

FY17 Information Technology Roadmap Document

Prepared for

The Information Technology community at Northwestern University
(IT@Northwestern)

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Northwestern Information Technology
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Northwestern

INFORMATION TECHNOLOGY

Contents

The project roadmaps in this document are provided as a supplement to Northwestern IT's FY17 Information Technology Planning Document. Each functional area covered in the planning document has a project roadmap included here to provide a more detailed view of the projects completed in FY16 and the planned FY17 projects.

Both of these documents are posted, along with the planning documents from previous years, on [the Northwestern VPIT/CIO's website](#).

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FY16/FY17 Roadmap - Teaching and Learning

Teaching & Learning Platforms

- *Canvas Ecosystem of Educational Technology Apps*
 - In FY16, Instructure rolled out a new, more powerful ticket/support platform, which, after a rough rollout, improved service levels beyond what was possible with its original platform, Zendesk.
 - Instructure’s Help Desk (24/7) addresses 2/3 of Northwestern instructors’ requests for help. Local resources focus upon Tier 3 requests for help. In FY17, Academic and Research Technologies (A&RT) will reorganize their support services group for optimal (but efficient) support of Canvas core tools and for the growing, extended ecosystem of 3rd party applications.
 - Major new releases are anticipated in FY17 for Canvas Gradebook, Canvas Quizzes as well as integration with Microsoft 365.
- *Video Creation and Management*
 - Due to the increasing demand for video content, and the on-going change in this market sector, the exploration of products for video creation and management continued in FY16, when multiple pilots were undertaken:
 - Mediasite pilot shows poor performance in the cloud, and a poor user experience on the desktop version (MyMediasite). However, Mediasite continues to be the favored video capture technology at Northwestern for classrooms.
 - Instructure’s beta version of its Arc product was previewed at Northwestern. It was good at annotating video clips, but its overall functionality is too minimal.
 - Zaption was piloted at the University and quickly gained a niche audience at several schools. However, the company was bought out in July by Workday and “disappeared” as a higher ed learning application.
 - This exploration will continue in FY17:
 - A technical and feasibility pilot of Panopto will be conducted with SESP and Kellogg, as a possible alternative to Mediasite in FY18+.
 - Instructure is reorganizing their Arc development team and will bring in a new product manager. We anticipate expanding the Arc pilot by winter quarter.
 - One Button Studios for video creation
 - Northwestern’s first One Button Studio was created in the Main Library (1South) in FY16, with video being created by faculty and students for a wide variety of usage.
 - An MOU with the Library was signed for continued development of the South Campus One Button Studio during FY17, and an integrated One Button Studio-Peshkin Lightboard will be designed in FY17 for the new Mudd Library (to be opened ~September 2017).
- *Videoconferencing*
 - The field of videoconferencing is another area with increasing demand amidst a changing marketplace.
 - In FY16, Vidyo was retired, and Blue Jeans was piloted as its successor. Blue Jeans use in FY16 exceeded all previous activity levels of Vidyo, and the campus-wide license has been

extended through FY17. Blue Jeans is integrated into Canvas, providing the best Teaching and Learning videoconferencing experience for now.

- In FY17, WebEx will be investigated with an eye towards possible usage as either an alternative or a primary videoconferencing platform in the future (it is not currently integrated into Canvas).
- Also in FY17, Northwestern IT will offer preferred equipment designs (USB Cameras, mics, etc.) for effectively supporting small group VC rooms with these new videoconferencing products.
- *Improved Discussion Services*
 - FY16: Nebula network map user interface for Canvas discussion groups is developed by A&RT and McCormick. Nebula use expanded to multiple Northwestern schools.
 - FY17: Nebula continued development; adoption will be promoted by offering workshops and consultations on the tool.
- *Social Media for Peer Learning and Community Development*
 - FY16: Yellowdig pilot quickly gained an expanded community of practice at Northwestern
 - FY17: Northwestern begins a 3-year campus-wide license for Yellowdig. A&RT developers will extend learning analytics services from Yellowdig in cooperation with Yellowdig's new data science engineers.
- *Desktop Productivity Applications integrated into Canvas*
 - The anticipated FY16 pilot of a Box-Canvas integration yielded disappointing results and higher than anticipated licensing costs for the University. Similar feedback came from the R1 University Canvas Peers Group and Instructure engineers.
 - On the other hand, the first preview of Microsoft Office 365's integration with Canvas looked well done, and a first release of Office 365-Canvas services is anticipated to be deployed at Northwestern by Winter quarter in 2017.
- *Learning Analytics*
 - A learning analytics environment was created in FY16, and partnerships were formed with Northwestern faculty, other peer universities, and platform vendors:
 - The first release of the new Canvas Data service was licensed, enabling access to this data warehouse of Canvas activities on the AWS Redshift database platform.
 - A learning analytics group -- Experimental Teaching and Learning Analytics at Northwestern (ETLAN) -- was formed with faculty and graduate students interested in learning analytics. Pioneer learning analytics projects were launched with faculty in McCormick, Medill, School of Communication, School of Professional Studies. These projects featured natural language processing services, experimental use of IBM's Watson, and network diagramming.
 - Joint learning analytics projects were charted with Big Ten Academic Alliance (principally, for now, by Northwestern, Michigan, IU).
 - Northwestern Learning Apps Store v1.0 was released in the spring for local learning analytics apps that can be accessed easily by Northwestern instructors.
 - In FY17, these fledgling efforts will be consolidated and expanded:

- An ad hoc learning analytics policy group will be formed to report back to the Education Technology Advisory Committee (ETAC) and the Office of the Provost on privacy issues and learning outcome measures.
- A new cohort of Experimental Teaching and Learning Analytics at Northwestern (ETLAN) faculty have submitted their analytics interests for exploration by the working group.
- Visiting speakers on Learning Analytics topics are being planned for ETLAN and general campus attendance.
- Multiple partnerships with schools have been planned:
 - A set of analytics tools that examine usage of course components across a broad set of courses is being planned with The School of Professional Studies.
 - A longitudinal, program-wide analytics project for the Medill IMC Program has begun.
 - Linguistic analysis and classification of peer reviews is underway for the Medill immersion courses to identify improvement in student peer review and self-reflection.
- New analytics tools for faculty for use from within Canvas that leverage the Canvas Data warehouse will be developed, and the use of existing tools (e.g., IBM Watson, Tableau, and other statistical and analytics tools) will become routine for learning analytics consultation.
 - With the roll-out of Nebula, Yellowdig Visualization, and Discussion Analytics Canvas tools in the Northwestern Learning Apps store, feedback from faculty and students will motivate analytics consultations with organic enhancements to these tools.
 - A public code release of Northwestern Analytics tools is expected in Fall 2016.
- *Gamification*
 - Gamification (the usage of game elements in traditionally non-game efforts to increase involvement) showed signs of increased interest in FY16 and will be the subject of increased attention in FY17:
 - Seann Dikkers' campus presentations ("Building Mobile Games for Education") is FY16's best attended educational technology forum event of the year.
 - In FY17:
 - A one-year pilot will be conducted for MobLab games and educational simulations for courses in Economics (microeconomics) and Kellogg (decision sciences), and as a classroom polling tool.
 - An expanded workshop series will be offered to our teaching and learning communities on gamification opportunities.
 - A re-useable gaming platform will be developed to support faculty interests in new educational technology and outreach. Two of the implemented games will include "GEO Game" (for Medill) and "Northwestern Predicts" (for the One Book One Northwestern steering group).
- *Digital Portfolios for Students*
 - FY16: The Faculty Distance Learning Working Group (FDLW) requested ETAC to survey and report on possible benefits of deploying digital portfolio services for Northwestern students.
 - FY17: Digital Portfolio study group will provide a report for community discussion and help in supporting decisions.
- *Course Feedback Surveys*

- FY16: The Blue by eXplorance course evaluations pilot was expanded each quarter to additional schools at Northwestern.
- FY17: Blue by eXplorance will be made the default course feedback survey application, and will be offered in a thoroughly-integrated version from Northwestern Canvas. Additional feedback opportunities for Northwestern students are enabled using Blue.
- *MOOCs*
 - FY16: Northwestern MOOCs on Coursera included a larger number of Specializations (multi-series MOOCs) within our offerings.
 - FY16: Coursera revenues to Northwestern increased, largely as the result of Specialization MOOCs oriented to the interests of professionals.
 - FY16: Coursera changed its MOOC platform to be “always on” and not session-based.
 - FY17: Northwestern will deploy its first MOOCs outside of Coursera, using the Canvas Network platform. The hope is that the Canvas Network approach will make it more efficient for Northwestern instructors to use MOOC content in their on-campus courses and to use on-campus Canvas content in their MOOCs, since they’ll be on substantially the same platform.

