



2015 ANNUAL REPORT

INITIATIVES AND ACCOMPLISHMENTS

University Technology Services Division
University of Denver

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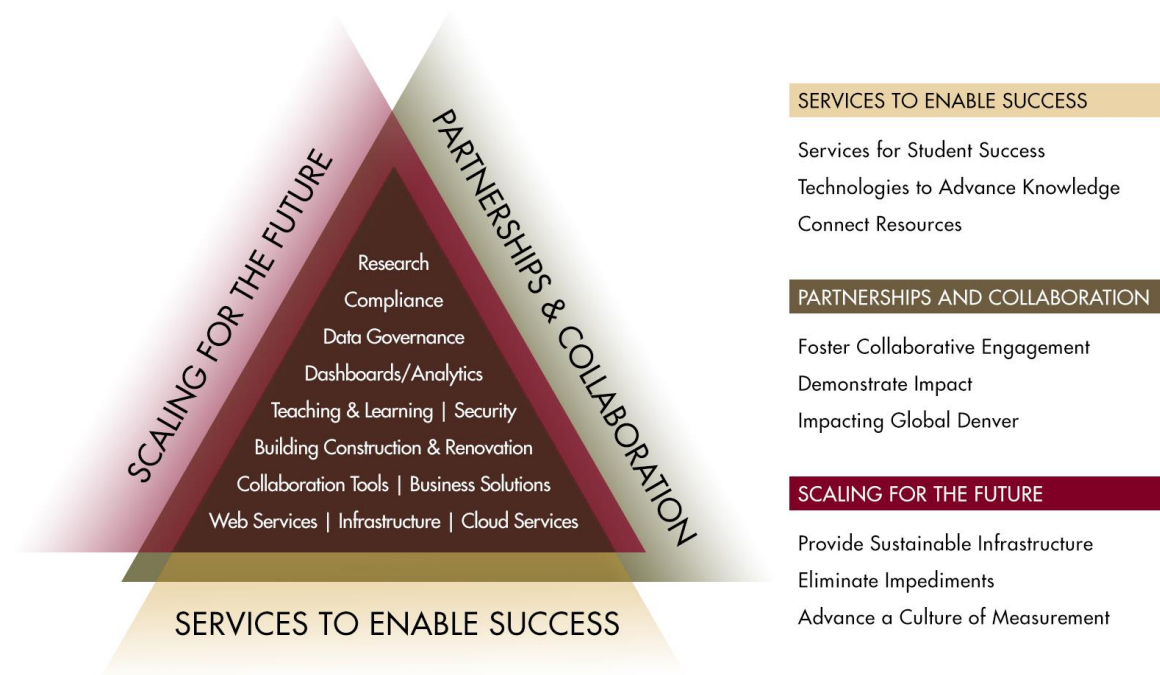
EXECUTIVE SUMMARY

University Technology Services (UTS) is pleased to present the University with a report detailing many of the projects and initiatives completed or underway in 2015. Three strategic themes guide the use of information technology (IT) in support of the University's mission. This annual report describes these strategic themes and identifies the alignment of 2015 initiatives and projects within each, and draws connections to the *Impact 2025* DU strategic plan.

UTS relies on the following strategic principles to steer the direction of technology for the institution:

- **Services to Enable Success** - Champion, deliver, and support services that provide students with what they need for success, and faculty members with what they need to advance knowledge. This aligns with the first two key transformative directions outlined in *Impact 2025*.
- **Strategic Partnerships and Collaboration** - Expand the value proposition of technology services across the institution through strategic partnerships and collaboration. These programs and initiatives reach out across the university to foster collaborative innovation, and leverage effort, supporting DU's capacity to lead to solve problems through engagement. This key theme of engagement aligns with the context of Global Denver in *Impact 2025*.
- **Scale for the Future** - Develop and enhance sustainable campus infrastructure and services that scale and adapt to the continual changing needs of our holistic community. We strive to eliminate impediments, streamline effort, and enable staff, facilities, and information infrastructure to support One DU, as articulated in *Impact 2025*.

STRATEGIC OVERVIEW



Nearly every technology initiative undertaken in UTS aligns with multiple strategic themes, and in many instances supports all three of these, and of course, as a central technology resource for the entire campus, supports One DU. For example, the implementation of Microsoft Office 365 Cloud Collaboration Suite as a campus communications and collaboration tool delivers a service that enables constituents be more successful, offers a platform to foster collaboration and partnership, and scales for the future in providing global accessibility and cost effectiveness. Further, nearly every initiative happens through collaboration and engagement between UTS and another DU unit or partner.

Key to ensuring that UTS is informed by campus and unit strategies is IT governance. While a governance model was designed in 2012, it is time to take a new look at the way key decisions are made, timelines established, and priorities determined, all in collaboration with campus stakeholders.

UTS looks forward to continuing to improve the campus technologies, services, and experience for our students, faculty members, staff, and extended community members. We are happy to say that University Technology Services has always been in support of One DU, of student success and creation of knowledge, and helps the University as a whole connect with the world through seamless and secure information flow. We appreciate your support and commitment to working with us throughout the next year and years to come.

SERVICES TO ENABLE SUCCESS

Champion, deliver and support services that provide students with tools and systems for success, and faculty members enhanced capacity to innovate and accelerate knowledge creation. Access to campus infrastructure supporting information access, communication, as well as security and reliability are key to success for students and faculty.

A primary mission of University Technology Services is to deliver reliable, secure, and high quality services to University constituents that provide the greatest value and support the objectives and strategies of the institution. Our goal is to exceed expectations in providing easy-to-use, seamless and safe technologies supporting communication, and intuitive and useful access to information and services to enable success for academic outcomes. Included in this strategic area are elements of our campus infrastructure focused on information security, privacy, and the safety of all.

SERVICES FOR STUDENT SUCCESS

Throughout the student experience, from applying to DU, to arranging financial aid, to using a laptop connected to the campus network, to uploading digital work to Canvas, technology is there to support success. The campus internet and information service should be secure and reliable, yet easy to find and use. Collaboration tools for working in groups, technology help services when something breaks, and classroom technologies to help students learn from each other are all parts of this year's highlights.

TECHNOLOGIES TO ADVANCE KNOWLEDGE

The faculty produces new knowledge every day, and their research data are emerging as one of the targets of technology support services. Research data management, high performance computing, graphics display capacity, and of course, the bandwidth to share data with colleagues around the world are all elements of success for the advancement of knowledge. But advancement of knowledge is key to data-centered decision making for university administrators as well, and data governance about and for the university itself is an element of success. Facilitating access to accurate information efficiently and effectively provides a tremendous value to the institution. Today, over 400 managers, directors and members of senior level management have access to enterprise reporting dashboards and real-time metrics that monitor business processes and activities from enrollment and graduation rates to research funding and alumni giving.

CONNECT RESOURCES

The connected landscape of higher education must accommodate access to resources anywhere and anytime whether on or off campus. Today's student, faculty member or staff person needs access to information and data from many different sources, and UTS provides deep integration among systems housed and administered on campus to facilitate accurate and relevant data. In addition, the institution utilizes more than 40 cloud-based offerings and services and nearly all of these systems are interconnected with DU campus systems. Whether utilizing *Microsoft Office 365 Cloud Collaboration Suite*, the institutional LMS *Canvas*, *Slate Enrollment and Admission* CRM or other cloud-based service,

the value and benefit to the institution and our constituents is in our ability to connect these systems and services together in a useful and meaningful way.

