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
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

<table>
<thead>
<tr>
<th>Category A</th>
<th>Category B</th>
<th>Category C</th>
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<tbody>
<tr>
<td>• Offer AS, BS and MS degrees</td>
<td>• Offer AS and BS degrees</td>
<td>• Offer STEM courses as part of general education requirement but no STEM degrees</td>
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<td>• Faculty with NSF-funded research projects and programs</td>
<td>• History of NSF TCUP funding</td>
<td>• Not likely to have history of NSF awards</td>
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<td>• Students have REU opportunities</td>
<td>• Limited research activity by faculty</td>
<td>• Basic IT challenges must be addressed before investment in CI</td>
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<td>• IT issues not a significant barrier to developing and accessing CI resources</td>
<td>• Student research opportunities generally off-campus</td>
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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 TCU: 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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