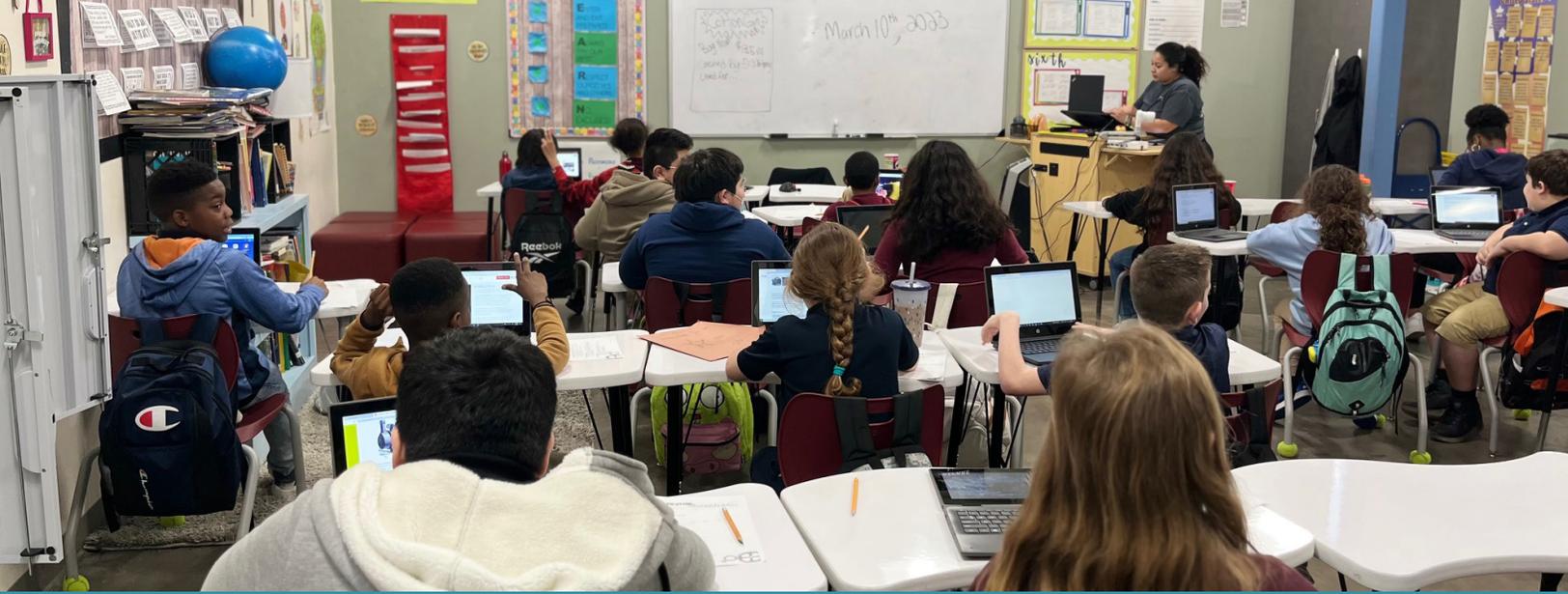
ODYSSEY ACADEMY

Odyssey Academy, a public charter school with three locations across the Galveston/Bay Area, reached out to LEARN in October of 2021 as administrators were researching partners for cybersecurity services moving forward.

The district was looking to shift its device model to a 1:1 approach so that each of the 1,600+ students had their own device. Anticipating the need for increased network capacity and other services led to a search for a new service provider. Systems Administrator Juan San Martin was introduced to LEARN via a peer recommendation. “LEARN was able to provide us both a gigabit connection and additional services, all while being local to Texas and demonstrating a true understanding of education.” San Martin shares that LEARN’s distinguishing characteristics are personal support and customer service. “As far as customer support, they’re the best company I’ve ever worked with. There’s no one better.”



Ezra Powell, Mark Bright, Aaron Sampson, Cray Crouse, Alan Shearer, Jeremy Knighton, and Donald Birkner from the City of Bryan.



“We couldn’t ask for anything more than their amazing customer service, the network reliability, and their dedication to supporting learning and education.”

**- Juan San Martin,
Odyssey Academy**

Synchronously with support, San Martin explains that LEARN’s extensive knowledge of the education technology landscape has been invaluable. “Even though it wasn’t something they had to do, they walked me through every step of the setup process. From selecting the right type of hardware within our budget to the details of network configuration, they were with me from start to finish.”

As Odyssey Academy’s experience with LEARN grows, the district hopes to integrate more of LEARN’s services and bring more campuses online to the network. “We’re not even going to look anywhere else. We couldn’t ask for anything more than their amazing customer service, the network reliability, and their dedication to supporting learning and education.”

As the LEARN organization extends its services to more community anchor institutions, like K-12 districts and local governments across the state, the commitment to its mission remains of primary importance. By providing fast and reliable connectivity, flexibility, a personal touch, and outstanding support, LEARN aims to empower communities to succeed.



Top of page: Students at Odyssey Academy utilize their devices to learn and engage in their classwork with Otilia Arita.

Above: Brian Thompson, Juan San Martin and Lindsey Wev from Odyssey Academy.



The GPS for the Journey

LEARN's Strategic Planning Initiative

By Therese Perlowski



Established in 2004, Lonestar Education and Research Network (LEARN) has become a vital and trusted partner empowering the research, education, healthcare, and public service communities to serve the State of Texas. Over the last two years of unprecedented change in the wake of the COVID-19 pandemic and on the eve of the next generation network project, LEARN recognized a critical need to gather its stakeholders and determine a clear organizational strategy moving forward. LEARN's President and Chief Executive Officer, Akbar Kara, explains, "When the pandemic started to subside in the fall of 2021, we knew we needed to update our strategic plan and began that journey with a recognition that the driver behind all of this is the sustainability of our infrastructure, services, and community. We're the only organization in Texas that brings all higher education together at the scale we do, and we want to sustain that, and the strategic plan gives us guidance on keeping all of those things healthy."

LEARN looked to Past Board Chair and Chief Information Officer for Southern Methodist University, Dr. Michael Hites, to spearhead the strategic planning process. Dr. Hites brought a deep understanding of two integral concepts – strategic planning best practices and a comprehensive perspective of the higher education and research and education network (REN) landscape. "Having someone internal to our Board was very unique, and it ended up working really well because he knew the Board, they were his colleagues. He was able to draw the information out of them," said Kerry Mobley, LEARN's Treasurer and Chief Financial Officer.

DESIGNING AN INTENTIONAL AND INCLUSIVE PLANNING PROCESS

A key goal was ensuring the strategic planning process was as inclusive as possible. LEARN chose regional, in-person meetings to gather feedback from stakeholders to capture the unique perspectives of its diverse membership from higher education (universities and community colleges) and K-12 schools. This allowed members to assemble closer to home in a more intimate setting and the chance to speak about more regional or institution-specific concerns. Mobley describes, "We have a really large board covering a really big state, so splitting up the whole process by conducting regional meetings was important. When you have over 40 people in a room together trying to talk about strategy, a lot of people are less likely to speak up or talk about things that they feel are unique to their region."

