UNIVERSITY of **DENVER**

UNIVERSITY TECHNOLOGY SERVICES

2014 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 institution with a report detailing many of the projects and initiatives completed or underway in 2014. 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 2014 initiatives and projects within each.

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, faculty members and staff with what they need to succeed
- **Strategic Partnerships and Collaboratio**n - Expand the value proposition of technology services across the institution as a key foundational asset through strategic partnerships and collaboration
- **Scale for the Future** - Develop and enhance sustainable campus infrastructure and services that scale and adapt to the continual changing needs of our community

STRATEGIC OVERVIEW

Nearly every technology initiative undertaken in UTS aligns with multiple strategic themes, and in many instances supports all three. For example, the selection of Microsoft Office 365 Cloud Collaboration Suite as a campus communications and collaboration tool delivers a service that will enable constituents be more successful, offers a platform to foster collaboration and partnership, and scales for the future in providing global accessibility and cost effectiveness.

UTS looks forward to continuing to improve the campus technologies, services and experience for our students, faculty members, staff, and extended community members. Nearly all of our IT projects are partnerships with colleagues like you. 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, faculty members and staff with what they need to succeed

A primary mission of University Technology Services is to deliver reliable, secure, 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, intuitive, useful access to information and services to enable success for University constituents.

CONNECT RESOURCES

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. 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 *Canva*s, *Slate Enrollment and Admissio*n 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.

ELIMINATE IMPEDIMENTS

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. 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.

STREAMLINE IMPLEMENTATIONS

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. Decreasing development time, improving functionality, and creating faster, more effective critical processes are vital aspects to insuring success for our constituents. Business process improvements not only streamline processes, but also provide

consistency in execution, enforcement of business rules, structured communication, added functionality, better device responsive user interfaces, and many more effective and efficiency improvements. 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 be more productive.

2014 IN REVIEW

BANNER XE REGISTRATION

Ellucian *Banner XE Registration* was implemented and used for winter quarter registration in October 2014. The new registration module provides each student with the ability to create one or more course "plans" for an upcoming term and then choose to register from the list of these "plans" with a single click, rather than selecting the next term's course registrations one course at a time. The module also informs the student about all outstanding issues with course plans (e.g. needing a course pre-requisite, requiring instructor approval, etc.) in advance, providing a better overall registration experience. The "pre-plans" can be created and saved for up to a year in advance, allowing a student to better plan and manage future course selection. This entirely new architectural approach optimizes user experience across various devices and platforms, including mobile, and was the first of many Banner XE modules to be implemented.

CAMPUS COMMUNICATIONS AND SUPPORT

UTS focused considerably on improving communications and information-sharing 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.

Secure remote support tools for individual desktop and mobile device management, deployment of enterprise computer lab, desktop, and Macintosh support solutions were enhanced to provide streamlined support models to improve response time and effective support for constituents.

CANVAS LEARNING MANAGEMENT SYSTEM

In April, 2014, the institution elected to move to a new advanced Learning Management System, *Canvas by Instructure*, an open-source LMS that provides course level analytics for continuous feedback to students and views for faculty to measure effectiveness of content and learning outcomes. These customizable dashboard views track student activity, assignments and grades to provide extensive course level analytics that can be used to predict how students react to course activities, see which students are at-risk, observe how effective teaching strategies are in allowing students to learn, and provide a quick view as to what students are achieving in the course. The institution will move from the legacy LMS (Blackboard) to the *Canvas* outsourced platform during the 2014-2015 academic year.

LEEPFROG COURSELEAF CATALOG

With an increasing need to publish information on academic programs and comply with various regulations, UTS worked with the Registrar's Office to acquire *LeepFrog: CourseLeaf Catalog and Curriculum Management* software to create web-enabled bulletins/course catalogs. The software delivers managed course and curriculum information to departmental web sites by leveraging Banner information and DU's web content management system. Consistent, integrated degree plans to aid in degree advising are available both within bulletins and institutional web sites. The solution also

streamlines and automates our existing manual course and curriculum proposal processes using online workflows.

