



TCUs: *Educating, Engaging, Innovating, Sustaining, Honoring*

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MEMBERSHIP:

ALASKA

Iñisaġvik College

ARIZONA

Diné College
San Carlos Apache College
Tohono O'odham Community College

CALIFORNIA

California Tribal College

KANSAS

Haskell Indian Nations University

MICHIGAN

Bay Mills Community College
Keweenaw Bay Ojibwa Community College
Saginaw Chippewa Tribal College

MINNESOTA

Fond du Lac Tribal and Community College
Leech Lake Tribal College
Red Lake Nation College
White Earth Tribal and Community College

MONTANA

Aaniih Nakoda College
Blackfeet Community College
Chief Dull Knife College
Little Big Horn College
Fort Peck Community College
Salish Kootenai College
Stone Child College

NEBRASKA

Little Priest Tribal College
Nebraska Indian Community College

NEW MEXICO

Institute of American Indian Arts
Navajo Technical College
Southwestern Indian Polytechnic Institute

NORTH DAKOTA

Cankdeska Cikana Community College
Nueta Hidatsa Sahnish College
Sitting Bull College
Turtle Mountain Community College
United Tribes Technical College

OKLAHOMA

College of the Muscogee Nation

SOUTH DAKOTA

Oglala Lakota College
Sinte Gleska University
Sisseton Wahpeton College

WASHINGTON

Northwest Indian College

WISCONSIN

College of Menominee Nation
Lac Courte Oreilles Ojibwa Community College

**American Indian Higher Education Consortium (AIHEC)
Tribal Colleges and Universities
Information Technology and Cyberinfrastructure
NTIA Funding Request
February 25, 2021**

Summary

On behalf of the nation's 37 Tribal Colleges and Universities (TCUs), which collectively are the American Indian Higher Education Consortium (AIHEC), we respectfully request that a minimum of **\$90 million for essential TCU broadband connectivity be set-aside** within the \$1 billion authorized for grants for Tribal broadband connectivity under section 905 of P.L. 116-260, the *Coronavirus Response and Relief Supplemental Appropriations/Consolidated Appropriations Act, 2021 (CRRSAA)*. *Tribal Colleges and Universities are specifically listed as eligible entities under section 905(a)(8)(B) of the Act.*

Over the past 2.5-years, AIHEC has conducted a comprehensive analysis of the current broadband capacity and infrastructure of TCUs with funding from the National Science Foundation (NSF). Based on this study, we are confident that approximately \$90 million will enable all interested accredited TCUs to connect to the state and regional broadband networks used by vast majority of institutions of higher education in the country, but which have bypassed much of Indian Country.

These networks are the foundation of the U.S. higher education and research infrastructure. Connecting to them will support and enhance the role of TCUs as anchor institutions in helping Tribal communities take full advantage of broadband Internet to address local education, research, and economic development needs and opportunities. TCUs serve hundreds of Tribal communities, including the country's largest Tribal nations, through more than 78 campuses and a wide range of online courses and programs. They are critical to the long-term economic, cultural, social, educational and health status of the tribes they serve. A specific set aside for TCUs within the NTIA Tribal broadband program will optimize the capacity of Tribal nations and communities to take advantage of the economic and social opportunities expanded broadband access can provide, without raising competition questions and fears among tribes and their colleges and universities.



Most TCUs currently have some degree of broadband access on their main campuses, but their access is a patched together, high cost, and reliant on older or outdated equipment. It is not the type of service suitable for a college or university, nor does it take into consideration that many TCUs require infrastructure improvements to provide this broadband to students and faculty across the college's main campus and branch campuses. Outlined below are our estimates of the infrastructure costs necessary for TCU faculty, students and the Tribal communities they serve to be well-positioned to leverage NTIA's investment in Tribal broadband access to achieve Tribal nation-building goals.

Background

In 2017, NSF awarded AIHEC a grant to conduct a detailed study of the information technology (IT) and cyberinfrastructure systems at the nation's 37 TCUs. The *Study of Tribal College and University Cyberinfrastructure (CI) and Supported STEM Programs* goals were to:

- a) Conduct a comprehensive examination of the cyberinfrastructure of all 37 TCUs; and
- b) Facilitate capacity-building at TCUs to enable the TCUs to participate in national CI-enabled research and education programs, which will significantly strengthen AI/AN participation in the national STEM workforce and bring STEM-based economic opportunities to AI/AN communities.