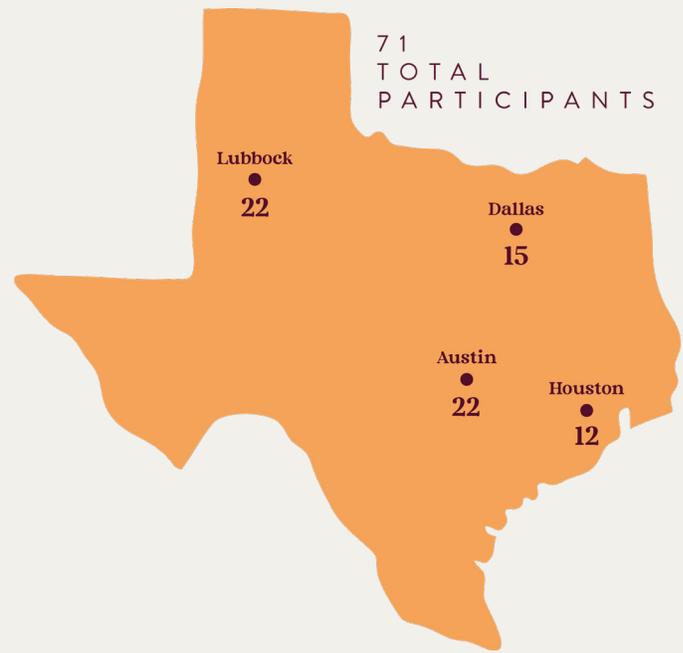
The regional meetings were all designed with the same basic flow and structure. The day began with a short presentation from the LEARN staff to look back at LEARN's history and evolution. From there, Dr. Hites facilitated a guided discussion and SWOT analysis (strengths, weaknesses, opportunities, and threats) to identify key themes. Each participant used sticky notes to select their most important themes and ideas. As each sticky note was placed on the boards, common themes emerged that would make their way to the strategic plan. Dr. Hites reflects, "The level of engagement was spectacular. By the time we got to the point where we were talking about priorities and goals and objectives, I think everybody in the room got to speak. That's awesome. If you're trying to gather a consensus, you want people to be excited about participating."

By designing an inclusive and participatory process, LEARN saw incredible engagement and participation from its members that provided invaluable insight into developing the new strategic plan. Seventy-one participants, including board members, affiliates, and LEARN staff, attended regional meetings in Dallas, Lubbock, Houston, and Austin. Kara reflects, "I've always said, 'The strategy drives the architecture; the architecture does not drive the strategy.' Those who set the strategy should be the very people that are going to be affected by it – our stakeholders. The driver behind all this is sustaining our community, so we needed to bring together the brain trust of that entire community to guide us in making the best decisions for our future."

COMMUNITY VOICES: A GPS FOR THE PATH FORWARD

The regional meetings helped LEARN collect critical feedback about how to approach its next chapter and develop its strategic plan's core content. Kara shares, "We needed a GPS for the journey that we were about to embark on, and these conversations and this strategic plan will serve as that GPS." While every regional strategic planning meeting was different, clear themes quickly emerged: the LEARN next generation infrastructure, the value of the LEARN community and staff, and LEARN's unique value proposition to its members.

Previous Page: Dr. Michael Hites leads a discussion with a group of Board Members on the J.J. Pickle Research Campus for the Texas Advanced Computing Center at the University of Texas at Austin.



TECHNOLOGY & NEXT GENERATION INFRASTRUCTURE

As expected, the LEARN next generation infrastructure was top of mind for many members. “One of the main takeaways we heard was, ‘Don’t fix what’s not broken. Keep investing in our infrastructure,’” explains Kara. Maintaining a congestion-free, low-latency, always-available network remains a top priority. With aging infrastructure and upcoming contract renewals, there was a lot of discussion about where LEARN should be going in the next twenty years. Dr. Hites shares, “Participants were addressing key questions like, ‘Where should we be going? How do we balance leasing fiber and new services we’re providing? How do we optimize and expand the network without impacting the quality?’”

The regional strategic planning meetings also identified a need to explore new and “above-the-net” services with the next generation infrastructure. Bryan Roesslet, LEARN Board Member and Chief Technology Officer at the University of Texas System, shares, “I’m most excited about the shared services and the potential for them to help LEARN in getting into new spaces and lines of business because I’ve seen the potential that these services have to help organizations both expand and save money.” As RENs across the country are experiencing, when it comes to expanding, a lot of focus is on community anchor institutions. Jim Bradley, LEARN

Board Chair and Chief Information Officer at Sam Houston State University, explains, “We want and need to expand, so we either increase our fees or we build on expanding services that increase our revenue and value, which an above-the-network service allows.” In navigating the prospect of new services, members acknowledged that there is much to be evaluated and considered for each new idea, from whether it fits LEARN’s brand and mission to how it makes financial sense. The group recognized the importance of using the valuable lessons learned from existing processes and past service pilots as new services are developed. LEARN staff developed a process to explore, evaluate, and pilot new service ideas through the Operation and Services Committee. Roesslet shares, “Now that we have a process, we know how to exercise it. It’s still young and new, but it gives us a concrete way to answer, ‘Do we do this?’ It gives direction, so it’s not just feeling your way around in the dark.”

LEARN’S HUMAN NETWORK

As President and Chief Executive Officer, Kara shares, “It quickly became very clear that the value of LEARN is not just the technical network, it’s the human network.” LEARN’s members and stakeholders repeatedly emphasized how important and valuable the community of like-minded, collaborative, education-focused peers connected by the network is. Bradley explains, “Even

though there's a certain amount of competition in that we're all competing for the same students, at the end of the day, we all care about student success. That's what I love about LEARN, the community and the extraordinary people I get to work with." Instead of focusing solely on their interests, LEARN members choose to support each other. Bradley continues, "When you have a collection of really smart people who really care like this, you can get some great things done. We're not just in the business of taking care of our own students, we're educating the children of Texas, and you couldn't ask for something that's more compelling than that."

"LEARN is a way to help do that, and it's a force multiplier for everyone involved." LEARN's essential human network goes beyond just its members. The expertise and passion of the LEARN staff made retaining and attracting employees another cornerstone of planning discussions. Mobley shares, "We have an amazing group of staff that are doing this for the right reasons. Everyone goes above and beyond, so it was amazing to hear at every single regional meeting how appreciative our Board is and that they recognize the work we're doing." Kara reiterated that retaining and attracting talent was at the top of every group's list. "You can have the best technology, but if you don't have the people and you run into a problem, the foundation falls apart. Maintain the people to take care of the foundation and build on top of that."

CULTURE OF COLLABORATION

LEARN was started with a solid, mission-focused foundation that has bloomed an important culture of trust, collaboration, and problem-solving that makes it unique. Throughout the strategic planning process, members were unified in the importance of nurturing,

sustaining, and growing this aspect of the organization's community culture. From technical to logistical challenges, LEARN's community provides a safe space for members to work through new ideas and the constantly evolving landscape of education and technology. Dr. Hites shares, "What makes LEARN special is not restricted to the network piece – it's the discussions and the knowledge sharing. We might have a discussion about identity and access management, or people who have made a complete conversion to all open-source software might share their experience." The culture of information sharing is unheard of outside LEARN's research and education community. "No matter what the topic is, those who have gone down that road are extremely willing to tell you what they did and how they pulled it off. They want to share that with you, and you can't find that anywhere else," says Dr. Hites. These open lines of communication between members often encourage opportunities to explore more formal collaborative work like grants and partnerships to serve students across the state.

Enhancing LEARN's role as a convener in the coming years is essential to continue nurturing these types of conversations and opportunities. "We know that we can progress a lot farther as a community by sharing our experiences than trying to figure it out on our own. Using the LEARN network and meetings to get thirty people around a table to throw out various topics and go around and share how we're solving that problem is incredibly valuable and really important," explains Dan Schmiedt, LEARN Board Member and Associate Vice President for Enterprise Networks at Texas A&M University. Members across the state expressed similar sentiments and interest in expanding events, working groups, roundtables, and opportunities to connect and collaborate. Bob Hartland, LEARN Board Member and Associate Vice President for IT Infrastructure at Baylor University, explains, "I came from the oil industry, where

"What makes LEARN special is not restricted to the network piece - it's the discussions and the knowledge sharing."

