North Dakota University System
Core Technology Services
Annual Report 2015-2016

(Report generally covers the period from July 1, 2015 to June 30, 2016)

Presented By:

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Vice Chancellor for Information Technology and Institutional Research

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A MESSAGE FROM THE CIO

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Core Technology Services of the North Dakota University System has made significant progress on a number of mandated initiatives and projects this past year. CTS collaborates with each NDUS institution to provide valuable, consistent and reliable services across the NDUS. Listed below are a few mandated initiatives CTS has been working on over the past year, in collaboration with the NDUS institutions.

Predictive Analytics Reporting or PAR is one project that will have a tremendous impact on student success. PAR combines student data from a number of sources to create insights into student academic progress. In turn, institutions can use the information provided by PAR to make better informed decisions. A number of committees and councils have participated in PAR demonstrations, including the State Board of Higher Education, the Academic Affairs Council, joint (K-12/SBHE) boards, the CIO Council, the Chancellor's Cabinet, and the Legislative Higher Education Committee. PAR is scheduled to be fully operational across all 11 institutions by mid-January 2017.

Starfish retention software is a direct, follow-on project to PAR. Integrating PAR and Starfish will effectively identify retention gaps while proactively assisting the institutions in taking corrective measures. For example: if a student is having trouble with a class at mid-term and needs the class for graduation or as a prerequisite for his/her degree, the advisors and faculty can use Starfish to reach out to the student proactively. The institutions have worked in close cooperation with CTS to identify the data sets required for effective retention analysis.

Information Technology Security has made significant progress and gained achievements during this year. Threats to NDUS systems and users continue to rise and the emphasis has been on reducing risk across the system. The Information Security Council (ISC) was created in August 2015 and is a sub-council to the NDUS CIO Council. During its first year, the ISC developed a NDUS Information Security Strategic Plan and worked to establish security policies and standards. There are six priority objectives listed in the plan and most have been implemented by CTS and the institutions. The enhancements to security include: multifactor authentication integration at institutions and CTS, improved protection for CTS users with elevated privileges, centralized logging at CTS and endpoint protections for institutions and CTS.

The Functional Consolidation project, directed by N.D.C.C 15-10, kicked off this year with a visit to each campus. The visits were conducted to better understand each institution's IT environment, develop an inventory of IT infrastructure, and determine the best fit for the consolidation plan. The goal of the project is to provide efficiencies and cost savings across the state while enhancing overall quality of services. This project will continue into the next biennium and CTS expects to improve the datacenter infrastructure to support these additional consolidated services.

Email Consolidation, driven by N.D.C.C 15-10-44 requiring all institutions to migrate faculty, staff and student email accounts to the NDUS tenant, has made significant progress this year. To date, seven campuses have completed the migration, and another two will be complete prior to fall semester 2016. The remaining two institutions will be completed by end of fiscal year 2017.

A nice improvement for CTS staff this year was the transition from paper forms to electronic forms for absence and time tracking. CTS was the first to pilot the new functionality and Valley City State

University was the first institution to adopt it. The goal is to have all institutions using this tool by December 2016.

In closing, I want to thank the staff that has been instrumental in various projects and in providing services for the North Dakota University System. I hope you will find the information within this report to be useful.

Sincerely,

Lisa Feldner

NDUS IT Office building (Grand Forks)

Multiband Building (Fargo). CTS staff location in Fargo.

WHO WE ARE AND SERVICES PROVIDED

Background

The Sixtieth Legislative Assembly (2007) passed HB1461 that created and enacted a new section to chapter 15-10 of the North Dakota Century Code (NDCC) giving responsibility to the North Dakota University System to manage its technology efforts. Hence, the State Board of Higher Education has the authority to manage and regulate information technology planning and services for institutions under its control.

State Board of Higher Education Policy Section 1901.3 states:

> *Consistent with North Dakota Century Code section 15-10-44, the state board of higher education shall manage and regulate technology planning and services for institutions under its control.*
>
> *The Chancellor is delegated authority and directed to develop information technology planning, policies, standards, guidelines, and project management oversight and reporting in conjunction with the state information technology department. NDUS Information Technology (IT) projects shall comply with established standards, guidelines, procedures and processes.*
>
> *Not more frequently than every two years, a comprehensive information technology plan shall be submitted to the Board for its review and approval. In addition, periodic progress reports on goal progress shall be submitted to the Board.*

The NDUS definition of Information Technology (IT) includes, but is not limited to: hardware, software, services, and supporting infrastructure to manage and deliver information using voice, data, and video.