SERVICES TO ENABLE SUCCESS: 2015 IN REVIEW

WIRELESS NETWORK IMPROVEMENTS

A new wireless standard, 802.11ac, provides higher data throughput than the previous 802.11n standard on the 5GHz band. The newer specification was approved by the *IEEE Standards Association* in January 2014 and installed in the Margery Reed remodel, UTS building, Sturm flipped classroom, and University Park Apartments in 2014. The newer standard is planned for the Daniel Felix Ritchie School of Engineering and Computer Science and Knoebel Center for the Study of Aging, and the Anna & John Sie International Relations Complex. The project will replace current 802.11n access points and add additional access points as we build out campus wireless capacity through 2015-17.

- Campus firewalls were improved for upgraded security in creating a new “DMZ” zone for wireless networks.
- Complete back-end and service redesign is underway for fall 2015 and forward, including deployment of Aruba’s *ClearPass* to enable enhanced service levels, including unencrypted role based SSID “DU Wifi” with general use and guest persona roles on the same network, a MAC address self service registration method including gaming and entertainment devices, and transition to Microsoft *Active Directory* for authorization and role management. The net effect is easy access for students and guests.
- Major investment in wireless network capacity and wireless coverage expansion in residence halls, and academic buildings, including Sturm Hall with its outdoor classrooms, Centennial Halls, Centennial Towers, and Johnson MacFarlane Halls. This added over 1000 additional wireless access points (1 per sleeping room!). The Ricks Center was upgraded with new *WebSense* software for age-based web filtering.

Expansion of this approach by the end of 2016 will complete Nagel Hall, Nelson Hall, and other campus residence graduate facilities including apartments.

MICROSOFT OFFICE 365 CLOUD COLLABORATION SUITE: PHASE I COMPLETE

The *Microsoft’s Office 365 Cloud Collaboration Suite* is now in use by all current DU students, staff and faculty members, providing them all with @du.edu email boxes, 1 terabyte of personal storage, and 5 copies of Microsoft Office Pro Plus and Office Mobile for iPad, iPhone, and Android devices. DU alumni will soon be able to choose to retain @du.edu email boxes after graduation. UTS is entering Phase 2 of the Microsoft Office 365 project by launching pilot projects in synchronous collaboration using Skype for Business, and integrating the Office 365 solution with *Canvas*.

SERVICENOW IT SERVICE MANAGEMENT PORTAL

The institutional technology information and support web site, support.du.edu, is fully in use across campus, with distributed IT entities fully engaged and most decentralized support groups engaged. With greater use of the ticket escalation system, and query referrals, as well as service catalogs, analytics will improve the UTS capacity to watch customer service trends, and proactively determine preventative approaches to common IT problems. UTS continued its efforts to consolidate forms, documentation, and "how-tos" residing on iris.cair.edu.edu and www.du.edu/uts into *ServiceNow* to improve their

management, availability, and tracking of usage. Finally, UTS staff focused on two key services: development and access to technology solutions through documented “standard operating procedures” within *ServiceNow* for distributed IT staff to use, and provision of a new, searchable knowledge base. The knowledge base is available from the UTS website, and is extremely useful to students, staff, and faculty, since it is essentially a set of answers to IT questions.

MOMENTUM SCHOLARSHIP MATCHING

Financial aid is critical to students, and the effective management of financial aid procedures is part of most students’ positive experience at DU. University Advancement in partnership with Controller’s office, Financial Aid, and University Technology Services formalized the specific parameters and internal processes required to successfully execute the Momentum Scholarship matching program. As part of this initiative the scholarship project team built a framework that can be replicated and utilized for executing future matching gift programs. The technology components of this framework include: a dynamic webpage in Pioneerweb that will be used by development officers to produce a standardized scholarship agreement template including a workflow if the agreement has preferences not included in the original parameters, an automated process to match funds in Finance, and multiple reports to audit and reconcile the gifts and the corresponding match.

CAMPUS BACKBONE NETWORK IMPROVEMENTS

In order to improve campus wide network capacity and set the stage for future increases in network traffic and demand for faster network speeds, UTS telecommunication staff installed Cisco 6500 Core & Data Center Routers/Switches as well as other new equipment.

TOUCHNET BILL PAYMENT SUITE

Together with Student Financial Services, UTS implemented *Touchnet* software to offer a robust payment solution to our students and their parents. Features include the ability for students to see their accounts in real time, register their parents or guardians as authorized users, store payment information, make payment directly from a bill, and enroll in a payment plan. The students can register multiple authorized users and each user has the ability to create a unique password. Multiple payment plans can be set up for one student. Many parents who are separated like this feature, so each parent can pay a certain share via a payment plan. *Touchnet* interfaces with *Banner* as soon as a payment is made. This real time posting helps Student Financial Services manage cash flow.

INSIGHT ADVISING BY SYMPPLICITY

The Learning Effectiveness Program (LEP) implemented the *Insight* Advising Module by Symplicity in partnership with UTS/EAS. This module is a scheduling tool that allows tutors to post and manage their schedules, and gives students the ability to schedule an appointment with the tutors using their DU credentials. Features include automated appointment reminders, capturing data for missed appointments, identifying content areas and appointment times of high demand, and ability to verify timesheets against the hours worked. The product also provides a ‘portal’ to post training materials, news and current announcements for the staff of tutors who are essentially part-time employees, and offer tutoring outside of normal business hours. This replaced an inefficient, insecure, and inconsistent method of information management.

BANNER XE ATTENDANCE TRACKING

This Banner XE module is a web-based class attendance tracking tool, allowing faculty to document attendance, excused and unexcused absences, tardiness, etc. This tool was implemented initially at the request of the English Language Center, which is required to track attendance for foreign students

pursuing English language instruction in the U.S. The newest version offers numerous enhancements, including a mobile interface, student photos, among others.

BANNER XE STUDENT ADVISING PROFILE

XE Student Advising Profile provides comprehensive student information to advisors in one place. Features include advisee searching; advisee lists; excel download capabilities; a robust student profile page with pertinent information such as academic standing, holds, advisor(s) information, photo, links to degree audit, registration information, and prior education and test scores. It also allows for customizable additional links. The student profile is also available to the student through PioneerWeb.

CANVAS LEARNING MANAGEMENT SYSTEM: NEXT STEPS AFTER ADOPTION

The move to Canvas is complete, and all faculty using the learning management system (LMS) can now use the Canvas dashboard to track student activity, assignments and grades to provide extensive course level analytics used to predict how students react to course activities, identify at-risk students, observe the effectiveness of teaching strategies, and provide insight into student achievement. Blackboard, the legacy LMS, was decommissioned in early summer, 2015. UTS continues to partner with the Office for Teaching and Learning to explore the use of solutions allowing asynchronous and synchronous connections to course content, as well as integrations with Microsoft Office 365 to provide access to file storage and collaboration capabilities across the two platforms.

PIONEERWEB CAMPUS INTRANET

The PioneerWeb SSO (single Sign-On) architecture was extended to allow trusted applications to render information specific to the user within the PioneerWeb portal. This allows for the creation of "dashboard" views rather than passing the user to an application (or sometimes multiple applications) to find the most commonly viewed information. UTS also worked with the OTL's *Canvas* administrator to develop a "My Courses" portlet to allow DU users to view current, future, and past courses in PioneerWeb, and click through directly to the corresponding courses in *Canvas*.