**- Dr. Michael Hites
Chief Information Officer
at Southern Methodist University**

you don't share any information, so I'm always impressed by the level of collaboration in this community. Looking around the table, you have folks from rivaling institutions willing to share and support the idea that we are not just our institution – we are Texans and we want to work together to better Texas.” “The strategic planning process highlighted that we are a member community and that we are helping each other to get to the best. We're better together than individually,” shares Sam Segran, LEARN Board Member and Vice President for IT and Chief Information Officer at Texas Tech University.

THE JOURNEY AHEAD

As a result of hard work, excellent participation, and careful planning, LEARN's strategic planning process was a success. Members felt included and provided invaluable feedback that helped LEARN create a comprehensive strategic plan. Hartland shares, “It was really encouraging. We're a small private institution swimming in a pond of big fish, and even though that was the case, I never felt like my opinion wasn't valued or sought. I felt (and always feel) that LEARN nurtured an inclusive environment.” Segran adds, “What makes LEARN different is that the whole is really important to us.”

“WE COME TOGETHER FOR THE COMMON GOOD, AND THE COMMON GOOD ELEVATES ALL OF US AS A COMMUNITY.”

Left: Amy Schultz and Byron Hicks (LEARN) prep for the Strategic Planning Session at Southern Methodist University in Dallas, TX.

Right: Akbar Kara (LEARN), Sam Segran (Texas Tech University), and Vince Fell (Texas Tech University Health Sciences Center) convene at the Strategic Planning Session at Texas Tech University in Lubbock, TX.

“Whether you're a health scientist, leading a university, or a library, all of our work benefits each other, and that's the important piece for us to share.”

LEARN staff were surprised to find how much of the feedback they received was aligned with their internal discussions. Amy Schultz, LEARN's Chief Relationship and Engagement Officer, shares, “Hearing our community and Board Members align with LEARN staff was the best outcome for me as part of this process. It was incredibly positive and reassuring that we are really in sync with each other and that the direction that we are going to take was one that was decided together - we're all taking this journey together.”

As the staff and the Board reviewed the feedback, they quickly found that the main themes fit organically within the existing functional areas. “This process provided us a beacon with clear and concise guiding principles for the direction we're headed moving forward,” reflects Mobley. At the Second Quarter Board Meeting in June, the Board approved the strategic plan. Kara shares, “Now we have the GPS, they have given us coordinates and are saying, ‘You've gotta get there.’ So our road conditions might change, there may be detours or delays, and we may have to adjust based on what's in front of our windshield, but ultimately, we know we're going North. That's what I'm excited about – that we have clarity and a very focused direction for the journey ahead.”

Following Page: Board, TAG, and community members identify strengths, weaknesses, opportunities, and threats for LEARN.

Top Left: Sam Segran (Texas Tech University) at the Strategic Planning Session at Texas Tech University in Lubbock, TX.

Top Right: Jeff Neyland (University of Texas at Arlington), Richard Sullivan (Tarrant County College District), and Gi Vania (University of Texas at Dallas) at the Strategic Planning Session at Southern Methodist University in Dallas, TX.

Bottom Left: Ken Pierce (Texas State University) at the Strategic Planning Session on the J.J. Pickle Research Campus for the Texas Advanced Computing Center at the University of Texas at Austin.

Bottom Right: Charles Chambers (University of Houston) and Marc Cogle (Rice University) at the Strategic Planning Session at Rice University in Houston, TX.





STRATEGIC THEMES



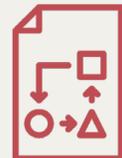
- Strengthen and grow relationships with members, collaborators, and other key stakeholders
- Improve marketing efforts and increase engagement activities



- Operate advanced infrastructure and support member's emerging requirements
- Evaluate new technologies and invest in the next generation infrastructure
- Seek member's input and invest in above-the-network services
- Target improvements in redundancy and resiliency



- Maintain financial stability & diversify revenue sources
- Pursue strategic funding opportunities
- Measure and analyze return on our investments



- Actively convene our human network for knowledge exchange and impactful collaboration
- Improve Business Continuity
- Focus on LEARN's differentiators
- Staff retention & growth





Partners in Innovation

LEARN at SC22

By Therese Perlowski



The annual SuperComputing (SC) conference (the International Conference for High Performance Computing, Networking, Storage, and Analysis) is hosted in a different city each year and has had over 13,000 attendees for the last several years. SCinet, the fiber optic network used for the conference, aims to provide SC attendees and the High Performance Computing (HPC) community with the innovative network platform necessary to connect, transport, and display HPC research. The conference always works with a local research and education network (REN) to help coordinate connectivity. This year, with SC22 located in Dallas, LEARN had the opportunity to be a primary volunteer and contributor. LEARN Engineers helped build the conference's SCinet network by providing connectivity, commodity Internet services, fiber resources, and staffing.

In 2018, the SuperComputing conference was held in Dallas, and fiber was extended from LEARN's network directly to the Kay Bailey Hutchison Convention Center. In 2022, seven Engineers from LEARN's staff were actively involved: two on the LAN team, two on the routing team, two on the DevOps team, and one on the edge team. LEARN Engineers worked to help test approximately 72 fiber stands for functionality. Matt Zekauskas, SCinet Chair, shares, "Coming off the pandemic, it was really important and valuable to have LEARN staff available and willing to help test that fiber out early on."

LEARN Engineers also helped sort, install, and test equipment donated by various vendors and provided commodity connectivity throughout the setup process. "They brought their routers, connected back to their network, and enabled all the volunteers to load software, access email, and basically get everything configured in a week and a half," explains Zekauskas. During the first week of November, the equipment was moved from the staging area to the convention center floor. Everything was tested again to be ready for exhibitors on the floor by the Saturday before the conference opened. Byron Hicks, LEARN's Network Services Director, shares, "It was a year-long commitment and very demanding in the lead-up to the actual conference (October through November), with an entire week of staging and a week of the actual show. It's very hectic but very, very rewarding seeing the network come together like that."

Ultimately, the LEARN team helped build a 5.0 terabits network that extended to the show floor and provided general connectivity for the conference. In testing, the network operated successfully at up to 4.9 terabits per second of sustained traffic, providing attendees and exhibitors with a great experience.

Above: LEARN Board, TAG, and Staff Members gather at the SC22 Conference in Dallas, TX.

Hicks explains, “It’s a great opportunity for all of us to see what this work we do on a regular basis is used for.” In one experiment in Japan, LEARN Engineers witnessed an uncompressed 8K video. Hicks shares, “Seeing them send it to Japan, process it, send it back, and see only a 2-3 second delay at that level of huge capacity, was incredible. You could really wrap your head around it and say, okay, I understand what we’re doing here.”

In addition to the tremendous human network of volunteers, the experience allowed the LEARN team to interact and build expertise with new and different hardware and configuration setups. “You get to touch pieces of hardware you’ve never run, you meet people you can call if you need help with something, and you might get to try a new automation setup you’ve never done before. It’s networking, it’s professional development, and it’s a lot of fun to get this networking running in a month,” shares Zekauskas.

and environmental data that can be used to monitor respiratory illnesses as well as climate impacts. Variable sensors demonstrated the ability to track temperature, humidity, particulate matter, and more to be translated back to live data analysis and mapping.

