



North Dakota University System

Core Technology Services 2018-2019 Annual Report

Report generally covers the period from July 1, 2018 to June 30, 2019





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Chancellor



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This report was developed in accordance with
N.D.C.C. §15-10-44.1.c.

Integration of higher education information technology planning and reporting
with the board's strategic planning process and annual performance and
accountability report required by section 15-10-14.2.

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.**

The mission of Core Technology Services is to deliver technology-based resources, services, and solutions to NDUS students, faculty, staff, institutions, 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.

A Message from the CIO



Greetings,

It has been another productive and challenging year for the Core Technology Services team of the North Dakota University System. As we wrap up one year and move to another, we have a laser-like focus on providing consolidated technology systems and services that provide value and both operational and fiscal efficiency to all eleven NDUS institutions.

In an extensive collaborative effort between CTS and all NDUS institutions, the final campuses were migrated to the NDUS systemwide instance of the Blackboard Learning Management System. This multiyear effort was recognized with the 2019 Blackboard Catalyst Award, a national award for innovation. The single system creates an integrated, seamless experience for students and faculty while providing great efficiencies for the system. We have been able to extend our capabilities by adding a digital accessibility solution that will help ensure we are developing and providing online course materials that meet federal requirements.

Our Peoplesoft teams (human resources, financials and student information systems) are fully upgraded to version 9.2. This major upgrade has allowed us to provide delivered mobile functionality to all of our Peoplesoft environments, automated workflows, and reduced our operational complexity.

Infrastructure and Operations, the largest CTS team, continues to develop new capabilities as we move towards a hybrid cloud environment. Technical advances in our identity and access management system, compute/storage infrastructure, and database administration will position us well to provide a next-generation data center for the NDUS.

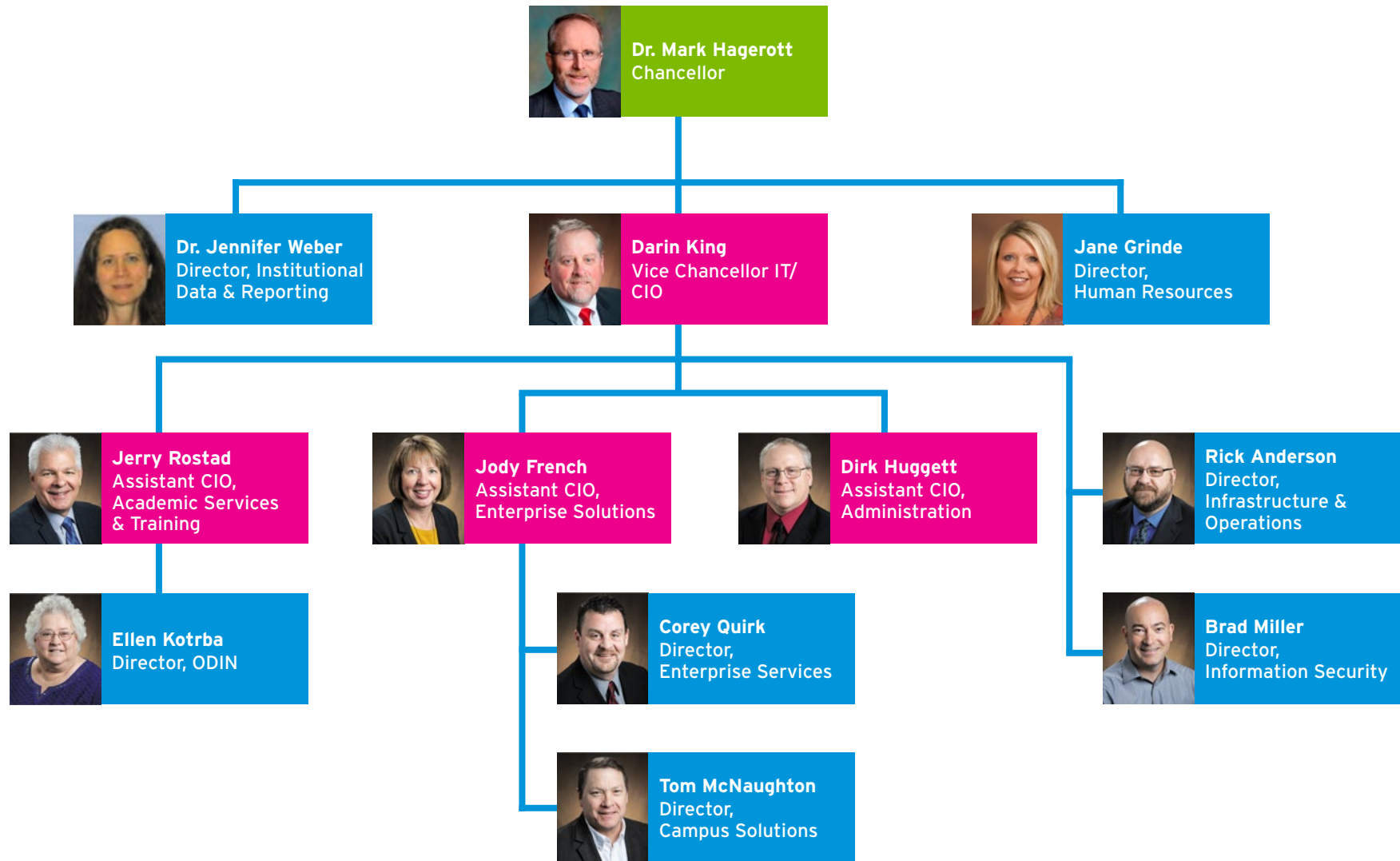
Our Information Security team continues to execute the NDUS Strategic Security plan. Recent improvements include the implementation of a data loss prevention solution, enterprise endpoint management and increased log management capabilities.

On the pages below, you will see the many accomplishments of each of our CTS teams. Our goal is to provide excellent service and solutions to NDUS students, faculty and staff. To do this, we must work with institutions to identify and implement products that will meet their needs, provide value, and be cost effective. The diversity of our institutions is both a challenge to and a strength of our system. With collaboration and cooperation, I am confident we can continue to move forward for the betterment of the North Dakota University System and our institutions.

A handwritten signature in black ink, appearing to read "Alan King".

Core Technology Services Leadership Team

“Providing secure information management and technology services to North Dakota University System students, faculty, staff, and state residents.”



Academic Services and Training (AST)

Academic Services and Training (AST) leads the effort to educate and support current and emerging academic technologies used by all NDUS campuses. AST works with the institutions of the NDUS to develop and deliver enterprise-level academic systems, help desk support services, library services, and relevant training and communication support (see figure 1). By working closely with the institutions, we collectively and collaboratively expand the capacity of online learning programs, collaborative learning environments, resources that supplement student education, and more.

In broad terms, the AST service line breaks into four quadrants:

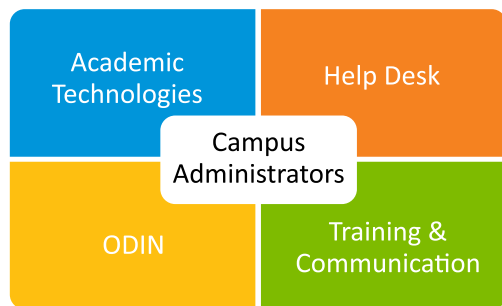


Figure 1: The Four Quadrants of AST

Quadrant One: Academic Technologies

AST supports an array of learning technologies that institutions use in support of both the online, distance learning experience as well as the face-to-face classroom experience. These technologies fill the three primary areas of academic tools, the learning management ecosystem, and productivity (see figure 2).

Learning Management System

A learning management system (LMS) is an umbrella term used to describe software applications that harmoniously work in unison to deliver online teaching and learning.

Blackboard Learn (Bb Learn)

The centerpiece of the NDUS learning management system (LMS) is Blackboard Learn. Bb Learn is a software application used for the administration, documentation, tracking, reporting and delivery of educational courses or training programs. Institutions use the LMS for online classes; however, there has been increased usage supporting face-to-face classes. Most institutions strongly encourage faculty to utilize the LMS and some have mandated faculty to post their syllabi in Bb Learn as a minimum requirement. In addition, some institutions are exploring the option of making grades available to students online through the LMS (see figure 3).

The NDUS recently completed the migration of all campuses to a single instance of (Bb) Learn. The Summer 2019 semester was the first semester that all 11 institutions used the shared environment. The sole, shared environment provides a single location of coursework for students who may be enrolled in classes at different NDUS institutions. Additionally, faculty who teach at more than one NDUS institution now have a single location to manage their course materials.

Now that the shared infrastructure is in place, the NDUS is looking at tools and functionality that will improve and enhance everything from reporting to assessment to mobile capabilities. See Figure 4, Roadmap for Learning Management.

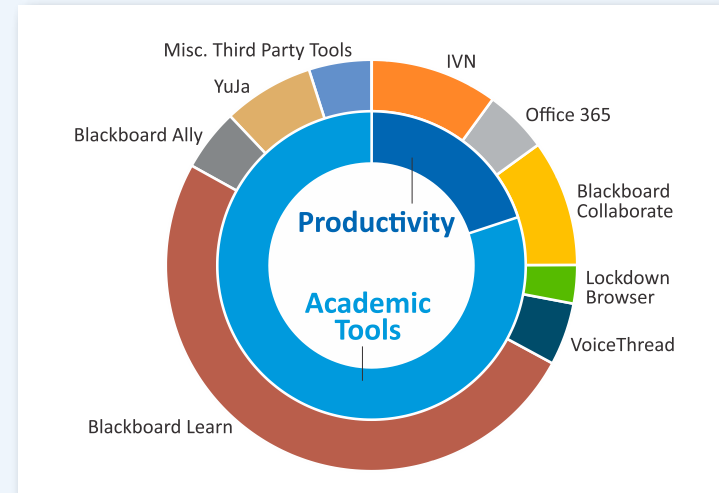


Figure 2: Breakdown of Academic Technologies Quadrant



Figure 3: Learning Management Ecosystem

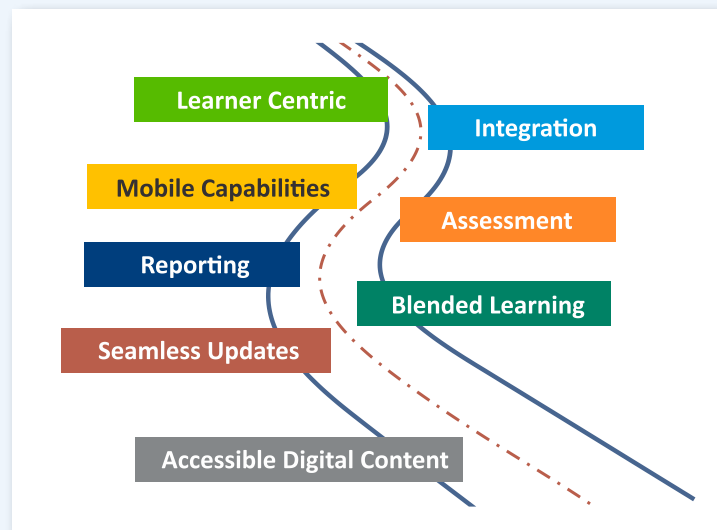


Figure 4:
Roadmap
for Learning
Management

Blackboard Ally

Ally builds a more inclusive learning environment and improves the student experience by adapting course content to their specific needs. As one example, Ally has the capability to convert certain documents from a written to an audio format. Features like this help students with disabilities, accommodate different learning styles as well as make content more readily available. Product implementation is in early stages.