ANSWERS: A CAMPUS-WIDE FAQ PORTAL

Working with the Library, Student Life, and many other units, UTS has helped establish a one-stop FAQ website using the library's license to *LibAnswers*. By collecting FAQs from all over the DU website, creating new FAQs based on questions received at the Driscoll Center Information Desk and all the service points in the Anderson Academic Commons, UTS hopes that this portal will eventually replace all unit-supported FAQ websites, making management of Q&As easier and answers much more visible to students.

CAMPUS CALENDAR (25LIVE) ROOM RESERVATION FRONT END

Sometimes a space is essential for academic success. The Room Reservation application was originally developed to provide a user-friendly way for students and others to reserve a group study room in the Anderson Academic Commons. Over the past year, the application was upgraded to allow users to cancel their own room reservations, and to provide Library staff with reporting on study room utilization that was not available from *25Live*. Efforts are currently underway to extend the Room Reservation application to accommodate any campus unit that manages space in *25Live* to make rooms available for self-service reservations/cancellations.

FOUR WINDS INTERACTIVE DIGITAL SIGNAGE

In 2014, UTS staff collaborated with University Libraries, Marketing & Communications, and divisions to implement *Four Winds Interactive*, a cloud-based visual communications platform for managing digital

signage and visual applications enterprise wide. Consistent presentation and brand management across campus keep students, visitors, faculty members, and staff engaged, informed, and up-to-date across the campus with routine and emergency notifications. The simple to use “drag and drop” content management solution provides templates for a consistent “look and feel” across the institution while allowing for each college or division to customize areas of the signage for tailored messaging and content. New, toward the end of 2015, is integration with the Division of Campus Safety’s emergency notification system, so all digital signs across campus alert students, staff, and faculty. That is key, since we now have 51 digital signs deployed in 20 buildings across campus, thanks to UTS telecommunications staff.

SPAM/MALWARE MANAGEMENT

The first defense against SPAM and malware detection/prevention moved to the *Microsoft Office 365 Cloud Collaboration Suite*. Office 365 offers new opportunities to manage spam and malware, and the University is now fully licensed for Malware-Bytes, which will identify and remove these problems from all faculty, staff, and student PCs.

Cyber criminals often use email spear phishing attacks, as well as malicious file attachments and URLs in emails to launch an advanced cyber-attack. Through additional services located on the DU network, ill-intended emails are blocked, and if a few phishing messages land in the “mail jail” or “junk mail” folders, users are automatically notified by UTS with a branded email from the Chief Information Security Officer. Managing email SPAM, detecting and blocking spear phishing, and providing protection from malware infections continue to be ongoing challenges that will involve stepped-up user awareness.

SCCM DESKTOP MANAGEMENT

UTS chose Microsoft's *System Center Configuration Manager (SCCM)* as the enterprise management solution to track and support institutional computers running Microsoft Windows, Windows Embedded, Mac OS X, Linux, and Unix operating systems. SCCM is being tested and deployed in 2015, offering increased service and management for remote control, patch management, software distribution (such as software for malware management), operating system deployment, network access protection, and hardware and software inventory. This project is now enabling Customer Services as well as distributed IT staff to more easily manage university-owned Windows workstations in departmental labs. Indeed, all DU-owned computers will benefit, since SCCM pushes out software updates and security patches, and manages software applications remotely that are a part of managed workstation images. Automating and unifying the management of large numbers of workstations not only improves service efficiency and saves time for users needing support, but also improves security since upgrades and patches are no longer optional. It is worth noting in this area that the Symantec Enterprise Antivirus software package included a major campus-wide upgrade.

MACIMAGING AND APPLE SERVICE TOOLKIT DIAGNOSTICS

Apple computers are popular with students, faculty, and staff alike, and when something goes wrong, the HelpDesk staff are now able to safely re-image these computers, and reinstall all files and data in mere minutes rather than in hours or days, resulting in a dramatic service improvement.

CRITICAL NETWORK AND APPLICATION PERFORMANCE MANAGEMENT

In 2014, UTS implemented NetScout's *nGeniusONE* software platform to better monitor and manage critical on and off campus application performance. With both real-time and historical measurement data, UTS can identify when critical applications are not performing at peak levels; allowing faster troubleshooting of application performance events more rapidly. UTS will continue to add more

applications into the solution in 2015 to gain further visibility into critical applications and their service performance levels for our customers. The result for students and faculty is reliability.

DU DISCOVERIES ORIENTATION AND TECHNOLOGY SESSIONS

All incoming undergraduate students benefited from these sessions, which were critical for orienting students to the new network and Office365 capacities as well as existing IT environments such as printing services.

CAMPUS ACADEMIC TECHNOLOGIES COMMUNICATIONS AND SUPPORT

UTS focused considerably on improving communications and information-sharing on academic technologies with our campus community. Quarterly Vinculum meetings sponsored by UTS staff provide a common venue for IT professionals across campus to meet and share information, highlight solutions deployed in departmental areas, and learn about upcoming institutional initiatives. UTS staff participate in quarterly meetings of the AV Consortium, a new campus-wide meeting convened by the University Libraries of IT staff concerned primarily with support of audio-visual, video, and videoconferencing technologies related to academic and event programs. UTS Research Support staff facilitate quarterly meetings of the High Performance Computing Steering Committee to discuss and set usage guidelines, as well as prioritize future investments in research computing resources.

UTS created an annual report site at www.du.edu/uts/annualreport to make UTS projects and initiatives available in web format.

UTS also developed standardized email templates for informational, warning/outage, and phishing messages. In addition to being sent to email recipients, templated email messages are also routed to UTS' environment for IT services management, *ServiceNow*, where they automatically notify Help Center staff, and are converted to a knowledge base article that can easily be edited, updated, and pushed to other notification channels (Ex: support.edu.edu, www.du.edu/uts, and *FourWinds* digital signage) as alerts.

AVIGILON CONVERSION FOR CAMPUS SAFETY

As part of the Division of Campus Safety's strategy for a safer campus, UTS staff supported wiring of new surveillance cameras and analog encoders, and management of the software and servers used for this new system. The new equipment replaces old stand-alone DVRs, and the upgraded cameras, encoders, and power-over-ethernet switches have been installed in 42 buildings, including parking structures, across campus.

VIRTUAL DESKTOP INFRASTRUCTURE (VDI)

The Ricks Center for Gifted and Talented Education has a new wireless network, new VDI imaging, and security enhancements through *WebSense*-enabled internet filtering for the young students. The UTS Telecommunications and Information Security staff collaborated to improve age-appropriate access to information, and managed control of workstations and mobile devices in the school.

VDI for Daniels College of Business classes involved a pilot to provide the Windows operating system, required for a number of Daniels College applications, on a virtual machine installed within a Mac computer. With a great many Mac-using students, this could be a money-saving solution enabling them to use the Mac they brought as undergraduates in their required Microsoft Certification Program. Students with Macintosh computers often incur cost upwards of \$300 and spend approximately 2-4 hours for initial set-up, as well as expected maintenance and often reinstallation of a localized virtual environment. In our implementation of a VDI environment, students are automatically provisioned with

their own personalized, virtual Window's desktop for the entire quarter. With the success of this pilot, we plan to roll out similar environments to other Daniels' classes throughout the academic year.