MICROSOFT OFFICE 365 CLOUD COLLABORATION SUITE

The University of Denver contracted to use *Microsoft's Office 365 Cloud Collaboration Suite* in September 2014 and will begin rollout of this strategic solution in Q1 2015. The service will provide all current DU students, staff and faculty members with @du.edu email boxes, unlimited personal storage and 5 copies of Microsoft Office Pro Plus and Office Mobile for iPad, iPhone and Android devices. DU alumni can choose to retain @du.edu email boxes after graduation. Documents stored in *Microsoft's Cloud Collaboration Suite* can be integrated with the *Canvas Learning Management System*, allowing for collaborative sharing and editing of documents among students and/or faculty in courses. In Q1 2015, students, staff and faculty members will be able to access free downloads of the Microsoft Office products, cloud-based unlimited individual storage and Office Online, a web-based document-sharing solution for Word, Excel and PowerPoint. In Q2 2015, student email will be available. In Q3 2015, all existing University of Denver email for staff and faculty members will be migrated to email accounts stored in Microsoft's cloud, providing a standardized and uniform campus wide collaboration solution for DU community members.

PIONEERWEB CAMPUS INTRANET

UTS replaced the campus intranet (webCentral) with a new campus intranet system, *PioneerWeb.* While the new DU portal sports a new name and a new mobile-friendly layout, *PioneerWeb* retained the tabs, widgets, and single sign-on to familiar DU services. This initiative required extensive application infrastructure work as the campus portal system is the core system supporting authentication, authorization and identity management to all institutional services. This initiative also required implementation of new email and announcement tools utilizing a cloud-based service, *ReGroup*, to provide this popular functionality. *PioneerWeb* represents a complete re-build of 10 years of infrastructure and content and was launched in August 2014.

TERRADOTTA FOR STUDY ABROAD

UTS collaborated with the Office of Internationalization to implement *Terradotta's Study Abroad Management* solution, an outsourced study abroad management system that integrates with the institution's ERP. This solution delivers better processes for managing study abroad applications, provides search capabilities by subject and country, offers a more current user interface and streamlined program management, and comprehensive risk management for students, staff and faculty travel, domestically and abroad.

SECURE SSN REPORTING FOR STUDENTS

Per IRS regulations DU is required to request SSNs at least three times from students with missing SSN's who are eligible to receive a 1098T. UTS developed an application for SSN collection that provides students with a secure, paperless process for reporting their SSN to DU. Using the University Counsel approved electronic signature process in *PioneerWeb*, the SSN link only appears for students with a blank SSN. SSN information is entered using the IRS W-9S template and is verified to ensure the SSN is within the range of acceptable numbers, the entered SSN does not already exist in the system, and that the student is over 18 and can legally sign the IRS W-9S. To satisfy IRS requirements, an electronic copy of the signed document is saved in the system. Initial solicitations were sent in August 2014.

SERVICENOW IT SERVICE MANAGEMENT PORTAL

The institutional technology information and support web site, support.du.edu, was greatly improved in 2014 to provide a better service delivery framework, enhanced communications, and IT support related metrics while offering greater transparency and accountability. A new user interface delivers an improved "look and feel" and user experience to encourage self-service support and to promote the knowledge base, information sharing, and intuitive access to the Service Catalog. Two major version upgrades provided enhanced features, workflow integration and process improvements. UTS is continuing to work with other departments on campus to develop and improve process workflow for technology-related requests that require coordination and information sharing among two or more departments.

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*. Student applicants use this mobile-friendly portal that provides targeted content as a single gateway to manage and check on application status and processes. The undergraduate implementation within *Slate* is currently in use and efforts are focused on building out more features such as Early Experience and Transfer communications. Graduate Studies and graduate units on campus will also utilize this same solution for recruiting and admission functions. A campus wide implementation team for graduate use has been identified to establish and determine timelines and plan a coordinated effort for shared use in 2015.

STARREZ ONLINE HOUSING MANAGEMENT

Undergraduate students experience greater value from *StarRez Student Housing*, an outsourced self-service online housing solution that offers many features not previously available to students. Integrated with the institutional ERP, new services include online applications, roommate matching/search/messaging, room assignment and changes, check-in processes, meal plan assignments, online communication and payments, room inventory, maintenance management and built-in reporting. This year's entering fall class began using the service in June, greatly improving the experience for housing requests.

STRATEGIC PARTNERSHIPS AND COLLABORATIONS

Continue to expand the value proposition of technology services across the institution as a key foundational asset through strategic partnerships and collaboration.

In many ways, technology sits front and center in the realm of higher education. It is embedded in nearly every business process of the institution. Establishing and fostering partnerships and collaboration with departments and divisions on campus to expand the value proposition of technology is essential for the institution to remain competitive in higher education.