Southern Methodist University (SMU) demonstrated its [SuperPOD](#), only the second SuperPOD on a university campus in the country. The SuperPOD is a high performance computing cluster specifically tailored to meet the demands of cutting-edge research consisting of 20 NVIDIA DGX A100 nodes, each with eight advanced and powerful graphical processing units (GPUs) to accelerate calculations and train AI models. SMU’s booth featured video games created by students enrolled in [Guildhall](#), its highly ranked game development program, and a baby supercomputer built by undergraduate computer science students.

**“SCinet takes a year to plan, a month to build,
a week to operate, and a day to tear down.”**

**- Matt Zekauskas,
SCinet Chair**

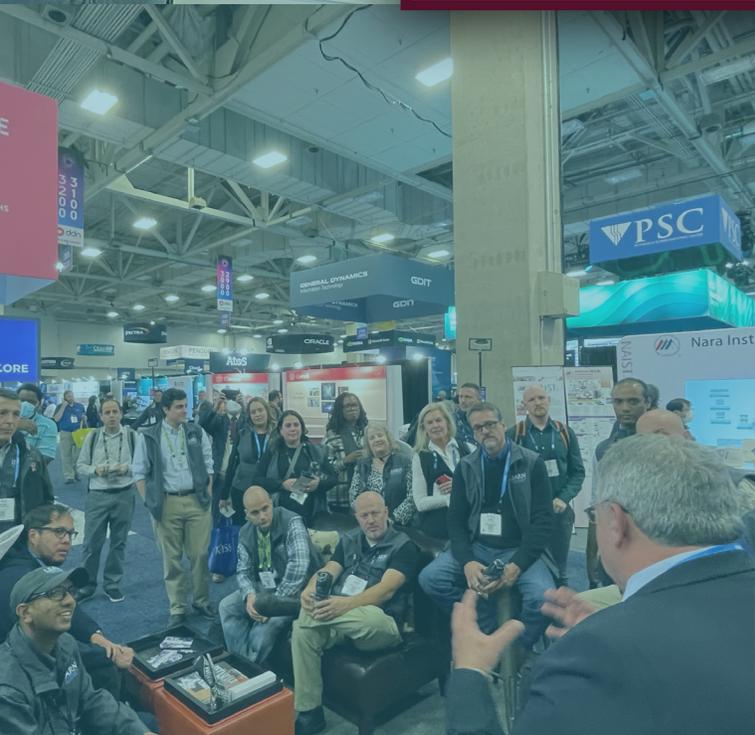
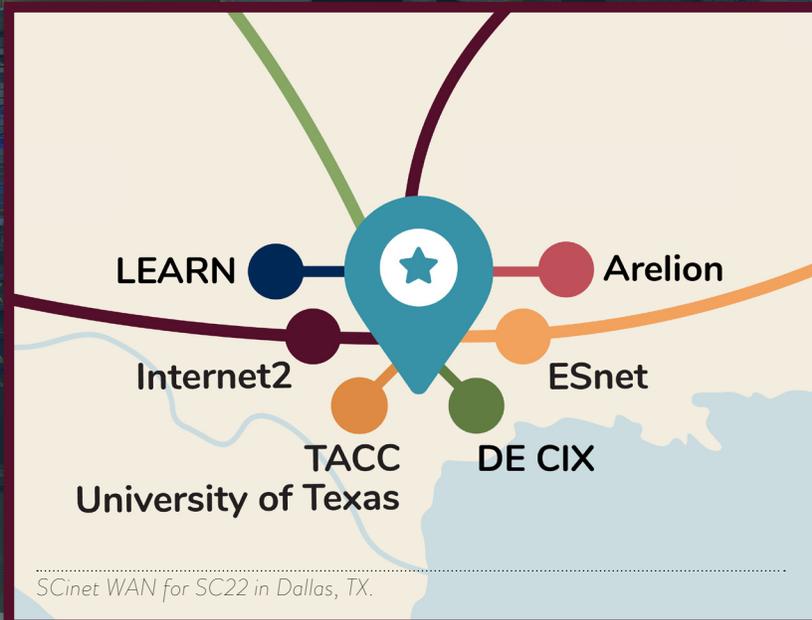
LEARN membership was also well represented at the conference and exhibit floor. The Texas Advanced Computing Center at the University of Texas at Austin represented the state with the tallest booth, coming in at just four feet under the height limit. Southern Methodist University, Texas A&M University, Texas Christian University, Texas Tech University, University of Texas at Arlington - Physics Department, and University of Texas at Dallas were also present.

University of Texas at Dallas (UT Dallas) showcased several experiments on the floor. One experiment of note was an open interoperable Reconfigurable Optical Add/Drop Multiplexer (ROADM) that could use transponders to operate line cards with up to 12 vendors. Hicks shares, “It was a really interesting experiment, especially now in light of the constant supply chain issues. It offers the possibility that one could have this kind of open system that isn’t all one vendor, so if a particular line card isn’t available through one vendor, I might be able to use that card from another vendor without breaking the system.” UT Dallas also highlighted [MINTS](#), its impressive SharedAirDFW project, which collects live biometric

Texas Tech University shared its incredible work at the [High Performance Computing Center](#) (HPCC) on campus. Texas Tech HPCC promotes and supports research and teaching by integrating leading-edge high performance computing and data processing resources for faculty, staff, and students.

University of Texas at Arlington - Physics Department exhibited the [ATLAS](#) experiment with the Large Hadron Collider (LHC). The campus runs a sizable data center that does simulation and data analysis from the LHC. Through partnerships with LEARN and ESnet, the University of Texas at Arlington can peer and send that data over higher speed and higher prioritized networks to its LHC colleagues.

LEARN staff were integral to making SCinet a reality at SC22. Their time, expertise, and dedication were invaluable to the experience for this year’s attendees and exhibitors. Not only were staff able to benefit from the experience, but LEARN members could also utilize the state-of-the-art network for their demonstrations and exhibits, displaying the innovation and talent across Texas.





Innovations, Internships, & Sharing the Knowledge Statewide

By Michaela Proper



LEARN'S INTERNSHIP OPPORTUNITY

When Todd Horkman, LEARN's Chief Technology Officer, began considering student interns and apprentices, he reflected on his technical training at a community college and gravitated his attention toward two-year programs. He found the [Flexible Learning Expressway for Technology \(FLEXTech\) Program](#) at Collin College, which offers essential on-the-job training experiences in the IT industry. Todd was impressed by the program's emphasis on soft skills, which results in a more well-rounded approach to technology careers. Horkman commented, "The FLEXTech students' commitment to this program is impressive and a brilliant pairing in conjunction with their cybersecurity degree."

THE JOURNEY WITH LEARN

In July 2021, LEARN posted an internship opportunity with FLEXTech. The search resulted in many promising student candidates, including Jason Jackson.

Jason states he has always been interested in Information Technology, and after researching Collin College, he chose to pursue their Cybersecurity program. He became aware of LEARN's new internship opportunity through the FLEXTech program at Collin College. After completing the professional interview process, Jason started his journey with LEARN. He shares that his favorite part of this experience is "the trust and respect I have been given during my internship. I love the company culture." The remote nature of the internship has allowed for a heightened work-life balance and given Jason the freedom to research and learn how to complete projects starting from square one. During his time at LEARN, he has been able to undertake noteworthy endeavors at the pace he chooses, with the understanding that learning takes time and the results speak for themselves.