Voice Thread

This web-based application allows participants to share conversations and make comments to presentations using a mix of video, text, and voice. Institutions are steadily adopting Voice Thread and during the 2018-19 academic year, nearly 4,000 threaded discussions utilizing audio, video, and content slides were created. During the same period, instructors and students spent more than 3,800 hours of time teaching and learning with the product. VoiceThread can be used within the LMS or as a standalone tool.

Lecture Capture

During the summer of 2019, AST successfully transitioned its lecture capture service from Tegrity to YuJa. YuJa provides a unified video experience with lecture capture, video streaming, and video management services. It provides better functionality when compared to Tegrity and it is significantly less expensive.

This software enables faculty, students, and staff to record presentations, lessons, training, lectures, and more. Institutions have amassed thousands of hours of lecture recordings in the system. The addition of video streaming significantly reduces Blackboard's course size and performance where video is paramount. YuJa can be used within the LMS or as a standalone tool.

LockDown Browser

As the name implies, LockDown Browser is a custom browser that increases test security in Blackboard. Students are unable to use other features such as print, copy, or paste, navigate to another URL, or open other applications. LockDown Browser can also be used in tandem with YuJa for test proctoring.

Video and Web Conferencing Technologies

AST provides support to three separate video and web conferencing platforms, including the Interactive Video Network (IVN), Blackboard Collaborate, and Skype for Business:

- AST provides technical and training support for IVN. IVN replicates traditional face-to-face classroom and institutions use it primarily to deliver classes to geographically remote students. The addition of the desktop client, Pexip, allows delivery to expand further. This year, a new classroom recording tool was added to the IVN infrastructure. The tool is called Vbrick and it also provides new video editing functionality. IVN is also used for a wide variety of statewide meetings.
- Blackboard Collaborate Ultra is a desktop web conferencing platform that operates equally as well within the LMS platform or as a standalone web conferencing tool. Instructors and students use Blackboard Collaborate Ultra directly from within their course environment for teaching, learning, office hours, and presentations. NDUS staff and NDSU Extension staff use Collaborate frequently for meetings and public training webinars.
- Skype for Business is a third web conferencing platform that operates within Microsoft's Office 365 suite (see below for more on Office 365). This tool is primarily used for text, audio, video, and content sharing in one-on-one situations or within working groups. However, Microsoft recently announced that Skype for Business will migrate to the Microsoft Teams environment. AST will closely monitor this transition as the Teams environment may provide additional opportunities to augment teaching and learning.

Microsoft Office 365

Office 365 is a suite of productivity tools and applications that Microsoft offers over the Internet via cloud services. All NDUS institutions share a single Office 365 environment. Office 365 provides email, calendaring, and other productivity tools like Word, Excel, and OneDrive. It also continues to add new tools to the environment and two of the newer applications are Microsoft Groups and Microsoft Teams. Groups and Teams have generated strong interest across the NDUS. Both are designed to create efficient ways for individuals and work-teams to collaborate and share documents. AST sees continued growth and development with Groups and Teams and will be monitoring the ongoing development of Teams within the academic environment.

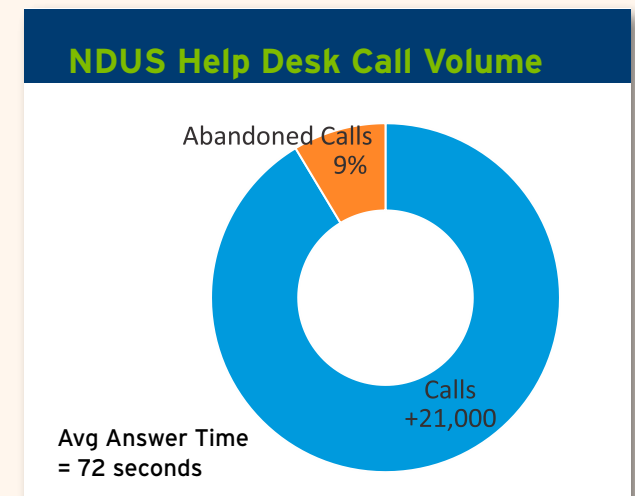
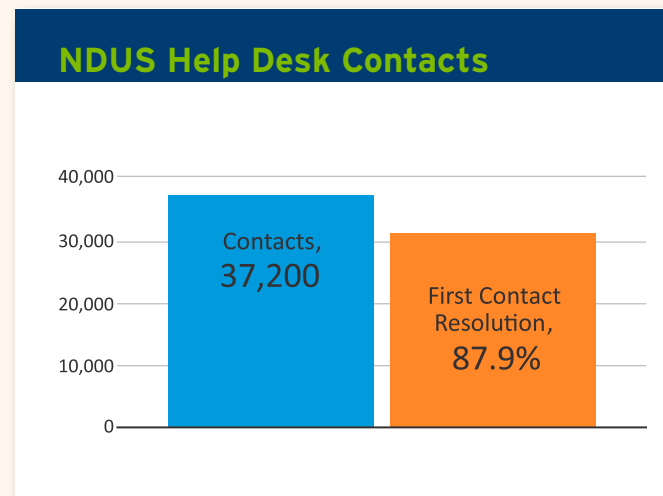
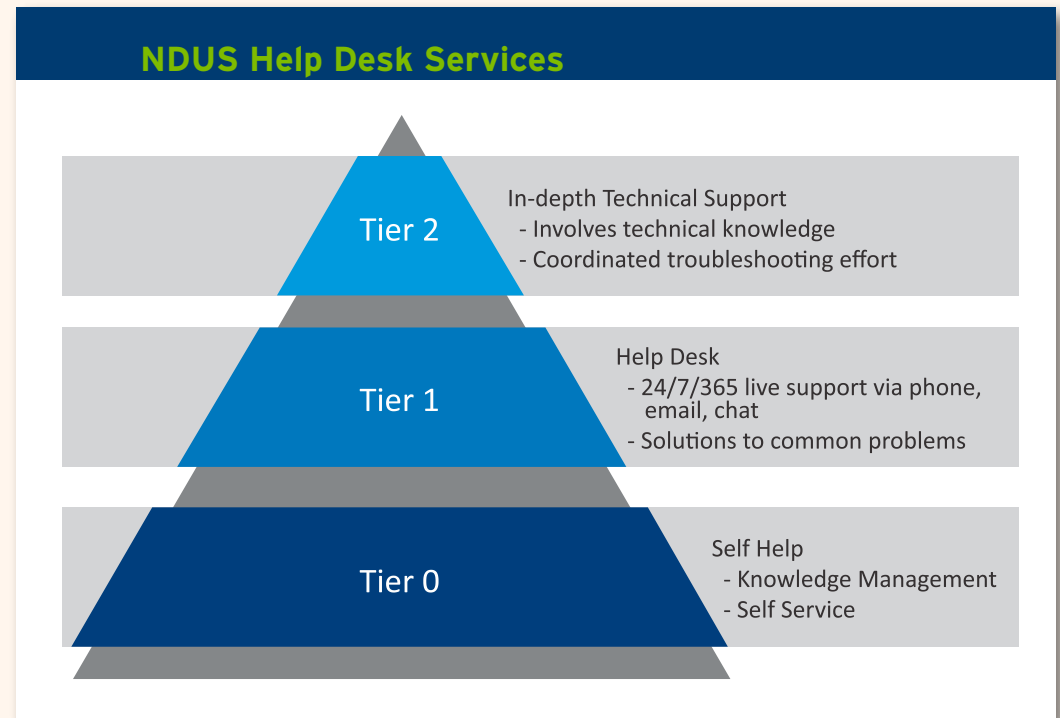
Quadrant Two: Help Desk

AST provides Tier 0, Tier 1 and Tier 2 help desk services for the North Dakota University System. Supported systems and applications include:

- NDUS Account IDs and passwords
- Password changes
- ConnectND applications, including Campus Solution/Campus Connection, Financials, and HRMS
- Bb Learn
- Bb Collaborate Ultra
- Skype for Business
- SharePoint
- Office 365
- 'How To' support for Exchange Email and Calendar

The Tier 1 Help Desk provides 24 hours a day, 7 days a week support. For FY 2019 (July 1, 2018-June 30, 2019), the Tier 1 help desk resolved 87.9% of the more than 37,200 contacts. Of the contacts, more than 21,000 were telephone calls. The average speed to answer was 72 seconds while the abandoned calls were just under 9%.

The top two goals of help desk services are 1) continuous improvement in customer service, and 2) increased productivity efficiencies. A primary help desk focus for the coming year is to deliver stronger self-service capabilities. Referred to as Tier 0 help desk services, self-service help desk support typically provides immediate solutions to problems, resulting in improved user experience with NDUS technologies. A software application called RightAnswers will operate the Tier 0 environment.



Quadrant Three: ODIN

The ODIN system provides library management services for 58 libraries across North Dakota, including all 11 institutions of the North Dakota University System. The remaining 47 ODIN libraries are disbursed across North Dakota at private higher education institutions, K-12 schools, local public libraries, and special libraries.

Library patrons use a discovery interface called PRIMO, which is connected to a library management service called ALEPH and a link resolver called SFX. Working in unison, this service searches for both print and electronic library materials while also providing management functions like circulation control, course reserves, acquisitions and serials control, and an interlibrary loan function. NDSU uses the library management services of ALMA with PRIMO (this version has a built-in link resolver).

This past year, ODIN concluded that an independent library management system would be best for all non-higher education libraries. In March 2019, a contract was signed to implement an integrated library system known as Polaris by Innovative Interfaces, Inc. for the public, k-12 and special libraries. Meanwhile and concurrently, a contract was signed to migrate the higher education libraries to Alma by Ex Libris (this is the same software used by NDSU). The Alma and Polaris transitions are happening in 2019-2020 - Polaris is expected to go live in December 2019 and Alma is expected to go live in July 2020. Both systems provide a robust discovery interface for library users.