REDCAP

UTS worked collaboratively with ORSP, University Libraries, the Associate Provost for Research, and researchers in International Studies and Graduate School of Professional Studies to conduct a pilot of "Research Electronic Data Capture" (*REDCap*). *REDCap* provides a tool for designing and conducting data gathering instruments specifically designed for human subject/clinical trials. The data is then properly formatted for detailed analysis. All of this is done with data integrity and security in mind. The pilot was very successful and is being implemented in a manner that will allow the service to be offered when appropriate to researchers conducting human subject research or clinical trials.

HIGH PERFORMANCE COMPUTING

The High Performance Computer cluster provides advanced analysis tools and storage for researchers in the College of Education, Natural Sciences and Mathematics, the department of Psychology, and the Daniel Felix Ritchie School of Engineering and Computer Science. Research support for high-powered advanced computing evolved to include Graphics Processing Unit (GPU) capabilities that can perform certain complex analysis functions much more quickly than traditional high performance computing models. Grant-funded GPU workstations are now being housed in the UTS co-location facility where researchers can take advantage of the security, power redundancy, and environmental controls of an enterprise-grade data center. In addition, the use of the university's traditional High Performance Cluster was expanded to allow students access to this valuable computing resource.

FACULTY SPONSORED RESEARCH DASHBOARD

In partnership with the Office for Research and Sponsored Programs, the Provost's Office, and Institutional Research, UTS built a Faculty Sponsored-Research Dashboard. This dashboard provides valuable insights to the University's leadership on grant proposal success rates, grant award portfolios, and grant expenditures. The information can be displayed at a division, department, and principal investigator level. Not only does the DU faculty advance knowledge, but now, this collaborative project advances data about advancing knowledge through research.

STURM HALL CLASSROOM UPGRADE

Previously mentioned WiFi upgrades in Sturm Hall classrooms, the most heavily scheduled for undergraduate classroom utilization, were coordinated and completed in summer of 2015 to support a major upgrade to the classroom learning environments in this building. The University Libraries, responsible for classroom support, completed an upgrade that placed new digital controls, collaboration capacity, and a windows computer in every classroom scheduled by the Office of the Registrar. This allows new computers that only have HDMI ports to be able to connect to high-definition projectors. Further, anyone in the room, including faculty or students, can send what's on their laptop to the screen to collaborate, share work, or do presentations. Software installed on the in-room computers will in the future enable remote communication, video calls, or distance learning. Some of the classrooms were also upgraded to include multiple wall-mounted flat panel displays for high-resolution work and multiple break-out groups. As always, the UTS telecommunication group partnered with the University Libraries and Facilities in this project. Sturm Hall classrooms will have new Unified Communications VoIP phones installed by the end of the year, providing additional conferencing capacity.

INFORMATION SECURITY POLICY

A key part of the information environment for students and faculty is a set of policies and practices representing a new Information Security Program. A suite of program elements and a comprehensive information security manual will guide the advancement of information security practices for the University. These practices will help ensure the safety, privacy, security, and reliability of our network, computing equipment, data, and information in all forms. A key element of success will be new future training programs for students, faculty, and staff on safe practices for protection of digital information. The new policy was approved in November 2015.

DATA STEWARDSHIP ADVISORY BOARD, AND THE INFORMATION, MEASUREMENT, AND ANALYTICS COUNCIL

Because accelerating knowledge (through use of analytics, data visualization, management of data sources, and information resource sharing) is important to the success of the University, UTS has been one of the leaders in two key initiatives to build a sustained effort to support data-centered decision making through resources of the Office of Institutional Research.

The University's Information, Measurement, and Analytics Council (IMAC) continues to promote analytic efforts and informed decisions based on data through cross-functional team interaction and learning. IMAC strives to enhance data literacy of campus constituents through professional development and dissemination of information related to data and analytics. Bi-monthly IMAC meetings are structured to include professional development, discussion, and relevant University updates. The IMAC is led by the Data Stewardship Advisory Board (DSAB), made up of leaders from Institutional Research and Analytics, University Technology Services, and Planning, Budget, and Analysis. This model of advancing analytics at DU has been shared at multiple conferences this year, including a keynote address at the annual Association for Institutional Research (AIR). The DSAB is currently developing roles and responsibilities for data stewards of systems of authoritative sources. The DSAB is also developing guidelines for storing and sharing confidential data.

There is increased attention for data governance and stewardship in higher education. At DU, awareness has been drawn to our "Culture of Measurement" through the report of the [Strategic Issues Panel](#). With greater dependence on data to identify trends, evaluate performance, and support decision-making, there is a clear need for institutional policies for consistent data definitions, data retention, data usage and data security. The DSAB worked with UTS to establish institutional guidelines for data system implementations. These guidelines outline the roles required for a system implementation as well as designating the responsibilities and duties of the implementation team members. A key platform for future initiatives is identification of key data sources through an inventory of software in use across the campus.

CABLE TV FOR RESIDENCE HALLS

A new one-year cable TV trial with *Xfinity on Campus* is moving forward to respond to student and Student Life staff requests for improved cable TV access on computers, tablets, phones, and other personal devices.

STRATEGIC PARTNERSHIPS AND COLLABORATIONS

Continue to expand the value proposition of technology services across the institution through strategic partnerships and collaboration across the university. Support DU's capacity to engage with the community of Denver, alumni, and beyond.

Through strong communication, engagement, partnership, cooperation, and collaboration, UTS is a part of the successful completion of technology projects and programs that bring success and improved technology platforms. Further, UTS supports nearly all construction and renovation projects, many of which enable the University to thrive in innovative collaborative programs. Collaborative work has deployed software designed to create community and global reach to alumni, corporations, and foundations. The linkages afforded through technology bring DU into a connected world.

FOSTER COLLABORATIVE ENGAGEMENT

In 2014 and in the years to come, higher education will become increasingly reliant on a "connected landscape" to facilitate access to people, information, systems, and services. This connected landscape must accommodate access to resources anywhere and anytime whether on or off campus. Today's student, faculty member or staff person needs access to information and data from many different sources and these sources must be "connected" in a purposeful way. UTS provides deep integration among systems housed and administered on campus to facilitate accurate and relevant data. Connected systems connect people.

DEMONSTRATE IMPACT

Facilitating access to accurate information efficiently and effectively provides a tremendous value to the institution. From helping to implement software that helps University Advancement staff connect with and track donors and alumni to supporting planning for a major website redesign led by the Division of Marketing and Communication, the positive impact that UTS brings to DU in turns supports DU's impact on its global constituents and their views into the University.

IMPACTING GLOBAL DENVER

In today's environment, institutions of higher education must not only offer information and services that support business needs, but also must be able to implement and adopt these services in record time with minimal resources and disruption. We must not be ivory towers, but must be connected and dynamic catalysts for innovation, using communication systems, social media, websites, and many other technologies to listen carefully to the needs of the community and speak clearly to address problems.

STRATEGIC PARTNERSHIPS AND COLLABORATION: 2015 IN REVIEW

DFR SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

The [Daniel Felix Ritchie School of Engineering and Computer Science](#) and the Knoebel Center for the Aging will include a full featured Unified Communications solution, 802.11ac wireless, video conferencing, classrooms, labs, and collaboration and work spaces for students, faculty, and staff to

teach, learn, and connect. The building is rising, and both the telecommunication and AV bidding is complete. As of October 2015, the UTS telecom group has devoted 463 hours to the design, bid, and deployment processes for all aspects of technology capacity in this new showcase of technology teaching and learning. These technologies will support the capacity of this building to represent a bridge to the Denver innovation and engineering communities, supporting corporate connection designed to benefit our students and energize faculty research.