The Chancellor delegated these responsibilities to Core Technology Services of the North Dakota University System.

Core Technology Services (CTS)

The mission of Core Technology Services is to deliver technology-based resources, services, and solutions to NDUS institutions, students, faculty, staff, the System Office, and North Dakota residents. CTS does this by leveraging current technologies, researching new technologies, and positioning the University System to innovate and use future technologies. CTS provides secure information management and technology services to the North Dakota University System, linking academic and business services within the NDUS community, and by connecting users to the information and educational resources they need to accomplish their goals.

Core Technology Services aligns with these NDUS strategic goals:

- Deliver degrees that are the best value in the nation
- Provide programs people want, where and when they need them
- Equip students for success
- Maximize the strengths of the unified system

CTS is responsible for a wide portfolio of technological activities in support of the North Dakota University System. The NDUS Chief Information Officer (CIO) is responsible for providing overall leadership, vision, strategy, management and accountability for System-wide information technology services. Working with the institutions, the CIO is responsible for carrying out the following NDUS information technology goals:

- Support North Dakota University System infrastructure needs.
- Improve North Dakota University System information technology-enabled business processes and services while providing and managing resources to align with NDUS strategic goals.
- Improve and enhance North Dakota University System student learning and user's focus.
- Improve and enhance North Dakota University System collaborative efforts.

These goals are covered in more detail later in this document.

CTS Departments

While the CIO has direct responsibility and oversight of the CTS organization, the Deputy CIO has responsibility for the day-to-day operations of the organization. As of July 1, 2016, CTS will implement many changes to the organization structure. Those changes will be reported in the next CTS Annual Report.

CIO Direct Reports

The CTS organization structure reporting directly to the CIO includes:

- Deputy CIO –responsible for the day-to-day operations of the technology organization.
- Assistant to the CIO – Includes: IT Planning Coordination, Procurement and Software Licensing Administration, Project/Portfolio Management, Large Project Oversight and Reporting, Enterprise Architecture Administration Oversight, and Grand Forks Site Facilities Management.
- Assistant CIO/Fargo Site Manager – Includes: Administrative Services, Application Access Control, Fargo Facilities Management, Financial Services, and Personnel Services.
- Assistant CIO for Academic Services and Communication – Includes: developing and implementing a CTS communication strategy, serve as the academic liaison for institutions and assist with special projects as assigned by the CIO.
- HR Director – Includes: Serves staff and administrators of NDUS Core Technology Services and the North Dakota University System Office in matters regarding employee development, conflict resolution, employee performance management, salary administration and daily HR functions/support.

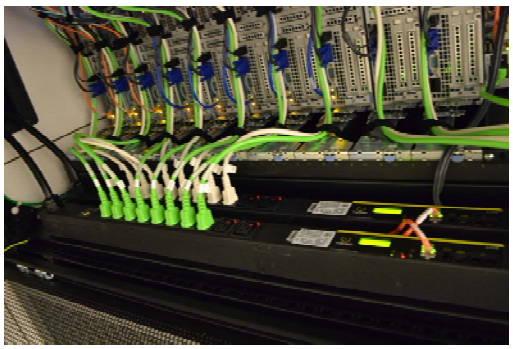
Deputy CIO Direct Reports

The CTS organizational structure reporting to the Deputy CIO includes:

- Director, Enterprise Services – Applications and Development – consists of the Connect North Dakota (CND) Campus Solutions Developers, Enterprise Application Administration, and Enterprise Development
- Director, Infrastructure and Operations – consists of Data Base Administration, Data Center, High Performance Computing, Integrated Services/Telecom, Network Services, IT Security, and Server Administration
- Director, User Services – consists of CTS Desktop Support, Foundational/Emerging Technologies, Instructional Services, Integrated Systems, System Office Support, and Web Communications
- Director, Financials & HRMS – ConnectND Financials and HRMS Business Analysts and Development
- Director, Student Information Systems – ConnectND Campus Solutions and third-party systems Business Analysts
- Director, ODIN Library Services – provides overall leadership and management of the Online Dakota Information Network (ODIN)
- Director, NDUS IT Security Officer – responsible for strategic planning and tactical execution of security policies, procedures and systems for the NDUS