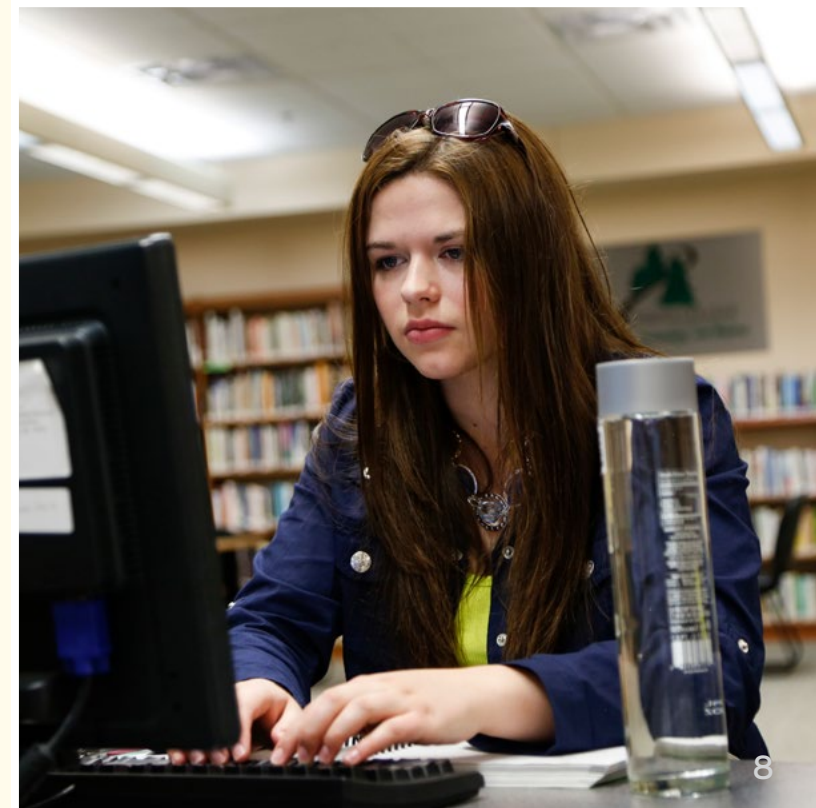
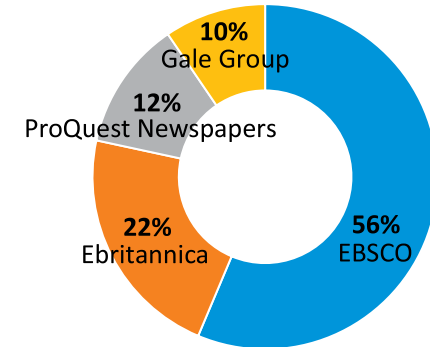
ODIN also provides authentication services for over 60 licensed, full-text databases and similar online materials for more than 300 North Dakota libraries. ODIN posts monthly usage statistics for these databases.

Authentication Services

60 licensed full-text databases
300+ North Dakota libraries

A Shared E-Resources Task Force in the Minitex region (MN, ND, SD) is reviewing the electronic resources that will best enhance education, economic development, and overall quality of life for citizens of MN, ND and SD. Resources selected for inclusion in the statewide program will serve the full spectrum of library users: from preschoolers, to post-secondary institutions, to lifelong learners in public and special libraries. North Dakota has four representatives on the Task Force, and they will recommend which resources will provide comprehensive access to a robust digital environment for North Dakota.

1.6M Databases by Vendor



Quadrant Four: Training & Communication

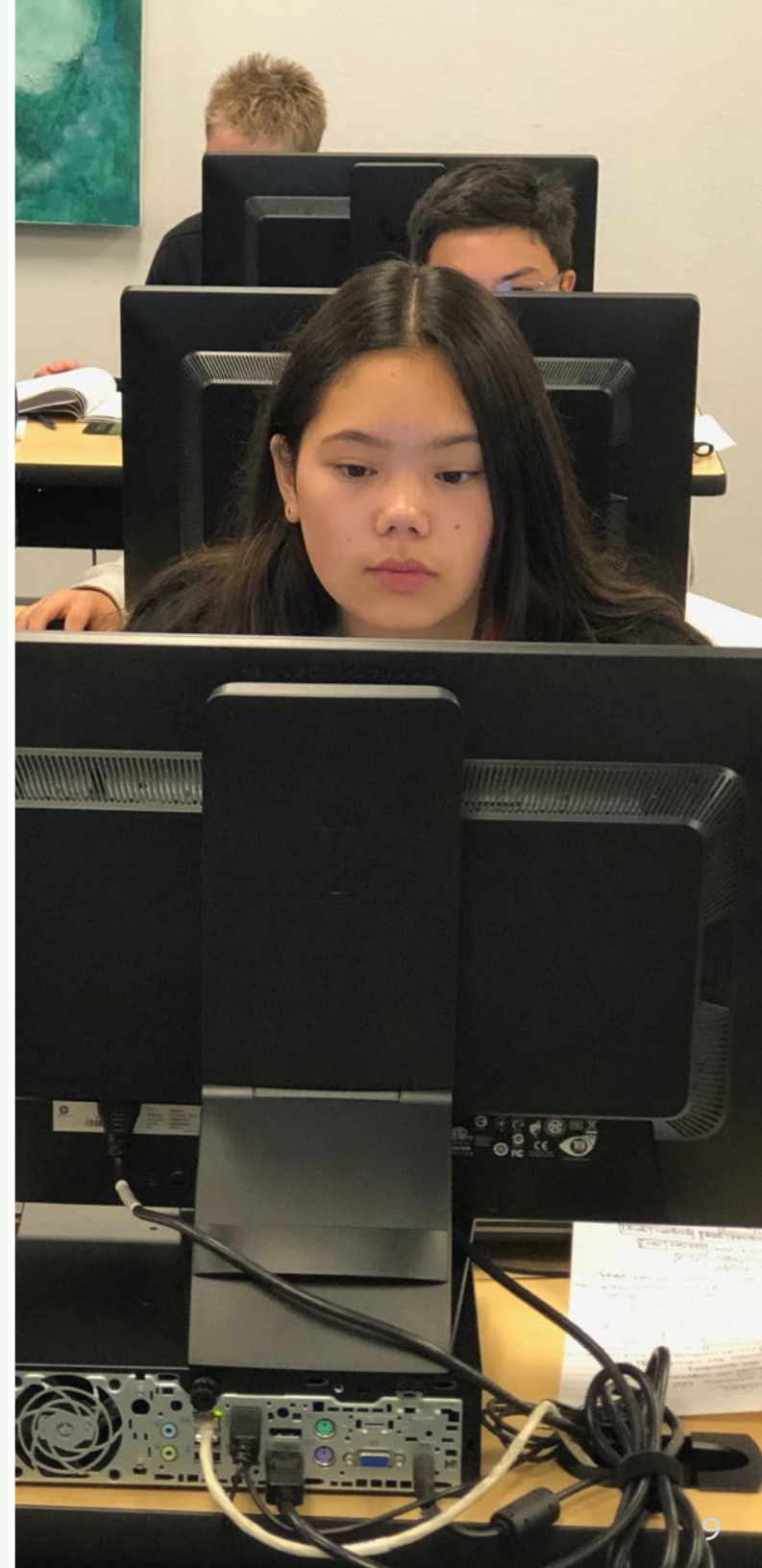
The AST Training and Communication quadrant consists of a mix of identifiable tools, solutions, and services that are reactionary in nature to emerging issues within the IT and NDUS Environment.

On the hardscape side, AST supports the following technologies and services in the training and communication quadrant:

- **State Authorization:** AST manages the State Authorization process required for degree-granting, post-secondary institutions that want to deliver curriculum in the state. All degree-granting post-secondary institutions offering onsite or distance education courses in North Dakota must seek authorization or exemption under state law. AST staff provide the NDUS with leadership as the state portal agent and membership on the WICHE Cooperative for Educational Technologies (WCET) Regional Steering Committee for state authorization.
- **Records Management:** AST provides NDUS leadership in the records management arena. AST works in coordination with records managers at each NDUS institution and North Dakota Information Technology (NDIT) to ensure records are properly maintained and disposed in accordance with state law. The Records Management group meets on a quarterly basis to discuss ongoing issues.
- **Web Services:** AST led the redesign of the NDUS System Office website. Initial planning is now underway to update the CTS website.
- **Qualtrics:** Qualtrics is survey software available to those institutions that wish to participate. Eight of the 11 institutions are currently licensed to use Qualtrics and AST is often the first line of contact for access or usage questions. Training is provided on demand.
- **Hoonuit:** Formerly called Atomic Learning, Hoonuit provides online professional training for institution staff personnel and faculty. DSU, MaSU, MiSU, NDSCS, UND, and the System Office are licensed to use Hoonuit.

On the softscape side, AST provided support for a variety of emerging issues and topics. These are ever changing issues and are typically short-fused, unplanned, and emergent. Highlights during the past year include:

- ACT developed a variety of training and support documentation. These materials support Bb Learn, YuJa, and Blackboard Collaborate Ultra. Other materials were created to support changes and updates to the Office 365 environment. And, AST created further documentation to support changes/additions to the administrative systems of IT systems.
- AST continues to provide support to the NDUS Chancellor in the areas of cybersecurity and data analytics. CTS supported a cybersecurity visit by members of the National Security Administration. CTS also provided leadership in a cyber land grant event held in Washington, DC, in cooperation with Future Tense.

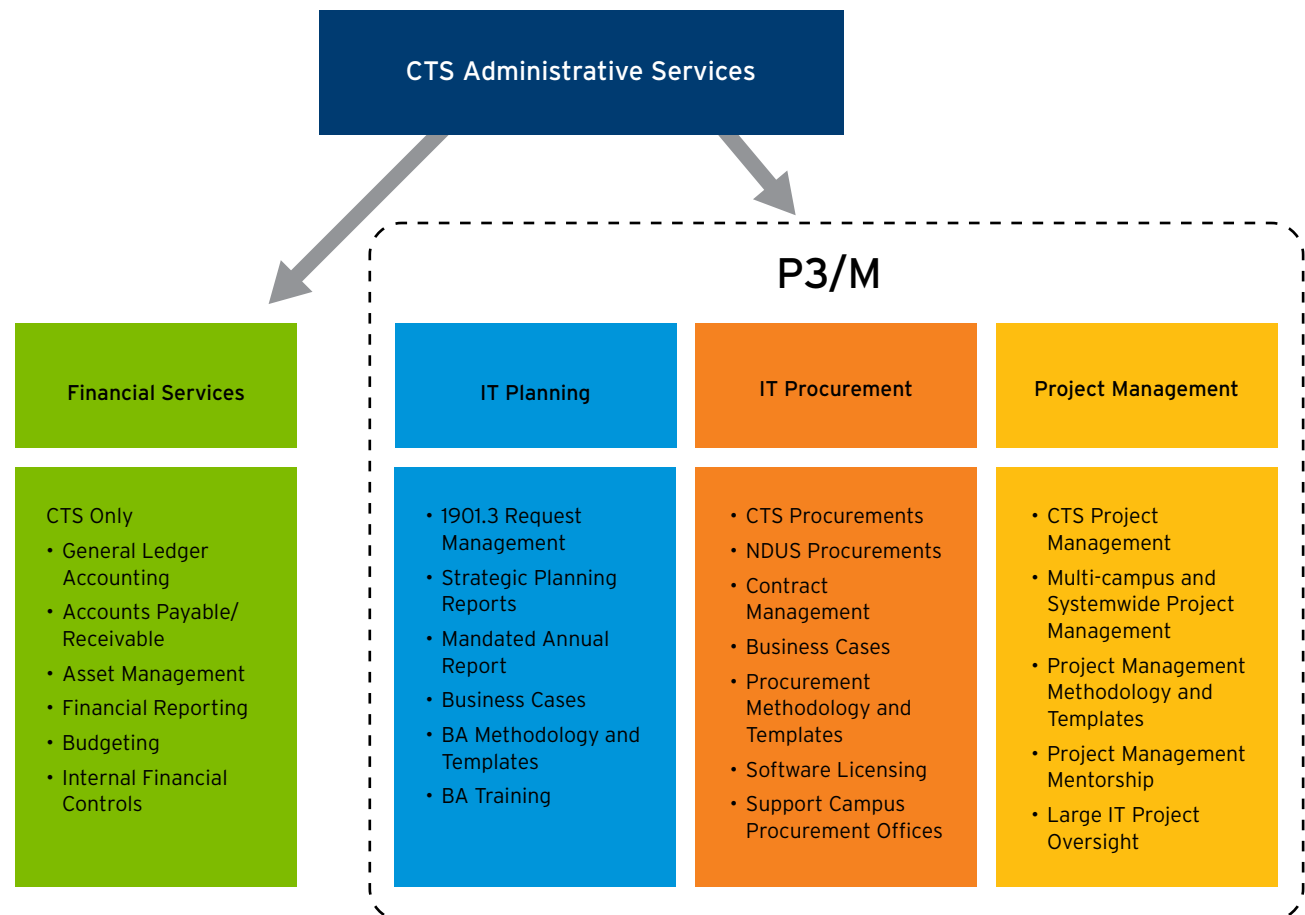


Administrative Services (AS)

In July of 2019, CTS reorganized some staffing and created the Administrative Services department. This department breaks into three functional areas as highlighted in the chart below. A general Administrative Services team, the Financial Services team, and the IT Planning, Procurement and Project Management team (P3/M).