ANNA & JOHN SIE INTERNATIONAL RELATIONS COMPLEX

The [Anna & John Sie International Relations Complex](#) is a substantial addition to the Ben Cherrington building that will require renovation of the telecommunications infrastructure in both the existing building as well as the addition. The remodel and addition will include a full-featured Unified Communications solution, 802.11ac wireless, video conferencing, classrooms, labs, and collaboration and workspaces for students, faculty, and staff to teach, learn, and connect. The UTS telecom group has spent almost 150 hours working with Sie Complex consultants and contractors on network, teleconferencing, AV capacity, and wireless design for this highly connected global center.

THE BUCHEL MEMORIAL TOWER

Rededicated in honor of the nearly 300 military veterans who now are part of the student body, the Buchtel Memorial Tower also demonstrates the University's dedication to the men and women who have served our country in the military, and serves as a connecting point for Denver area veterans. The Tower is all that remains of the Memorial Chapel building, which was destroyed by fire in 1982. The building was completed in 1917 and was named in honor of alumni who died serving their country during World War I. In 1949, Memorial Chapel was renamed the Buchtel Chapel after Chancellor Henry Buchtel who served as chancellor of the University from 1900-1924. The ground level of the tower now contains a meeting room, which has been upgraded to include network access, wireless, and telephone access.

DU WEBSITE REDESIGN

It is often said that the University's website is as important as its physical facilities, since it is our global virtual presence, linking parents, friends, donors, prospective students, and alumni with current students, faculty, and staff. This year, as the Marketing and Communication Division studied the options for updating and improving our web presence, key UTS leadership was involved with the research, and the request for proposals, as well as the interviewing of finalist firms. Now that the redesign project is underway, key UTS staff continue to support the process through participation in action committees, and we look forward to a positive outcome for DU and its external constituents.

TEMPORARY FACILITIES FOR SHARED SERVICES, AND MAIL SERVICES

As with numerous off-campus DU facilities, whether permanent or temporary, the UTS Telecom group installs networking capacity, wifi, unified communications phones (VoIP) as well as software and server access. In this case, the large temporary facility at 1325 S. Colorado Boulevard is up and running with Shared Services staff. The new warehouse, located at 4925 East Pacific in Denver, is currently being converted to support other functions such as Mail Services, and Shipping and Receiving, and will be similarly configured with network connectivity, wifi, unified communications.

RENOVATIONS

All Phase I and many more minor space planning projects and renovations involve the UTS Telecom group. Examples are the reconfiguration of the Driscoll Underground, the Lacrosse locker room, the Custodial Services house, the meeting room in the tower of Mary Reed, and others. UTS

Telecommunications is a strategic partner of the University Facilities Division, as their projects are always interwoven and collaborative. The major remodel of 2467 South Vine Street for Shared Services' relocation back to campus is already underway for 2016!

GUEST WIRELESS

As easy to use as a Starbucks wifi connection, the new Guest Wireless connection was launched this fall, 2015. A digital welcome mat for visitors and guests, the new wireless system for guest use leverages the same infrastructure that was rolled out for DU students, staff, and faculty, using a system that automatically expires after 4 hours.

GUEST PARKING

A key element to welcoming guests is parking, and this year, UTS telecommunication staff worked with Parking Services to network 16 new Cal America self-service paystations, many with new fiber links, through an extension of the campus network for visitor convenience and Parking Services revenue.

CULTIVATION AND SOLICITATION STRATEGIES TRACKING

The Cultivation and Solicitation Strategy tracking application provides an easy to use interface for fundraisers to enter, track, and manage their tasks related to cultivating and soliciting donors. The ability to track the due dates for the various proposal and fundraising tasks has helped streamline the process to successfully cultivate donors. Partnership with University Advancement in developing this new application brings the world of DU alumni, friends, and supporters closer to our One DU in terms of maximizing giving.

iMODULES

University Advancement in partnership with MarComm and UTS implemented *iModules* with multiple sealed sub-communities for the various units on campus. This new implementation provides for unique site branding; community membership, administrative rights, and email/event templates specific to the community; email marketing and event management segmented at the community level; and revenue management at the community level. As part of this implementation, a real time interface between *Banner* and *iModules* called *Advancement Connector* and a nightly interface for additional data integration will be implemented by the end of 2015.

CURRENT WEBSITE IMPROVEMENTS

Since the new website will require some months to design and deploy, the UTS Web Services group continues to make improvements, by using the *SiteImprove Quality Assurance* module to scan www.du.edu sites for broken links and misspellings. In prior years, it was not unusual to have 1,000+ broken links, with hundreds of misspellings reported across www.du.edu sites. After a concentrated effort to eliminate as many of these as possible, for a single day in February 2015, broken links and misspellings were reported by *SiteImprove* as zero! This effort had a measurably positive impact on Google's evaluation of the quality of DU's web pages. Since that time, broken links and misspellings (maintained primarily by DU site managers) have remained at 10%-20% of the prior "normal" level.

UTS efforts to improve support to DU site managers in DU's web content management system OmniUpdate *OU Campus* (OU) included customizing the hosted OU login screen to add DU "branding" and in-context help. UTS also leveraged OU's newly-released Graphical User Interface gadgets to improve web editor productivity by building a *SiteImprove* Site check gadget, 25Live script snippet generator, and a User Guide gadget that all display alongside other editing tools inside OU. While it

sounds complicated, it makes life simpler for the DU staff across all campus units who manage and maintain their webpages with *OUCampus*.

What about improved searching on the DU website? That box in the upper right hand corner of every web page is an important tool for searching success. It works using the Google Search Appliance (GSA). UTS developed custom 'feeds' to push content that is not readable by the GSA crawler into search results to support greater discoverability of previously 'hidden' content. This included creation of feeds for Campus Calendar events and UTS *ServiceNow* knowledge base articles.

All of this helps the world see DU much more clearly and completely.

C-CURE ACCESS CONTROL AND SECURITY MANAGEMENT

Part of being a campus open to the general public is providing a safe urban environment for all. UTS collaborated with Campus Safety, Facilities, and the Pioneer ID Card Office to implement *C-Cure*, a campus wide institutional access control and security management solution. The system was chosen primarily to respond to security risks in times of emergencies, but also to address the inefficient use of Campus Safety officers' time to manually lock and unlock the majority of the buildings each day. This implementation required significant integration between the institutional ERP, Banner, the campus Pioneer ID Card system, and *C-Cure* as well as collaboration among Facilities, Campus Safety, and UTS to install, monitor, and maintain the telecommunications infrastructure across campus buildings. The rollout of this important initiative will take place in individual buildings in 2015-2017, and as of October 2015, 320 doors in 21 buildings have been readied for the new technology.

NEW TECHNOLOGY REVIEW PROCESS

UTS worked with many institutional departments and divisions to facilitate and oversee an institutional review process for more than 40 technology-related projects. The New Technology Review Process ensures completion of a feasibility analysis and information security due diligence for each new technical proposal at the University of Denver. The intent of the review is to ensure that network and application integrity is maintained at all times, that data and information used is transported and stored in a secure manner, and that appropriate processes and procedures are in place to support and maintain the technology.

