Interdisciplinary studies, greater access for students, world-class research, art and collections, and a passion for teaching are some of the goals for Yale University. In order for Yale to achieve these goals, IT plays a big part in delivering capabilities that enable faculty and student success. Moreover, as Yale’s administrative units continue to drive for greater efficiencies, IT will be the cornerstone of these strategies.

FY14 was an outstanding year for IT at Yale. We continue to deliver rock-solid services while moving greater resources to support the mission of Yale. In FY15, IT is poised to continue its path toward service excellence through a continued focus on listening to our community and delivering the highest quality technology solutions that meet the needs of the university. On behalf of all the IT professionals on campus, I am happy to present the FY14 annual report.

Sincerely,

Len

Len Peters
University Chief Information Officer
Associate Vice President

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iPads in the Classroom Promote Innovative Teaching and Learning

The Instructional Technology Group (ITG), in close partnership with the Collaborative Learning Center (CLC) in the Bass Library, acquired several sets of iPads for instructional use (http://clc.commons.yale.edu/ipad) and launched a program to introduce the devices into the curriculum.

Interested Yale College faculty members are asked to submit proposals describing how they and their students will use the iPads in support of a Yale College course. ITG then provides selected applicants with pedagogical and technical support, assisting with the development and implementation of the proposed activities.

Participating faculty are asked to evaluate the iPad-supported activities and share their experiences on the CLC website and at a CLC-hosted event. The March 18 event, held in the TEAL classroom, showcased 11 successful projects developed as class activities, and highlighted projects made possible with mobile learning technologies.

Since its initiation three years ago, this program has served over 20 faculty members and hundreds of students in their mission of teaching and learning, and has enabled creative and innovative pedagogies through technology.

Supporting the iPad class sets has given me the opportunity to partner with a variety of groups within ITS and Bass Library, and work closely with fantastic faculty. The iPads have been used in a number of amazing ways—from capturing streaming microscope specimens to measuring trees for fieldwork.

—Matthew Regan
Senior Academic Technologist
Academic Services

ONEXYS Program Offers Hybrid Academic-Social Online Experience

Building on an existing program for select rising freshmen, Freshman Scholars at Yale (FSY), mathematics lecturer Jim Rolf was asked to reinvent the program as an online experience focused on mathematics and quantitative skills. Academic IT Solutions (AITS) was invited to participate, along with staff from the Center for Scientific Teaching, Office of Digital Dissemination and Online Learning, and the Yale Science and QR Center. The result is a very creative social-academic hybrid experience (ONEXYS) that meets the academic objectives of the program as it encourages supportive social connections among this first-year cohort.

AITS’s Instructional Design group supported the project with services ranging from developing and delivering training materials, to planning evaluation of the program’s impact. The social layer of the online experience was accorded particular significance. Since there is no course credit, this online effort uses social media elements to pull students into the QR learning experience. For example, ONEXYS students began chatting with their upperclassmen peer coaches on Facebook.

Several technologies support this program, including the Canvas learning platform, the ALEKS adaptive placement tool, Learning Catalytics for math practice, and Adobe Connect for videoconferencing. ONEXYS also will integrate badges to motivate students and help track their progress.

To view a video about this project, visit http://itsannualreport.yale.edu/teaching-learning/onexys-program-offers-academic-social-online-experience.
Teaching & Learning

Yale Sign-Up Tool Released in Learning Management System Sakai

A Yale-developed tool called Sign-up is being released worldwide as a core component of the next version of Sakai, the open-source platform that powers Yale’s Classes*v2 learning management system. Neal Caidin, Sakai Collaborative Learning Environment (CLE) community coordinator, considers Sign-up’s promotion to core status as “one of the highlights” of the platform’s latest release, Sakai 10.

Sign-up facilitates online registration for office hours, study sessions, and other academic meetings within Classes*v2, replacing the paper sign-up sheets that professors would post to their office doors. The tool provides communications and reminders about meetings, and extended capabilities such as waitlists and attendance tracking.

The tool was introduced to the open-source community in 2008 and has since become broadly adopted by schools across the world including Stanford, Oxford, Cambridge, Columbia, Michigan, Indiana, and Virginia. In the 2013 Sakai Tool Survey, the Sign-up tool was the most actively used contributed tool, with more than twice the amount of usage as other contributed tools.

New Course Reserves Management System Launched

Yale University Library, assisted by the Classes*v2 team, implemented a new course reserves system for the start of classes in August 2013. The system gives students the ability to access all of their course reserve materials, print and electronic, within their Classes*v2 courses by clicking on the Course Reserves tab of their course pages.

The new system also allows faculty to follow the status of reserves requests, copy materials from previous classes, and track the number of times an e-reserves reading has been accessed. The new system replaces paper forms submitted by faculty to the library, and shelves the books held out of normal library circulation for student use in the library.

The new program was developed using endowment funds specifically set aside for course reserves in the late 1800s. When the endowment was created, the funders could never have envisioned what their donation would enable with today’s technologies.

Support for teaching and learning is a cross-campus endeavor. The online course reserves project was a collaborative effort between the Library and ITS to unify our services in a way that’s seamless to Yale faculty and students.