Administrative Services

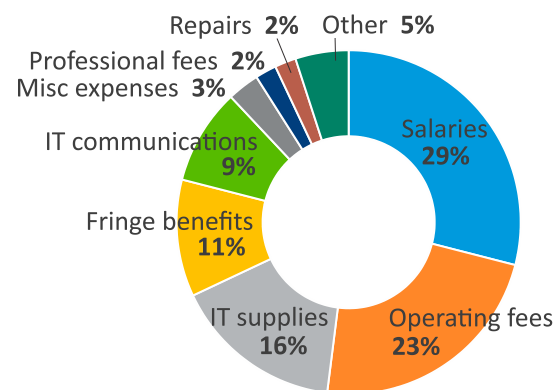
The Administrative Services team handles the general administrative tasks for the Grand Forks site including the reception desk, meeting room setup, mail, travel arrangements, facility issues, and departmental data entry/file management.



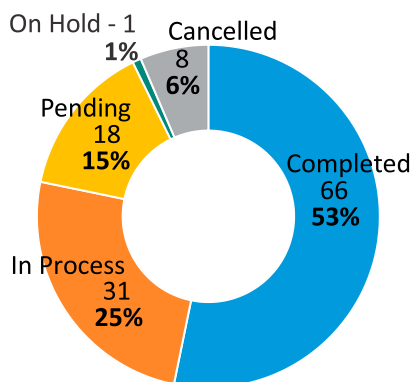
Financial Services

The Financial Services team oversees all the CTS financial transactions and maintenance in areas including general ledger accounting, accounts payable and accounts receivable, asset management, financial reporting, budgeting, and internal financial controls. Overall, the Financial Services team prepares and manages an annual budget in excess of \$30 million.

FY19 Budget



Projects



IT Planning, Procurement & Project Management (P3/M)

P3/M is responsible for issuing the mandated IT strategic plans and annual report, overseeing all CTS procurement, and performing all Level 3 & 4 procurements for the organization. P3/M also manages some of the most complex projects and perform Large Project Oversight as mandated in N.D.C.C.

IT Planning

The focus of this team is assisting NDUS and all institutions with developing a strategic IT plan and publishing required reports. P3/M utilizes good business analyst practices and support the rest of the organization with templates and training. Key reports published:

- The CTS Annual Report
- The Performance and Accountability Report
- The biennial IT Strategic Plan

They also worked in collaboration with the State of ND's Information Technology department on the mandated biennial Statewide IT Strategic Plan by implementing a Statewide ITD Dashboard. The dashboard provides current initiatives entered by campuses and CTS. The purpose of the dashboard is for stakeholders to view at any time, up-to-date initiatives that are happening around the state.

Another responsibility of this team is to coordinate the review and approval process for institution IT requests known as 1901.3 according to the corresponding policy number. These requests are vetted for approval, evaluating factors such as cost, resources, and schedule.

Looking forward, P3/M will be entering another planning cycle. They intend to continue to evolve the reports to focus on the strategic view of IT across NDUS. This includes the involvement of CTS staff and our institution's CIOs. This includes developing a new CTS Strategic Plan to help us make sure CTS is aligned with the system strategic plan as well as identifying any new strategic directions. This group is also working on updating the 1901.3 Policy and NDUS Procedure.

Procurement

The procurement team supports both CTS and the institutions with their IT purchases. They provide several centralized contracts that any institution can use. The team manages over 125 active contracts. They also help research software and participate in state and national procurements collaborating with the State Procurement Office and the Midwest Higher Education Compact. This area is also responsible for ensuring CTS remains in compliance with all software licensing agreements.

The procurement team's focus over the next 12 months will be to update their Request for Proposal (RFP) templates utilizing the latest from the State Procurement Office and our own lessons learned.

Project Management

The project management team leads by example. They manage some of the most complex projects in the organization, many of them affecting multiple institutions. They also serve as mentors for others in the organization who are managing the multitude of projects going on in the organization. This area is also responsible for performing Large Project Oversight as mandated by N.D.C.C.

The project management team is working on revising project management process and procedure documents. They are also working on updating the 1901.3 Policy, NDUS Procedure and their project management templates.

Active Projects

- **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. This project is under Large Project Oversight and after several setbacks, is scheduled to go live with their first module over the fourth quarter of 2019.
- **FAMIS Cloud:** CTS is moving the existing facilities management software to the SaaS solution offered by the vendor. This project is also under Large Project Oversight and is scheduled to complete this fall.
- **Recruiting Solutions:** This project is to deploy the PeopleSoft Human Capital Management Recruiting Solutions module to all campuses and the NDUS HR office. Recruiting Solutions includes Candidate Gateway and Talent Acquisition Manager. Deployment is expected in March 2020.
- **NetIQ Program:** This program has multiple projects that includes an upgrade to many components in the NDUS identity management solution, NetIQ, along with building and implementing an infrastructure to enable new features and functionality. The project is currently in the initiation phase.
- **Spirion:** This project will implement Spirion Sensitive Data Manager for CTS and 9 NDUS member institutions. CTS and institutions have a large amount of restricted data on end user systems that is at risk of loss or theft, potentially leading to a costly breach event. The risks of a data breach are high, both to the reputation of the NDUS and member institutions and due to the large costs incurred from breach response efforts, penalties, legal liability, and loss of future tuition and research grants. Spirion will help CTS and member institutions discover, reduce, and protect student and employee restricted data across faculty and staff endpoint computers. Deployment to identified institutions and CTS is scheduled to be completed by November 2019.
- **Communication Application Implementation:** Has been purchased by CTS and will be implemented by the end of calendar year 2019 across CTS as a means of outage communication to stakeholders. The project is in implementation.
- **Academic Library Services Platform:** As noted in the ODIN section of AST, ODIN solicited for a system to replace its Aleph library application, with Ex Libris and its Alma & Primo applications being selected. This project meets the requirements for Large Project Oversight. The project is currently in the planning phase of the project. It is anticipated that the project team will move into configuration & implementation in the fall of 2019. Expected Go-Live is the middle of summer, 2020.

Completed Projects

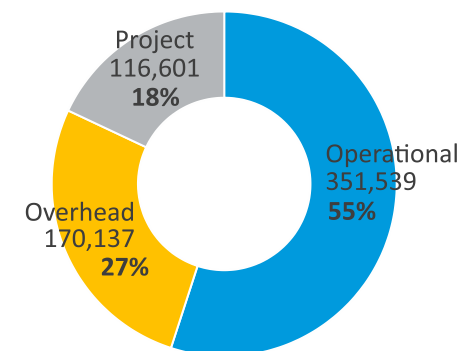
- **Blackboard:** The P3/M team is managing the system-wide deployment of Blackboard Learning Management System.
- **Campus Solutions 9.2:** As noted earlier, this is a major upgrade of the Student Information System.
- **Exadata Migration:** CTS migrated Oracle databases (Campus Solutions, ImageNow, FAMIS, and IAM) from an existing infrastructure to Oracle's Cloud @ Customer appliance. This provided cost savings and affordable functionality for the organization.
- **YuJa:** This project transitioned the eleven institutions from the current vendor (Tegrity) to YuJa for video lecture capture, video capture and content management functionality. This process took place from February - June 2019. All institutions originally used Tegrity for a lecture capture and content management system, and that contract was scheduled to expire on 6/30/19. UND was already using YuJa as a complementary technology to Tegrity. The YuJa contract was amended to include the NDUS.
- **NDUS ID Change Project:** This project authorized resources to identify, schedule, and conduct the required work to convert the NDUS account (dotted identifier) name change process connected with downstream applications within CTS and the 11 NDUS institutions. Project went live on August 5, 2019.

Work Management System (WMS)

CTS implemented the TeamDynamix Work Management System in March 2015. CTS staff use the system for time and project tracking. WMS also provides other capabilities such as a service catalog and our ticketing system which was rolled out to CTS departments last year. AS leads a cross-functional team who provides the support for the tool.

This team is working on continuing to expand and revise our use of the system, develop better reporting, and improve CTS department's productivity with the tool.

638,277 Hours Recorded FY19



Enterprise Solutions (ENSO)

The Enterprise Solutions department includes ConnectND and Enterprise Services.

ConnectND is North Dakota's implementation of Oracle/PeopleSoft. Core Technology Services supports Human Capital Management, Financial Management and Campus Solutions along with dozens of ancillary systems for the eleven institutions in the North Dakota University System.

Enterprise Services is responsible for administration of enterprise class information technology solutions including a Service Level Agreement (SLA) for applications administration with the University of North Dakota.

ConnectND, Blackboard and document imaging services are each supported by a governance committee and multiple user groups. The division hosts the ND Higher Education User Group (NDHEUG) conference every other year to provide professional learning for institutional participants.

Campus Solutions (CS)

Campus Solutions is the system of record for more than 46,000 active students of the North Dakota University System. The system supports all 11 institutions with day-to-day operational data and functionality for every aspect of the student learning cycle, including Financial Aid, Admissions, Student Records, Academic Advisement, and Student Financials. In addition, Campus Solutions feeds 40 additional University System data systems, including the Housing, Parking, Facilities Management, and scheduling (Ad Astra) systems. Lastly, Campus Solutions is the system of record and supports Blackboard Learn, Starfish, and projects related to the student's success and intervention initiatives. While each module supports its own functionality, the total environment seamlessly tracks student progress, registration, graduation, and overall success.

Campus Solutions 9.2 Upgrade

The last year was focused on upgrading Campus Solutions to the latest version. This included significant enhancements and functionality meeting the mobile challenges that face Higher Education supporting students in their everchanging world. With Oracle's latest release the next steps have been taken to develop and release delivered functionality labeled "fluid" that will allow Campus Solutions to become truly mobile-compatible. We have removed intermediary software that provided mobile-friendly screens. As part of the project the CS team also reduced customizations across the environment by over 20%. This upgrade continued the vision of efficient, effective, and reliable data accuracy. Core Technology Services spent over 117,000 combined hours across the entire student support system.

North Dakota HEUG 2019

The 2019 North Dakota HEUG brought all 11 campuses together for 2 days of networking, learning and fellowship. This cross-functional bi-annual event had the most sessions and highest attendance since its start with over 250 attendees. This year sessions included Blackboard, Peoplesoft, Perceptive Content, Microsoft, and multiple ancillary products. This year's highlight was a national renowned leadership speaker Dan Rockwell.