FACILITATE A CULTURE OF MEASUREMENT

The University is well-positioned for better decision making using information and data. The institution has a data warehouse and advanced analytical tools that provide a robust technology foundation to support and advance a "Culture of Measurement", described in the 2014 Strategic Issues Panel Report on Higher Education. Using advanced analytics, UTS provides the institution with the ability to mine data for key indicators of mission performance, to inform academia, and to make operational decisions. By establishing performance metrics, the institution can measure efficiency and effectiveness of business processes in areas such as shared services, workflows, etc. and focus decision making on the business outcomes on these important initiatives.

FOSTER COLLABORATIVE INNOVATION

Retaining and strengthening strategic partnerships across the institution to promote academic and administrative innovation is fundamental to the mission of UTS. Collaboration and support for innovation using technology helps foster knowledge, new ideas, and educational innovation for the institution. UTS partners with every division and department on campus in many ways. Whether the partnership initiative includes implementation of a new business solution, designing a collaborative learning space or new building, assisting with research needs, assuring compliance, integrating a cloud service, tackling a security issue, supporting desktops and mobile devices, or any other endeavor that requires the use of technology; UTS is committed to supporting strategic partnerships to fulfill objectives for our campus community.

DEMONSTRATE VALUE

The value of enterprise IT in higher education and its ability to "inform to transform" is immeasurable. The technologies and services administered and supported by UTS have a profound impact for the institution whether applied to teaching and learning, administrative systems, research, or organizational sustainability. However, the influence of IT goes far beyond the technologies deployed. The real value to the University is what our colleagues **DO** with the software and services we provide. UTS works in partnership with key stakeholders and senior administration to ensure that the information and services provided play a prominent role in helping our institutions identify solutions and processes that will set the institution on the right course. Through collaborative efforts across the institution, UTS helps enable

new business models, create additional value, and allow for the creation of new value propositions for DU.

2014 IN REVIEW

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. UTS collaborated with a cross divisional committee to select two new advanced analytics tools, *SPSS Modeler* and *SPSS Statistics*, to bring more robust and advanced analytics capabilities to the University. 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.

BUSINESS PROCESS IMPROVEMENTS

Business Process Improvements reduce the time and effort to perform recurring tasks. UTS developed user friendly electronic processes to improve the following:

- **Tuition Appeal** - The entire Tuition Appeal process was streamlined so students can submit all information online, including attached supporting documentation. The process was improved in three significant ways. 1) The new process provides easier and modern access for students to enter their appeal information. Students no longer have to fax in their appeal information and have the ability to modify and update their appeal information as needed before it is sent to committee. 2) Student Financial Services no longer has to spend the time to manually type in the student's appeal information and get other student information (college, level, refund amount) ready for the appeal committee and 3) All committee members have access to view all appeal documentation electronically. If a committee member is out of the office for whatever reason, they can still participate in the committee review process and have access to the same information that other members have access to.
- **Data Download Options for Advancement** – University Advancement central office and development officers can now select data fields they want to download for a report and report type without requiring code changes.
- **Parent Record Creation for Advancement** – This improved process allows University Advancement to create parent records from new student information anytime during the year, matches tool reduced duplicates and enriches the quality of the data.
- **Advancement Self-Service for Development Officers** - University Advancement utilizes improved methods for its fundraisers to enter, track and manage their cultivation/solicitation strategies in Banner.
- **Integration Matching Processes** – Administrative offices often receive data from multiple external sources. A new browser-based tool, Perceptives - Data Transfer, was used to create a user-friendly matching and loading process for a variety of departments on campus.

- **Financial Operating Statements** – This one stop dashboard provides daily operating reports as well as a monthly report. Drill through capabilities easily allow quick access from account level summaries to transaction details. Reporting includes encumbrance summaries to PO and invoice details and salary account to payroll distribution reports. This business process improvement replaced disconnected individual reports with interconnected reports and filtering options.

CAMPUS ENTERPRISE CALENDAR

A new institutional enterprise calendar utilizes the University's event management system, *25Live*, to replace the University's de-supported WebEvent calendar. UTS rebuilt a front end website for the new campus calendar and worked with constituents to finalize permissions, searches, and spuds and provide training for calendar publishing to reside in *25Live*. The new campus calendar provides an integrated view of individually-selected calendars as well as daily and weekly "featured events" for the campus community.