Data Center

The North Dakota University System Data Center is the primary hosting site for NDUS enterprise systems. Located on the University of North Dakota campus, this Tier 3 data center has redundant



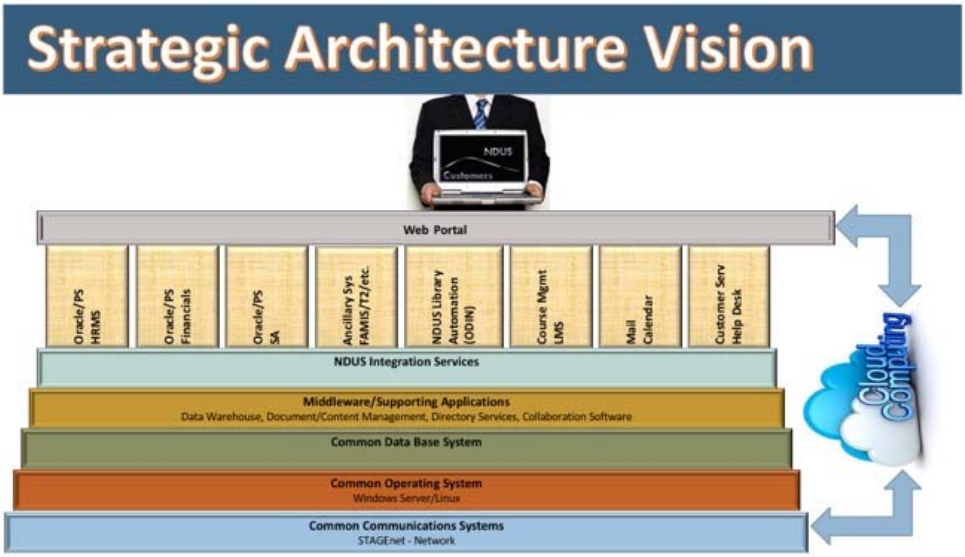
electrical and mechanical support systems. This means failure of one component should not affect the data center's ability to continue operations. It also means that operations will continue while staff perform repairs or maintenance on portions of the support systems.

STRATEGIC ARCHITECTURE

Core Technology Services has a defined strategic architecture that serves as the base foundation to build upon.

NDUS institutions implementing an IT service or application must receive approval from the NDUS CIO prior to purchase. This helps to ensure the system or service will be compatible with the rest of the infrastructure while not duplicating an existing System-provided application or service. NDUS Procedure 1901.3 defines the process for gaining approval and provides information on what systems of specific interest are included within the NDUS Strategic Architecture requiring NDUS CIO approval.

The following visual best describes Core Technology Services' strategic architecture:



The base of the foundation begins with a Common Communication System. This is the state's STAGEnet network.

The second layer of the foundation is Common Operating Systems: Windows Server, Linux, etc. Common Operating Systems provide the foundational component between computers, software and users. Operating Systems instruct the computer how to perform basic tasks such as accepting input from the keyboard, sending output information to the display screen, keeping track of files and directories on disks, and controlling peripheral devices such as disk drives and printers. An operating system makes sure different programs and users do not interfere with each other. It also provides security to make sure that unauthorized users cannot access the system.

The third layer is the Common Data Base System. A database is a collection of information organized in such a way that a computer program can quickly select the desired pieces of data. Think of it as an electronic filing system. To access information from a database, you need a database management system. This collection of programs enables us to enter, organize, and select data in a database.

Layer 4 consists of Middleware/Supporting Applications. Middleware includes such things as security software, directory services, and applications. These tools assist in controlling other applications and may include software that allows applications to exchange data even when operating on two different operating systems. Middleware sits between an operating system and applications.

The next two levels consist of the integration and application layers. The integration layer is the area where CTS links the middleware/supporting applications with the NDUS applications. The application layer consists of the NDUS software and systems that the user community accesses on a regular basis.