Student Retention

Student intervention and success is a continuing initiative related to Starfish and the use of the Statewide Longitudinal Data System (SLDS) data, combined with real-time reporting that creates a holistic approach. These systems gather information from various sources to produce data driven insight into student academic progress. In turn, institutions can use the data to make better informed decisions.

TouchNet

TouchNet is the vendor utilized for all payments within the University System. It includes Single Sign On capabilities with easy access for parents and students making electronic payments. The "Marketplace" or storefront functionality also connects to our third-party vendors, including Campus Management and the Parking systems.



Statewide Longitudinal Data System (SLDS)

The SLDS provides K-20 longitudinal data reporting. It is a collaborative effort involving the North Dakota University System, the Department of Public Instruction, the Department of Commerce, Job Service North Dakota, and the North Dakota Information Technology Department. The higher education project is evaluating data feeds utilizing Power BI to provide near real time data for institutions to track, report and react to. The student information system is broken into the modules of: Admission, Student Records, Financial Aid and Student Financials. An additional project completed was the Reverse Transfer initiatives which provided an avenue for degree completion for students. The SLDS also provides information for the Scholarship Management System for North Dakota. Additional data, overview and research is located at <https://www.slds.nd.gov/>.

Other Campus Solutions Initiatives:

- Bank of North Dakota Application Fee Waiver Event: They had 2,684 North Dakota students will take advantage of the free applications to University System institutions.
- Improve quality and functionality of systems.
- Coordinated University system-wide face-to-face visits to institutions fostering relationships. Included were training and troubleshooting issues and receiving feedback on our current processes, reports, and queries.
- Expanded and implemented additional built-in functionality including Communications, Student Center and Veterans Benefits.
- Enhancements to required IPEDS reporting to streamline and automate processes, also building consistency in reporting efforts.
- Support of institutions requests on proof of concept system to evaluate student interactions and the application process.
- Deployed multiple bolt-on systems to support institutional requests. One significant effort was the implementation of Target X for UND & NDSU. This product helps students and advisors recruit, communicate, and assist the student applications processes.
- Deployment of Civitas College Scheduler to BSC, with support for system wide expansion in 2020.
- Review and selection of Conduct Coordinator replacement due to end of support from vendor.
- Review and selection of Student transcript product, Parchment.

Enterprise Services (ES)

Enterprise Services is the business unit responsible for design, development, implementation, maintenance, and administration of enterprise-class information technology solutions while providing IT leadership, vision, and planning for the University System. The unit supports enterprise-level software applications including a document imaging system, dashboard software, learning management systems, student information systems, Web solutions and mobile applications. Enterprise Services is comprised of teams that are highly integrated to provide complete solutions to serve the needs of NDUS constituents.

Learning Management System

Completed Implementation of the NDUS System-Wide Learning Management System (LMS), Blackboard delivers a single instance LMS to create a unified user experience across the 11 institutions and the System Office. The Fall 2019 term will be the first full semester of all 11 campuses on the systemwide LMS. The team continues to provide current production support, training, and planning, as well as 3rd party and custom integrations, advanced reporting, and grades integration into CS. CTS was also awarded the 2019 Blackboard Catalyst Award for Leading Change. The award was presented to CTS at the Annual Bb Conference in July.

Future projects include research and potential implementation of Analytics for Learning (A4L) and Ultra. A4L provides student performance reporting by extracting data from Blackboard Learn and bringing it into an analytics framework where it's combined with data from Campus Solutions. Ultra is a redesign of the Blackboard Learn user interface offering a more contemporary teaching and learning experience with a focus on mobility. To increase existing security, multifactor authentication will be required for use by individuals with elevated user accounts.

Secure File Transfer System

ES continues to provide configuration and administrative services for LiquidFiles (sendfiles) and MOVEit MFT (Managed File Transfer) Solution offering secure exchange of critical business data and sensitive files both internally and externally. These systems ensure delivery to the intended recipients and document transfer activities with an audit trail and enforces file retention policies. On average, the MOVEit system moves over 134,000 files a day, with users/systems uploading over 28,000 files and downloading over 46,000. The sendfiles system has sent over 1,500 secure messages to date. One of the major projects completed in the last year was all data and processes were moved off the old MFT (Sophie) system.

Data Analysis System

The team continues to work with all areas of CTS to integrate their systems into Splunk. Currently there are 15 systems connected, with many more on a defined priority list. CTS uses Splunk for searching, monitoring, and analyzing machine-generated data. This initiative has allowed CTS to automate the collection, indexing and alerting of real-time machine data that is critical to CTS's operations and security.

Mass Communication Delivery Systems

The ES staff runs and maintains the day-to-day operations of the statewide Listserv system as well as the NDUS Blackboard Connect notification system. Currently within the Listserv system there are 4,304 lists, averaging over 42,400 emails a month to subscribers. The Blackboard Connect system has 43 unique sites across the 11 institutions and system office. Bb Connect is used to send targeted emails, phone calls, SMS (texting), as well as other message types. For FY19, campuses sent out over 1,200 unique email messages and an additional 1,200+ phone numbers called. UND operations has it configured with the National Oceanic and Atmospheric Administration (NOAA) for severe weather alerts.



UND SLA

CTS provides application administration for nearly fifty software applications hosted in the data center (On-Premise OP) and in a cloud service (Software as a Services SaaS). Software Application Administration Services include:

- Architectural design (OP)
- Application and Desktop Virtualization (OP)
- Installation and implementation (OP)
- Administration (OP/SaaS)
- Upgrades and patching (OP) Server replacements (OP) Security (OP/SaaS)
- Integration and Middleware
- (OP/SaaS) Backup (OP)
- Data recovery (OP) Tuning (OP) Support/Troubleshooting (OP/SaaS)
- Vendor relations (OP/SaaS) Budget (OP/SaaS)
- Contract renewal (OP/SaaS)

Document Imaging

During the last year, the Document Imaging team implemented systemwide integration for automatic import of Hobsons application. The team has completed the workflows for Records, Admissions and Student Financial Aid for all institutions. Perceptive Experience was implemented and launched in May for the viewing of documents within any web browser while providing additional mobile browsing support. The expansion of Transform online forms grew from 107 to 176 live forms with three forms that were implemented systemwide. In support of end user staff development, further training was developed to better prepare department power users for management of their application business processes.

The Document Imaging team will continue building on the existing use of statewide forms to conduct cross-institutional business. These transactions provide efficiencies that impact students, faculty, and staff. Student Finance workflow development will begin later this year providing quick, accurate, and effective resolution of business process tasks. The adoption of the retention module tool will be expanded to all institutions' departments. This expansion will prove the identification, approval and removal of documents meeting NDUS retention schedule and auditing requirements.

Financials Management (FIN)

The NDUS PeopleSoft Financial Management is the system of record for the North Dakota University System business operations. The system supports all 11 institutions with day to day operational data and functionality for every aspect of the system's budget. The system contains thirteen modules, some of which include General Ledger, Commitment Control, Accounts Payable, Procurement, Grants and Travel & Expense (T&E).

The FIN team provides daily support of the PeopleSoft application and ancillary systems for all 11 institutions, the System Office and CTS. They also conduct centralized processing for the University System such as 1099 generation for all institutions, numerous processes for fiscal year end, monthly PCard and bank statement extracts/uploads, applying system patching to remain current with changes to regulations and government mandated reporting and assisting institutions with troubleshooting financial transactions.

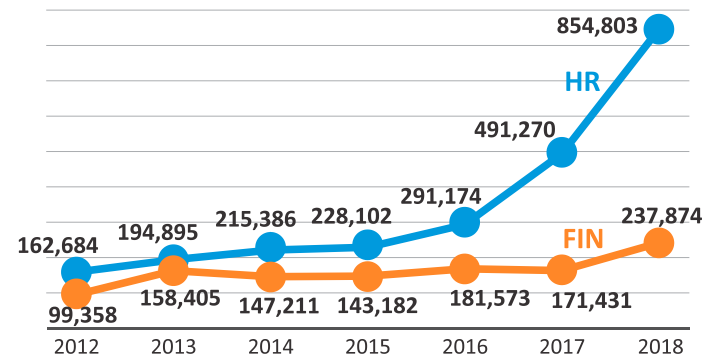
The FIN team has also provided leadership in application management such as representing the NDUS as the Chair for the Oracle Higher Education Product Advisory Group, which is a global organization working closely with users and key Oracle Strategists to improve the Academic Advising functionality for all institutions.

The team continuously works to improve quality and functionality of the system. Some of this year's successes include:

- Implementation of electronic approval workflows throughout Accounts Payable, GL and other modules to participating campuses.
- Development of an Online Access Request form within Peoplesoft for the institution Access Control Officers to streamline their process for requesting access for their institution's users.
- Using the new Online Access Request pages, developed much more transparent user access reports and compensating controls.
- Completion of the Single Use Account (SUA) project in collaboration with the State of ND allowing for the use of a virtual-type payment method initiated out of PeopleSoft's Accounts Payable module.
- Implementation of the mobile friendly version of Travel & Expense.

Future projects include implementing Cash Advances and Travel Authorizations in the T&E module, implementation of an Online Supplier Registry Portal, participation in a study with the State of ND on eProcurement, researching and implementing other Fluid (mobile friendly), implementing Payment Request (simplified AP entry for decentralized users) and reporting features throughout the Financials system.

Total Logins by Year



Human Capital Management (HCM)

Human Capital Management is the PeopleSoft solution that serves as a global foundation for HR data. The system supports all 11 institutions with day to day operational data and functionality for nearly every aspect of the system's 7000+ employees. Applications in production include Payroll, Benefits Solutions, Time & Labor and Absence Management.

The HCM team provides daily support of the system including such activities such as the administration of all NDUS payroll for all 11 institutions including the System Office & Core Technology Services, applying system patching, providing Workforce Safety and Insurance (WSI) annual workers compensation reports and processing of W-2 & 1095Cs and assisting institutions with troubleshooting HR transactions. Manager Self-Service (MSS) and Employee Self Services (ESS) ensure workflows for transactions process efficiently. The HCM team also provides leadership in application management by providing training to institutions and serving as active participants in the HR user group & Human Resource Council.

The team continuously works to improve the quality and functionality of the systems. Some of this year's successes include:

- The 9.2 upgrade went live in October 2018 after nine months of planning and implementation activities. The new version offers an improved user experience including an increased mobility interface (Fluid) for employees and managers. The Company Directory is a new module that was rolled out with the upgrade and serves as the main system directory providing easy to view organization charts.
- The Recruiting Solutions project kicked off in June 2019 and is anticipated to go-live in March 2020. Recruiting Solutions is comprised of two complimentary applications that work in conjunction to address enterprise recruiting challenges. Candidate Gateway (CG) allows our system to brand our campuses to attract best-fit candidates and gives internal as well as external applicants the tools they need to find the right job. Talent Acquisition Manager (TAM) provides comprehensive functionality, supplier integration with third party staffing vendors, underlying global architecture and tight integration with our Human Resources system. Talent Acquisition Manager is aimed at bringing together the complex business processes of recruiting into an integrated, seamless experience for hiring managers and recruiters. This Enterprise deployment meets the goal of automating the recruiting process by providing technology to track open jobs, candidate profiles and other information relevant to the evaluation of candidates and fulfillment of open positions. These systems create an easier application process for candidates, easing the burden on recruiters by distributing the data entry to candidates. Recruiting Solutions will allow campuses to generate reports and track their recruitment metrics more easily and efficiently.
- A CTS HCM business analyst participates on the Oracle HCM Advising Product Advisory Group at the national level working closely with users and with Oracle to improve the Human Capital Management functionality for all institutions.
- CTS HCM business analysts continue to serve on Oracle's various focus groups including but not limited to Onboarding, Payroll for North America, Time and Labor and Approvals and Delegations. Participating in focus groups allows input on the footprint and delivery of Oracle modules as well as enhancements to modules.