C-CURE ACCESS CONTROL AND SECURITY MANAGEMENT

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 addresses 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.

CENTER FOR STATISTICS AND VISUALIZATION

Data visualization, the art of presenting research findings in meaningful and compelling ways, improves the competitiveness of our researchers and makes findings more accessible. UTS is a key collaborator with the Associate Provost for Research, the Office for Teaching and Learning and University Libraries in the establishment of the Interdisciplinary Center for Data Visualization, a *Renew DU* initiative located in Anderson Academic Commons.

DATA GOVERNANCE

There is considerable 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 University's *Information, Measurement, and Analytics Council* (IMAC) is dedicated to developing critical thinkers around the many uses of data as well as share ideas and collaborate. In 2014, a *Data Stewardship Advisory Board* (DSAB) was created from principle leaders of the IMAC to provide oversight to institutional data governance. Responsibilities of the DSAB include:

- Connect data users to institutional leadership.
- Identify data stewardship responsibilities and provide training.
- Inventory data governance policies and procedures.
- Consider governance issues and recommend policies and procedures.
- Identify data use concerns and assist with collective decision making.

- Respond to information needs from institutional leadership in a collaborative, consistent manner.

DATA SYSTEM IMPLEMENTATION GUIDELINES AND NEW TECHNOLOGY REVIEWS

The *Data Stewardship Advisory Board* (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.

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 that feasibility analysis and due diligence for all technical proposals and implementations at the University of Denver are completed. 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.

DUZONE

UTS collaborated with Athletics to create mobile presence for the *DUZone* application. This user friendly web application utilizes responsive design for digital card and participating vendors in a format suited to mobile users.

DUPONT BOARD ROOM RENOVATION

UTS and University Libraries partnered to install a new audio/visual and conferencing system in the DuPont Board Room in the Mary Reed building. A wired *DIS* microphone system vastly improves the ability to hear participants whether in person or on an audio call. Two flat panel screens replaced the antiquated projector and screen, allowing for various mediums to be displayed and/or recorded. A new *CISCO TelePresence Codec* video conferencing unit delivers flexible HD video and superior audio for observers and participants. Several devices can display on either or both screens simultaneously or individually, allowing for greater flexibility and presentation customization.

FOUR WINDS INTERACTIVE DIGITAL SIGNAGE

UTS collaborated with University Libraries, Marketing & Communications, and divisions to evaluate and implement *Four Winds Interactive*, a cloud-based visual communications platform for managing digital signage and visual applications enterprise wide. Previously, the institution utilized several on-campus and third party vendors for digital signage. 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.

FLIPPED CLASSROOMS

UTS collaborated with the Office of Teaching and Learning and University Libraries to build a *flipped classroom* in Sturm Hall. This interactive learning environment allows a faculty member to spend less time lecturing and more time to devote to exercises, projects, or discussions with students. Movement away from reliance on traditional lecturing, especially in large introductory courses, allows institutions

to devote the valuable in-person time of both faculty and students to activities that are more powerfully educational.

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 starting in 2014, the Daniel Felix Ritchie School of Engineering and Computer Science. In 2014 MATLAB software was installed to aid Physics and Psychology faculty members and additional computation nodes were acquired to aid engineering faculty members in developing analytical tools. Storage capacity was also doubled to accommodate the growing data needs of faculty in Physics and the College of Education.

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 > $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.

LICENSE PROCUREMENT AND MANAGEMENT

UTS continues to invest in software used across campus in teaching, learning, and administration. Microsoft Office, Mathematica, and SPSS licenses were renewed and expanded to cover new use cases. New licenses were acquired for SAS and are being used by faculty and students in the Graduate School of Social Work, Josef Korbel School of International Studies, and the Daniels College of Business. In addition, new licenses for SPSS have been acquired allowing administrators to leverage advanced data analysis methods. As license needs grow and become more complex, the challenge of maintaining compliance with license agreements also becomes more complex. UTS is now using Sassafras K2 to manage licenses of Nvivo qualitative analysis software. Sassafras K2 can be expanded to cover additional applications as needed.

REGROUP MESSAGING SYSTEM

Regroup, a messaging platform chosen to replace functionality previously available in the campus portal was developed and implemented as part of the release of the new campus portal. This communications tool provides granular administration and services for bulk email, utilizes numerous pre-defined groups and provides minimal metrics for delivery and open rates.