Jason is a fundamental part of LEARN's organizational overhaul and integral to updating and organizing systems behind the scenes. Much of Jason's time has been focused on exchanging information within LEARN's network, including constructing digital databases. Jason created a fiber span, a map of the physical layout of the fiber in Texas. Information is constantly gathered and interpreted visually, like a street map. This allows LEARN to quickly identify where and when changes occur in the data flow and the potential fixes if a problem occurs.



This partnership with Collin College has proven mutually beneficial. LEARN looks forward to furthering its internship program with equally successful results.

Previous Page: Collin College hosts a career fair at their campus in Frisco, TX.

Above: Jason Jackson is enthusiastic about the knowledge, experiences, and projects his LEARN internship has facilitated.

Collin College's FLEXTech Program

Authorized by the U.S. Department of Labor, Collin College's FLEXTech training program is for employers interested in developing apprenticeships, internships, or other flexible on-the-job training experiences in IT and Cybersecurity.

Sandra Scheidegger, the FLEXTech Program Manager and Employer Relations, works with employers to develop IT/Cybersecurity opportunities for Collin College students to gain on-the-job training as they complete their education at Collin College. Scheidegger says she is proud of the program and the career opportunities it provides for Collin College students.

FLEXTech Program Career Coach, Dr. Tara Lewis, prepares students to enter the profession with strong technical and relational skills by offering in-depth career coaching and professional development. Students from Collin College who are part of the FLEXTech program are provided with career readiness workshops, events, tutoring, and certification reimbursement for exams passed.

"By the time students in our FLEXTech program graduate from Collin College, they already have job experience within their field and are top candidates with endless career opportunities," Dr. Lewis said.

Dr. Nora Hernandez plays a vital role as the Data Coordinator for the program at Collin College. She helps tell the program's story by collecting and analyzing data.

The program has seen more than 100 students gain employment through internships, co-ops, and job opportunities and strives to expand the number of students receiving career readiness training and industry connections.

A student from Collin College's FLEXTech Program gets hands-on experience.





Discussion

- What are the major research challenges your region or organization faces?
- What efforts (if any) have been made to address these challenges? What has worked?
- What resource(s) is your region or organization lacking that would help you navigate these challenges?
- What opportunities for collaboration exist between your region or organization and others?

BRICCS |

Building Research Innovation at Community Colleges

Strengthening Research in the Lone Star State

By Michaela Proper



LEARN takes great pride in working on National Science Foundation (NSF) Award #2019136, CC* CIRA: Building Research Innovation at Community Colleges (BRICCs). The BRICCs approach focuses on encouraging and strengthening undergraduate research at two-year community colleges through collaboration with invested experts nationwide.

SHOWCASING SMALLER CAMPUSES

As research skills become increasingly valuable in the higher education and workplace setting, it is essential to understand and support the growth of research at community colleges. The cyberinfrastructure BRICCs is designed to promote and allow smaller campuses to participate in more research opportunities and elevate their educational capabilities. In addition, BRICCs includes the training and education needed to implement these resources to expand computing access at smaller colleges and universities. The BRICCs community aims to create cooperative digital learning environments to equip students at these institutions with tools that develop their research, education, and professional interests.

PROVIDING RESOURCES

Amy Schultz, LEARN's Chief Relationship and Engagement Officer, is a founding member of BRICCs. LEARN's involvement with research and education networks, communities, and services on the state, regional, and national level provides valuable connections and collaboration opportunities. "Knowing LEARN has been engaged with the CC* Program at the NSF, it made sense to be involved and partnered with a group that shared a lot of similar perspectives on bringing more computing to those doing research in Texas," shares Dr. Dhruva Chakravorty, the Principal Investigator for the NSF grant. LEARN leverages its members and experience to assist BRICCs in hosting community workshops to raise awareness of its benefits to a broader audience. Over 70 institutions nationwide have taken part in these workshops.

In August 2022, more than 50 participants from across the country, including faculty, IT professionals, non-profits, and industry representatives, attended the two-day, in-person Collaborative Computing Models

Workshop at Texas A&M University-Corpus Christi. The attendees gathered for group-style brainstorming and problem-solving sessions to identify community colleges' research challenges and explore ways to support computing at smaller institutions. Workshops like this result in significant collaborative networking opportunities for LEARN and the participating colleges and universities. This is especially valuable for campuses to increase their network potential by helping develop platforms to share and build on their successes in research-heavy fields.

NO LEARNER LEFT BEHIND

The BRICCs community encourages larger campuses to mentor and collaborate with smaller community colleges, with the understanding that size has little bearing on creativity or talent. Dr. Chakravorty explains, "One of the major things we learned out of BRICCs is that there are a lot of people who want to help each other. There's a lot of goodwill among the community and a common, recognized need for collaboration." When excellent ideas and research are shared and built cooperatively, everyone benefits. A smaller campus may have high-quality, innovative research. By enabling access to more extensive resources through this grant, these projects can reach a vast audience permitting exposure and cultivating collaboration. One of the main goals of BRICCs for their next workshop is to identify pathways by which larger four-year institutions, state entities, and non-profits can engage and communicate with smaller institutions more effectively.

Facilitating stronger relationships between colleges and universities promotes research, learning, and innovation.

"THIS IS AN EXCELLENT OPPORTUNITY FOR CAMPUSES TO CREATE TRANSFORMATIONAL PARTNERSHIPS TO SHARE IDEAS, TECHNOLOGIES, AND RESOURCES."

Previous Page: Ralph Zottola (University of Alabama at Birmingham), Ed Evans (Texas A&M-Corpus Christi), Van Howell (South Plains College), Forough Ghahramani (NJEdge), and Akbar Kara (LEARN) share insights and ideas during a panel discussion at the BRICCs Collaborative Computing Models Workshop in Corpus Christi, TX.



Connecting Texas to Opportunity

Enhancing LEARN's Network Infrastructure

By Therese Perlowski



As LEARN members rely on the performance and reliability of the network across the state, continuous maintenance and upgrade of the LEARN infrastructure remains a priority. While the next generation project is top of mind, several other initiatives aimed at increasing network performance, resilience, and reliability took shape in 2022. These network-enhancing projects included the Houston Metro Augmentation, the Session Initiation Protocol (SIP) service pilot, a shift to more multi-protocol label switching (MPLS) resilience, and the beginnings of the packet platform refresh.

HOUSTON METRO AUGMENTATION

Building upon the resilience and redundancy of its existing network in Dallas, LEARN worked to expand opportunities and services in the Houston Metro area. Before beginning the most recent strategic planning process, the Houston area was identified as an opportunity for broadening connectivity and expanding resiliency. LEARN's Network Services Director, Byron Hicks, shares, "One of the goals was to expand our Houston footprint to have more capabilities to pick up stakeholder connections or connect to upstream peers in the Houston area and provide a little more redundancy and resiliency."

Ultimately, the project will create two new on-ramps, or Points of Presence (POPs), in Houston, one at

a Lumen facility in Greenspoint and another in the Netrality data center at 1301 Fannin, providing more connectivity solutions for members as well as prospects. The Netrality data center will make it easier for LEARN to connect to other providers, create an exit point for Commodity Internet and the SIP service, and increase overall capacity for the Commodity Internet connection in Houston. The Greenspoint extension includes a new 100-gigabit circuit that feeds LEARN's connection to Beaumont and has the potential to house LEARN's Internet2 and ESnet connectivity. "Implementing this augmentation allowed us to leverage some existing assets and secure some new assets to increase the resiliency and redundancy of our network as well as increase our capability in the region and create an avenue to connect future prospects," explains Todd Horkman, LEARN's Chief Technology Officer.