Classrooms – physical spaces

- *Kresge Hall Renovation*
 - FY16: classroom designs completed with a partnership of Facilities Management, WCAS and Northwestern IT, including a classroom (~60 seats) designed for active learning.
 - FY17: classrooms opened for first use in September; special open-house events conducted for exploring new classroom practices within these Kresge classrooms
- *Tech Active Classrooms*
 - FY16: orientations for instructors using 2 active learning classrooms in Tech
 - FY16: a small group of instructors studied and implemented some active learning techniques in these classrooms; general interest in using screen-sharing technology (Solstice) for classes.

Support and Engagement

- *Classroom Support Services Expansion*
 - FY16: Co-funded Innovation AV Engineers placed in strategic places on campus (The Garage, Segal Visitor Center).
 - FY17: Expanded classroom support services provided by Northwestern IT in Evanston for Kresge Hall (WCAS), and in Chicago for Abbott Hall (SESP) and Feinberg (multiple building locations).
- *Course Design*
 - FY16: A new job family of “Learning Engineers” was created with the support of Northwestern HR. The first two hires for this new job family were made in A&RT during the summer.
 - One of the new Learning Engineers is dedicated primarily to Medill online education activities. This funding and partnership pattern for the Medill-A&RT hire may become the model for partnerships with other schools that are moving programs into either the online space or into thoroughly hybrid course models.

- FY17: A&RT’s Course Management Specialist family is retired from use. Formerly a core job at A&RT during the days of Blackboard, this staff service is no longer a priority with modern educational platforms such as Canvas.
- *Partnership and Engagement within the Teaching & Learning community*
 - Multiple new organizations and offerings were created in FY16 to promote, and broaden engagement with, faculty around new approaches to teaching and learning:
 - First iteration of the Educational Technology Teaching Fellows (ETTF) program sees faculty participants from 8 schools with about 24 participants. ETTF participants meet monthly during the year; each group completes a teaching experiment.
 - ETTF participants, ETLAN participants, Tech Active Learning instructors, and the recipients of Provost’s funding invited to take part in day-long celebration of experiments in teaching, TEACHx.
 - TEACHx offers full day of presentations by instructors, a student panel, and recognition for learning community participants. About 150 people attend.
 - A Northwestern Digital Learning website was launched in May 2016 featuring stories and opportunities for innovation in teaching and learning at Northwestern. The development team was a joint enterprise between Northwestern IT and the Office of the Provost.
 - In FY17, these programs will be refined and broadened:
 - ETTF will be offered a second time, with fewer group meetings, more consultations with experts.
 - TEACHx 2017 scheduled for May 19, with expanded participation and attendance.
 - The Digital Learning website’s impact will be increased by means of social media campaign and internships, and a permanent editor hired, with co-funding from Office of the Provost.
- *Expanding Teaching and Learning Service Points*
 - In FY16, initial steps were taken to expand service points for teaching and learning on both the Evanston and Chicago campuses. The resulting expansions will be planned and deployed over the next several years:
 - Chicago Service Point
 - FY16: Introductory planning discussions. Tour of Abbott Hall spaces.
 - FY17: Planning meetings with FM and with Chicago schools for increased and distributed service locations for Northwestern IT’s classroom support services.
 - FY17 + FY18: Establish expanded service points for classroom support services.
 - FY18: Planning and design meetings for an expanded service point by Northwestern IT for support of Chicago campus researchers and instructors.
 - Evanston Service Point
 - FY16: first planning meetings for a new, integrated service point in the new Jacobs Center for supporting faculty innovation in teaching and learning. Participants include Northwestern IT, Facilities Management, and Smithgroup JJR architects.
 - FY17: Integrated service point planning is expanded to include the Searle Center and the Office of the Provost, with the goal of submitting design options to the Provost for review and decision in FY17.

- FY18: Most likely move date of A&RT offices from Northwestern Library to the new Jacobs Center.

Software Development Practices for Teaching and Learning

- *Amazon Web Services (AWS)*
 - FY16: Most of Northwestern IT's local development practices for teaching/learning activities shifted to AWS.
 - FY17: Best practices for use of AWS components and architectures will be gathered by A&RT AWS developers.
 - FY17: THE AWS Educate program will be introduced at Northwestern to support free use of AWS services in Northwestern courses and for student projects.
- *IBM Watson*
 - FY17: Use of IBM Watson Predictive Analytics will become routine for learning analytics consultation.

FY16/FY17 Roadmap – Research

Platforms and Technology Services

- *High Performance Computing / Quest*
 - Compute and storage refresh projects were completed in FY16. In FY17 we will perform lifecycle refreshes and expand Quest to meet the needs of the research community. In FY17 we will expand, formalize and communicate back-up services for data stored on Quest.
 - In FY16 we expanded buy-in models to support both “immediate access” to computing as well as short-term duration research requirements. In FY17 we plan to further evolve “computing as a service” models for researchers who need to adopt computing into their research.
 - In FY17 we will focus on reducing barriers to access Quest in order to address the growing need for computing services in all research areas, including basic science and the social sciences. This includes realigning the allocation request process to streamline the evaluation of proposals. We will continue to provide software support, tutorials, and hold workshops on cluster/HPC computing to promote and support the use of Quest.
 - In FY17 we will work to enable users and stakeholders to have better access to reporting metrics, such as computational hours consumed, account expiration, and storage quota usage.
 - In FY17 planning will begin for a more comprehensive set of usage, security, and health analytics on Quest. Implementing phase 1 of a reporting platform will follow in FY18.
 - In FY17 we will prepare Quest to seamlessly leverage public cloud services for burst requirements, technology exploration, and time-sensitive research workflows.
- *Basic Sciences, Social Sciences, Humanities Computing / SSCC*
 - Began discussions about the future of the Social Sciences Computing Cluster (SSCC) in FY16. Continue to advance understanding of the social and economic sciences communities in FY17, and identify alternatives to retaining the SSCC by the start of FY18.
 - During early FY17 we will pilot new, easy-to-use services for providing access to research software with the aim for implementing production-level service in late FY17.
 - During FY17, RStudio server and SAS Studio server will be transitioned from the SSCC to the cloud or an alternative platform in support of teaching, as well as research.
- *Data Storage Services*
 - In FY16 we launched and continued to expand new desktop mountable research storage (RDSS) to meet expanding requirements of the research community. (It housed 450 TB of data by the end of FY16.) An audit reporting process was implemented in conjunction with this service. In FY17 we will continue to expand this service to meet community needs and extend audit reporting services (Stealthbits) into the schools.
 - We have been migrating Vault Collaborative users to Box and other storage platforms during FY16 and are set to turn down the service at the end of Fall Term FY17.
 - We continue to grow our partnership with the Library in developing archiving and repository services for research data and publications (FY16+). We will explore collaborative outcomes of the AV Preserve recommendation for an institutional data strategy in FY17.
 - We will support the research community in adopting Box for handling sensitive or contractually restricted data in FY17.

- In FY17 we will partner with Feinberg School of Medicine (FSM) IT to identify storage solutions for research areas generating large amounts of data, such as neuro-imaging and genomics. We will explore cloud services for archival and intermediate storage options between data collection, processing, and archiving.
- *Consolidate research onto centralized infrastructure where available and when appropriate*
 - In FY16 we completed power and cooling expansion and remediation in the Evanston and Chicago datacenters. In FY17 we will continue to improve datacenter capacity and services in support of research activity.
 - During FY17 we will explore the provisioning of firewall and other research network capabilities to improve co-location facilities.
 - We will continue to clarify and promote the value proposition of central research services by transitioning researchers on individual servers into clustered environments whenever appropriate.
- *Expand our infrastructure in strategic areas, including beyond the campus (the commercial cloud, national and regional research facilities)*
 - Data Transfer
 - Received NSF award in FY16 which funded a research engineer position focused on integrating research instruments in with Northwestern's infrastructure. Continue this work in FY17 to expand our support for real-time and/or data-intensive workflows.
 - An introductory data transfer platform was created in FY16 for incoming and outgoing faculty to stage data before transferring it to a University service. During FY17 we will explore ways to improve self-service and automation to simplify use of the platform.
 - Networking
 - Northwestern Research Network
 - FY16: The core research network infrastructure was deployed, and a total of approximately forty 10Gbps access ports were across the Evanston and Chicago campuses. (CC-NIE NSF Grant).
 - FY17: Expand deployment of research network ports, enable Software Defined Networking (SDN), and add redundancy as needed. Leverage the NSF funded research engineer to evaluate if the emerging Science DMZ research networking model is a fit for Northwestern research.
 - Regional Networking
 - FY17: Prepare for expanding regional networking capabilities to improve data movement through partnership with faculty, local institutions, and available NSF funding programs.
 - Cloud computing
 - FY16: Cloud solutions were explored for their potential to provide solutions in three areas: 1) Burst needs (like those associated with human genome analysis); 2) cost efficient use of emerging technologies (such as GPU's); 3) secure computing for data policy and grant compliance; 4) providing general computing/server needs.
 - FY17: There will be pilots underway in these areas that will lead to further service definition.