SHARED SERVICES

In 2014 the institution launched a *Shared Service Initiative*, a strategic tactic for delivering business services to improve service quality and operational efficiency. This integrated and structured approach provided the framework for four distinct phases: project planning and preparation, diagnostic assessment, organizational design, and implementation. Active support and engagement from the IT enterprise was identified as a critical factor for success. UTS was engaged in the implementation phase in July 2014 to begin implementation of process redesign and improvement efforts. Current process and policy redesign tasks completed include Human Resources/Payroll efforts for on-boarding, job change request, separation request, leaves, benefit enrollment and time entry. Future process and policy redesign efforts to be completed later next year will focus on contract review, purchasing processes, PO issue, Purchasing Card reconciliation, time and expense software, accounts payable, employee recruiting (postings, review of candidate pools, cross recruitment), I-9/Affirmation Statement/eVerify processes,

accounting and journal entries. Process evaluation in these transactional areas will be an ongoing effort, leveraging better integrations between products and identifying metrics for continuous process improvement.

UTS VENDOR COLLABORATION EFFORTS

UTS Enterprise Application Services (EAS) partners with other UTS departments and 3rd-party vendors to develop and maintain the infrastructure for our enterprise technical solutions. *Oracle Enterprise Manager* was installed and configured to more effectively monitor and manage databases and middleware to further ensure high availability of software systems used by the University community. UTS/EAS met bi-weekly with Ellucian as a development partner for the *XE Registration* module, one of the first schools to utilize Ellucian's new and advanced technology platform. UTS/EAS is also a development partner on Ellucian's *Seamless Navigation* product, currently in beta testing. The partnership with Ellucian allows the opportunity for the University to see the new products earlier and to guide the functionality that would most benefit our DU community. The Banner XE migration will take years to complete, but the new device responsive products will greatly improve the user experience.

WEB SERVICES AND SUPPORT

UTS collaborated with campus constituents to improve and enhance the University's web presence and services. A Web Services governance structure, test service and documentation were developed to provide web service interfaces using standardized and documented web architecture.

A template for www.du.edu authenticated content that also serves as a portlet in *PioneerWeb* was developed. An easier and more standardized method for creating "Live Delivery Platform" (LPD) forms using the institutions' content management delivery system, *OmniUpdate*, replaced forms on an outdated legacy platform. UTS also facilitated the training and transition for the release of *OmniUpdate* version 10 in the summer of 2014.

WORKFLOWS

Automating processes that originate in departments and require approvals are projects that provide great value to the institution. Working within the Banner system, UTS created workflows to decrease process time and improve accuracy. For better transparency into the status of the workflow, UTS developed a web based link that provides users of workflows access to specific transaction details as well as transactional meta-data (who approved/denied what and when). Workflows developed in 2014 included:

- **Position Access Request (PAR)** – Automating the tasks of requesting position changes as well as electronically posting new hire information to the hiring/on-boarding system greatly improves responsiveness and efficiencies. An enhanced feature added to this workflow also improves the approval process by enabling the approving authority to communicate with the requestor to make specific changes to the request. The requestor can then apply the changes to the original request without reentering any previously entered data and resubmit for approval.
- **University Counsel (non purchasing contracts)** - A University Counsel workflow to convert an existing paper process to an electronic process improves efficiencies and provides greater transparency to constituents needing contract approval.
- **GXA Hiring** – The hiring process for Graduate Teaching Assistants and Graduate Research Assistants improved tremendously with this new workflow. GTA's and GRA's are now hired per quarter rather than monthly. This process eliminates manual pay requests, reduces

departmental effort and payroll mistakes, and eliminates the manual process of entering assistantship data into Banner. In addition, the manual process of entering assistantship data has been automated and unnecessary approvers have been removed.

- **Coursework approval** – Students are now able to submit transfer coursework for approval electronically prior to that the classes at other institutions. This electronic workflow allows the Registrar's office to communicate with department chairs more effectively. Having prior approval is very helpful to the students and eases the load on the faculty.

- **Refunds > $10,000** - All refunds greater than $10,000 need to have backup documentation sent to Accounts Payable. The legacy process required a manual task to run a process for each refund greater than $10,000, print out the account detail, and fax over to AP. Now, when a refund is issued via the nightly refund process or manually, the account detail is automatically created and sent in a workflow. Both Student Financial Services and Accounts Payable are able to process these tasks more efficiently and sustainably.

