TCU CI Study

NSF CC* and CICI PI Meetings
September 25, 2019

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

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

SOUTH DAKOTA
Oglala Lakota College
Sinte Gleska University
Sisseton Wahpeton College
Sitting Bull College

WISCONSIN
College of Menominee Nation
Lac Courte Oreilles Ojibwa Community College

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

WASHINGTON
Northwest Indian College
Salish Kootenai College

IDAHO
Northwest Indian College

WYOMING
Wind River Tribal College

CALIFORNIA
California Tribal College

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

NEBRASKA
Nebraska Indian Community College

KANSAS
Haskell Indian Nations University

OKLAHOMA
College of the Muscogee Nation

ALASKA
Iḷisaġvik College
Salish Kootenai College

NEW MEXICO
Diné College
Navajo Technical University
Institute of American Indian Arts
Southwestern Indian Polytechnic Institute

States whose AI students attend TCUs

Tribal College and University (TCU) Demographics

- **37 TCUs – More than 75 sites in U.S. – 16 States**
- **Serving 130,000+ AI/ANs through academic and community education programs.**
- **TCU students come from over 30 states**

AHEC
TRIBAL Colleges and Universities: *Educating, Engaging, Innovating, Sustaining, Honoring*
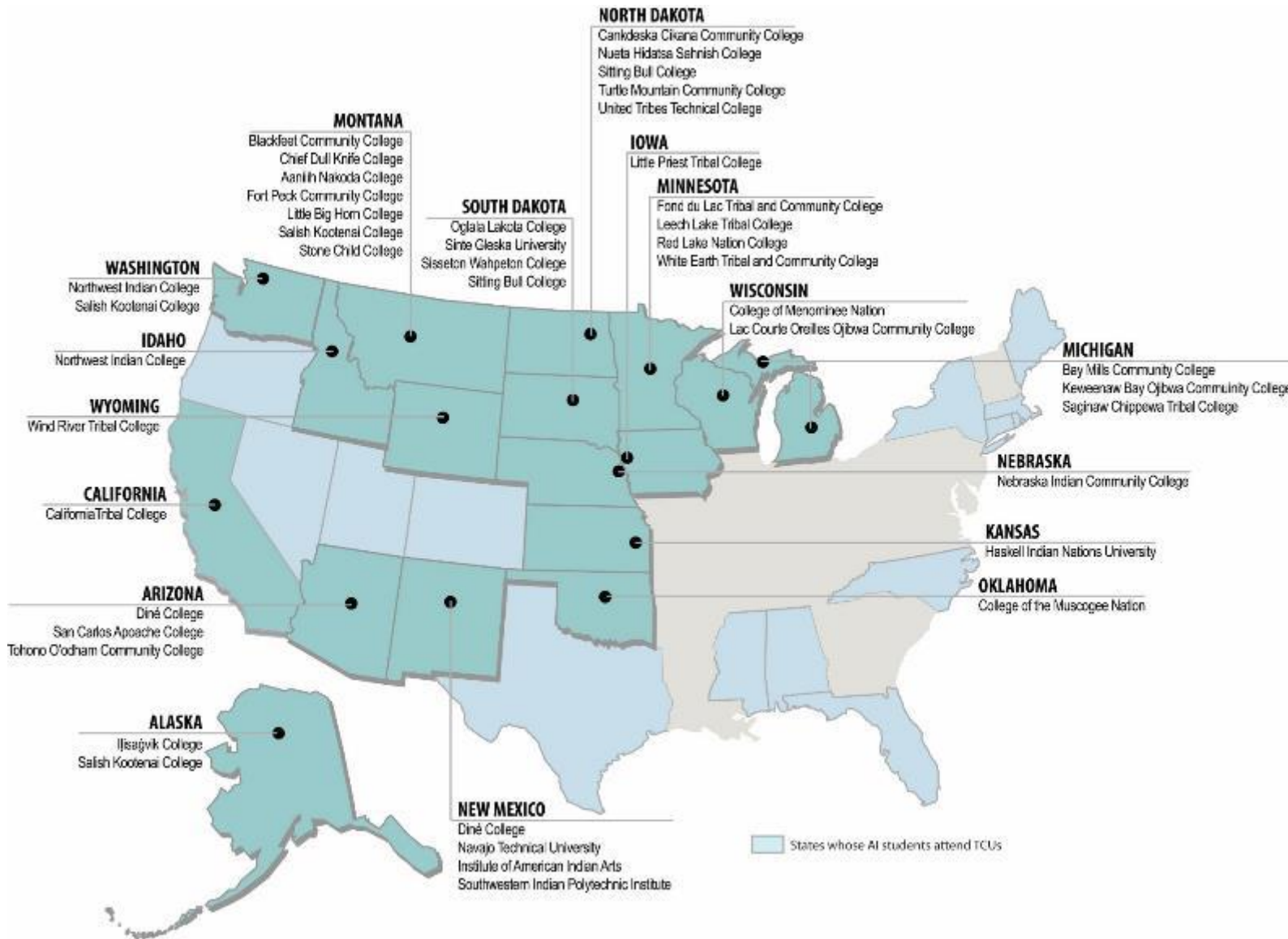
AIHEC VISION