SIP SERVICE PILOT

As interest in new services grows, LEARN partnered with the technology company GTT to offer a new Session Initiation Protocol (SIP) service. Established by the Operations and Services Committee, this new service offers both cost savings and a solid technical solution for members. GTT handles the technical side of porting over information and phone numbers while LEARN builds the VLANs from the member back to connect to GTT. This structure allows access to redundancy from LEARN's and GTT's POPs and direct VLAN access to the SIP service. Members can reduce costs by not buying a separate circuit. The pilot portion of the project also allowed the Operation and Services Committee to work out a process to onboard and evaluate similar new "above-the-net" type services to position the organization to explore future options and benefits for members efficiently.

MPLS RESILIENT CONNECTIONS

LEARN provides multiple connectivity options, from wave-based services on the optical system to a more packet-based layer 2 design over the MPLS backbone. Over the last year, members experienced a spike in fiber cuts and disruptions due to both the post-pandemic economy and weather-related incidents. Hicks shares,

Previous Page: Byron Hicks, Network Services Director, and Sal Ghani, Systems Engineer, discuss strategies to enhance LEARN's network infrastructure.



“With COVID-19 kind of at its tail end, businesses are somewhat back to normal and the economy in Texas is booming, so there’s a lot of activity and construction on top of an already very active weather climate. Unfortunately for us, that means a lot of fiber cuts and potential outages.” Illustrating this, one member shared their experience suffering multiple successive cuts from various causes: a house fire where aerial fiber was burnt, another fire where the ground temperature caused fiber to melt, and construction-related digging cuts.

LEARN saw many members shifting toward the more resilient MPLS-based service this year. “We’re selling fewer and fewer dedicated waves and more and more MPLS-protected services,” explains Hicks. With a wave-based service, typically point-to-point, the connectivity is more vulnerable to disruption in cases like this. However, an MPLS-based connection is configured with VLANs, and traffic is automatically rerouted across the backbone without significant interference. Often with an MPLS-protected connection, members aren’t even aware there has been a fiber cut because the services that failed are successfully and seamlessly redirected over another path.

While weather-related incidents and fiber cuts are expected challenges,

LEARN IS COMMITTED TO CONTINUING ITS UNPARALLELED QUALITY OF SERVICE AND OFFERING OPTIONS TO MEMBERS TO ENSURE RESILIENT AND REDUNDANT CONNECTIONS.

“It’s the nature of the business – there will always be fiber cuts; it’s just what happens. So we focus on finding the best options for our members to overcome it,” Hicks emphasizes.

NSF FABRIC

LEARN embraced the opportunity to work with [FABRIC](#) in 2022, an NSF-funded grant project that aspires to build a high-speed network tying together all the major supercomputing centers nationwide (NSF Award #1935966). Eventually, the project hopes to create a terabyte connection across the network. LEARN collaborated with the FABRIC team to establish a 100G connection in Dallas so that the Texas Advanced Computing Center (TACC) at the University of Texas at Austin could migrate some of its services to the 100G

circuit. The Dallas circuit acts as phase 1 on this project, as LEARN hopes to build a terabit connection from Dallas to Austin to the TACC campus at the J.J. Pickle Research Campus in future phases of the project.

PACKET PLATFORM REFRESH

Maintaining the statewide network requires LEARN’s constant assessment of current conditions and anticipation of future needs. As advanced networking evolves and grows, the demands and capacity shift with it. The existing network supports 100G capacity, but LEARN is committed to adjusting upward as demand grows when big data sets start coming out with projects like the Hadron Collider and ATLAS-connected sites where the minimum required speed will be 400G in a few years.

The first part of this packet platform refresh process is identifying a packet platform that can handle up to 400G but can still provide redundancy and resiliency in a smaller form factor and a smaller power load. Hicks explains, “The data centers aren’t lowering their prices – they charge by space, and they charge by power – so we have to be good stewards of what we’ve been given by the LEARN community. We have to provide more functionality while keeping costs down with smaller footprints and smaller power load.” Currently, LEARN is evaluating packet platform solutions with the goal of installing new equipment beginning in 2023.

LEARN is also focused on digging deeper into automation to make for a seamless transition. Automation has been a key piece of success for others in the community, like Internet2, which has completed similar transitions, so LEARN is actively working to follow the same model. “We’re in the process of making sure databases are up-to-date, ready to convert to the new platform, and we are exploring automation orchestration tools that will help us build this faster and make changes in a more automated way,” shares Hicks. “We’re in the early stages, but we’re excited.”

2022 had LEARN maintaining, enhancing, and expanding the network for current and new members across the state. In addition to ongoing projects, the team is anticipating upcoming initiatives as a result of strategic planning and as part of the next generation project. Hicks shares, “It’s really exciting to see the bigger vision of what LEARN is and what LEARN is providing taking shape.” Horkman adds, “There’s a lot of creative discussions happening and there’s going to be a lot of innovation over the course of the next few years that I’m really excited about.”

Board of Directors

DOUG FOX

Associate Vice President, Information Technology & CIO
Angelo State University

VACANT

Baylor College of Medicine

BOB HARTLAND

Associate Vice President, IT Infrastructure
Baylor University

MICHAEL WELCH

Dean, Academic Technology Services
Blinn College

DAVID STEPHENS

Chief Information Officer
Collin College

JIM PARKER

Chief Information Officer
Dallas College

PATRICK STEWART

Chief Information Officer
Lamar University

ANN KEANE

N-Wave Business Manager
National Oceanic and Atmospheric Administration

TREVOR JONES

Chief Information Officer
Parker University

TONY MOORE

Chief Information Officer
Prairie View A&M University

MARC COUGLE

Associate Vice President, IT Infrastructure and Operations
Rice University

JIM BRADLEY

Chief Information Officer
Sam Houston State University

VAN HOWELL

Associate Dean of Information Services
South Plains College

MICHAEL HITES

Chief Information Officer
Southern Methodist University

VACANT

Tarrant County College District

VACANT

Texas A&M Health Science Center

DAN SCHMIEDT

Vice President, Information Technology & CIO
Texas A&M University

JOSHUA GONZALEZ

Director, IT Infrastructure and Research Computing
Texas A&M University-Corpus Christi

MARK STONE

Chief Information Officer
Texas A&M University System

BRYAN LUCAS

Chief Technology Officer
Texas Christian University

LEA CASTILLO

Manager of Information Technology
Texas Education Telecommunications Network (TETN)

KEN PIERCE

Vice President for Information Technology & CIO
Texas State University

Board of Directors Cont'd

SAM SEGRAN

Vice President for IT and Chief Information Officer
Texas Tech University

VINCE FELL

Vice President, Information Technology & CIO
Texas Tech University Health Sciences Center

JERRY RODRIGUEZ

Associate Vice President, Information Technology & CIO
Texas Tech University Health Sciences Center El Paso

KAY RHODES

Special Advisor
Texas Tech University System

VACANT

Texas Woman's University

BEN LIM

Chief Information Officer
Trinity University

DENNIS FOUTY

Senior Associate Vice President/Vice Chancellor & CIO
University of Houston System

JUAN SERRANO

Vice Chancellor and Chief Information Officer
University of North Texas System

DEEPIKA CHALEMELA

Chief Information Officer
University of Texas at Arlington

WILLIAM GREEN

Director of Networking and Telecommunications
University of Texas at Austin

FRANK FEAGANS

Vice President, Information Technology & CIO
University of Texas at Dallas

LUIS HERNANDEZ

Vice President for Information Resources
University of Texas at El Paso

KENDRA KETCHUM

Vice President, Information Management and Technology
University of Texas at San Antonio