SCALING FOR THE FUTURE

Develop and enhance sustainable campus infrastructure and services that scale and adapt to the continual changing needs of our customers

The design and implementation of the campus technology infrastructure, classroom spaces, and technology uses focus on services that promote sustainability and greening the curriculum and classroom, while supporting information and physical security needs to provide secure and reliable services. UTS stays abreast of the direction of the technology industry in higher education and prepares for, communicates, and supports these industry changes. 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 and accommodations.

PROVIDE SUSTAINABLE INFRASTRUCTURE

Virtualization of physical hardware is one mechanism UTS employs to efficiently utilize existing hardware resources and cost effectively provision new services. The technology simplifies IT operations and allows IT organizations to respond faster to changing business demands. Leveraging appropriate virtualization methodologies not only improves performance, security, and cost effectiveness of campus-wide services, but also provides our customers with a robust, highly available, flexible, dynamic and agile infrastructure that can support the technologies of today and tomorrow. We recognize that continued adoption and development of these technologies allows us to keep pace with industry best practices in the data center, network, and desktop service areas.

ASSURE GLOBAL ACCESSIBILITY

Seamless integration of services on and off campus are necessary for our constituents as we continue to leverage externally hosted and cloud-based services where appropriate to improve service, lower cost, and/or integrate new services and technologies. DU community members need to take full advantage of increasing resources available online and to provide collaboration in the worldwide community. UTS continues to facilitate on and off campus access to DU resources ubiquitously with "device friendly" and "intelligent" application and network connectivity that adapts to multiple device frameworks, delivery, and media types. We continually monitor and plan for expansion of resources to provide robust and reliable connections to the internet. In 2014, a second connection to the internet was installed to improve redundancy, reliability, and availability of global resources.

ENSURE COST EFFECTIVENESS

The resultant pressure on higher education institutions to be more cost effective in the delivery of services to students, faculty members and staff is substantial. As the institution contemplates refining metrics on costs, determining where technology fits in, what technologies work and do not work, and where technology can save money is paramount. 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". UTS aims to

provide technologies to create and promote research, teaching, and learning effectiveness and administrative efficiencies that provide the greatest value at the lowest cost.

2014 IN REVIEW

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 work spaces for students, faculty and staff to teach, learn and connect. The building is estimated to be completed in late 2015.

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.

CAMPUS NETWORK FILE RESTRUCTURE AND DOMAIN MIGRATIONS

A new DU private cloud file management system was implemented across 57 divisions with 7,680 clients to manage the hundreds of thousands of unstructured files stored in the institutional private cloud for faculty, staff and students. This new system provides a much greater level of auditability and accountability to both internal and external audit processes. UTS leveraged this restructure to increase the scalability and reliability of our campus Microsoft Active Directory environment and to prepare for utilization of *Microsoft's Office 365 Cloud Collaboration Suite*. User accounts were migrated to a single domain by July 2014. Divisions completed the restructuring process in November 2014.

CAMPUS PARKING LOT UPGRADE

UTS installed new cabling and electronics infrastructure in 2014 for conversion of 18 parking garages and surface lots to a new *T2 Flex IP-Based Parking* solution. The enterprise parking management system utilizes IP-based technologies to streamline all parking tasks into a single web application.

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.

DATA CENTER ENHANCEMENTS

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.

A *Very Early Warning Smoke Detection Aspiration System* (VESDA) with continuous air sampling was installed in the UTS Data Center to provide the earliest possible warning of an impending fire hazard. Highly encouraged by DU's liability insurance carrier, a VESDA system can buy the critical time needed to investigate an alarm and initiate an appropriate response to prevent injury, property damage or business disruption.

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 estimated to be completed in late 2015.

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.

INSTITUTIONAL SECURITY POLICY

UTS Information Security convened a Security Working Group and drafted a board-level Information Security Policy. The policy is the first step in addressing a comprehensive Information Security Program designed to satisfy the findings in the Security Audit, standardize security processes and procedures, and provide an "enterprise" approach to security across the institution.

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 will be incorporated in 2015.

MARGERY REED RENOVATION

The renovation of Margery Reed Hall was a substantial remodel that required complete reconstruction of the building's telecommunications infrastructure. The renovation included a full featured Unified Communications solution, 802.11ac wireless, video conferencing, classrooms, collaboration, and work spaces for students, faculty and staff to teach, learn and connect. The building was open for occupancy in April 2014.