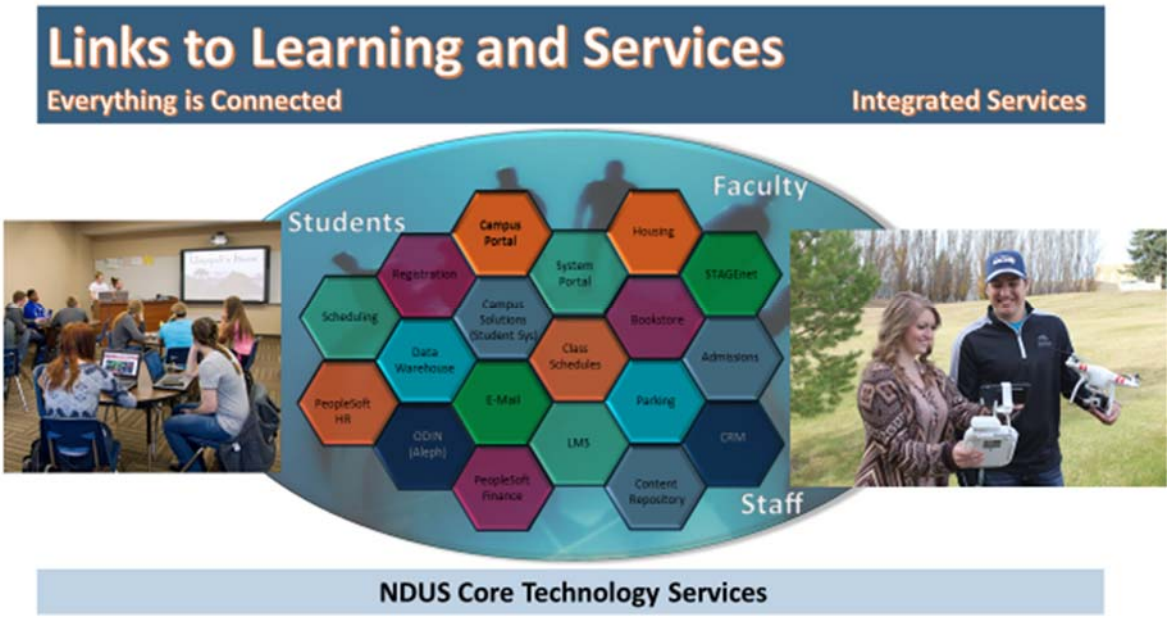
They include applications such as ConnectND, third-party systems, Learning Management Systems (LMS), ODIN library services, e-mail/calendaring, and the NDUS Help Desk.

The Web Portal is the seventh layer. The portal is the window that is used to access applications.

Today, more and more Enterprise level services are becoming cost-effective, secure, and available through the Cloud. The Cloud could be an internal Cloud located and managed by CTS or an external Cloud provided by a vendor. The Cloud could be any of the layers represented. These "X" as a service (XaaS) could consist of anything represented by the "X." It may be Communications as a Service (CaaS), Desktop as a Service (DaaS), Disaster Recovery as a Service (DRaaS), Infrastructure as a Service (IaaS), Monitoring as a Service (MaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and many others.

Everything Is Connected

Many of the applications provided through/by CTS are interwoven. The following visual depicts this relationship:



Today's IT ecosystem is a complex environment made up of a number of individual systems that are tightly integrated. A simple upgrade or enhancement to one system has the potential to impact and possibly break other things within the ecosystem. So prior to making any changes, detailed planning and analysis is required. Moreover, ongoing maintenance and support within this environment requires a high degree of expertise and attention to detail.

CORE TECHNOLOGY SERVICES - GOALS

Four goals provide Core Technology Services (CTS) with the guiding principles for information technology planning and system implementations. This framework allows for the information technology goals at the eleven institutions to roll into the goals of CTS and ultimately make their way into the strategic plan of the State Board of Higher Education.

Goal 1 – Support North Dakota University System infrastructure needs.

Infrastructure holds information technology systems together and allows systems to communicate with each other over a network. It includes such things as security and access control for which guidelines must be developed and updated as needed. Enterprise Architecture provides a blueprint for establishing information technology policies, procedures, and guidelines to promote effective use of information technology.

Goal 2 – Improve North Dakota University System information technology-enabled business processes and services while providing and managing resources to align with NDUS strategic goals.

In order for the NDUS institutions to remain competitive and offer information technology support for students, faculty, and staff, including research and public service, the NDUS must provide and manage information technology resources aligned with NDUS strategic goals.

Goal 3 – Improve and enhance North Dakota University System student learning and users' focus.