Future projects include additional Manager Self Service (MSS) functions such as pay rate changes and transfers, fluid e-Forms and the e-Performance module. e-Performance is a performance management solution that streamlines the appraisal aspect of the staff development process, from goal planning and coaching to performance assessments and rewards.



***The addition of applications in HCM & FIN along with Manager Self Service and Employee Self Service availability increases logins in recent years.**

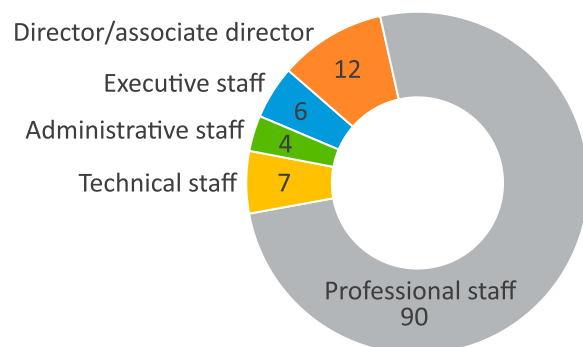
Human Resources (HR)

The Office of Human Resources provides HR services and support to CTS and System Office staff of approximately 140 employees. HR supports the mission of the NDUS and CTS by providing services that attract, develop and retain a highly qualified and diverse workforce. HR services include recruitment, employee relations, learning and development, performance management, HR information management, policy implementation, policy compliance and employee engagement/recognition. The HR team consists of one director, and two part-time administrative support positions. CTS Human Resources is part of a larger system council called the Human Resource Council (HRC). The HRC advises the chancellor, institution presidents and other University System councils on human resource issues. The NDUS/CTS HR Director serves as the System Office liaison to the HRC. HRC council membership includes human resource directors from each institution and three employee designees: one from a two-year institution, one from a four-year institution and one from a research institution.

FTE* as of 6/30/2019: 119

*full-time benefited constitutes employees working more than 20 hours per week

Staffing Breakdown



Recruitment

The HR team assists CTS and System Office leaders in fulfilling recruitment requests with well-qualified candidates within a minimal turnaround time. In FY19 thirteen new employees were hired; two for the NDUS System Office and 11 for CTS. The HR department also advises the System Office on presidential searches.

Learning and Development

CTS provides employee professional development using several delivery methods that include both formal and informal opportunities. CTS delivers formal on-site training to staff at least once per year by collaborating with the organization's employee assistance provider, Village Business Institute. Additionally, CTS uses various online systems to deliver web-based training courses in a variety of areas. Employees participate in mandatory compliance training on an annual basis in the areas of fraud, security, and internal controls. In addition, employees have access to an online system called Hoonuit, formerly known as Atomic Learning, which offers a variety of training topics from Microsoft tutorials to workplace behavioral and environmental topics. CTS allotted a budget to each division, allowing them to prioritize professional development requests within each department. HR offers supervisor training quarterly.

Performance Management

The HR department provides advisement and facilitation for employee performance management. A consistent process is in place for both CTS and the System Office to implement employee annual performance reviews, which has contributed to a successful completion rate for the past three years.



Salary Administration

The primary purpose of salary administration is to attract and retain well-qualified employees who can best contribute to the mission of the organization and the North Dakota University System. Decision makers in the salary administration process strive to make salary decisions fairly and communicate accordingly. HR oversees annual salary administration and market salary analysis. Market is derived by benchmarking positions against similar positions using salary surveys recognized by the North Dakota University System/Human Resource Council. HR compiles data on an annual basis ensuring current position data is matched and updated to the most recent market survey.

Employee Engagement and Recognition

Employee engagement is a priority at both CTS and the System Office. Both organizations hold annual staff recognition gatherings and several informal employee events throughout the year. In addition to events, employees are encouraged to participate in anonymous surveys that aim to gather feedback to improve morale. NDUS/CTS Staff Senate and the NDUS compliance office support the surveys with HR oversight.

Human Resource Council (HRC):

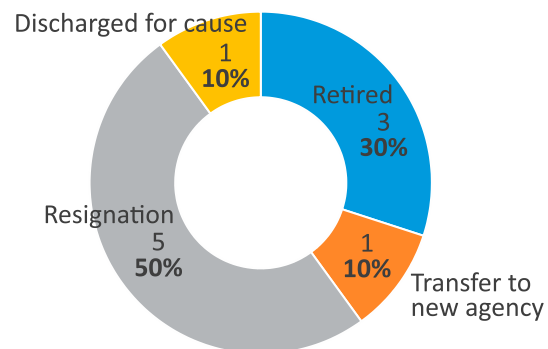
The HRC advises the chancellor, institution presidents and University System councils on human resource issues. The HRC also facilitates collaboration between institution HR staff to reduce inconsistencies in business processes, data entry, reporting, and policy and procedure implementation.

Future goals for HRC include:

- Develop system-wide reporting for key HR data including; turnover, faculty tenure, vacant positions, and staff FTE.
- Increase meeting from quarterly to monthly to align with other NDUS key council meeting schedules. This should improve communication and align agendas to State Board of Higher Education (SBHE) meeting dates, other NDUS councils and regular board meetings.
- Collaborate on ideas to improve employee morale. Recent budget cuts placed added pressure on staff workload and the elimination of annual increases for the past two years has had a significant impact on morale.

**FY19 turnover rate
11.8%**

Turnover Breakdown



Infrastructure & Operations (I/O)

Infrastructure and Operations (I/O) is a business unit of Core Technology Services (CTS) and is comprised of the following sub-units:

- Database Administration
- Data Center/Production Control
- Endpoint Services
- Identity and Access Management
- Network Services
- System Administration

We strive to provide, sustain, and enhance, a robust, reliable, and relevant technological foundation that is used across the NDUS. Our successes are directly attributable to staff. They are action and detailed oriented, committed, and passionate subject-matter experts of many technologies.

Identity & Access Management (IAM)

The IAM team is responsible for managing the identity life cycle for all students, staff, and faculty within the NDUS. The team maintains the complex administration and processing of NDUS people, processes, and products governing identities and access to resources of the enterprise environment. The team ensures that users have quick and secure access to the resources they need, while providing users strong authentication without restricting productivity, and ultimately simplifying the process of gaining access to IT resources.

In the coming year, the current Identity and Access Management (IAM) solution, NetIQ, will be upgraded and infrastructure built for new features and functionality to streamline and enhance identity management.

Data Center

The NDUS-CTS Data Center provides power, cooling, space, and Remote Hands support staff for the technology needs of higher education stakeholders and partners throughout the region. Skilled staff work 20/7 with established processes and approved operational governance practices to ensure safe and secure data processing in a mission-critical facility.

Building infrastructure remained uninterrupted during this year's maintenance cycle.

The team also conducted a review of CTS and UND facilities and technologies to ensure compliance with NDUS information security standards.



Database Administration (DBA)

The Database Administration (DBA) team is responsible for enterprise-level software systems administration. The team is responsible for physical and logical configuration planning of enterprise-level architecture, technical implementation, and ongoing management of software to support local and enterprise-wide applications. The team ensures operational stability, integrity, and security of database management software and interfaces to that software. The team supports standalone and clustered databases on multiple database platforms. The team performs technical functions in support of database-driven applications.

During the past year, the DBA team was integral to the success of two major initiatives, the upgrade to Campus Solutions v9.2 and the implementation and migration to Oracle's Exadata Cloud @ Customer (ExaCC) infrastructure. Work will continue in the coming year to further utilize the added functionality and security that the ExaCC has to offer.

Endpoint Services

Endpoint Services provides technical support to the NDUS System Office and Core Technology Services. In addition, the team provides assistance and consultation to institutions as needed.

The team participated in the Team Dynamix planning and rollout project and enhanced reporting capabilities using Power BI. They also implemented a system that integrates with System Center Configuration Manager (SCCM) to patch third party software. The team reviewed the NDUS Azure environment and consolidated servers to other NDUS systems for efficiencies of time and cost. They also began transition of the management of the NDUS Azure environment to the System Administration team.

A new communications application has been purchased and will be implemented by the end of 2019. This new product will allow application owners to send out notifications in a more efficient manner using self-subscription for notifications via email or text messages. A dashboard will also be available so that users may see the current status of systems at any time.

Device management this year included completing the upgrade of Dell laptops, reduction of the number of Mac computers, and the development/implementation of new hardware standards (monitors, laptops, mice, keyboards, etc.). The team worked to replace the digital signage system and conference room presentation equipment to increase function and usability.

The team worked with the System Office to meet their needs in web applications and updating and migrating the NDUS and ND Choose websites to a new Content Management System (CMS). They began developing and successfully implementing several services in Team Dynamix, including HR employee on-boarding/off-boarding (HR), State Authorization Requests (AST), IVN (AST), Load Balancer Request, Firewall Rule Request, and DNS (Domain Naming Service) Request. The team also worked with Williston State College and within CTS to enhance the capabilities and utilization of SCCM. The group also assisted in the implementation of a basic incident management process between I/O, Campus Solutions and Enterprise Services, and reviewed the SharePoint environment to begin the migration from on-premise to SharePoint Online to increase functionality and decrease costs.

Application Development for the year included migrating to new coding framework for web development, redesigning the NDUS Fee's website, and beginning work on an update to the Data Dictionary web application. The team successfully supported the System Office Financial Aid team's custom web application leading up to and during the STEM application process in May.

Network Services

The Network Services team is responsible for enterprise-level network administration. The team is responsible for physical and logical configuration planning of enterprise-level architecture, technical implementation, and ongoing management of the UND network. Network Services works closely with ND IT in providing Internet connectivity to institutions.

During the past year, Network Services partnered with the ND IT group to expand the STAGEnet backbone to 100Gbps with a minimum of 1Gbps to each campus. They also completed a UND core network upgrade and began a network upgrade for UND Housing. They conducted a review of CTS and UND technologies to ensure compliance with NDUS information security standards. The Network Services team was also integral to the success of two major initiatives, the upgrade to Campus Solutions v9.2 and the implementation and migration to Oracle's Exadata Cloud @ Customer (ExaCC) infrastructure.

CTS worked with Cisco to sign an enterprise agreement for licenses, this agreement will allow all campuses to be able to purchase licenses from this agreement at reduced pricing. Two campuses are already using the agreement and two more are in the process of moving to it. This purchase allowed for the replacement of the current authentication system providing additional functionality with other products under the agreement.

CTS supports the UND campus network, consisting of approximately 25,000 wired connections and over 11,000 connected wireless devices during the semester. CTS is working with UND to upgrade the campus network by upgrading switches and access points in buildings during construction projects and as funding is available. The design of the residence hall network was evaluated, and changes were made to reduce costs, increase efficiencies, and provide a better service to students. Four residence halls were upgraded to Wi-Fi 6 providing student with the latest wireless standards available. The residence hall network core will be upgraded in the coming months. Aerospace buildings have been moved to the UND campus core, eliminating the need for a separate core in Clifford Hall.