advancing students + advancing tribal nations

Strong sovereign Tribal Nations through excellence in *TRIBAL* higher education

AIHEC Cyberinfrastructure Study
Major Goals

Comprehensive Examination of CI at the TCUs

- TCU Site visits
- EDUCAUSE Survey customized for TCUs
- CI reports with recommendations to TCU presidents and IT directors

IT/CI Capacity-Building at the TCUs

- Community of IT Practice
- Regional partnership facilitation
- Annual IT Directors meetings
- Monthly webinars

Project Focus Areas

- **Campus infrastructure:** Internet connectivity, connections to local and regional networks, Internet2

- **IT personnel:** training, collaboration with other TCUs, and develop skills for CI operations and management needs

- **STEM programs:** current and anticipated demands for CI-enabled resources (e.g. research collaborations, data acquisition, instruction)

- **Strategic planning:** current status of CI planning and resource allocation

- **Faculty capacity:** development and support needs to optimize/generate demand for CI resources for education and research

TCU Site Visits

Technical Track

Comprehensive review of the status of the TCUs' physical systems and their management

X 36 TCUs =

Management Track

Review of user community/program issues based on campus stakeholder focus group meetings

General Observations

Three categories of CI Readiness/Capability

Category A

- Offer AS, BS and MS degrees

- Faculty with NSF-funded research projects and programs

- Students have REU opportunities

- IT issues not a significant barrier to developing and accessing CI resources

Category B

- Offer AS and BS degrees

- History of NSF TCUP funding

- Limited research activity by faculty

- Student research opportunities generally off-campus

- IT issues may present barriers to accessing CI

Category C

- Offer STEM courses as part of general education requirement but no STEM degrees

- Not likely to have history of NSF awards

- Basic IT challenges must be addressed before investment in CI

Technical Observations

- **TCUs have relatively low internet connectivity compared with other institutions**
  - **Average TCU campus connectivity: 336 MB**
  - **Average connectivity based on 2015 EDUCAUSE Survey:**
    - AA/AS degree granting institutions: 513 Mbps
    - BA/BS degree granting institutions: 3.5 Gbps
    - MA/MS degree granting institutions: 3.3 Gbps