NEW WIRELESS STANDARD

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, the Anna & John Sie International Relations Complex, and will replace current 802.11n access points and additional planned capacity access points as we build out campus wireless capacity in 2015-17.

PCI DSS COMPLIANCE

In collaboration with the Controllers' Office, DU Merchants Account holders, and Wells Fargo, UTS Information Security achieved full *Payment Card Industry Data Security Standards* (PCI DSS) compliance under Self-Assessment Questionnaire (SAQ) D in January 2014. The institution now has a program in place to advise new merchant account holders, validate technical controls on a quarterly basis, conduct the assessment in July each year, and submit the final SAQ in August of each year. PCI Data Security Standards is identified as one of eighteen rapidly increasing strategic technologies in higher education.

REDUNDANT INTERNET CONNECTIVITY

A redundant internet border router was purchased and installed in the secondary data center in August 2014. This redundant internet router ensures that the campus has two geographically diverse 10G connections with the institution's internet provider. As the institution takes greater advantage of readily available externally hosted services, it will be critical for the campus to have robust, reliable internet connectivity.

REMODELS, RENOVATIONS AND NEW CONSTRUCTION

UTS was involved in many building remodels, renovations and new construction in 2014. Projects included:

- Olin/Boettcher Renovation
- Bridge Project Remodels Neighborhood House
- Distance Education Site in Glenwood Springs
- University Park Apartments Remodel
- Einstein's Bagel Shop in Daniels College of Business
- South Gaylord Remodel for Shared Services

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 will be deployed in 2015, offering increased service and management for remote control, patch management, software distribution, operating system deployment, network access protection and hardware and software inventory.

SECURITY DEFENSE IN DEPTH

Various technical solutions were evaluated, designed, and implemented to provide the University with a balanced defense-in-depth security architecture. Implementations include an enterprise cyber security malware and email solution, filtering on firewalls, IDS/IPS solutions (Intrusion detection and prevention) and other solutions designed to provide a "mesh" of preventative and detective controls. Additional

enhancements are planned for 2015 to expand the log-analysis components, integrate a vulnerability management solution, and evaluate required changes for cloud-based infrastructure (e.g., email and personal storage) in the *Microsoft Office 365 Cloud Collaboration Suite*.

SECURITY INFORMATION AND EVENT MANAGEMENT
UTS implemented a solution to provide central log storage for analysis and some limited correlation features. UTS Information Security is expanding the use to consolidate log storage and retention, replace redundant solutions, and provide multi-level access to UTS departments. During 2015 reporting, correlation, and analysis features will be improved to provide additional capabilities.

SPAM/MALWARE MANAGEMENT
Cyber criminals often use email spear phishing attacks, as well as malicious file attachments and URLs in emails to launch an advanced cyber-attack. Managing email SPAM, detecting and blocking spear phishing, and providing protection from malware infections continue to be an ongoing challenge. Improved process changes and streamlined technical analysis, in combination with an enterprise email security solution have reduced the impact of malicious SPAM email in the last year. SPAM and malware detection/prevention will be a primary focal point as the campus Exchange email system mail is moved to the *Microsoft Office 365 Cloud Collaboration Suite* in 2015.

SYMANTEC ENTERPRISE ANTIVIRUS MANAGEMENT
UTS upgraded the enterprise *Symantec Antivirus Service* and more than 5,000 clients to provide improved endpoint protection for the campus intranet. *Symantec Endpoint Protection version 12* provides increased security, improved performance, and smarter management across both physical and virtual environments. The endpoint security was expanded to include antivirus, anti-malware, and limited personal firewalls to limit the impact and spread of malicious software. The institution's *Symantec* installation proactively identifies at-risk files and stops zero-day threats providing better security through a single, high-powered agent.

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. A pilot is underway to evaluate *NVIDIA's GRID* technology to improve responsiveness and throughput for video, graphics and multimedia playback.

WINDOWS XP DEPRECATION
Microsoft Windows XP entered end-of-life during 2014 and UTS led the efforts to replace Windows XP systems across campus. More than 500 Windows XP systems on the domain were identified in early

2014. UTS tracked systems, assisted in computer quotations and upgrades, and systematically identified Windows XP computers to be removed from the network.