The focus of this goal is to empower student learning and development through the use of technology by providing a near seamless environment for learning through boundless access to informational, educational and research resources, both inside and outside the classroom, for all types of students from undergraduates to the life-long learners. The NDUS encourages and supports an operational environment where characteristics of its users – student, faculty, staff, North Dakota residents, and affiliates worldwide – are identified, their needs are understood, relationships and expectations are effectively managed, and quality assurance is fostered for high-quality services and support.

Goal 4 – Improve and enhance North Dakota University System collaborative efforts.

By working together with the State, K-12, and other constituents, the NDUS is able to bring new technologies to North Dakota and support existing ones. Communicating with stakeholders is an important factor and everyone must work together in making necessary information available to every administrator, faculty, staff, and student across the North Dakota University System institutions.

MAJOR ACCOMPLISHMENTS

The 2014 legislature made significant investments in CTS for the 2015-17 biennium. This support resulted in a number of major accomplishments. For the most part, the items listed have made progress between July 1, 2015 and June 30, 2016. However, the specific timeframe of action, where applicable, is listed in (*italics)* after each accomplishment.

The items identified below are either strategic or tactical/operational in nature. Some items fit into both categories.

Strategic

Functional Consolidation

The 64th Legislature passed House Bill HB 1003. Section 8 of this Bill added new code to North Dakota Century Code N.D.C.C. chapter 15-10 that requires all entities under the State Board of Higher Education (SBHE) to utilize a centralized service for email, file server administration, database administration, research computing, storage, application server, and hosting services. It also requires the SBHE to establish policy and guidelines for the delivery of these services. CTS has interviewed all of the campus presidents and CIOs in an effort to understand their IT environment and needs. In addition, each institution's IT infrastructure was inventoried to determine how it would fit into the consolidation plan. The migration phase of the project will continue as we move into the 2017-19 biennium.

Skype for Business

The project is on hold at this time to allow time for CTS to complete the ADFS/DirSync project and the replacement of the Identity Access Management (IAM) system. ADFS/DirSync is a prerequisite to integrating the NDUS's email and telephony services. Concurrently, Microsoft continues to make improvements to Skype for Business and these updates may create additional opportunities into the future.

Learning Management System (LMS)

As part of the "Maximizing Results through Efficiencies" document, the SBHE at its May 2016 meeting reaffirmed its commitment to move to all of the institutions to a single Learning Management System. A single LMS will provide students with a consistent software approach; shared curriculum content, when appropriate; content repository; and consistent mobile device interfaces. This shared environment will provide institutions with new opportunities to manually develop and share common components of online curriculum.

FAMIS

Accruent, the vendor for the facilities management system (FAMIS) the NDUS has implemented, is moving towards a cloud based solution. CTS is working with campuses that are using the system to determine policy requirements, review the cloud-based product as well as alternatives to ensure we can migrate to a new platform/product before the company decides to no longer support the current version

Tactical/Operational

Network Firewall Devices

NDUS worked with the State's Information Technology Department (ITD) to install network firewall devices in the Sate's STAGEnet network to help protect NDUS institutions from cyber threats and unknown malware. These firewalls will decrease unwanted/harmful data traffic from reaching campuses and reduce harmful attacks perpetrated on campus networks and their users. Since the install, ITD has also installed the Palo Alto in STAGEnet, increasing security to the network.

Work Management System (WMS)
The TeamDynamix Work Management System was implemented for CTS in March 2015. CTS staff use the system for time and project tracking. WMS also provides other capabilities. Between July 1, 2015 (Go live) and June 30, 2016 the following information was captured in TeamDynamix:

- 208,368 hours of CTS Team Member work
  - 13% Project Work
  - 69% Operational Work
  - 27% Overhead Time
- 450 Projects
  - 68 Completed
  - 22 Cancelled
  - 169 In Process
  - 160 New (upcoming)
  - 31 Backlogged

Bomgar
Bomgar is a remote support tool for help desks, providing support staff with the ability to log into a remote computer and provide help. The software application was implemented at several institutions. UND was the first campus to implement the software and found it to be beneficial when assisting students on the phone. CTS staff use Bomgar in working with campuses to troubleshoot issues.