Networking also completed or began work in the following areas:

- Institution-level access to edge network and information security devices
- Network support includes a cooperative arrangement with ND IT to support the common communications systems required for secure and reliable access to both NDUS hosted and cloud-based applications, along with network interconnectivity between institutions, and to the Internet.
- Participated in an RFP that will allow campuses to be able to outsource Residence Hall networking on campuses.
- Deployed a DNS appliance to another campus and is currently working with two more. This will bring the total to four campuses that are using these appliances as part of the redundant grid provided by NDUS.
- CTS manages the Eduroam contract while Network Services works directly with campuses on implementations.
- I/O has purchased licenses to enable micro segmentation in the NDUS data center. This implementation will occur in early 2020.
- Network staff has completed a security assessment of the CTS buildings and the Data Center. Network Services will upgrade all three office buildings to the latest network design, including switches, licensing, and wireless.
- Network Services is in the process of doing a Data Center network refresh.



System Administration

The System Administration team is responsible for enterprise-level hardware and operating system administration. The team is responsible for physical and logical configuration planning of enterprise-level architecture, technical implementation, and ongoing management of server, backup and storage hardware and software to support local and enterprise-wide applications. The team ensures operational stability, integrity, and security of servers and storage hardware and software to enable CTS departments and institutions to provide services to staff, faculty, and students.

Next Generation Data Center: The System Administration team continually researches new products and services to determine which will assist CTS with meeting the needs of the institutions, the strategic plan, and the mission of the organization. Products researched must be efficient, adaptable, based upon industry best practices, help provide data protection, have high availability, and be cost-effective.

The System Administration team has implemented many efficiencies over the past years with virtualization and automation. These efficiencies have allowed the team to reduce the number of personnel from 14 to 8 positions.

The System Administration team continued to move systems to the hyper-converged infrastructure and have consolidated 98% of their systems to one 10 node cluster. This system is backed up to a disk system in the data center and then off-site copies are maintained to another disk system.

The System Administration team has begun the process to take over support for the Azure server environment. This transition will allow for greater consistency in support, costs, and security between the on-premise and cloud servers. During the past year, the Systems Administration team was integral to the success of two major initiatives, the upgrade to Campus Solutions v9.2 and the implementation and migration to Oracle's Exadata Cloud @ Customer (ExaCC) infrastructure. They also conducted a review of CTS and UND technologies to ensure compliance with NDUS information security standards.

The System Administration team, as well as the Network Services team worked through an SLA with UND on the Advanced Computational (ACA) systems. This work included setup of a new local cloud cluster and integration of old clusters into this environment. Additional work by the team in conjunction with ND IT and NDSU was to create a 100Gbps Science/Research network to allow for additional resource sharing between the two campuses.

"The System Administration team worked with the Information Security team and Network Services to implement an on-line system that allows staff to quickly block malicious links found in phishing emails. Blocking access to these malicious links across the NDUS will help to further protect resources.

Institutional Data & Reporting (IR)

The Office of Institutional Research is responsible for system-wide institutional research for State Board of Higher Education reporting, legislative requests, Chancellor studies, required federal and state reporting, and other ad-hoc data requests. IR conducts studies, maintains datasets, and reports information on topics such as enrollment, retention, degree completion, productivity, and other areas of interest. The four main areas of work for Institutional Data & Reporting include:

NDUS System Office Data and Reporting

System Office IR staff serve to fulfill data needs of the State Board of Higher Education, Chancellor's Office, legislature, and governor's office. They also contribute to statewide committees relating to workforce needs, K-12 education, and the state data warehouse. Ongoing responsibilities include:

- Annual enrollment reporting (fall, spring, annual), program enrollment and completion
- Development and maintenance of the State Board of Higher Education Strategic Planning dashboards
- Integrated Postsecondary Educational Data System (IPEDS) keyholder services for NDUS institutions as well as eight additional ND private and tribal schools
- Support of System Office and institutional staff for Strategic Planning Online (SPOL) software used for documenting strategic planning at all levels of the system
- Provision of requested data and/or reporting for legislature, governor's office, workforce, media, and other ad hoc requests
- Representing NDUS for the interagency North Dakota State Longitudinal Data System (SLDS)
- Contribute to CTS collaboration on Power BI application standardization, training, and services

ND Department of Public Instruction Data and Reporting Services

As of July 1, 2017, the ND Department of Public Instruction contracts IR services through the North Dakota University System. NDUS-IR works collaboratively with NDDPI and NDITD to provide services that include development and implementation of the federally required K-12 district profiles, accountability reporting, and state/school district public dashboards.

NDUS Systemwide IR Collaboration

The Office of Institutional Research team leads the collaboration effort of the IR staff among all NDUS institutions and System Office. Known as the Institutional Research Users Group (IRUG), members meet monthly to discuss, critique, and plan for data reporting and processes across the university system so that data and methods are consistent, and so that IR staff are supported in their work and professional development needs. The IRUG also gathers twice per year for an extended face-to-face meeting and communicates daily on the IRUG listserv.

NDUS Shared IR Services

The shared services provide contracted data and reporting services to NDUS institutions, focusing primarily on federally and state mandated reporting, including IPEDS and Student Achievement Measures (SAM).

Future Goals for Institutional Data and Reporting

- Adoption and implementation of Python programming for data science needs
- Redesign of NDUS Strategic Plan dashboards for improved end user experience
- Increase communication to stakeholders and public by establishment and maintenance of a NDUS IR blog

Information Security (InfoSec)

The Information Security Department (InfoSec), in collaboration with the NDUS Information Security Council (ISC), has identified 10 strategic initiatives (Figure 1) as part of a 5-year plan. These initiatives are aimed at protecting CTS systems and data from known cyberattack vectors. These initiatives align with the Center for Internet Security's (CIS) 20 Critical Security Controls (CSC), which are a set of actions for cyber defense that provide specific and actionable ways to thwart the most pervasive attacks. InfoSec also utilizes the National Institute of Standards and Technology (NIST) Cybersecurity Framework (NCF) as the foundation for much of its security planning efforts.

← NIST CyberSecurity Framework (NCF) →						
Strategic Initiative	Center for Internet Security (CIS) Critical Security Controls (CSC)	Identify	Protect	Detect	Respond	Recover
Systems and Software Management	2, 3, 5, 7	✓	✓		✓	
Data Loss Prevention	13, 14	✓	✓	✓		
Endpoint Security	2, 3, 8, 13	✓	✓		✓	
Vulnerability Management	1, 2, 3, 4, 5, 8, 9, 11, 12, 15, 18	✓	✓	✓	✓	
Penetration Testing	20	✓		✓		
Centralized Logging	4, 6, 7, 8, 12, 16, 19			✓	✓	
Identity & Access Management	4, 11, 12, 15, 16	✓	✓		✓	
Intrusion Prevention Systems /Firewalls	7, 12, 13, 14, 19		✓	✓	✓	
Security Awareness	17		✓	✓		
Security Operations	1, 3, 6, 8, 19			✓	✓	✓

Figure 1. Strategic initiatives as part of a 5-year plan.

InfoSec has made progress on improving the security stance of NDUS and continues to focus on the following areas:

Data Loss Prevention

Avoiding loss of data is paramount to security. InfoSec has procured a sensitive information discovery product called Spirion (Figure 2). Spirion has been deployed to CTS and 9 NDUS campuses to scan endpoints and network systems for restricted and private information. This is helping CTS and campuses reduce their sensitive data footprint, control access to this data, and minimize the risk of a breach. In addition, InfoSec has been working with campuses to implement data loss controls in systems where sensitive information might be exposed, such as email and cloud services.



Figure 2.

Endpoint Security

InfoSec has worked with CTS and institutions to deploy Bitdefender Endpoint protection (Figure 3) to over 10,800 computers across NDUS. Other endpoint protections and response capabilities, such as Palo Alto's Traps product, are being explored. These efforts are intended to expand capabilities and systems to improve endpoint security.

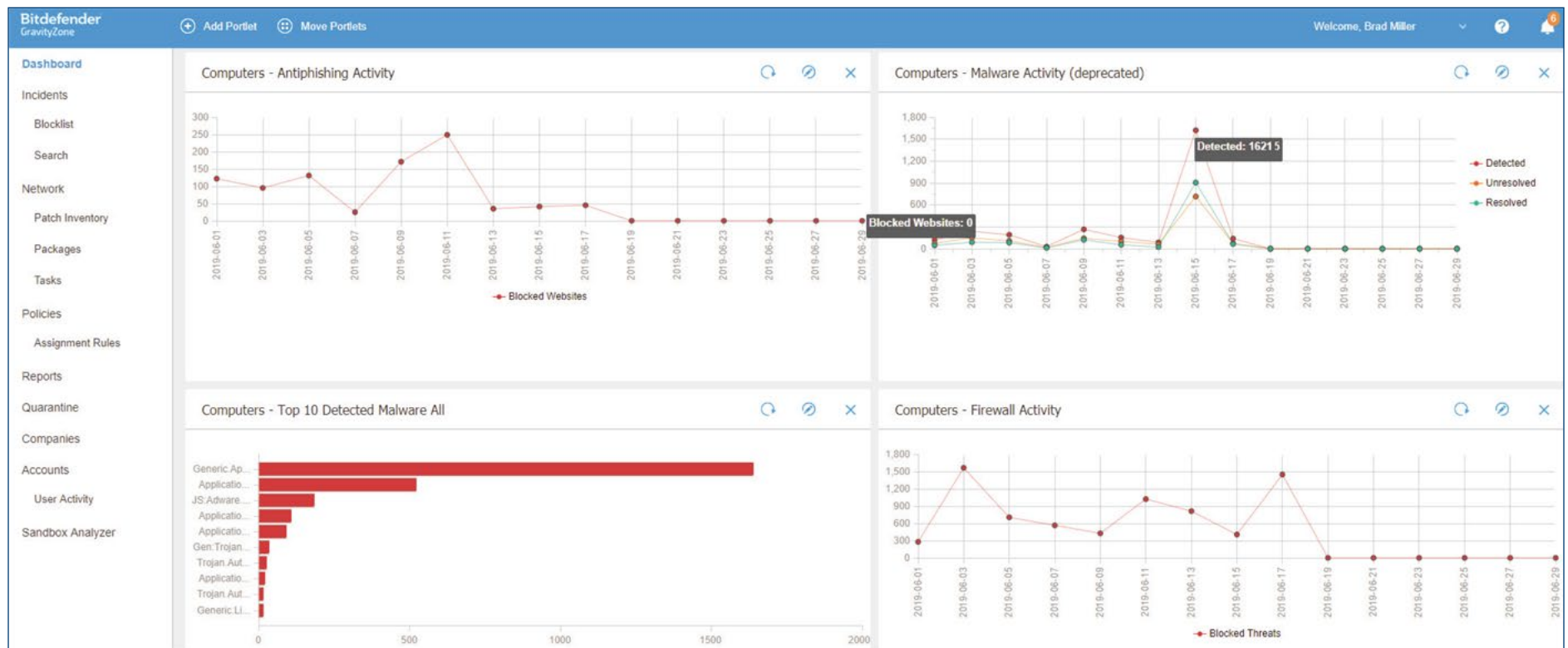


Figure 3.