- **Limited financial resources resulting in IT budget challenges**

- **Relative isolation from larger higher education IT community**

- **Over-reliance on vendors for equipment installation, configuration**

- **Cybersecurity vulnerabilities**

- **Hardware refresh cycles longer than generally accepted practice**
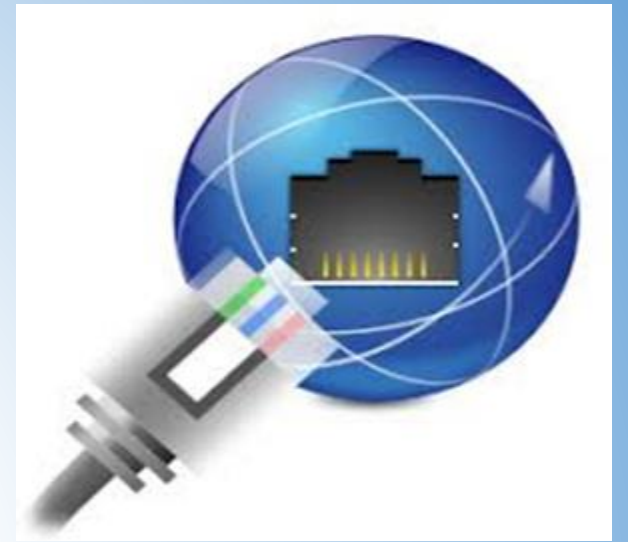
Next Steps
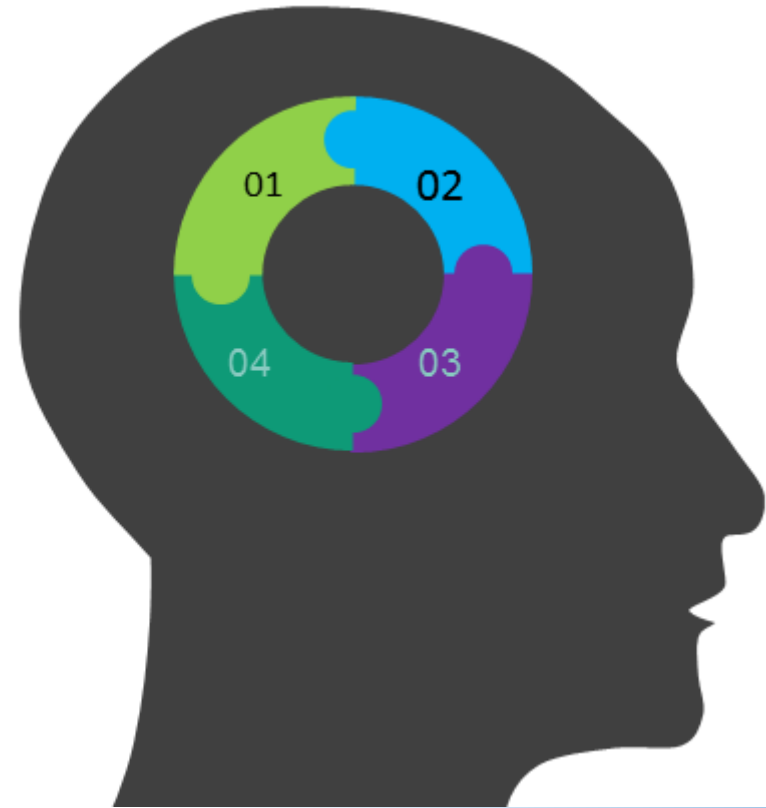
Dual Focus

TCU Cyberinfrastructure Development

STEM Research and Education Programs

Single Vision

Align IT/CI with fundamental mission of TCUs: Tribal Nation-building and sustaining traditional language and culture

IT Capacity-building

- IT strategic planning support

- Facilitate access to reliable and impartial (vendor-neutral) technical assistance in acquisition and configuration of systems

- Identify group purchasing opportunities for favorable pricing of hardware and software licenses involving multiple TCUs

- Professional development for IT staff

- Encourage engagement with and generation of new ideas, technologies

TCU Cyberinfrastructure Planning

- Encourage significantly higher prioritization of IT department needs in college budgets, even given resource challenges

- Align IT staffing with infrastructure operation and management requirements

- Address network design, hardware upgrades and configuration issues

- Bring infrastructure in closer alignment with academic program needs

IT staff Training & Professional Development

- Provide general professional development opportunities based on TCU identified needs and priorities

- Take advantage of economies of scale in making training events available to all TCU IT staff

- Training needs assessments

- Staff-level networked improvement communities (NICs)

Growing STEM/CI Partnerships

Create/strengthen connections with national/regional CI resources

- Regional Networks
  - Northern Tier Network Consortium
  - Westnet
- Texas Advanced Computing Center (TACC)
- Open Science Grid (OSG)
- Higher education institutions with existing relationships with TCUs
- Strengthen TCU IT CoP to include non-TCU partners

STEM Research and Education at TCUs
Facilitate CI science drivers

- Project-driven partnerships
- Professional development for faculty in scientific computation
- Disseminate Course-based Undergraduate Research model
- Graduate research certificate programs
- DOD, NASA, USDA and Dept of Energy program alignment

Current and Planned Initiatives

- IoT ecosystem services monitoring system designed and deployed by TCU students with USGS, NOAA and NCAR/UCAR partners

- TCU advanced manufacturing/engineering network partnering with National Labs on renewable energy projects

- DOD faculty research fellowships

- NASA/Dept of Energy science/engineering institutes

- Tribal Data Center housed at a TCU

- Digital Humanities focused on creation/preservation of cultural knowledge and practices

- Indigenous STEM practice-driven research design supported by CI

Want to partner?

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