Campus Solutions (CS) upgrade 9.2/Cloud
Evaluation continues to determine the upgrade path for Campus Solutions. Currently, other projects surfaced and took priority this past fiscal year. Campus Solutions will continue to evaluate the two approaches to determine the best fit for their department.

Statewide Longitudinal Data System (SLDS)
CTS has been collaborating with the Department of Public Instruction (DPI), and the State's Information Technology Department (ITD) to meet the demands of K-12 longitudinal reporting. Both teams worked to identify a collection of data for the postsecondary domain. The project is on track and reports are currently under development in the Data Warehouse environment using data from four Campus Solutions modules: Admission, Student Records, Financial Aid and Student Financials.

Data Inconsistencies
This initiative seeks to correct the data inconsistencies identified and detailed in House Bill 1003 Section 4.2. The types of inconsistencies that this project focused on are: personal and demographic information, lack of standardized chart of accounts, absence of standard financial business processes, inconsistent methods of recording/tracking student data, inconsistencies in tuition related expenses, fees, etc., inconsistent account coding and naming, improper use of 'shadow account' systems, and varied 'student' definitions. The project formed teams of Subject Matter Experts (SMEs) to help drive project goals with expected completion by December 2016.

Asset Management
CTS has been looking for a better way to manage software licensing and technical asset inventory. An informal RFP was completed at the end of May and Sassafras was awarded the contract. They will assist CTS in implementing a tool that helps track and maintain CTS assets.

Identity Management Systems (IAM)
IAM is a replacement project that will help reduce complexity, increase productivity, and ultimately make the end user experience more consistent and reliable. The project kicked off this year and will have a successful implementation by November 2016. IAM is the center of accessing and using all NDUS resources.

Data Center Manager
The contract with Vision Technologies for data center management services has expired. Recommendations from the Consultant have been considered or implemented by CTS.

inside.NDUS
After a successful deployment during the 2014-2015 year, NDUS continued to expand usage of Microsoft's SharePoint system. Numerous councils and groups moved into SharePoint in 2015-2016 and are now using the system to share information and documents. One focus of the past year was the addition of a scholarship system for NDUS Financial Aid. The first phase of the Scholarship App is completed and in use across the system.

Information Security
The NDUS Information Security Council (ISC) was created in August 2015 and is a sub-council to the NDUS CIO Council. The ISC developed a 2015-17 Strategic Plan and the following objectives were identified and majority have been implemented:

- Security Policy and Standards Development
- MultiFactor Authentication
- Endpoint Protection
- End User Security Awareness and Training
- Vulnerability Management and Asset Discovery
- Centralized Logging and Security Information and Event Management

P^3/M
Created a unit within the Office of the CIO responsible for or assisting with deploying strategic initiatives. P^3/M stands for Planning – Procurement – Project/ Management.

- Current staffing consists of the Director, Associate Director and Chief Procurement Officer, one additional Procurement Officer, two Project Managers and a Business Analyst. Depending on the quantity of projects in their implementation phase, CTS staff with proper training/experience or contracted individuals may take on project management roles for certain projects.
- Future goals are to add an additional Business Analysts in the Planning area, one additional Procurement Officer, and Project Managers where needed.
- Provided procurement and negotiation training to CTS and other NDUS staff.

ImageNow
All 11 institutions have successfully implemented ImageNow. This centralized system will reduce cost of managing and maintaining a large critical system, eliminating separate instances.

NDUS Bio-Demo Synchronization
The Bio-Demo Synchronization project completed in September 2015 and is in operational mode.

Time and Labor/Absence Management
Time & Labor began implementation in February 2015 with CTS piloting the new functionality in spring 2016. Valley City State University was the first institution to use the new functionality shortly thereafter. Time & Labor will provide a consistent and systemized process whereby all NDUS employees are able to log their time while submitting leave requests and leave taken forms via PeopleSoft self-service. This module will also provide the ability to generate consistent reporting at both the unit level and NDUS system level. Rolling out the functionality to the rest of the institutions will continue throughout the remaining 2016 year.