- FY17: Work with Office of General Counsel and school partners to create a ready-to-use and repeatable computing service for research with highly-restricted data, which is both secure and compliant with HIPAA and emerging NIST standards.
- *Consolidate research onto centralized infrastructure where available and when appropriate*
 - FY16: Completed power and cooling expansion and remediation in the Evanston and Chicago datacenters. In FY17 we will continue to improve datacenter capacity and services in support of research activity.
 - FY17: Explore the provisioning of firewall and other research network capabilities to improve co-location facilities.
 - We will continue to clarify and promote the value proposition of central research services by transitioning researchers on individual servers into clustered environments whenever appropriate.

Support and Engagement

- *Computing*
 - Research Support
 - FY16: Partnered with Feinberg to build out computing (Quest) and support (new staff position) for genomics research.
 - FY17: Continue to align introductory biomedical research support services that focus on genome analysis at all scales and prepare for adoption of cloud services during FY18.
 - Regional and National Computing
 - FY16: Assistance to multiple Northwestern researchers in adopting national computing facilities (such as XSEDE).
 - FY17: Continue consulting and awareness activities; continue participation in the Advanced Computing Innovation Partnership, an exploratory effort among regional institutions with the goal of enabling research across a diversity of computing and storage platforms; begin evaluation of the new NSF Bridges facility, which focuses on providing computing services to basic and social sciences.
- *Visualization*
 - In FY16 we began reimagining the Visualization Group as a new, campus-wide resource for the use of smaller-scale and nimbler visualization tools. During FY17 we will continue to re-staff and retool this team to complement this new approach, which is intended to be more in alignment with the growing interest in data science investigations and development of insight tools at the University.
 - In FY18, provide for an introductory visualization presence in Chicago that will enable a better understanding of the needs of life scientists in the Feinberg School of Medicine, and an improved ability to direct researchers to existing services.
- *Data Driven Research*
 - Our FY16 efforts to evaluate needs for increased support and services for across-the-board research activity, such as statistical computing, GPGPU programming, survey tools, and the digital humanities will continue in FY17.

- Our ongoing effort to better understand data science research needs will continue in FY17 with a continued focus on training and partnership with schools to better understand the breadth of challenges faced by our community.
- During FY16 and FY17 we will rebuild social and economics sciences community support and prepare for a larger role in providing data-science support services across the Northwestern community. In FY17 we will be prepared for additional staffing to support growing research needs in these areas.
- *Cores and Centers*
 - In FY16 we made ground in better understanding the IT requirements of cores and centers. During FY17 we will continue to cultivate delivery of personal computing services to cores, centers, and individual PI's via Northwestern IT's Distributed Support Services team (DSS).
 - During FY16 we partnered with the Office for Research to add a staff position to support cores and centers in leveraging University infrastructure. This includes the development and implementation data workflows, such as instrument data collection, data storage, and data transfer and sharing to external collaborators/customers. During FY17 we will grow the numbers of groups supported.
- *Faculty Onboarding and beyond – partnerships with School IT teams*
 - FY16: Building on partnerships with school IT teams and Research Deans in Feinberg, Weinberg, and Kellogg, made significant gains in building onboarding support services for new faculty coming to Northwestern.
 - FY17: Continue to grow the collaboration with Feinberg, Weinberg, and Kellogg to move beyond faculty onboarding to other areas of research support, while also expanding the faculty onboarding partnerships to other schools.
- *Grant Preparation*
 - FY17: Improve assistance in grant preparation through raising awareness of services provided. Expand effort in the design of computational elements, data management, and budget development assistance.
 - FY17: In conjunction with the Office for Research and other strategic partners, explore and recommend mechanisms and frequency for gathering and disseminating qualitative and quantitative metrics in support of obtaining grant funding and developing scientific output of the University.
- *New Approaches to Support*
 - Tiered Support
 - FY16: Partnered with Northwestern IT's Technology Support Services (TSS) team to explore a tiered support model that utilizes TSS resources to provide Tier I support for Northwestern IT research computing services.
 - FY17: Begin to roll out the new tiered model to help improve response time and support for Northwestern students and faculty.
 - Inclusion of Northwestern Students
 - FY16: Steadily grew Research Computing's student programs to include students interested in software development, data science, and computing.

- FY17: Continue to develop and evolve student programs in Research Computing, e.g., increasing focus on projects to better the user community experience, and recruiting student interns who can be involved in technical support.
- *Operational Improvement/Evaluation*
 - FY17: Evaluate, and where necessary, improve security practices and administrative processes to meet the needs of a modern research environment.

Training and Awareness

- *Training*
 - Continue to partner with our community to grow domain-specific training and continue to identify and link resident experts and work with focus groups to identify evolving needs around centrally provided services, including:
 - Delivering networking events, boot camps, workshops, and tutorials to undergraduate students.
 - Continuing to offer training programs in partnership with the Northwestern Library and Galter Library (“The Researcher’s Toolkit” and “Computational Skills for Informaticians”).
 - Delivering training and material for the Engineering Master’s of Science in Analytics program bootcamp, and continuing to expand availability of training opportunities oriented to growing data science skills in our graduate and undergraduate communities.
 - Developing programmatic approaches to providing Software Carpentry events and training for the University community.
 - Continuing to support and grow participation in the workshop series that we helped start in FY16 via a partnership with Mark Mandel (FSM), Programming for Biologists, as well as looking for other opportunities to expand participation in biological research at Northwestern.
- *Awareness*
 - Social Media
 - FY16: Developed a Twitter feed, which is displayed on Northwestern IT’s Research Computing website. Explored Facebook and LinkedIn as possible platforms to share information and promote workshops and training opportunities.
 - FY17: Continue with Twitter and with exploring other platforms for engagement.
 - Computational Research Day
 - FY16: 3rd annual Computational Research Day saw increased interest from across our community.
 - FY17: Continue development of Computational Research Day as a keystone event for the digital/computational research community.
 - Cross-organizational Strategy
 - FY17: Develop a cross-organizational strategy for raising awareness on research services, opportunities, and events, including:
 - Improve website communications by developing story-driven content, expanding services represented, and incorporating tools to increase education and outreach.

- Explore ways of increasing information from the Research Computing staff that demonstrate service improvements, community building, training opportunities, service-level changes, and other outreach opportunities.

Research Administration

The following list of FY16 and FY17 projects provides a large sampling of the projects completed or planning for these two years to lower the administrative overhead associated with the research process. For the full list, see the Office for Research section in the Administrative Systems roadmap on page 20.

FY16

- Cognos report updates to improve access and value of data: FY16 report enhancements improved availability, usefulness and aggregation of data.
- InfoEd: During FY16 improve ability to track and report on data through various configuration updates within InfoEd.
- Clinical Trial Actuals Reporting/GM090 Award Projection Report: FY16 Updates enabling OSR reports to show actual/current account balances to date, and budget amounts.
- Sub-Contract monitoring report: FY16 developed a report providing detailed subcontract finances. Enables necessary oversight to meet tightened federal closeout requirements; prevents errors.
- Cost-share Reports: FY16 developed new cost share reports which combine multiple reports into one. Benefitting departments, schools and central offices, saving staff time.
- InfoEd Workflow: FY16 re-configured InfoEd to support a streamlined review process that includes capturing milestones for administrative shell ready-to-review/proposals final and ready to submit.

FY16/17

- Learn@Northwestern: Phase 1 FY16 Single LMS (Learning Management System) for Northwestern, with Phase 2 FY17 expanded to additional areas such as HR L&OD, and Police.
- Research Dashboard/Portal: Phase 1 FY16 addressed key issues necessary for improved efficiencies. Phase 2 addresses key issues within the system in order to improve accuracy and efficiency in FY17.
- Conflict of Interest (COI): FY16 Phase 1 COI system implemented for Northwestern and affiliates. FY17 Phase 2 extends system to Feinberg School of Medicine, NMHC, RIC and Lurie Children's.

FY17

- Effort Reporting: FY17 create a data mart comprised of data sourced from number of systems, w/ad hoc reporting package and canned report built for it.
- CCM Granite/Topaz: FY17 replace CCM census, billing, vet service charge, order transfer system, moving to Click platform which offers CCM, managing projected growth and online animal ordering.
- eACUC System: FY 17 incorporate various improvements to address time consuming inefficiencies.
- eIRB: FY17 address various inefficiencies reported by OHRP and reviewers since system first uploaded.
- NSIS Enhancements: FY17 addition/redesign of Research Safety System modules.

- Click Discovery: FY17 partner with Click to complete discovery of costs, resources and scope for subsequent implementation of the Click Grants module.

Information Security

▪ *Research Information Security program*

- Program being driven by the Research Information Security Working Group (VP IT/CIO; IT Directors from McCormick, WCAS, SoC, Kellogg; CISO from Feinberg; multiple other members from Northwestern IT).
 - Ensure researchers can get assistance to adopt University-wide services, and to set up and maintain secure research computing.
 - Improve awareness of solutions available; emphasize why information security is important and how to get help.
 - Expand the portfolio of secure shared research services, and improve the consistency and customer experience of these services to encourage broader adoption.
 - Continue to encourage the movement of research data to the data center or an appropriate environment with a University contract.
 - Improve knowledge of information security practices and needs within the research community.

There are numerous projects aimed at remediating risk in the research community that have been completed in FY16 or are planned for FY17. Included in this set of work are:

- Encryption and backup services to help mitigate researcher's risk should their computer be lost or stolen.
- Email protection services to guard against the exposure of sensitive information.
- Secure computing and storage services.
- Endpoint management services to insure personal computers are properly configured and the software is kept current.
- Vulnerability assessment services.
- Secure file transfers.
- Multiple network projects to help protect data and monitor and prevent threats and attacks.

FY16/FY17 Roadmap – Administrative Systems

Alumni Relations & Development

▪ *System/Data Integration*

FY16

- CATracks/Prospect Strategies: Completed FY16, enables ARD to identify prospect strategies at a glance within CATracks entity record.
- FASIS->CATracks Load Improvements: FY16 completed project enhancing data transfer to ensure key updates to employee information.
- Early Admissions Decisions-Load Enhancements: FY16 work completed allowing ARD access to student information.
- GPL Phonathon: FY16 completed the automation of Phonathon gift loads.
- Pritzker School of Law Name Change: FY16 completed the consistent re-naming across all systems.

FY16/FY17

- Lifetime Giving Standardization: Brings consistent calculation across CATracks, reports, Cognos BI during FY16 and 17.
- CATracks /Onbase Integration: OnBase integrated with CATracks during FY16 and into FY17.
- CATracks/SES Incremental Load: FY 16 and 17 implement regularly scheduled data transfer process to ensure key updates to student information are reflected in CATracks and OurNorthwestern.
- CATracks/NUFinancials Interface Improvements: FY 16 and 17 enhanced interface between CATracks and NUFinancials for gift processing.

FY17

- NU Mentoring Integration (Xinspire): FY 17 automate work flow and data load processes between the Network Mentorship Program online platform (Xinspire), OurNorthwestern, and CATracks.
- CATracks/Salesforce Integration: key data flows between CATracks and Salesforce set-up during FY17.
- CATracks/CATalyzer Integration: During FY17 automate the workflow and data load process between CATalyzer/CATracks as fundraising tool.

▪ *Reporting/Analytics Improvements*

FY16

- Names Project: FY16 completed correcting name input issues as stored in CATracks.
- GPL Lockbox: Completed FY16, easily loads and processes gifts through automated tool.
- CATracks/New Pledge Types: FY16 completed enhancements for improved accuracy reporting.

FY16/FY17

- CATracks/Student Affairs: FY16 and FY17 new allocation school code of Student Affairs will report fundraising progress for the campaign and fiscal year at an executive level.

- *System Enhancements*

FY16

- IDP Matching Logic P1: FY16 completed the matching of alumni/friends information with CATracks entities.

FY16/17

- OurNorthwestern Improvements: Research/Implement improvements to selected components of the OurNorthwestern environment during FY16 and FY17.

FY17

- NAA Site Redesign: FY17 Major updates and bringing the NAA web presence into alignment.
- CATracks Physical Recognition functionality: FY 17 provides new functionality for donors of physical objects related to University.
- Prospect Module Simplification Project: by removing customizations, the model will be more in line with current vendor-delivered functionality during FY17.

- *Infrastructure Maintenance*

FY16

- CATracks Upgrade v9.10: FY16 upgrade enabling Ellucian support for Advance application and leverage improvements.

FY16/17

- Jive Software Upgrade: Upgrades to latest version of Jive during FY 16 and FY 17.

Enabling Technologies

- *System/Data Integration*

FY17

- Gap analysis of Univ Workflow Needs Relative to Solutions: FY17 gap determination between workflow needs and the solutions the University has licensed already.

- *System Enhancements*

FY16

- Database Encryption: FY16 encrypt administrative system databases to add additional layer of security to administrative system databases.
- IdP Gateway: FY16 project to enable users to log into a system using a social identity (e.g. Facebook Google) for those with library privileges but without a netID.
- OnBase Enterprise license: FY16 negotiate enterprise license for OnBase and provide enterprise support for product.

FY16/17

- Single Sign-on (SSO) / Multi-factor Authentication (MFA) Expansion: FY16 expand SSO and MFA to University's Administrative Systems, during FY17 go out further to more University systems.
- Improve Web Services Request/Approval System: Replace existing technology/process that provides the current request/review workflow for gaining access to University web services with a more user-friendly solution.

FY17

- Implement API Management/Gateway Product: FY17 project enhancing the SOA infrastructure in order to lower the barriers for developers, and to enable expansion of SOA adoption for integrating within the University systems.
- Portal Strategizing: FY17 re-assess enterprise needs for a University portal experience to facilitate finding and using University online systems and services more efficiently.

▪ *Infrastructure Maintenance*

FY16/17

- Replace Identity Management System: FY16/17 two-year project replaces current IdM system with a system consisting of better features, functionality, and integration ability with other Univ. systems.
- OAuth Enablement in SOA Infrastructure: FY16/17 2-year project to enable added security layer to the University's SOA infrastructure.

FY17

- Upgrade GoAnywhere: FY17 upgrades system to enable University to transfer files internally and w/business partners securely, keeping the system on a solid support basis and not depreciated.
- Upgrade Autosys: FY17 upgrade the system enabling 24/7 scheduling of batch processes for University systems, keeps it on supported release of the product and vendor support.

Enterprise Reporting & Analytics

▪ *System/Data Integration*

FY17

- Single Organization Tree Analysis: Unified Organizational Structure to assist with integration across enterprise systems in FY17.

▪ *Reporting/Analytics Improvements*

FY16

- New CTEC System Reporting: FY16 completed unified evaluation data sets of CTEC historical and current data collection.
- Retirement of SES Crystal Reports: Completed the conversion of Crystal reports into BI in FY16.

FY16/17

- Research Portal Phase 1 & 2: Unified portal for research administration easy access, worked on FY16, to be completed in FY17.
- Administrative Dashboard: FY16 developed WCAS dashboards with school metrics. Standardization/consistency in reporting metrics/self-service improvements made during FY17.
- Undergraduate Transition: Assessment of pre and post enrollment transition programs for Undergrads project during FY16 and FY17.
- Graduate Student Funding: Reports on grad student funding using comprehensive reports and adhoc reporting tools accessed through the Cognos BI reporting system in FY16 and FY17.

▪ *System Enhancements*

FY16

- ETL Migration to Data Stage: Phase 2 completed in FY 16 for a more powerful enterprise platform in order to integrate the data warehouse environment.

FY17

- Alumni 3.0: During FY17 enhancements to the Cognos BI reporting system for ARD, addressing 21 enhancement requests deemed high priority by ARD and the ASAC L4 committee.
- Access Improvement: FY17 plans to improve the user experience around gaining access to administrative systems.

- *Infrastructure Maintenance*

FY17

- Cognos Upgrade: FY17 will see a Cognos suite upgrade to Cognos Analytics/Cognos 11.

Facilities Management

- *Reporting/Analytics Improvements*

FY16

- Cognos Reporting Updates: FY16 enhancements allow for improved oversight of inventory control and enable self-sufficiency in year-long review of open purchase orders.

- *System Enhancements*

FY16

- IWMS Software Selection: FY16 evaluation of options to integrate industry best practices into current University processes.

FY17

- Integrated Work Management System (IWMS) Implementation: FY17 implementation project of an IWMS solution providing increased functionality, integrated data, enhanced user interfaces, etc.

- *Infrastructure Maintenance*

FY16/17

- NUFM (FM Mobile) Upgrade: FY16 new release model /enhanced configuration options improving flexibility and stability of application. FY17 upgrade to latest vendor model.

Finance

- *System/Data Integration*

FY16

- Salary planning/budget integration: Phase 2 completed in FY16 allows for increased efficiency/accuracy by facilitating focused review of all salary related activities at one time and eliminating duplicated data.

FY16/17

- Univ Contracts Workflow System: FY16 implemented contract management solution which automates workflow review/approval routing on sample group. Improved availability of electronic data related to contracts. In FY17 expanded usage to additional schools/units.

- *Reporting/Analytics Improvements*

FY16

- Data Archival Strategy: FY16 developed data archival strategy for Financial data.
- Enhance data availability/reporting: FY16 developed/enhanced Cognos reports to improve availability of information and flexibility of data retrieval to support business decisions.

FY17

- Revenue recognition on non-grant contracts: Audit requirement FY17 to ensure all University contracts/revenue agreements are filed properly for financial reporting and are auditable.

▪ *System Enhancements*

FY16

- My Wallet Implementation: FY16 PeopleSoft My Wallet module in NUFinancials automates P-card transactions. Enhances reporting and admin/audit controls.
- Financials Dashboard: Dashboard created in FY16, which improves efficiency by increasing ability to quickly identify transaction status and intervene as necessary.
- Confidential Expenses: Enhanced data security in FY16 for individuals with sensitive expense transactions.
- Budget and forecast enhancements: Project completed in FY16 which enhanced tools, functionality and data availability for budgeting and forecasting functions of NU Plans to version 10.2.2.
- Treasury enhancements: During FY16 worked with Treasury to prioritize areas targeted for automation to improve efficiency, data availability, processing, through automation.
- Chart field processing enhancements: Enabled chartstring validation as a service, and automated closure of budget codes to reduce errors during FY16.
- Tax identification and reporting enhancements: Automated manual review during FY16, thereby improving efficiency and reducing error rates.
- Update system generated messages: FY16 enhanced event driven notifications by updating system generated messaging to conform with communication guidelines on usage content/frequency.
- IT Infrastructure enhancements: During FY16 provided enhancements to data security and enhanced information available to resolve issues.

FY16/17

- Research Portal: During FY16 efforts made to address key issues that caused difficulty for staff; will continue into FY17 when additional enhancements will be rolled out resulting in higher efficiency.

FY17

- NUFinancials Voucher Import Service (SOA): FY17, a service to be developed loading invoice data to NUFin for areas processing payments through the application, eliminating wasted time and efforts.
- NUFinancials Voucher Payment Service (SOA): FY17 service to provide voucher payment status and other related information from NUFinancials for automating previous manual payment tracking processes.

- Update system generated messages: FY17 Service Delivery Initiative to ensure consistent communications to improve experience, provide clarity, identify appropriate contacts, etc.

- *Infrastructure Maintenance*

FY16

- NUFinancials Roadmap: During FY16, developed a plan for future upgrades of system, allowing for effective planning, standardization and alignment of app delivery with University objectives.

FY17

- Infrastructure Upgrades: AutoSys/GoAnywhere Upgrades in order to maintain IT infrastructure and ensure support for critical business processes relying on these tools during FY17.
- Financials 9.2 upgrade: to enhance functionality, during FY17 PeopleSoft Financials will be upgraded from v. 9.1 to 9.2 in order to remain vendor supported.

Human Resources

- *System/Data Integration*

FY16

- Training Management System – Pilot: FY16 Office for Research pilot implementation of training management system for improved visibility/functionality in training, managing/teaching classes, and compliance requirements.
- Annual Graduate Student Interface: FY16 improved process by implementing 2 enhancements to annual graduate student interface.
- Aligning Budget/Salary Planning: During FY16 implemented integrated data from FASIS to NuPlans which reduced duplicate data entry, increased overall effectiveness and accuracy of annual process.
- SOA: FY16 created services of demographic/appointment related information for all employees, etc., for increased efficiency because of real-time updates sent out from FASIS to BI.
- 3rd Party integrations: FY16 integrated 7 functions for compliance needs for Payroll and Benefits.

FY17

- Faculty Recruiting: During FY17 implement a faculty recruiting system integrating between FASIS and Faculty Recruiting system for job openings and Applicant Data.
- NMG Benefit Enrollment/Interfaces: FY17 implement cloud solution for benefits enrollment. Integrations between FASIS and BenefitFocus system providing HR with visibility and full control.

- *Reporting/Analytics Improvements*

FY16

- Position Management Reports: FY16 increase efficiency to track vacancies and budgeted salaries, including breakage and variance dollars.
- Additional Pay: FY16 improved user experience and increased efficiency for admin staff to submit, approve and track add pay request by moving from paper to electronic.

FY17

- Research Portal: FY17 integration of existing data in the HR data mart into the Research Portal to improve administrative efficiencies; including data from multiple administrative systems.

- *System Enhancements*

FY16

- SSO/Upgrade MFA: FY16 implemented single sign on and an upgraded MFA platform for FASIS.
- Tuition Benefits Application/FASIS self-service: FY16 created online tuition assistance request form.

FY16/17

- Grad Student Operations FASIS/SES Rewrite: Phase 1 FY16 rewrote interface/requirements for tuition/stipend process for grad students. Eliminates duplication and paper forms. Phase 2 in FY17.
- Audits: FY16 and FY17 Series of audits engaged in both internally and externally: Kronos, Terms/Transfers, and PwC.

FY17

- W2 Delivery: Additional security analysis will be done in FY17 regarding vendor options and possible enhancements to the electronic W2 implementation.
- Timekeeping Software Selection and Compensation Module: Planning work to be done FY17.

- *Infrastructure Maintenance*

FY16/17

- PeopleSoft Upgrade to 9.2: FY16/17 Two-year phases enhancing technical tool set to provide more functionality, and increase user experience for both administrators and self-service.

Research Administration

- *System/Data Integration*

FY16/17

- COI: FY16 Phase 1 COI system implemented for NU and affiliates. FY17 Phase 2 extends system to FSM, NMHC, RIC and Lurie Children's.

FY17

- Effort Reporting: FY17 create a data mart comprised of data sourced from number of systems, w/ad hoc reporting package and canned report built for it.
- Award Chartstring Service: FY17 provide ability to systematically retrieve associated chartstring data when providing proposal, award or protocol data.

- *Reporting/Analytics Improvements*

FY16

- Metric Reporting: FY16 establish fast turnaround time reports for IRB; rewrite IRB query grid to work with IRB7 data model.
- Cognos report updates to improve access and value of data: FY16 report enhancements improved availability, usefulness and aggregation of data.
- InfoEd: During FY16 improve ability to track and report on data through various configuration updates within InfoEd.

- Clinical Trial Actuals Reporting/GM090 Award Projection Report: FY16 Updates enabling OSR reports to show actual/current account balances to date, and budget amounts - saving staff time.
- Sub-Contract monitoring report: FY16 developed a report providing detailed subcontract finances. Enables necessary oversight to meet tightened federal closeout requirements; prevents errors.
- Cost-share Reports: FY16 developed new cost share reports which combine a # of reports into one. Benefitting departments, schools and central offices, saving staff time.

FY17

- ORI Tracking System: FY17 routes and tracks all documents and review history relating to research integrity reviews, allowing ORI metrics to be reported without manual work.
- Metric Reporting: FY17 various performance indicators improved, also serves program review.

▪ *System Enhancements*

FY16

- InfoEd Workflow: FY16 re-configured InfoEd to support a streamlined review process that includes capturing milestones for administrative shell ready-to-review/proposals final and ready to submit.

FY16/17

- Learn@Northwestern: Phase 1 FY16 Single LMS (Learning Management System) for Northwestern, with Phase 2 FY17 expanded to additional areas such as HR L&OD, and Police.
- Research Dashboard/Portal: Phase 1 FY16 addressed key issues necessary for improved efficiencies. P2 addresses key issues within the system in order to improve accuracy and efficiency in FY17.

FY17

- CCM Granite/Topaz: FY17 replace CCM census, billing, vet service charge, order transfer system, moving to Click platform which offers CCM, managing projected growth and online animal ordering.
- eACUC System: FY 17 incorporate various improvements to address time consuming inefficiencies.
- eIRB: FY17 address various inefficiencies reported by OHRP and reviewers since system first uploaded.
- NSIS Enhancements: FY17 addition/redesign of Research Safety System modules.

▪ *Infrastructure Maintenance*

FY16

- Endpoint Management: FY16 use KACE and Windows server Update Service to centrally control PC updates centrally monitored and applied; decrease security risk of lost/stolen devices.
- CCM Operations: FY16 updates to Space Management, testing of Oracle 12c for migration and Electronic Medical Record upgrades to address pain points in various CCM operations.
- Pre-Award Vendor evaluation/analysis: During FY16 conducted an evaluation of pre-award systems to determine if current system is best fit for Institution.

- Financials Roadmap: FY16 develop roadmap identifying gaps and key opportunities for process improvement to ensure long term viability of applications supporting critical Financials functions.

FY17

- InfoEd v15 Upgrade: FY17 upgrade includes Oracle 12c v2 Upgrade and Database Encryption projects.
- Financials 9.2 Upgrade: FY17 upgrade to remove customizations to prepare for future move to Oracle Cloud ERP
- Click Discovery: FY17 partner with Click to complete discovery of costs, resources and scope for subsequent implementation of the Click Grants module.

Student

▪ *System/Data Integration*

FY16

- Implement Address Verification/SES: FY16 DHS compliance project which retains all international students' US residential address while associated with Northwestern.
- Blue CTEC system Integration: Integrating learning objectives within the course and teacher evaluations during FY16.

FY16/17

- Health Insurance Coverage Verification: FY16 Phase 1 developed a business process for the HSO which provides insurance data with more integrity and reliability on all full-time NU students. Phase 2 FY17, improves the process for students to renew their health insurance selection, ensuring all students have adequate coverage.

FY17

- Graduate Student Funding: Implementation during FY17 of ongoing interface between FASIS and SES to improve student funding.

▪ *Reporting/Analytics Improvements*

FY17

- Annual Confirmation Process/Students: FY17 Improve configuration of annual student survey so that questions can change w/o much effort, and allow Northwestern to be responsive to regulatory/Univ. needs.

▪ *System Enhancements*

FY16/17

- Enable MFA: FY16 Phase 1 standardizes use of Web SSO, requests the integration into the existing Web SSO (with CAESAR and/or SES Admin) of some/all systems of SES to make use of this technology. FY17 Phase 2 enforces MFA for CAESAR students, instructors, academic advisors.

FY17

- Misc. student experience and compliance projects: FY17 implement changes in various systems to support the Student Experience University Initiative.

- Academic Calendar Change: FY17 possible change to the academic calendar beginning fall of 2018 as part of the University Strategic Initiative.

- *Infrastructure Maintenance*

FY16

- PeopleSoft Campus Solutions 9.2 Upgrade: FY16 upgrade of PeopleSoft Campus Solution (SES/CAESAR) to take advantage of new application which enhances Self-Service user experience.
- PeopleTools 8.54/Oracle 12C Upgrade: FY16 infrastructure upgrade to maintain the Oracle PeopleSoft Campus Solution Application, reducing total cost of ownership.
- TGS Admission system replacement: in order to meet diversity goals, we need to provide a new combined recruitment/admission system platform solution in FY16 for application season 2016-17.

FY16/17

- Campus Partners Conversion: FY16 project to find an appropriate replacement system for Campus Partners (recently acquired by a competitor), as the current servicer for Student Loans. FY17 Student Loan System Conversion Phase 2: will implement a system for servicing student loans which has been acquired from different vendor.

FY16/FY17 Roadmap – Information Security

Information Security Controls

- *Network*
 - Network Firewalls and Routing
 - FY16 The DUIT (Deny Unsolicited Inbound Traffic) service was introduced in FY16, with ~25% of all public IP address space brought under DUIT protection by the end of FY16. In one 24-hour period early on in the pilot project, over 460,000 unsolicited inbound sessions were blocked. Direct engagement with schools and departments will continue in FY17.
 - FY16 Northwestern IT introduced a virtual firewall service for servers hosted at the University Data Center, reducing deployment time and the dependence on hardware appliances.
 - FY17 Investigate options for improved management of the data center enterprise firewalls to reduce change request delivery time.
 - FY17 Investigate options in FY17 for a new departmental firewall service model that reduces current barriers to adoption, standardizes deployment, and improves scalability.
- *Identity and Access Management*
 - Identity Management System
 - In FY16, the requirements for a new system to replace the University’s core identity management system, NUValidate, were gathered, an RFP was issued, and a contract has been signed with the selected vendor (SailPoint). An implementor selection process is underway, and an implementation timeline of the system replacement and other projects will be released in winter quarter for the multi-year initiative.
 - Identity Assurance - Multi-factor Authentication
 - Infrastructure for Multi-factor Authentication improved and integrated with the University’s Single Sign-on platform in order to replace “password only” authentication mechanisms. New platform launched in FY16 for NUPlans, FASIS, Student, and NUFinancials.
 - FY17: Expand service to include remote access (VPN) and privileged access (i.e., for System Administrators)
- *Email*
 - FY16 implementation of advanced management and security solutions for Exchange email system (ProofPoint, an improved anti-spam and anti-phishing platform, and IronPort, an email encryption platform that provides both automated and on-demand encryption services)
 - FY17 deploy Single-Sign On for Outlook Web Application.
- *End-user Security*
 - Encryption
 - An enterprise approach to endpoint encryption was launched in FY16. New services to provide whole disk encryption natively within a device’s Operating System were created within Northwestern IT, and were used to encrypt Northwestern IT devices. An assessment of the state of encryption around the University was also done, and will be used to help target encryption efforts in FY17, when the goal is to have all devices encrypted.
 - Endpoint Management

- Standard configurations for personal computers drafted and agreed to by the Infrastructure Advisory Committee in FY16.
 - FY17: Report by the Infrastructure Advisory Committee’s working group on Endpoint Management to be released in Fall Quarter, 2016. Will provide recommendations for an enterprise approach to improved endpoint security. Work with each school and unit to build their roadmap for implementation from each school and unit. Have agreed-upon roadmaps by January 2017.
 - FY17: Feinberg School of Medicine implements IBM’s BigFix endpoint management platform as part of a larger solution to provide more granular management of access to legally restricted data.
- *Threat Detection and Response Mechanisms*
 - Advanced Threat Detection Software
 - Newer, more advanced threat detection software will be added to the network in FY17 in order to improve our ability to detect newer attack approaches.
 - Network Traffic and Event Log Monitoring
 - Expanded log aggregator/analysis tool (Splunk) from email logs to network traffic logs in FY16. Will continue to expand in FY17 and beyond. Log analysis used to aid in vulnerability and outage events.
 - Data Center Asset Monitoring
 - FY17 – install software agents (QualysGuard) on all Northwestern IT-controlled servers in the University data center to enable real-time reporting of information on installed software, configuration settings, and vulnerabilities. Will be expanded to the other servers in the data center once the processes have been established and verified. This will be a great assist in being able to respond to announced critical vulnerabilities in widely deployed resources, e.g., operating systems, applications, network equipment, etc.
 - Incident response
 - Revise incident management protocols in FY17 to accommodate larger, potentially enterprise-scale security incidents.
 - *Policies*
 - Feinberg School of Medicine established mandatory encryption and endpoint management policies in FY16.

Information Security Services

- *Research Information Security program*
 - Program being driven by the Research Information Security Working Group (VP IT/CIO; IT Directors from McCormick, WCAS, SoC, Kellogg; CISO from Feinberg; multiple other members from Northwestern IT)
 - Ensure researchers can get assistance to adopt University-wide services, and to set up and maintain secure research computing
 - Improve awareness of solutions available; emphasize why information security is important and how to get help.
 - Expand the portfolio of secure shared research services, and improve the consistency and customer experience of these services to encourage broader adoption.

- Continue to encourage the movement of research data to the data center or an appropriate environment with a University contract
- Improve knowledge of information security practices and needs within the research community.
- *Endpoint Management*
 - FY16: A new instance of the JMFF Casper endpoint management system for Apple devices deployed by Technology Support Services (TSS). Initially deployed for Mac computers supported by Northwestern IT.
 - FY17: As part of the strategy to provide sharable endpoint management services at the center, with participation encouraged by funding centrally rather than via chargebacks, deploy Casper and Dell KACE endpoint management platforms as shared services with no chargebacks for software or hardware.
- *Whole Disk Encryption Shared Service*
 - FY16: New instances of the JMFF Casper and Microsoft’s MBAM servers were deployed by Technology Support Services (TSS) to manage native OS encryption of personal computing devices at the University. Will be deployed as shared services with no chargebacks for software or hardware in FY17.
- *Vulnerability Assessment Services*
 - Vulnerability Scanning Service
 - Interest in utilizing ISS/C’s Vulnerability Assessment Service spiked in FY16 (100% increase in number of sites scanned) due to work being done by the Research Information Security working group. As part of the interaction with this working group, the operational process surrounding the assessments has been greatly improved (e.g., targeted reporting of vulnerabilities and the devices on which they were found, y reporting, remediation. We anticipate these interest levels to continue to grow in FY17.
 - Created an Information Security wiki to improve the reporting and usability of vulnerability assessments results.
 - FY17: Extend use of QualysGuard software agents to schools and departments, allowing for constant monitoring of critical servers.
 - Information Security Assessment for Research Centers
 - In FY16, Northwestern IT partnered with the Office for Research to create a discovery survey on Information Security Controls and Practices in research centers. 11 Centers participated in the survey, and the results will help drive remediation activities and service improvements in FY17.
 - Service Provider Security Assessment (SPSA)
 - FY16 - In response to feedback from vendors and IT teams at Northwestern, the University’s form for assessing the information security postures of external vendors was shortened and revised to eliminate duplicative work and focus on the most relevant information security elements.
 - FY17: Development of a web-based service that will allow service providers to complete the survey ‘on-line’ and upload appropriate documentation. Improvements will include reporting on status of surveys (e.g., issued to or received from vendor, in progress,

completed, etc.), automated scoring of survey results, and notifications to processors and clients.

- *Insuring security of legally-restricted research data*
 - In FY17, work with the Office for Research, the IRB, and distributed IT units to institutionalize the identification of legally restricted data and the review of its associated data security plans
 - In FY17, provide a template for defining and implementing secure environments for researchers who have been given data with legal restrictions attached to it.
- *Secure Compute and Storage Services*
 - Research Data Storage Service (RDSS)
 - The RDSS is a regulatory-compliant data storage service that is designed to accommodate large research data sets. It was launched in FY15, and grew to house 450 TBs of data by the end of FY16. This service will continue to be expanded in FY17.
 - The Use of Box File Storage for Restricted Data
 - During FY16, WCAS developed a User Interface (SAFER) to wrap additional auditable information management controls around the Box file management service provided by the University. WCAS piloted this product during FY16, and in FY17 that pilot will be evaluated from the perspective of the product's viability for the rest of the University.
 - Establish secure enterprise cloud-based practices
 - FY16: Contracts in place with both Amazon Web Services and Microsoft Azure. A Cloud Architecture and Design team established to develop and document best practices for the delivery of these services and their use throughout the campus community. This team engaged with over a dozen Proof of Concept candidates from Feinberg, SESP, ADEA, Northwestern IT, and Kellogg to provide access to both AWS and Azure accounts.
 - FY17: Develop security templates for use by subscribers, and establish required procedures that ensure end-to-end compliance by subscribers.
 - FY17: Pilot of cloud-based research environment in AWS that can be the basis for an expandable research environment for the University
 - Secure File Transfer
 - Upgrade Administrative Systems' secure file transfer product, GoAnywhere, in FY17 to the latest software release.
 - Identify in FY17 a solution to propose for a centrally-supported secure and 'easy to use' file transfer solution for the University as a whole.

Education, Awareness, and Community Engagement

- *Annual Communications Plan*
 - In FY16, the research information security working group (RISWG) began envisioning, along with the Northwestern IT Communications team, a revamped annual communications and engagement plan for the University. The new plan will be finalized and implemented FY17.
 - FY17: Establish an Information Security blog to facilitate the sharing of knowledge of 'all things security' across the enterprise.
- *Information security website overhaul – architecture and content*

- As part of their work on a revamped annual communications plan, the RISWG / Northwestern IT communications team began re-envisioning a new Information Security website. The new website will be launched in the fall 2016 quarter and progressively updated in the course of FY17.
- *Faculty engagement*
 - Quarterly training sessions for faculty and staff were conducted in FY16 in partnership with the Office for Research; continuing into FY17.
 - As part of the RISWG’s work, new engagement guidelines and content are being developed for use across the University, and initial and on-going engagement with Research Deans in the schools is being emphasized. Much of the focus of this material is on how to get help and increasing awareness of existing services that can help researchers reduce the information security risk attached to their research.

This work, and associated work with the school Research Deans, began in FY16 with the schools in the working group. It will expand to the rest of the campus in FY17.

- *Phishing education/testing*
 - To combat one of the most widespread attack vectors, an educational and awareness program centered around phishing avoidance will be coupled with use of a commercial Self-phishing service (i.e. send out fake phishing notices to identify and educate people who might be susceptible to authentic phishing attempts.

IT Partnership and Organization

- *FY16 was a year in which there was a qualitative shift in how the University’s Information Security posture was addressed, with coordinated, on-going, participatory engagement at many new levels*
 - Key Enterprise Engagements
 - The Infrastructure Advisory Committee (IAC) identified Information Security as one of it’s leading priorities for FY16, and played a central role in this area during FY16, providing a forum for discussion, commitment to execute, and on-going updates. Topics included: standard configurations for personal computers, encryption services and practices, denial of unsolicited inbound network traffic,
 - Research Information Security – An enterprise working group was created In FY16 to help improve our security posture with regard to Research Information Security. IT Directors from McCormick, Kellogg, WCAS, and SoC, joined FSM’s CISO, the University CIO, and other representatives from Northwestern IT to comprise this group.

Areas of focus have included: vulnerability assessments and remediation; definition of the overall information security approach to endpoint computing at Northwestern, including standard configurations for personal computers; faculty engagement frameworks and content; an annual communications plan for information security; and an overhaul of the Northwestern IT web pages on Information Security.

The focus of these efforts has been to build this content and processes via a much closer working relationship between Northwestern IT and the schools, and for the IT groups in the working group to use them to insure their stability and appropriateness. During FY17, these services will be expanded to the schools not represented on the working group via the Infrastructure Advisory Committee.

- Endpoint Management - An enterprise working group was created In FY16 to develop a roadmap for a holistic, enterprise approach to improving our endpoint information security posture. The working group considered five functional areas – endpoint management, patching management, policy management, asset management, software delivery, and user state migration – and looked at them in terms of current state at the University, risks inherent in the area, desired state at the University, and proposed path to attain that state. The group will issue a report in the fall 2016 quarter, and governance and implementation timelines will be created thereafter.
- Key Themes
 - Emphasize active participatory partnerships between Northwestern IT and distributed IT teams through all stages of the initiative, rather than handing off centrally-prepared requirements to distributed IT units and expect individual implementations.
 - Develop shared services at the center to reduce duplicative effort.
 - Improve consistency of practices across the University to raise the University’s overall security posture, reduce confusion around expectations and options, and encourage broader adoption of secure solutions
- *Information Security-related Northwestern IT staffing*
 - The current director of ISS/C is retiring in October. A new Chief Information Security Officer position has been created, and the search for his successor will begin in September 2016, as will a search for a new Associate Director position.

FY16/FY17 Roadmap – Cyber Infrastructure

Service Platforms

- *Computing platforms*
 - FY16: Growth of administrative systems computing platforms has flattened out due to movement to the cloud and curbing the growth of development and test environments. Research computing is the growth area, both in terms of shared compute clusters and individual servers being moved into the data center. The belief is that the growth of cloud computing at Northwestern will eliminate the need to keep expanding the existing data centers.
 - FY17: Identify opportunities to tie NUCloud services into cloud services from partners such as Amazon Web Services or Microsoft Azure.
 - FY16: The Feinberg School of Medicine Secure Computing Environment initiative to provide improved management, control, and policy enforcement across all devices used to access regulated and University data moved from investigation and architecture requirements to a final decision stage.
 - FY17: Complete deployment of FSM secure computing environment initiative.
- *Monitoring and Log Aggregation*
 - FY16: Identify a platform that will allow for the rapid evaluation of servers and the services running on them to aid in the rapid determination of vulnerabilities and mitigation of zero-day exploits.
 - FY16: Added additional capacity to the Splunk log aggregation tool and expanded the logging capacity allowing for a greater number of operational and application logs to be captured and analyzed. Completed deployment of Splunk security module.
 - FY16: Consolidation of monitoring tools has continued. 90% of Nagios monitored applications and services have been migrated into Solarwinds, providing for improved monitoring and notification.
 - FY17: Deploy agent-based solution (Qualys) across all servers running at the University data center to allow for rapid evaluation of server configurations to aid in response to announced critical vulnerabilities in widely deployed resources.
 - FY17: Develop a Splunk service model that will allow for departments and schools to utilize the log aggregation capabilities and tools that are being built around the service.
- *Load balancer*
 - FY16: Complete hardware refresh of the campus load balancers, providing greater capacity and new features to improve application level load balancing.
- *Cloud*
 - FY16: NUCloud service updated/adapted to meet addition requirements requested by NUCloud tenants, including updates to the cost model, the ability to add incremental quantities of compute or storage throughout the year and the additional of highly available virtual firewalls.
 - FY16: Contracts in place with both Amazon Web Services (AWS) and Microsoft Azure. A Cloud Architecture and Design team established to develop and document best practices for the delivery of these services and their use throughout the campus community. This team engaged with over a dozen Proof of Concept candidates from Feinberg, SESP, ADEA, NIT, and Kellogg to provide access to both AWS and Azure accounts.

- FY17: Pilot a secure research computing environment in AWS that can be expanded for additional research projects. Further develop the campus cloud architecture and service delivery process around cloud-based services. Partner with schools and researchers to prioritize the developing services.

- *Storage*

- FY16: Active partner in Northwestern University Library’s assessment of requirements for archival and preservation storage
- FY16: Box – quotas removed from faculty and staff usage.
- FY16: Research Data Storage Service continued to grow with over 400 TB of data residing in the platform.
- FY17: Continued expansion of the Research Data Storage Service to meet community needs and extend the auditing and reporting services (Stealthbits) into the schools.

Data Center

- FY16: Upgrades to the Evanston and Chicago datacenters provide additional capacity and redundancy to the power and cooling systems in each facility.
- FY16: Introduced a virtual firewall service for servers hosted at the University Data Center, reducing deployment time and the dependence on hardware appliances.
- FY17: Investigate options for improved management of the data center enterprise firewalls to reduce change request delivery time.

Data Network

- *Campus Backbone and Border Routers and Firewalls*

- FY16: Increased off-campus network capacity with 100Gbps links to support high speed research needs.
- FY16: Introduced the DUIT (Deny Unsolicited Inbound Traffic) service, with ~25% of all public IP address space brought under DUIT protection by the end of FY16. Direct engagement with schools and departments will continue in FY17.
- FY17: Investigate options in FY17 for a new departmental firewall service model that reduces current barriers to adoption, standardizes deployment, and improves scalability.

- *Wired*

- FY17: Implement an internet circuit that connects to the Evanston campus and bypasses the downtown Chicago area. This circuit will provide alternate network access for the campus in the event of a large scale disaster that compromises our redundant facilities in Chicago.
- FY17: Develop a service model to allow for IPv6 deployment across campus networks on an as-needed basis.
- FY17: Planned upgrade of the campus site-to-site VPN service allowing for greater redundancy and capacity.

- *Wireless*

- FY16: 95% coverage of interior space was achieved in FY15. In FY16 wireless changes comprised refreshing end of life equipment, adding access points to high density classrooms, and tuning the infrastructure to improve coverage where required.

- FY17: Centrally funded efforts will continue FY16’s work of refreshing end of life equipment, adding access points to high user-density areas, and bringing service to more outdoor areas.
- *Research network*
 - FY16: Continued build out of dedicated research computing network. Ten of the 16 original committed participants are fully connected to the new infrastructure, including the new Large Hadron Collider Compact Muon Solenoid Experiment Tier 3 facility.
 - FY16: The research network’s connection to external networks upgraded to 100Gbps.
 - FY17: activities will include enhancing security, connecting data transfer nodes (DTNs) in the data centers, and continued investigations into Software Defined Networking for dynamically allocated services.

Communications and Collaboration

- *Voice Platform*
 - FY16: Two proof of concept pilots were completed with for the new University voice platform with participation from 150+ faculty and staff, representing 19 departments across the schools of the University. After analyzing the data collected from pilot participants and the Northwestern IT evaluation team, the solution from Cisco Systems demonstrated the closest alignment with campus needs and is the solution of choice.
 - FY17: Deployment of the new Cisco voice platform begins. Estimated that it will take approximately two years to migrate all existing telephone lines to the new platform.
- *Cellular coverage*
 - FY16: Due to changes in technology that are on the horizon (Voice over WiFi) and the complexities of such arrangements, lack of carrier interest in participating in an enterprise-wide Distributed Antennae Systems (DAS) a non-starter. A shift to broader partnering with the carriers, which includes greater cell-site investments by the carriers and shared targeted investments in the existing DAS for critical spaces, is now being pursued. Initial engagements have been successful with commitments from AT&T, Verizon and T-Mobile to invest in campus improvements.
 - FY16: Enhanced coverage in selected strategic areas (e.g. The Garage, Ryan Center for the Musical Arts, Segal Visitors Center and surrounding outdoor areas) completed.
 - FY17: Ongoing enhancement across campus, including Ryan Field, the Kellogg Global Hub and other locations across campus that require improved cellular service.
- *Microsoft Collaboration suite*
 - FY16: Migrated Kellogg students into Office 365.
 - FY16: Migrated Feinberg students into the University’s on-premise Exchange instance.
 - FY16: Upgraded Board of Trustee's SharePoint site.
 - FY16: Upgraded to Skype for Business (from MS Lync)
 - FY17: Complete the assessment of a migration plan for the Microsoft collaboration suite to a cloud-hosted offering and begin transition as appropriate. This would include SharePoint and other services as appropriate.
 - FY17: Deploy Single SignOn and Multi-factor Authentication across the Collaboration suite.
- *Emergency Communications*

- FY17: In partnership with the City of Evanston, identify priority locations and begin addressing locations that presently do not meet the City of Evanston ordinance for fire and police in-building communication.

FY16/FY17 Roadmap – User Support Infrastructure

EndPoint Management

- *Endpoint Management*
 - FY16: Created central instance of an endpoint management platform specifically designed for managing Apple devices.
 - FY16: Initial draft created of a business model to de-bundle endpoint management services from the Distributed Support Services (DSS) support offering so the services can be subscribed to on an a la carte basis.
 - FY16: active participant in IAC Endpoint Management working group, which is charged with developed a roadmap to an enterprise approach to endpoint management.
 - FY17: Finalize business model for endpoint management services, turning these services into shared services that are available to schools and units with no chargebacks for hardware or software including:
 - Endpoint management via KACE and Casper (monitor success of FSM’s adoption of IBM’s BigFix)
 - Endpoint backup via CrashPlan
 - Managed native whole-disk encryption (MBAM for Windows computers and FileVault for Macs)
 - FY17: Incorporate the recommendations of the IAC after their review of the Endpoint Management Working Group’s final report has been issued.
 - FY17: Reduce the number of different models of personal computers purchased by Northwestern IT and encourage the same in other units and schools.
- *Whole Disk Encryption*
 - FY16: Developed scalable services for managing native whole-disk encryption (MBAM and Casper), and encrypted 90% of Northwestern IT personal computers.
 - FY17: Complete rollout to all DSS-supported personal computers, and deliver turnkey service to all distributed IT units.
- *University-wide Standard Naming Convention*
 - FY16: Worked with the IAC End User Support L3 Subcommittee to develop recommendations for a standard naming conventions for computers in order to facilitate consolidation of asset management and other shared services.
 - FY17: Finalize standard naming convention and guide the implementation efforts across all distributed IT units.
 - FY16: Active participant in IAC working group that was charged with developing a roadmap for an enterprise approach to Endpoint Management.
- *Asset Management Improvement Initiatives*
 - FY17: Expand supported endpoint management platforms to include IBM’s Big Fix alongside KACE and Casper.

IT Support Center

- FY16: Total ticket volume: 123,521, with 31% being solved by Tier I.

- *Administrative help desk consolidation*
 - FY16: Tier I support for Learn@Northwestern and Alumni Relations and Development systems transitioned to Northwestern IT.
 - FY17: Continue consolidation of user support for administrative systems by transitioning Tier I support for SES and Office for Research systems to Northwestern IT.

Distributed Support Services (DSS)

- *FY16 was a time of great change for Northwestern IT's group that provides desktop support to Northwestern IT and to groups outside of Northwestern IT on a chargeback basis:*
 - Revised DSS contract template to reduce length and remove legalese.
 - DSS chargebacks reviewed and adjusted. Costs reduced by 27%.
 - Quarterly/semi-annual DSS reviews with customers launched in April
 - Improved standards for support ticket notations to improve accountability to customers and management
 - Print environment re-architected to improve stability, security, and customer self-service
 - Completed self-service reporting plan for DSS customers to see service metrics and status of support tickets
 - Improvement in delivery of executive support
 - Overall support model for Crown redefined with added resources and wider organizational support within Northwestern IT for the DSS Crown team
 - Communications with Crown customers improved for both daily and planned maintenance tasks
 - Removed internal barriers between Northwestern IT TSS and A&RT to improve delivery of Crown conference room support
 - Established inventory of spare devices (laptops, projector, screen, monitors) created for emergency, loaner, and short-notice requests to facilitate faster machine deployment execution.
- *FY17: Rollout self-service printing and reporting services to DSS customers*
- *FY17: Establish project planning template to maintain a high quality consistency in communications, risk management, coordination, and execution.*
- *FY17: Improve asset lifecycle management processes including asset tagging and tracking along with tighter quality controls around deployment procedures.*
- *FY17: Lead implementation of the DUIT network change for Northwestern IT.*

IT Service Management

- *Process Improvement*
 - FY16: Standardized incident, problem, and change management process flows in partnership with administrative systems teams (ADEA, HRITS, FFRA, SES).
 - FY16: Enhanced Footprints customer ticket status communications by developing and implementing an HTML email template based on usability feedback from Administrative systems regarding the previous plain text format.

- FY16: Completed self-assessment of tracking and reporting Key Performance Indicators for Service Desk and Desktop Support service operations.
- FY17: Assess consultancy feedback results, establish remediation roadmap, and execute improvements accordingly.
- FY17: Improve the collection of service delivery metrics in partnership with Enterprise Reporting & Analytics by augmenting existing Footprints reports via a new Cognos datamart. Use the new metrics to drive business process improvements
- FY17: Establish roadmap for improved partnership and synergy across TSS's Network and Communications Services team (NetComm) and Cyber Infrastructure's Telecommunications and Network Services team (TNS).
- *Knowledge Management*
 - FY16: Completed requirements gathering from IAC L3 user support group. Assessed a number of KnowledgeBase upgrade options and presented recommendation of University of Wisconsin's KnowledgeBase to IAC L3 to solicit feedback.
 - FY16: Began restructuring and refreshing the IT Service Catalog, utilizing the EDUCAUSE Service Catalog model.
 - FY17: Present recommended KnowledgeBase upgrade solution to Northwestern IT leadership and the IAC IT governance group to gain feedback. Continue to review and improve all facets of knowledge management in user support, including forthcoming changes as part of the Northwestern IT website refresh and a better knowledge management system for recording and delivering support documentation for enterprise IT services.
 - FY17: Complete rollout of Service Catalog including a tie into the Northwestern IT website refresh.
 - FY17: Assess and recommend organizational structure adjustments within Northwestern IT's Technology Support Services team (TSS) to address evolving roles for knowledge management and accessibility compliance.
- *IT Service Management platform*
 - FY16: Rejected ideas of migrating the Footprints platform from Oracle to SQLServer and of doing a full review of Footprints alternatives as too resource intensive for this point in time. Reviewed some possible alternatives to improving Footprints functionality via add-on products. Internal path chosen for reporting improvements, and began socializing the idea of the University of Wisconsin's KnowledgeBase as an add-on.
 - FY16: Presented Footprints' capability for doing Administrative Systems' System Access Request/Approval workflow. OnBase chosen as the preferred in-house tool for this project.
 - FY16: Upgraded Footprints to version 11.6.8, which supports Oracle v12 database. Benefits included an improved User Interface and lower search response times.
 - FY17: Participate in possible review of the Footprints platform in the IAC End User Support L3 Subcommittee.