DISTRIBUTED BUT COORDINATED IT

There are three units providing DU with centralized IT services. Marketing and Communication provides leadership on the core DU website, the University Libraries provide the entire campus with audio-visual help in all our classrooms, and for events, as well as video production and editing services for academic and event purposes, and of course UTS provides customer services, web services, computer operations support, unified network, voice, and video infrastructure services, information security services, and enterprise application services for business operations. This year, the three central IT providers worked together more closely, collaborating through new and existing round tables to gather and communicate with the decentralized IT staff in dozens of academic and administrative units. This heightened collaboration will reap rewards for the future, as it establishes a platform that will enable a more unified approach to distributed work, improved IT governance, and stronger communication in all directions.

AUTO ATTENDANT

Operator Assistant from Parlance is an auto attendant solution that works with DU campus operators to meet growing call load demands, enable enhanced operations, and provide effective after-hours call support. UTS employed *Operator Assistant* services to help alleviate the need for additional staff

coverage of this important function as well as to provide operator assistance on evenings and weekends. Though the institution continues to provide staffed operator coverage during regular business hours, the auto attendant service delivers convenient, economical services to support a positive caller experience when the campus operator is unavailable. Indeed, many prefer to use *Operator Assistant* for calls to individuals; it is faster than looking someone up in the University Directory. The service is a friendly welcome to many external and internal callers. In a single month, September 2015, the *Operator Assistant* answered 3,221 calls, and successfully referred 2,042, or 63%, to someone on campus. Another 18.8% were referred to the switchboard operator for a personal touch, or to discuss a question.

ELLUCIAN ADVANCEMENT EVOLUTION TESTING

The institution contracted with Ellucian to participate in the alpha development and testing of *Advancement Evolution*, a hosted platform for the next generation Advancement and Development CRM. If selected for use, this enterprise solution would enable the institution to target key constituent groups for holistic relationship building that leads to more committed alumni and supporters. The cloud-based system includes higher education models, business logic, workflows, dashboards, and reports that take full advantage of the Ellucian XE strategy to enable real-time access and synchronization with the broader Ellucian solution portfolio. The partnership with Ellucian allows the opportunity for the University to see the new product earlier and to guide the functionality that will most benefit our DU community. Yet, there is no predetermined commitment to use this CRM, and UTS will work with University Advancement toward the end of 2015 to proceed with a CRM RFP based on a needs assessment currently underway.

PIONEER ATHLETICS FUNDRAISING AND TICKET SALES

Go Pioneers! An innovative system called *Pointstreak 50/50* was installed in the Ritchie Center this year, feeding to the Athletics website, the scoreboard, and supporting ticket supply and demand. The raffle approach to ticket sales sends 50% of jackpot dollars to a philanthropic target, and the other half to a raffle winner announced on the website and in the game. UTS worked with Athletics staff to install wireless terminals, cash collections methods, and the link to the scoreboard.

UTS SHARES WITH THE COMMUNITY

Through contributions of time and expertise, UTS staff has supported the technology community, the community of Denver, and the broader development of professional expertise and best practice in academic and higher education technology. DU hosted the Banner Users of the Mountain States conference in November of 2015, bringing hundreds of IT staff from other colleges and universities together to discuss Ellucian products and services. DU staff traveled to conferences to give papers at IT conferences, and thereby improved the University of Denver's reputation for innovation and excellence. For instance, Cindy Crouch and Craig Woody co-authored an EDUCAUSE Center for Analysis and Research (ECAR) working paper called "Calculating the Costs of Distributed IT Staff and Applications" published in August of 2015 by EDUCAUSE. DU also volunteered many hours of service and support to local DU-Denver partnerships such as the outreach programs of the Graduate School of Social Work, including the Neighborhood House and other Bridge Project sites.

SCALING FOR THE FUTURE

Develop and enhance sustainable campus infrastructure and services that scale and adapt to the continual changing needs of our customers. As a central resource for technology and technology services scaled for today and for the future, for students, faculty, and staff, we support the very concept of ONE DU.

Facilitating access to accurate information efficiently and effectively provides a tremendous value to the institution. Today, over 400 managers, directors and members of senior level management have access to enterprise reporting dashboards and real-time metrics that monitor business processes and activities from enrollment and graduation rates to research funding and alumni giving. The University of Denver was an early adopter of analytical financial reporting that integrated budget dollars and actuals on a daily basis. These administrative and business performance reports have been expanded to use more sophisticated multi-dimensional modeling tools that allow the institution to plan far into the future. Further, UTS has co-led, with the Office of Institutional Research and the Provost's Office, the IMAC, a powerful collective think-tank around Information, Measurement, and Analytics that scales up the impact of analytics and data to the campus level.

UTS has been supporting efficiency for staff across dozens of shared operations and transactions, leveraging effort through elimination of impediments, and streamlining workflow for many DU staff and faculty. Our investments in next generation technologies and infrastructure promote, support, and allow for future expansion that facilitate adaptable, flexible, and nimble infrastructure for future growth.

With partners, UTS will continue to evaluate the collective impact of enterprise, rather than unit, software decisions, with proposals to scale up what might otherwise benefit only a unit, or a division. In this way, as well as in many other ways, we represent One DU.

PROVIDE SUSTAINABLE INFORMATION INFRASTRUCTURE

Compliance efforts, information security, safety and physical security, financial security, robust telephony, and network performance are all key areas of the DU information infrastructure. Virtualization, centralized management of software patches and updates, and a host of carefully considered approaches to stability and redundancy are key to the reliability of information exchange.

ELIMINATE IMPEDIMENTS FOR EFFICIENCY

The pressure on higher education institutions to be more cost effective in the delivery of services to students, faculty members, and staff is substantial. Through ingenious software development, workflow improvements are possible for those who work within key software environments, and software connections build information flow from one secure workspace into another. Shared services themselves support efficiency, cost reduction, and higher quality, and UTS has helped the shared services offices deliver improved effectiveness. UTS considers and evaluates ways in which to improve cost effectiveness with every technology initiative, whether build vs. buy, minimizing customizations, leveraging systems with built-in integrations, or implementing a component "as a service". Even remote

desktop support workflow for help desk staff speeds delivery of solutions to problems without geographic barriers causing delay. In developing workflows and creating business process improvements, UTS helps streamline essential business processes so everyone at the institution has reliable access to the right information anytime, anywhere, to make better decisions and to be more productive.

ADVANCE A CULTURE OF TRANSPARENCY, MEASUREMENT AND DATA-CENTERED DECISIONS

Analytical financial reporting and other administrative and business performance reports have been expanded to use more sophisticated multi-dimensional modeling tools that allow the institution to plan far into the future. The admission dashboards not only show three year trending, but also predict the expected matriculation based on historical information and compare it with the desired budgeted numbers. The added ability to visualize dashboard reports can easily display concerns and influence changes in operations providing timely information to key stakeholders. Transparency and outstanding data for decision-making are also key components to open governance, a powerful contributor to One DU.