VACANT

University of Texas Health Science Center at Houston

YEMAN COLLIER

Vice President and Chief Information Officer
University of Texas Health Science Center at San Antonio

JOHN YODER

Vice President of Technology & CIO
University of Texas Health Science Center at Tyler

VACANT

University of Texas MD Anderson Cancer Center

GEORGE GADDIE

Vice President and Chief Information Officer
University of Texas Medical Branch at Galveston

JEFF GRAHAM

Chief Information Officer
University of Texas Rio Grande Valley

JOSH SPENCER

Associate VP, Info. Resources & CIO
University of Texas Southwestern Medical Center at Dallas

BRYAN ROESSLET

Chief Technology Officer
University of Texas System

Story Contributors

JIM BRADLEY

DHRUVA CHAKRAVORTY

CRAY CROUSE

AUSTIN GAMBLE

BOB HARTLAND

NORA HERNANDEZ

BYRON HICKS

MICHAEL HITES

TODD HORKMAN

JASON JACKSON

AKBAR KARA

TARA LEWIS

NICOLE LUNA

KERRY MOBLEY

BRYAN ROESSLET

JUAN SAN MARTIN

SANDRA SCHEIDEGGER

DAN SCHMIEDT

AMY SCHULTZ

SAM SEGRAN

REANA TEICHMAN

MATT ZEKAUSKAS

JASON ZURAWSKI

Affiliated Organizations

4-YEAR HIGHER ED: PRIVATE

St. Mary's University
Texas Lutheran University
University of Mary Hardin-Baylor

4-YEAR HIGHER ED: PUBLIC

Stephen F. Austin State University
Sul Ross State University
Sul Ross State University Rio Grande College
Tarleton State University
Texas A&M University at Galveston
Texas A&M International University
Texas A&M University Kingsville
Texas A&M University Central Texas
Texas A&M University Commerce
Texas A&M University San Antonio
Texas A&M University Texarkana
University of Houston Downtown
University of Houston Victoria
University of Houston Clear Lake
University of North Texas
University of North Texas at Dallas
University of Texas at Tyler

University of Texas Permian Basin
West Texas A&M University

CITY/COUNTY

City of Austin
City of Bryan
City of San Angelo
Travis County

COMMUNITY COLLEGE

Austin Community College
Brazosport College
Del Mar College
Galveston College
Hill College
Houston Community College System
Kilgore College
Lamar Institute of Technology
Lamar State College Orange
Lamar State College Port Arthur
McLennan Community College
Midland College
Paris Junior College
South Texas College
Texarkana College
Trinity Valley Community College
Victoria College
Wharton County Junior College

HEALTHCARE

Citizens Medical Center
Guadalupe Valley Hospital
Houston Methodist Hospital
Parkland Memorial Hospital
Texas Children's Hospital
University Medical Center
University of North Texas Health Science Center

K-12

Adrian ISD
Albany ISD
Alief ISD
Angleton ISD
Anson ISD
Aspermont ISD
Austin ISD
Austwell-Tivoli ISD
Baird ISD
Bangs ISD
Bartlett ISD
Blackwell CISD
Blanco ISD
Blanket ISD
Bob Hope Charter School 1
Boling ISD
Booker ISD
Borger ISD
Bovina ISD
Boys Ranch ISD
Brady ISD
Breckenridge ISD
Brenham ISD
Bronte ISD
Brookeland ISD
Brookesmith ISD
Brownwood ISD
Buna ISD
Burkeville ISD
Canadian ISD
Canyon ISD
Channing ISD
Chester ISD
Childress ISD
Christoval ISD
Cisco ISD
Clarendon ISD
Claude ISD
Clyde CISD
Coleman ISD
Colmesneil ISD
Colorado ISD
Comanche ISD
Comfort ISD
Comstock ISD
Crockett County CSD
Cross Plains ISD
Cypress-Fairbanks ISD
Dallas ISD
Darrouzett ISD
DeLeon ISD
Denton ISD
Devers ISD
Deweyville ISD
Dime Box ISD
Dimmitt ISD
Doss CSD
Dumas ISD
Early ISD

Affiliated Organizations Cont'd

K-12 CONT'D

Eastland ISD	Keller ISD	Panhandle ISD	Santa Anna ISD
Eden CISD	Kelton ISD	Panther Creek CISD	Schleicher ISD
Ehrhart School	Kirbyville CISD	Plemons-Stinnett-Phillips CISD	Schulenburg ISD
Eula ISD	Kountze ISD	Port Arthur ISD	Shamrock ISD
Flatonia ISD	Kress ISD	Prairie Lea ISD	Shiner ISD
Follett ISD	La Grange ISD	Pringle-Morse CISD	Sidney ISD
Fort Elliott CISD	Lake Travis ISD	Ranger ISD	Silverton ISD
Fort Worth ISD	Lefors ISD	Region 3 Education Service Center (ESC3)	Snyder ISD
Giddings ISD	Lexington ISD	Region 5 Education Service Center (ESC5)	Sonora ISD
Gonzales ISD	Liberty ISD	Region 6 Education Service Center (ESC6)	Spearman ISD
Gorman ISD	Lockhart ISD	Region 13 Education Service Center (ESC13)	Spring Creek ISD
Grandview-Hopkins ISD	Loraine ISD	Region 14 Education Service Center (ESC14)	Spurger ISD
Granger ISD	Lueders-Avoca ISD	Region 15 Education Service Center (ESC15)	Stamford ISD
Grape Creek ISD	Luling ISD	Region 16 Education Service Center (ESC16)	Sterling City ISD
Groom ISD	Lumberton ISD	Richland Springs ISD	Stratford ISD
Gruver ISD	Mason ISD	Rising Star ISD	Sunray ISD
Gustine ISD	May ISD	River Road ISD	SUNERnet
Hamlin Collegiate ISD	McLean ISD	Robert Lee ISD	Sweet Home ISD
Happy ISD	Memphis ISD	Rochelle ISD	Sweetwater ISD
Hardin-Jefferson ISD	Menard ISD	Rockdale ISD	Texas Leadership Charter Academy
Harper ISD	Merkel ISD	Rocksprings ISD	Texas School for the Blind
Hart ISD	Meyersville ISD	Roscoe Collegiate ISD	Texhoma ISD
Hartley ISD	Miami ISD	Rotan ISD	Texline ISD
Haskell CISD	Miles ISD	Round Rock ISD	The Raven School (Gulf Coast Trade Center)
Hawley ISD	Moran ISD	Round Top-Carmine ISD	Thorndale ISD
Hedley ISD	Nederland ISD	Rule ISD	Thrall ISD
Hermleigh ISD	New Braunfels ISD	Runge ISD	Trent ISD
Highland ISD	Nueces Canyon CISD	San Saba ISD	Tulia ISD
Highland Park ISD	Nursery ISD	Sanford-Fritch ISD	Vega ISD
Ira ISD	Odyssey Academy		Veribest ISD
Irion County ISD	Olfen ISD		Victoria ISD
Jarrell ISD	Orangefield ISD		Vidor ISD
Jim Ned CISD	Paint Creek ISD		Vysehrad ISD
Katy ISD	Paint Rock ISD		Waelder ISD