Through the grant, AIHEC assembled a team of nationally recognized higher education IT professionals, including network engineers, chief information officers, and systems specialists, to assist with the study. The technical lead is Dale Smith, University of Oregon network engineer. The management lead is Jim Bottum, retired Clemson University chief information officer. AIHEC partnered with EDUCAUSE, the nation's premier association of higher education IT professionals to conduct a survey of the status of TCU IT and CI systems. Twenty-four TCUs participated in the AIHEC IT EDUCAUSE survey. Over the past two years, the AIHEC IT/CI team conducted in depth site visits and evaluations at 35 TCUs (site visits to date do not include the College of Menominee Nation and San Carlos Apache College).

Current TCU Connectivity Speeds & Equipment:

Findings (in March 2020, at the start of the pandemic) based on the AIHEC IT EDUCAUSE survey and AIHEC site visits include:

- TCUs average 336 Mbps Internet connectivity, with a maximum reported 1.06 Gbps (one TCU, Navajo Technical University), and minimum of 6 Mbps. More than **one-third of all TCUs (16) have Internet speeds at 100 Mbps or less – five are at or below 50 Mbps**. The TCU average speed of 335 Mbps contrasts with the 2015 national averages of 513 Mbps for 2-year institutions and 3.5 Gbps for 4-year institutions.
- Average TCU equipment replacement rate of 8.29 years; industry standard rates is 3-5 years. This includes firewalls, core switches, and routers.
- While some TCUs have made investments in Gigabit Ethernet, several continue to use old 10/100 Ethernet ports. Only about one-third of responding TCUs have faster 10 Gigabit equipment installed.
- All TCUs have Wi-Fi networks on their campuses, but many are using outdated Wi-Fi technology. Only approximately 15 percent are using current state of the art Wi-Fi systems.
- Approximately 25 percent of all TCUs have not properly separated network servers from the rest of the campus network due to lack of funding, resulting in privacy compliance issues.

For the 25 percent of TCUs that have not properly separated their network servers from the rest of their campus network, many may not meet the most basic compliance issues such as Payment Card Instruction compliance (credit card processing), Family and Educational Rights and Privacy Act compliance (protecting student information), and Gramm-Leach-Bliley Act compliance (student and consumer privacy).

Current TCU Connectivity Costs:

In addition to inadequate broadband connectivity speed and capacity, many TCUs are paying connectivity rates that are *significantly* higher than the national average. Due to the extremely high costs, TCUs simply cannot afford connectivity levels that are typical for 2-year and 4-year institutions nationally. Exorbitant connectivity costs are common for TCUs and their students where monopoly or near monopoly power exists or where a small number of providers charge near-identical high rates, regardless of whether the providers are commercial providers or tribal providers.

- Average TCU Internet connectivity cost: \$40,000 per year
 - Maximum expenses: \$250,000 for per year for Iłisaḡvik College (Barrow, AK), single location; \$367,000 for per year for Diné College (Tsaile, AZ), includes two satellite locations, as of March 2020.¹
- Tohono O'odham Community College (Sells, AZ) pays \$70/Mbps per month, a monthly cost of \$3,500 for 50 Mbps service, *which is 70 times the national average cost.*
- National average for 1 (one) Gbps is \$1,000 per month (based on the rate of \$1/Mbps per month).

Clearly, there is a compelling need for TCU connectivity costs to be negotiated with providers. Provider participation in the NTIA Tribal broadband initiative should include a requirement that connectivity costs for TCUs be brought in line with regional averages, regardless of who the provider is.

TCU participation in the National Research and Education Network:

The United States has developed a sophisticated regional research and education network system that serves the needs of institutions of higher education across the country, including almost all the regions within which TCUs are located. Composed of a collection of state and regional networks, this system provides access to a national and global network of research and education resources that are essential to the national STEM research enterprise. The state and regional networks are connected on a national scale by Internet2, which typically delivers service to one or more locations in a state or region. These connections are typically 100Gbps and above. Each state or region has developed fiber-based networks that connect institutions of higher education, K-12 education, public libraries, and some government organizations. A handful of TCUs currently are connected to the state or regional research and education networks. Through the NTIA Tribal broadband initiative, more TCUs finally could be connected, which would open a broad array of new opportunities and resources for TCUs and the communities they serve. This is essential to achieving equity for Tribal higher education.

The benefits of participating in a state or regional network cannot be understated and include a high level of cybersecurity, regular system upgrades that improve performance across the network, and most important, membership in a community of practice from which all TCU IT departments can benefit through access to a broad range of technical expertise and support. However, as the appended maps indicate, for most TCUs, the distance, and therefore cost, of connecting has been prohibitive.

Thus, the TCUs, their students, and their Tribal nations have been excluded from this essential STEM, health care, and economic development tool. However, as the appended maps also show, some TCUs are located relatively close to a network and with an investment in fiber to bridge the “last mile”, they would be able to connect to existing networks.

Despite the advantages of connecting to the national R&E networks, some TCUs may find that they are better served by commercial carriers. However, these carriers’ networks on tribal lands are engineered to serve residential needs, not the needs of technology-reliant higher education programs. In these cases, the carriers likely will need to re-engineer portions of their network to be able to serve the higher bandwidth needs of the higher education sector.

Finally, there is a need for **Enhanced Internet Access** for faculty and students to teach and study remotely. TCUs are in isolated rural regions where most students lack access to Internet service at their homes. This category provides additional access locations on tribal lands and connection speed enhancements at all TCU campus locations.

Cost estimates:

1. Total TCU connectivity costs

This estimate uses the average annual cost of \$40,000 for Internet connectivity.

Annual recurring cost of \$40,000 per year; cost x 37 Main TCU locations x 1 year = \$1.48M

Annual recurring cost of \$12,000 per year; cost x 35 TCU satellite locations x 1 year = \$420,000

2. IT Equipment Improvements: This includes network hardware upgrades to support higher speeds and additional Internet capacity at each location needed for online teaching and learning.

One time cost of \$100,000 per location; Cost x 72 campus locations = \$7.2M

Annual recurring cost of \$10,000 per year; cost x 72 locations x 1 year = \$720,000

3. Public Wi-Fi hot spot locations distributed in locations on tribal lands to optimize student and faculty Internet access close to home. Intended primarily for individuals to access from their personal vehicles. Some of these hotspot sites will be served by point-to-point wireless, others by DSL or telecom provided Internet.

One-time cost of \$10,000 per location; Cost x 72 community locations = \$720K;

Annual recurring cost of \$1,200/year/location; cost x 72 locations x 1 year = \$87K

4. Building Staff and IT Administrative Capacity: TCUs are challenged to maintain adequately staffed and trained IT departments. Current staff levels and skills sets much match the requirements of campus technology operations, maintenance and user community support. Funds will allow TCUs to achieve adequate staffing and provide professional development in critical IT skills set needs.

Annual recurring cost of \$150,000 per year: cost x 37 locations x 1 years = \$5.55M

5. Upgrading Networks to Serve TCU Campus Locations: TCUs need access to cost effective service that is comparable to what is available on non-tribal lands. This includes additional fiber builds and equipment investments to upgrade either the carrier network or to connect the TCU to a nearby state or regional research and education network. It must be emphasized that the available broadband service to TCUs is inconsistent in terms of speeds and cost across tribal lands, therefore some TCUs will require more resources than others.

One-time network upgrade costs \$50M for all 37 TCUs.

Total: First Year Funding: \$56,220,000

Recurring Annual Funding: \$8,257,000, or \$24,771,000 for 3 years



Figure 1.1. Tribal Colleges and Universities in the U.S. (AIHEC, 2018)

2017-2018 AIHEC TCU IT EDUCAUSE Survey Data Summary (24 TCUs)

TCU Information Technology Expenses

	Total IT Expenses	Staff Expense	Student Staff Expense
Average	\$484,088	\$245,997	\$1,007
Max	\$1,978,377	\$593,916	\$10,100
Min	\$120,064	\$70,590	\$0

Information Technology Staffing

	Full Time Staff	Student Staff*
Average	4.21	0.89
Max	12	8
Min	1	0

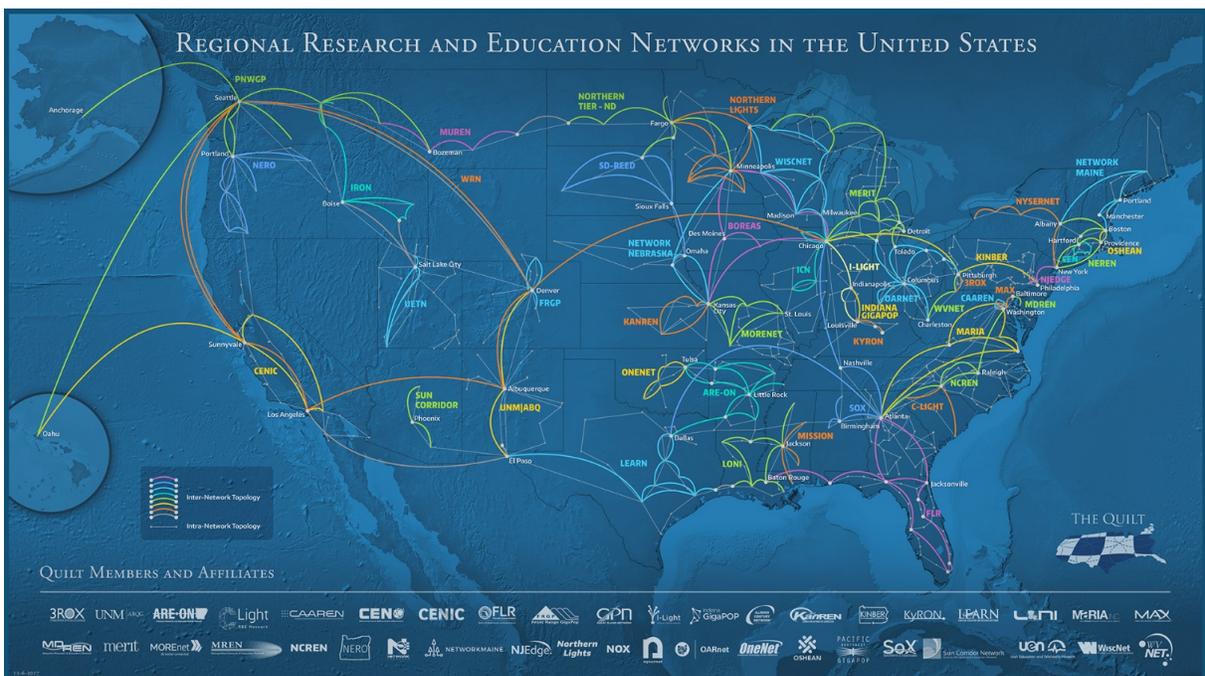
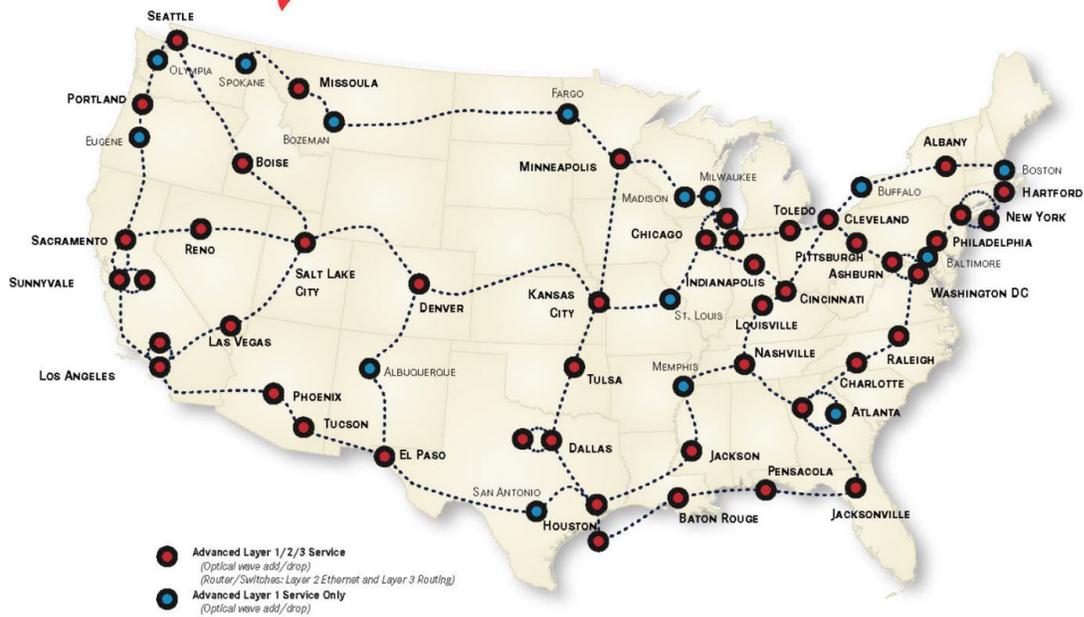
*Several TCUs employ students in their IT departments. Student employment can expand IT support resources in a cost-effective manner.

Size of Institution

	# Buildings on Main Campus	# of Branch Campuses
Average	12.78	2
Max	54	12
Min	2	0

INTERNET2 NETWORK INFRASTRUCTURE TOPOLOGY

OCTOBER 2020



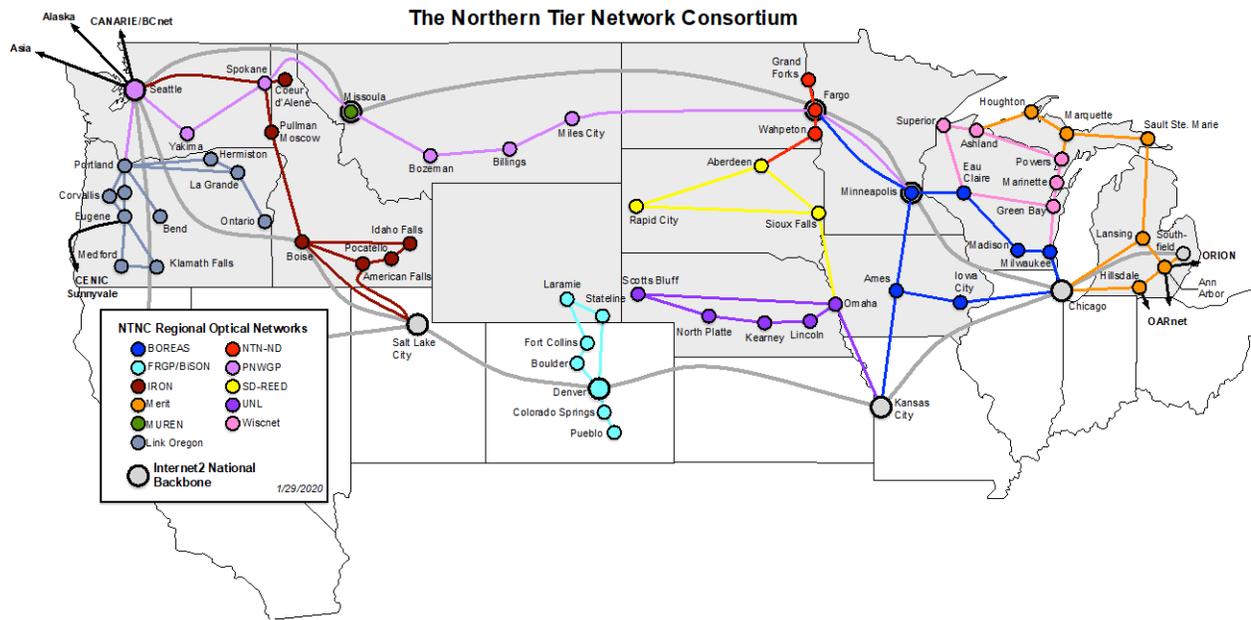


Figure 1.3. Geographical map of the Northern Tier Network Consortium as of 2020 (excluding Alaska).