SCALING FOR THE FUTURE: 2015 IN REVIEW

CAMPUS-WIDE UNIFIED COMMUNICATIONS CONVERSION FOR VOICE OVER IP

An enormous multiyear project, the UTS Telecom group is well under way this year, with the goal of entirely replacing the old, end of life PBX phone system with VoIP in 18 months. The project charter and project plan outline steps for completion. Among the activities either planned or underway are readying all telecom closets, purchasing new application servers, and installing *Cisco Expressway* software (with the positive corollary result of enabling *TelePresence* equipment and other room systems to collaborate with *Cisco WebEx* cloud services). New gateway routers supply connections to all life safety analog lines for elevators, fire alarms, and the like. *RedSky* software enables e911 notifications for Campus Safety, and *Stack8* software enables automated provisioning and de-provisioning of phone numbers and services. *Informacast* software enables paging and call recording for Campus Safety. UTS is currently assessing the total number of phone licenses needed, to determine the most cost-effective timing of an enterprise campus license for user and device licensing. Next steps include investigating a new efax campus solution to replace the PBX faxing services, and a new Contact Center by Cisco. In the meantime, the legacy voicemail and efax systems were upgraded to avoid premature failure. Overall, this project leverages the upgraded switches and routers being installed for the new campus wireless rollout, and demonstrates the merger of telephone and telecommunications hardware, software, and industries. Currently, the newer buildings that have VoIP phones include Ruffato Hall, Anderson Academic Commons, the temporary Shared Services building, the Hampden Center (library and art storage), the UTS Building, Campus Safety, Margery Reed Hall, and other buildings already completed are the Mt. Evans Observatory, Centennial Halls, Centennial Towers, and Johnson and MacFarlane Halls. By the end of 2015, UTS is scheduled to complete Nelson and Nagel Halls, and the Sturm Hall classrooms.

KRONOS TIME AND ATTENDANCE

The implementation of the *Kronos Time and Attendance System* greatly impacts the efficiency of the collection and approval process by replacing antiquated time card processes in favor of a fully automated system. The Controller's Office estimates a saving of more than \$140,000 per year in reduction of errors, staff salary inflation, overtime reduction, absence management, and reduction in administrative burden. The system was put into use in December 2014 for Facilities and Campus Safety

personnel, and there are now a total of 47 wired time clocks installed. This process will be extended to all non-exempt employees in January 2016. The *Kronos* leave management module for all exempt employees is scheduled to go live by the end of Spring 2016.

INTEGRATION OF BOMGAR AND SERVICE NOW

Bomgar, our remote desktop management tool, has increased our first-call resolution tremendously over the past two years. To further improve services, we have successfully integrated *Bomgar* with *ServiceNow*. With this integration, *Bomgar* sessions can be initiated from within Service Now by a Help Center Phone Consultant, with a remote session being logged by video screen capture as well as critical information automatically saved in incident work notes. The sessions can be easily searched, reported and called upon, creating both a more streamlined and robust support system and positions us to implement the chat feature within *Bomgar*. Because remote services are most helpful to those using full size office-configured workstations that are not easily transported to the Help Center, this new development is highly beneficial to staff.

ADVANCED ANALYTICS AND PREDICTIVE MODELING

The University has invested in technologies that have prepared the institutional framework for advanced analytics: a data warehouse, *Cognos* business intelligence and performance management software, the Ellucian *Banner ERP*, Learning Management Systems and Customer Relationship Management (CRM) solutions. The emphasis on collecting and securing accurate data has positioned the University to now leverage more sophisticated advanced analytic/predictive modeling tools. Advanced analytics can be comprised of many different forms including: modeling success outcomes, predictive analytics, classification analysis to segment audiences, data mining and descriptive analysis, text mining, forecasting, and optimization analysis. In embracing a "Culture of Measurement", the institution has positioned itself to be more responsive to using data in many more capacities, such as decision-making, creating engagement factors, and benchmarking.

TECHNOLOGY DASHBOARD

This year, there is a new Technology dashboard for Enterprise Application Services, providing transparency on the impact of hundreds of small and large projects to improve workflow and decision-making. This dashboard also models best practices for analytics presented to the Information, Measurement, and Analytics council.

SECONDARY AUTHENTICATION FOR SENSITIVE INFORMATION

With the recent uptick of phishing attempts and other forms of sophisticated social engineering, first level credentials are becoming compromised more frequently causing concern regarding access to information such as banking information, pay information, and records with a social security number. In order to provide more stringent authentication to protect personally identifiable information (PII) or sensitive information of our University community, a secondary password/pass phrase was developed and implemented. The industry standard of having a set of confidential security questions/answers selected initially by the employee or student along with another password/pass phrase was used. The process for the initial setup is shared in new hire meetings as well as new student orientations. This second password is required to be entered before allowing access to web pages containing PII or sensitive information. If employees or students forget their second password, they can answer their security questions that will then allow them to reset their password/pass phrase. If they can't answer the questions the first time, they will not be allowed to proceed and will receive instructions for contacting Payroll or the Bursar's office to have their security questions/answers reset.

BANNER ACCESS PROVISIONING BY POSITION

In order to grant Banner access to new benefitted employees more efficiently, UTS has developed and implemented a position-based model for provisioning. This process automated the provisioning of *iBanner* form access, financial funds and organizations, HR organizations, Financial Aid funds, document management (*Xtender*), *Cognos*, and *Banner* views used in *MS Access*. This automation reduced the time to completion, reduced human errors, and created efficiencies across all departments on campus.

BUSINESS PROCESS IMPROVEMENTS

Business Process Improvements reduce the time and effort to perform recurring tasks. UTS developed user-friendly electronic processes, each using intuitive web interfaces, to improve the following processes not previously mentioned in other strategic areas of this report. Each new process provides a validated single point of data entry reducing human errors, improves process efficiency, reduces time to completion, and provides transparency and accountability.

Employee Separation Process

As part of the Shared Services initiative, UTS in partnership with Shared Services, HR, and the Provost's office developed an electronic application to initiate an employee separation process. This process leverages workflow for approvals and automatically separates the employee in Banner.

Benefited New Hire and Transfer Process

As part of the Shared Services initiative, UTS in partnership with Shared Services, HR, and the Provost's office developed an electronic application to initiate benefitted hires and internal transfers. This system is integrated with Silkroad *Openhire* to streamline the posting and hiring process.

Benefited Job Change Request Process

As part of the Shared Services initiative, UTS in partnership with Shared Services, HR, and the Provost's office developed an electronic application to request changes to benefitted employee jobs. Examples are reclassification, promotions, salary increases, and temporary changes. This process leverages workflow for approvals and automatically applies the job change requests into Banner.

STUDENT FINANCIAL AGREEMENT

A recent decision in the Federal Court of Appeals, Eleventh Circuit highlighted a need for a formal payment agreement, both acknowledging the debt owed and covering the responsibility to pay costs of collection. The court ruled that unless a consumer agreed, in writing, to pay collection costs, the consumer was not responsible for said costs. DU, like many schools, opted to formalize payment agreements prior to registration, which also require students to agree to payment of costs of collection. A new financial agreement was implemented requiring the student to electronically sign the agreement prior to registration. The agreement will cover all costs for an academic year. Once signed by the student, he/she will be allowed to register for classes in that academic year.

SLATE ENROLLMENT AND RECRUITMENT CRM

UTS collaborated with Undergraduate Admission and Graduate Admission units to investigate solutions and select a "best of breed" cloud provider for an institutional Admission and Recruitment Customer Relationship Management (CRM) solution, Technolutions *Slate*. The undergraduate implementation within *Slate* has been in use for a year, and Graduate Studies and graduate units on campus are being onboarded into this same solution for recruiting and admission functions. A campus wide

implementation team for graduate use is deploying *Slate* across all graduate units in 2015 with the sole exception of the Sturm College of Law, which must continue to use the universal legal education approach.