Novelution
Novelution Electronic Research Administration and Compliance software solution began implementation at both NDSU and UND this year. Novelution will provide a central repository for researchers to track their projects and help foster consistency, accuracy, completeness, and compliance using the software's forms, workflows and accessibility.

iDashboards
Due to cost, several institutions declined the use of dashboards. The four institutions who wanted to use dashboard software – VCSU, MiSU, LRSC, and BSC – were provided pricing that was integrated with the UND instance. As part of onboarding, CTS/UND has demonstrated dashboards for the executive leadership and institutional research at the institutions. CTS/UND created four standard dashboards; pre-enrollment, enrollment, retention/persistence, and graduation rates on behalf of the institutions. A training session for institutional research and information technology staff focused on how to build dashboards. As advanced training, CTS/UND trained institutional dashboard builders to create a custom dashboard specific to their institutional needs.

iDashboards was very much a collaborative effort with UND. Now that training is complete, institutional dashboard builders are empowered to build their own dashboards, and all builders are expected to collaborate and support each other on future dashboard projects.

Office 365 Student Tenant Consolidation
This project completed in December 2015. All seven institutions that were included in the scope of the project (BSC, DCB, DSU, LRSC, NDSCS, UND and WSC) are on the NDUS tenant and students have passwords synchronized to their NDUS account.

NDUS Microsoft Symposium
The Annual NDUS Microsoft Symposium took place on Wednesday, April 13, 2016 in Fargo. More than 60 staff members from Microsoft, NDUS, State Government, and K-12 participated. The Microsoft Road Map for Office 365 and other Microsoft products were presented. This year, information was presented on email security, Office 365 educational applications, Office deployments in the campus labs, and a campus demonstration on Power BI.

North Dakota Internet2 K20 Liaison
The North Dakota Internet2 Liaison provided support for the North Dakota Research & Education (R&E) community this past FY16 and includes:

- Represents higher education and ND K-12 by serving R7E network organizations in various capacities
    - Provide Leadership in project development and management for projects based in ND, in collaboration with Norther Tier Network Consortium partners, and across partner organizations at the nation/international level engaged in Internet2
    - Manage the state's Northern Tier Network
    - Provide management and oversight of NTN-ND budget and finances
    - Develop and distribute the annual NTN-ND report
    - Serve as the state liaison for initiating local level engagement in R&E network resource to support academic and leadership across K-20
    - Provide leadership in grant proposal development
    - Service on Executive and Advisory committees
- Developed and implemented activities supporting teaching, learning and research through a variety of ongoing activities, strengthening collaboration across the state and region
    - Invited to present to the state of Montana's K-20 leadership confluence on the history, process and activities of ND's K-20 community and membership
    - Invited to present to the state of Arizona's K-20 leadership confluence on the history, process and activities of ND's K-20 community and membership

    - Invited by the New Media Consortium to service on a national expert's panel for research and development of strategic brief.
- Provided support for outreach and collaborations across NDUS institutions and North Dakota Tribal Colleges
- Develop and implemented Internet2's first remote instrumentation and virtual labs videoconferencing event that showcased select remote instrumentation projects and virtual lab resources available to the educational community
- Develop and implement several K-12 outreach activities including:
    - Internet2 K20 Initiative's "Presidential Powers and the Constitution"
    - North Dakota Teacher Resource Coalition Annual Summer Workshop
    - ND EduTech

PAR (Predictive Analytics) & Starfish

PAR combines student data from a number of sources in order to provide a better insight into student academic progress. In turn, institutions can use the data to make better-informed decisions. Starfish retention software is a direct, follow on project to PAR. Integrating PAR and Starfish will effectively identify retention gaps while proactively assisting the institutions in taking corrective measures. Several institutions are using the following PAR modules:

- Predictives (DSU, MaSU, MiSU, UND and VCSU)
- Course Explorer (DSU, MaSU, MiSU, UND and VCSU)
- Benchmarks (MaSU, MiSU, VCSU and UND)
- Student Success Matrix (BSC, MaSU, VCSU and UND)

LiquidFiles

LiquidFiles has successfully been implemented at CTS. The secure file transfer system has the capability to transfer large encrypted files that supports two-factor authentication, integrates with existing directory services and environment, and is scalable.

SAIP Implementation with Minot's Blackboard

The implementation of Oracle's PeopleSoft Enterprise Student Administration Integration Package (SAIP) with Minot State University's Blackboard system is complete. MiSU went live this past summer and are using the SAIP data feeds. This allows for a more efficient means of transferring data between the two systems.

In addition to projects listed above, CTS also completed numerous operational tasks on a day-to-day basis. This concludes the 2015-2016 NDUS Core Technology Services Annual Report.