Affiliated Organizations Cont'd

K-12 CONT'D

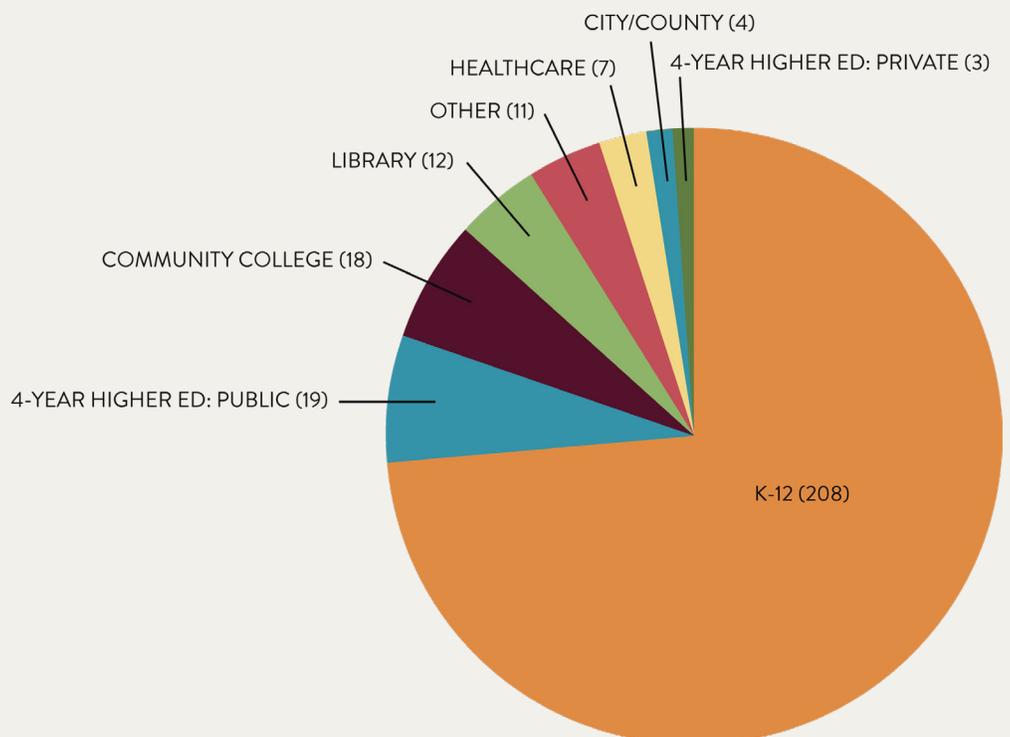
Walcott ISD
 Wall ISD
 Warren ISD
 Water Valley ISD
 Wellington ISD
 West Orange-Cove CISD
 Westbrook ISD
 Westhoff ISD
 Wheeler ISD
 White Deer ISD
 Wildorado ISD
 Wimberley ISD
 Woodville ISD
 Wylie ISD
 Ysleta ISD
 Zephyr ISD

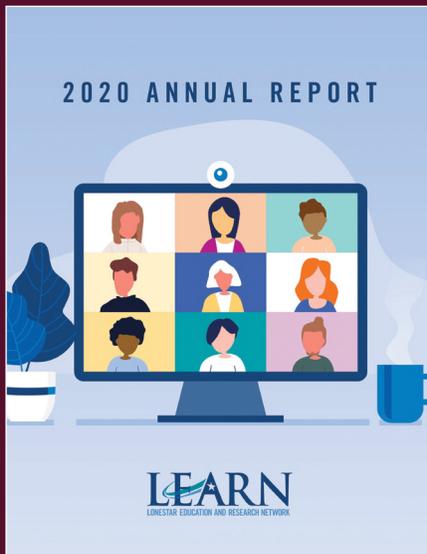
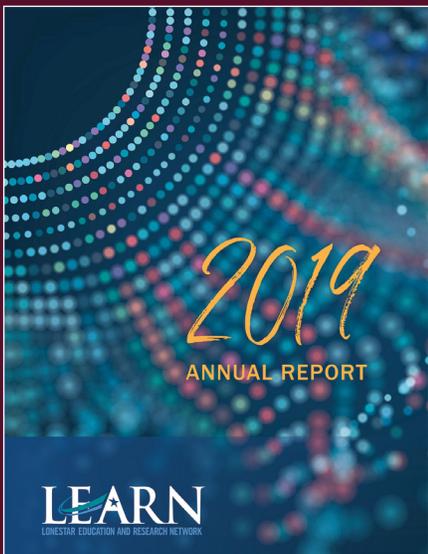
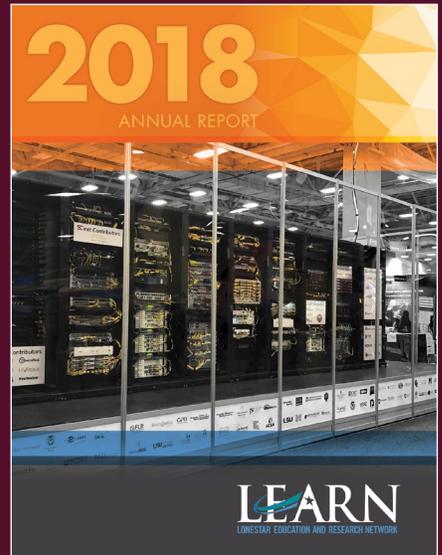
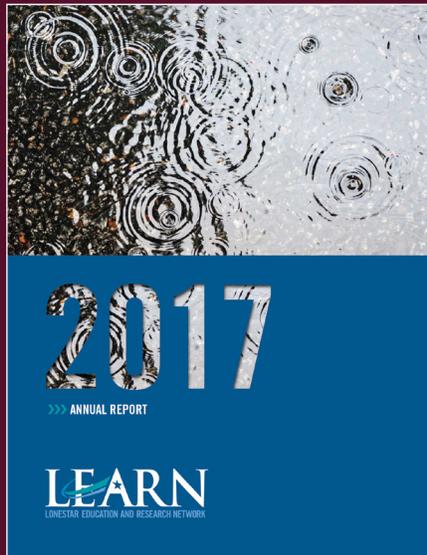
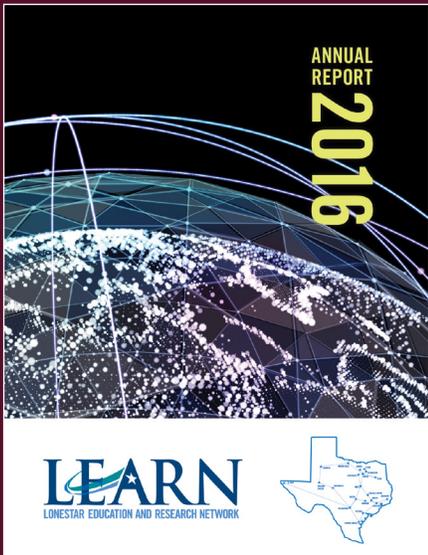
LIBRARY

Alexander Memorial Library
 Allen Memorial Public Library
 Cochran County Love Memorial Library
 Duncanville Public Library
 Fairfield Library Association
 Friona Public Library
 Grapeland Public Library
 Jacksonville Public Library
 Lee-Bardwell Public Library
 Muleshoe Area Public Library
 Upshur County Public Library
 Wharton County Library

OTHER

Department of Information Resources (DIR)
 Houston Museum of Natural Science
 Lower Colorado River Authority (LCRA)
 Metropolitan Transit Authority of Harris County [METRO]
 Texas AgriLife Extension Service
 Texas AgriLife Research
 Texas Engineering Experiment Station
 Texas Engineering Extension Service
 Texas State Library and Archives Commission
 Texas Transportation Institute
 Texas Veterinary Diagnostic Lab





LEARN

LONESTAR EDUCATION AND RESEARCH NETWORK



tx-learn.net



info@tx-learn.net



806.743.7878



P. O. Box 16920 | Lubbock, TX 79490

SCAN FOR AN
INTERACTIVE
VERSION OF
THE REPORT