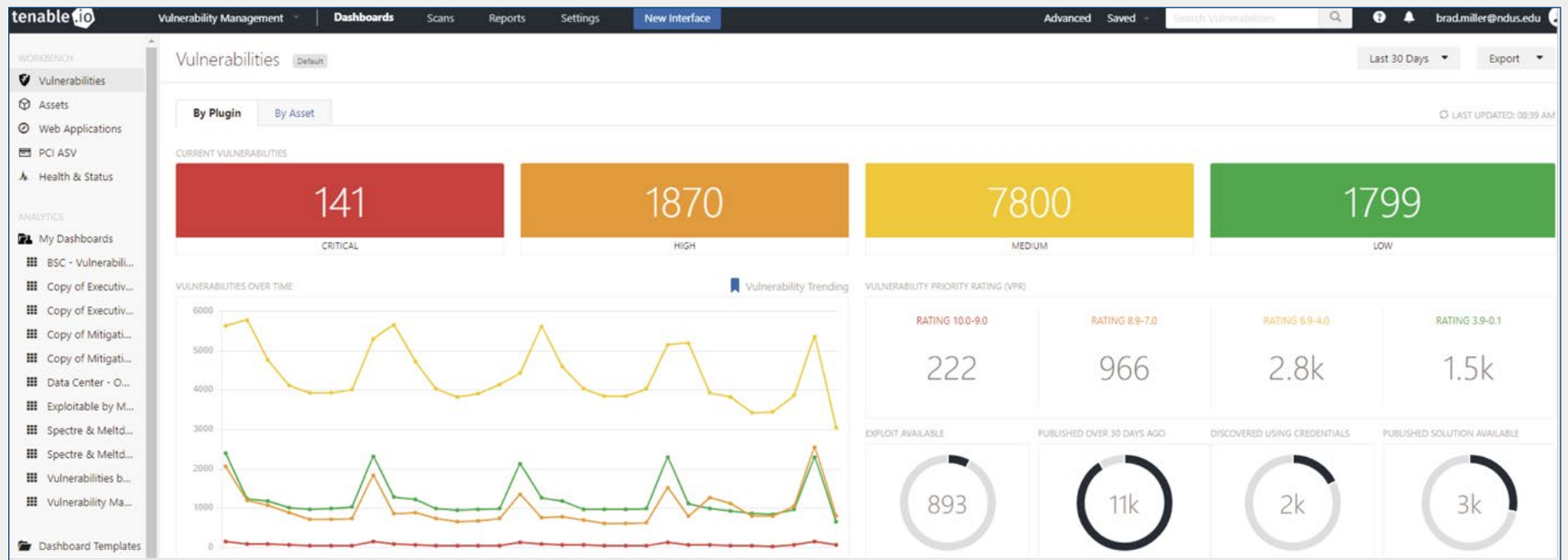


Figure 4.

Vulnerability Management

NDUS currently scans over 10,300 systems across CTS and 11 campuses with the Tenable.io Vulnerability Management system (Figure 4) implemented by InfoSec. This system is helping to mitigate threats and reduce the attack surface to systems, services, and applications. Additionally, InfoSec has worked with CTS departments to conduct more detailed and accurate credentialed scans in the NDUS datacenter, as well as configure and conduct policy scans to assess compliance with the CIS security benchmarks. Future efforts will focus on expanding scans to more systems throughout the University System.

Centralized Logging

InfoSec and a CTS functional team have worked to implement Splunk centralized logging (Figure 5) to assist in identifying security risks and conducting incident response for CTS systems and applications. Future efforts include the expansion of log collection to more CTS data center systems, implementing security event dashboards and alerts, and procuring and deploying the Splunk Enterprise Security application to address security risks and assist in responding to security incidents more proactively.

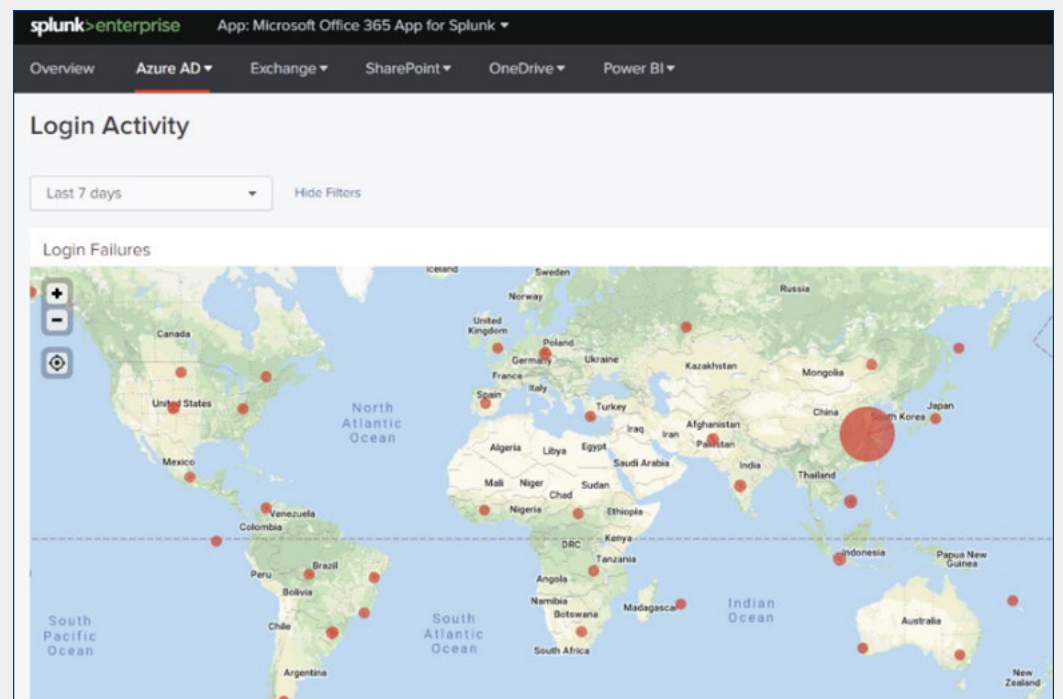


Figure 5.



Identity and Access Management

The InfoSec team, in coordination with CTS and NDUS institutions, continues to expand the Duo multifactor authentication (MFA) system to protect more applications from the risk of stolen credentials. Duo currently protects 49 critical business applications and in the past year has been expanded to protect over 25,000 student accounts across the NDUS. A major effort is underway to protect Office 365 with Duo MFA, which is already protecting faculty and staff accounts and many student accounts. Plans in the coming year will be to expand MFA to more areas of Campus Solutions and other critical systems, as well as integration with a Single Sign On portal.

MFA

49 critical business applications
expanded to protect 25,000+ student accounts

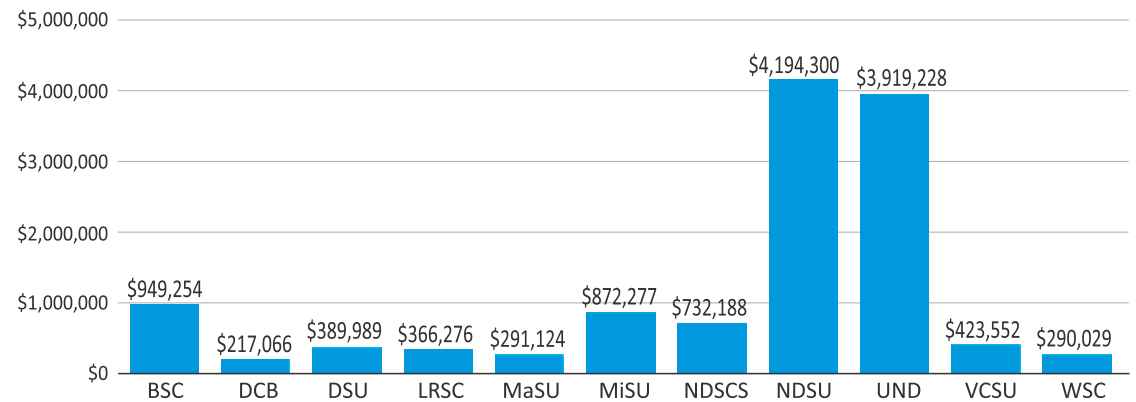
Security Awareness

Helping faculty, staff, and students understand security risks, as well as how to protect themselves, NDUS data, and resources is a key to improving the overall security posture of the NDUS. InfoSec has worked with CTS and 7 NDUS campuses to procure and deploy a security awareness and phishing assessment platform called InfoSecIQ from the Infosec Institute. InfoSec will continue to expand security awareness activities as well as explore security skills training for CTS and campus IT employees.

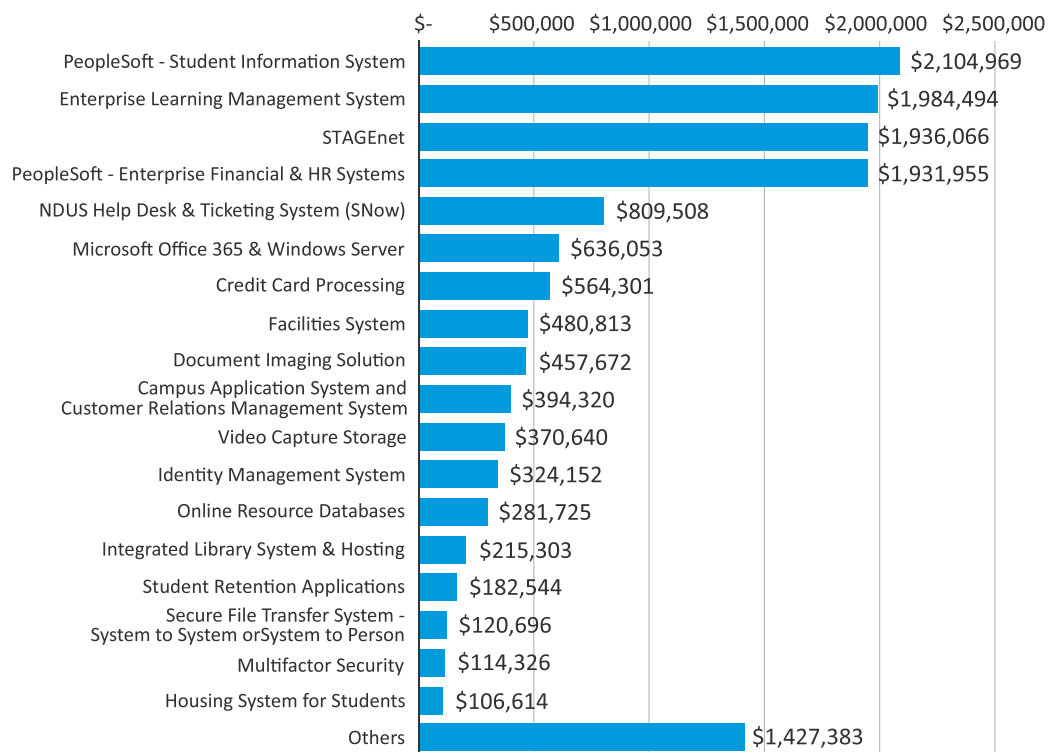
NDUS System Service Cost Evaluation



NDUS System Services Spend by Campus (Student FTE)



Cost by System Service (Over \$100,000)



NDUS System Services
Spend per Student per Year
\$364.82



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.

1

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.

2

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 using 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.

3

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

By working together with the State, K-12, and other constituents, the NDUS can 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.

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