—David Hirsch
Director of Academic IT Solutions

computers on campus

11,841
Leading-Edge Technologies in New SOM Building

In January 2014, Yale School of Management (SOM) opened its new campus at Evans Hall. Renowned architect and Yale graduate Norman Foster designed the building. Evans Hall is a marvel in its beauty, though the cutting edge technology that drives the building’s use is not immediately apparent to many admirers.

ITS’s Network Services and the school’s IT department have been involved in the planning of this building for the last six years. The goal was to deliver a modern technological wonder on par with the best business schools across the globe.

This building has three leading-edge technologies:

- Early in the planning process, SOM was interested in doing something more than standard cable TV. Working with a small startup technology company, Philo, we deployed an IPTV-based video distribution system that serves classrooms and break rooms alike over the standard network, thus eliminating the need for a dedicated cable TV network. This system also includes the capability of taking a video feed from the SOM video center and showing it on one of the SOM-dedicated channels.

- A Distributed Antenna System (DAS) allows for the redistribution of cellular signals into the building. This technology has become important in buildings that use energy-efficient glass, as this glass often impacts cellular penetration. AT&T currently offers coverage in Evans Hall, and we hope to enable additional cellular providers in the near future.

- Evans Hall utilizes 802.11AC WiFi, which is the latest standard of a technology that has become an important part of the network on campus. SOM has been designed so that WiFi can be the primary network with special design accommodating high-density use. 802.11ac is very fast; we have seen real-world performance of 300 mbps, which is nearing the speed of the wired network.

Film Study Center Admitted as International Federation of Film Archives Associate

After applying for affiliation with the International Federation of Film Archives (FIAF), Yale University was admitted as a FIAF Associate in May 2014, becoming the 14th institution in the United States to join the organization.

Six of the member institutions are part of universities (Berkeley, UCLA, Harvard, Wisconsin, Indiana, and now Yale). The other eight are the Academy of Motion Picture Arts and Sciences, American Film Institute, George Eastman House, Anthology Film Archives, Library of Congress, Museum of Modern Art, National Gallery of Art, and National Archives.
Teaching & Learning

ITS Proposes Support for Campus 3D Technology Maker Spaces

A 3D technologies team led by John Eberhart, School of Architecture Critic and Director of Digital Media, presented a recommendation to the Deputy Provost of Science and Technology for establishing tiered 3D Technologies or “maker” spaces and services on campus to be supported by ITS.

The team that formed to analyze this emerging technology and develop a support recommendation included broad representation from ITS, the Center for Engineering Innovation and Design, Yale Printing and Publishing Services, and the School of Medicine. For the first time, an IT partner led the team developing an ITS service recommendation, and the team included faculty and student members.

The recommendation includes first-tier 3D technologies support in residential colleges and alongside computing clusters, second-tier support at a central 3D Technologies Center with deep expertise and the capacity to provide training to faculty and students and to support research as well as teaching and learning, and a third-tier support level for overnight model printing and very specialized service.

“We are finding that multiple disciplines across Yale want to use these 3D technologies. To address this demand, ITS is working to develop a university-wide 3D center that would provide 3D resources and instruction on various 3D technologies to help foster creativity and innovation across all of these disciplines.”

— John Eberhart, Critic in Architecture, Yale School of Architecture

Teaching & Learning Committee Promotes Educational Mission

To advance the educational mission of the university, the Teaching and Learning Committee guides strategy, direction, and decision-making in the use and support of technologies that enhance teaching or enable learning at Yale. The committee held its first meeting in December 2013.

Members are asked to influence and vet decisions by offering perspectives of colleagues and students, as well as by sharing innovative instructional experiences. Committee members are engaged with academic thought leaders, consortiums, and professional groups to understand strategic directions of teaching and learning technologies, and to identify opportunities for the university.

The Teaching and Learning Committee advises ITS and the Office of the Provost on how to best advance Yale’s technology footprint in support of the educational mission. The Committee is responsible for receiving and synthesizing applicable program committee reports to inform annual strategic portfolio planning.

The Teaching and Learning committee is interested in fostering innovation by creating a Center for Digital Humanities, spreading opportunities for 3D printing and scanning broadly across campus, launching a Domain of One’s Own program to give students space to program websites or create e-portfolios, and finding more convenient ways to deliver educational software.

— Gary Kidney, Deputy CIO, Academic IT Operations

53 3D printers on campus
23 3D scanners on campus
Research

High Performance Computers Aid Lung Cancer Research

ITS Research Services has been supporting cancer research conducted by Dr. Theodore Holford, Professor of Public Health (Biostatistics), Professor of Statistics, and Head of the Division of Biostatistics at the School of Medicine, through the use of the High Performance Computing (HPC) clusters. Professor Holford’s research team is examining smoking behavior with the goal of developing lung cancer prevention strategies. The team belongs to the Cancer Intervention and Surveillance Modeling Network (CISNET), which is funded by the National Cancer Institute.

Dr. Mark Clements, of the Karolinska Institute in Stockholm, Sweden, visited Yale for one week to launch this effort beginning on Labor Day weekend in 2013. