American Indian HIGHER EDUCATION CONSORTIUM

TRIBAL COLLEGES AND UNIVERSITIES: INFORMATION TECHNOLOGY & CYBERINFRASTRUCTURE NEEDS

February 2021

CONGRESS MUST ADDRESS CRITICAL TCU IT INFRASTRUCTURE NEEDS

The **USDA-Rural Utilities Service** provides funding to support a variety of critical infrastructure improvements in rural communities including telecommunications and broadband services. Congress should establish a permanent **$24 million per year set aside for TCUs** under the USDA-Rural Utilities Service to better serve TCUs, as rural, community-based, and under-resourced institutions. Over the past several years, telecommunications and broadband funding has gone unused under the RUS program. A permanent $24 million set-aside for TCUs, which are 1994 Land-grant institutions served by USDA, could be established at no additional cost using existing funds.

AIHEC Cyberinfrastructure Study, funded by the National Science Foundation

The American Indian Higher Education Consortium (AIHEC) was awarded a grant in 2017 from the National Science Foundation to conduct a detailed study of the information technology and cyberinfrastructure systems at the nation's 37 Tribal Colleges and Universities. The *Study of Tribal College and University Cyberinfrastructure (CI) and Supported STEM Programs* goals are to:

a) conduct a comprehensive examination of the cyberinfrastructure of all 37 of the nation's Tribal Colleges and Universities and

b) facilitate capacity-building at TCUs that will enable the colleges 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.

In fall 2017, AIHEC assembled a team of nationally recognized higher education information technology (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 EDUCASE, the nation's premier association of higher education Information technology professionals to conduct a survey of the current status of TCU information technology (IT) and cyberinfrastructure (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 do not include the College of Menominee Nation and San Carlos Apache College).

Current TCU Connectivity Speeds:
Many TCUs are paying connectivity rates that are significantly higher than the national average and, therefore, cannot afford connectivity levels that are typical for two-year and four-year institutions nationally.

	TCUs	2-year IHEs	4-year IHEs
Average Internet Connectivity	**336 MBPS** Max: 1,060 MBPS Lowest: 6 MPBS	**513 MPBS**	**3.5 GBPS**
Average Hardware Refresh Cycle	**8.29 years**	**3-5 years**	
Annual TCU Internet Costs	**$40,000 - $250,000/year** **Highest IHE in Nation: $250,000/year: Iḷisaġvik College (Barrow, AK)**		

Preliminary findings based on the AIHEC IT EDUCAUSE survey and AIHEC site visits include:

- While the colleges have made investments in Gigabit Ethernet, a number of the colleges continue to use old 10/100 Ethernet ports. Approximately one-third of responding TCUs have faster 10 Gigabit equipment installed.
- All TCUs have Wi-Fi networks on their campuses. Many of the colleges are using outdated Wi-Fi technology; approximately 15% are using current state-of-the-art Wi-Fi systems.
- Approximately 25% of the TCUs have not properly separated network servers from the rest of the campus network due to lack of funding, resulting in privacy compliance issues.

Based on the AIHEC IT EDUCAUSE survey results, the TCU IT equipment replacement rates lag behind industry standard rates. For core devices such as firewalls, core switches, and routers, the average replacement rate at TCUs is 8.29 years. The industry standard replacement rates is between three to five years.

Current TCU Connectivity Costs:
- Average TCU Internet connectivity cost: $40,000 per year
- Maximum expenses: $250,000 for per year for Iḷisaġvik College, single location
- Maximum expenses: $367,000 for per year for Diné College, includes 2 satellite locations
- Tohono O'odham Community College (Sells, AZ) pays $70/Mbps per month, a monthly cost of $3,500 for 50 Mbps service.
- The national average for a faster 1 Gbps is $1,000 per month (based on the rate of $1/Mbps per month).

As many as 25% of TCUs have not properly separated their network servers from the rest of their campus network and 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).

Establish $24 million TCU IT Service Fund: USDA-Rural Utilities Service Program

The ongoing pandemic has exacerbated the digital divide and homework gap and underscored the lack of broadband access across Indian Country. To address these deficiencies, Congress should establish a *permanent* **TCU IT Service Fund** within the existing (and previously under-used) **USDA-Rural Utilities Service Program**. An annual $24 million set-aside for TCUs, which are the 1994 Land-grant institutions, is needed to cover ongoing equipment costs, maintenance and upkeep, infrastructure expansion, and IT staffing. If TCUs had adequate funding for IT service and infrastructure support, they would have already put in place many of the community-based mobile hot spots needed to address the "homework gap" on many reservations. Establishing specific funds for Land-grant institutions is not uncommon. For example, in the 2018 Farm Bill reauthorization, Congress established a permanent $40 million scholarship fund exclusively for 1890 Land-grant institutions (Historically Black Colleges and Universities).

Enhanced Internet Access for students and faculty 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 college campus locations.

1. **Internet Access at TCUs:** 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
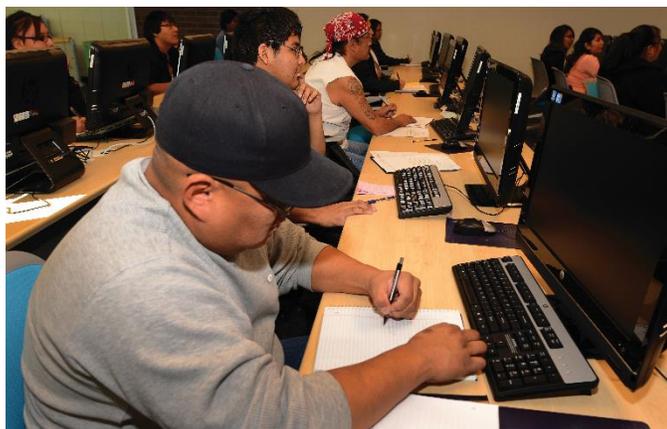
2. **IT Equipment Improvements**: This includes network hardware upgrades to support higher speeds and additional Internet capacity at each location needed for online teaching and learning.
   - *One-time cost* of $20,000 per location; Cost x 72 campus locations = $1.44M
   - *Annual recurring cost* 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: This is 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 campus 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 must match the requirements of campus technology operations, maintenance, and user community support. Funds will allow colleges 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. **Enterprise Resource Planning Systems:** Funds are needed to support annual licensing costs of the colleges' administrative systems and to provide regular training and technical support by the ERP provider to the campus user community.
   - *Annual recurring cost* of $400,000 per year cost x 37 TCUs x 1 years = $14.8M

Total: First Year Funding $23,990,000
Recurring Annual Funding: $21,577,000

2017-2018 AIHEC IT EDUCAUSE Survey Data Summary

The EDUCAUSE survey was completed by 24 TCUs.

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

National Research and Education Network

State/regional R&E Networks: State and regional networks provide access to the national network of research and education resources that are essential to the national STEM research enterprise. The Northern Tier Network is a regional research and education network serving the region within which most to the TCUs are located. As can be seen from the maps below, colleges, although some colleges are located relatively close to a network and with some investment in fiber or wireless technology to bridge the "last mile" would be able to connect, for most the distance and therefore cost of connecting is prohibitive for small under-resourced institutions. The benefits of participating in a state or regional network are many: 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.
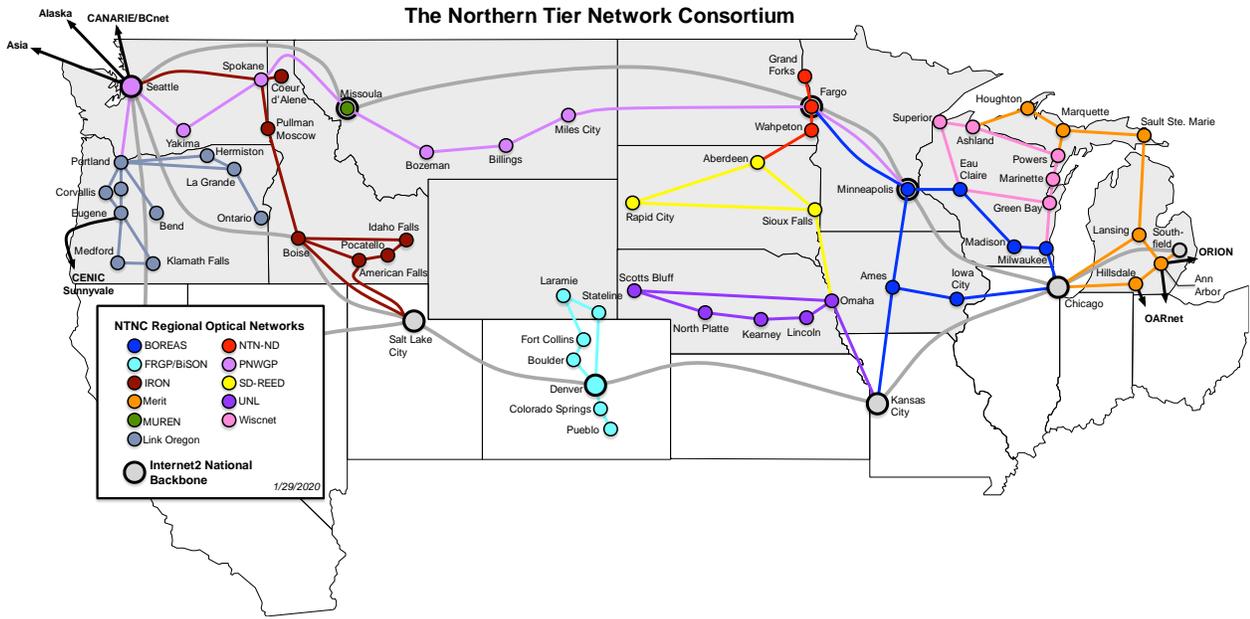
Figure 1.1. Geographical map of the Northern Tier Network Consortium as of 2020 (excluding Alaska).

Figure 1.2. Tribal Colleges and Universities in the U.S. (AIHEC, 2018)