SILKROAD

SilkRoad is a suite of products implemented by HR in partnership with UTS. It is comprised of three modules: *OpenHire* – Applicant tracking, *RedCarpet* – New Employee Orientation, and *Wingspan Performance* – Employee Performance Management. *SilkRoad Connect* is an integration module that spans across all three systems. Benefits of the *Connect* product include consistency in basic department, employee, and job information; and facilitation of a single sign-on platform across the three applications. UTS implemented individual interfaces to both *OpenHire* and *WingSpan Performance*. In addition to these interfaces, UTS is working on developing a nightly interface to transfer additional information from Ellucian *Banner* to *Connect*. While *OpenHire* was in use since 2014, *Performance* was implemented in the summer and fall of 2015, enabling cascading goals reflecting individual, unit, and university performance targets, as well as competencies, with scheduled conversation support throughout the year.

LIMEAID WELLNESS SOFTWARE BY ADURO

The institution contracted with *Aduro* for Limeaid Wellness Software for employees. The hosted solution incorporates aspects of individual health, well-being, and performance on one platform by targeting both healthcare and employee engagement. The solution encourages employees to set their individual visions and then creates personalized experiences for fostering awareness, obtaining goals, inspiring action, and meeting targets and challenges. Human Resources will have access to a corporate dashboard that reflects engagement to continually measure and evolve wellness strategies that meet institutional goals. University Technology Services partnered with Human Resources to develop an interface of benefited employees between DU's ERP Ellucian *Banner* and *Aduro*.

DATA CENTER IMPROVEMENTS

UTS continued to augment and enhance our system and service monitoring for the campus network and data centers. Several environmental and process monitoring services were implemented that provide timely alerts to staff when systems or services are problematic. Further, "green" lighting was installed this year, helping to limit cooling requirements.

INFORMATION SECURITY ASSESSMENT

Internal Audit engaged an outside company specializing in security risk assessments to perform a high-level security assessment. The assessment and a tool resulting from the engagement presents input across all aspects of information security and provides an opportunity to enhance DU's security posture. The only comment within the audit report related to UTS stated the importance of completing the enterprise level Information Security Policy.

TIME MATTERS

HR, University Counsel, and Risk Management in partnership with UTS are implementing Time Matters. Time Matters is a flexible case management software for tracking, investigating, and reporting details for a variety of matters. The product enables collaboration on matters between the three units utilizing an intuitive web interface, database, and document management system. Features include automated reminders of deadlines, templates for standard documents, tracking of all communications, and collection of additional data for specific matters. Processes and reporting will be consistent and streamlined.

INSTITUTIONAL SECURITY POLICY MANUAL

A key part of the proposed Information Security Program, this comprehensive manual outlines elements of success for the new program, which will be created through approval of the new Policy. The policy, program, and its manual will be submitted for approval to the Chancellor with feedback from the Executive Risk and Compliance Committee and the Board of Trustees Audit Committee, which first reviewed the policy early in 2015.

INTEGRATED TECHNOLOGY PLAN

An institutional *Integrated Technology Plan* merges current and future IT investments from baseline operations through organizational growth to strategic initiatives and forecasts these dollars in a multi-dimensional, collaborative planning, budgeting and forecasting solution for institutional technology funding. IT asset management tools and planning for strategic IT funding is identified as one of eighteen rapidly increasing strategic technologies in higher education. Current assets and planned initiatives in UTS were gathered and uploaded into the institution's *TM1* budgeting and modeling software in 2014. Remaining technology areas such as classroom technologies, Athletics, University Libraries, and other areas with specialized technology were incorporated in 2015 along with additional information about ongoing software commitments and updated data about replacements and upgrades scheduled in 2015.

REGULATORY/COMPLIANCE UPGRADES

Gainful Employment

To protect students at colleges and universities from becoming burdened by student loan debt they cannot repay, the U.S. Department of Education announced regulations to ensure that these institutions improve their outcomes for students or risk losing access to federal student aid. These regulations will hold career training programs accountable for putting their students on the path to success, and they complement action across the administration to protect consumers and prevent and investigate fraud, waste and abuse, particularly at for-profit colleges. Multiple *Banner* student module upgrades were implemented to support this regulation.

150% Enrollment Reporting

In 2012, Congress passed a law that limited the eligibility of subsidized federal student loans to 150 percent of a given program's length. In May 2013, the Department of Education (ED) released an Electronic Announcement regarding regulations published for the "Moving Ahead for Progress in the 21st Century Act" and the 150% Direct Loan time-limited eligibility provisions of Public Law 112- 141. As a result, student enrollment data that are reported to the Department of Education should include newly required fields so they can calculate a student's subsidized loan usage. UTS worked closely with The Office of the Registrar and Office of Financial Aid to apply multiple *Banner* student module software upgrades and patches to support this reporting requirement.

Affordable Care Act

Banner HR and Position Control upgrades were installed with components required to track the employee health coverage information for Affordable Care Act (ACA). DU is required to report the ACA information to Federal agencies through the 1094C form beginning tax year 2015.

Financial Aid

Multiple *Banner* financial aid module upgrades were applied due to regulatory requirements mandated by the Department of Education. Failure to apply these upgrades in a timely manner could result in substantial fines from the Department of Education and may have an impact on a student's financial aid package.

PCI DSS Compliance

In collaboration with the Controllers' Office, DU Merchants Account holders, and Wells Fargo, UTS Information Security successfully completed its 2015 *Payment Card Industry Data Security Standards* (PCI DSS) assessment in July 2015 with no significant findings. For the second year in a row the University has demonstrated that the access controls, processes, and procedures it uses to manage its PCI environment meet and/or exceed those prescribed in the PCI Data Security Standard.

SECURITY DEFENSE IN DEPTH

A number of changes in the way UTS delivers services to its user community forced changes in the methods and tools used to secure those services. Migration to cloud-based offerings such as Office 365 and changes in the way users access network services such as the new DU WiFi, resulted in the need to modify access controls and security monitoring/management devices across the University. As an example, malware detection and management for e-mail was move to the Office 365 solution and the University's WiFi authentication, authorization, and accounting were totally reworked. In order to keep up with the pace of technological change, the Information Security team is in development with a number of its stakeholders to develop and operationalize an Identity and Access Management (IAM) platform as well as a Mobile Device Management (MDM) solution. Integrating these tools with existing security capabilities will reinforce the University's security in depth strategy and position it for future growth.

VIRTUAL TECHNOLOGIES

The institution's fault tolerant, highly available private DU Cloud continued to be a tremendous success, providing fast provisioning and product development, business agility and elasticity, scalability, cost efficiency, high availability, resiliency, and disaster recovery. Using standard virtualization techniques, all applications running in this environment consume only what resources are needed at runtime. This popular and highly efficient consolidation technology has saved significant dollars within UTS and across campus as units take advantage of virtualized services that do not require hardware purchases. Every division and department benefits from this pooling of resources in a "shared services" model.

Virtual desktops continued to become more popular for both lab and personal computing settings. This centrally managed environment provides staff and faculty access to a customized "personal PC" from their office, home or another remote location as the copy of the desktop is housed in one of the campus main data centers. UTS completed a pilot evaluating NVIDIA's *GRID* technology and has acquired the product to enhance the virtualization environments. NVIDIA *GRID* significantly improves the performance of virtual desktops, especially in classroom settings where complex graphics rendering applications are in use.

LAW IT INTEGRATION

A joint Sturm College of Law and UTS project is underway to bring UTS support into the law school's technology infrastructure. A host of elements and options are being weighed, including extended help center and field support by UTS, website support and application support, network integration, server and storage administration, and Microsoft Office 365 integration.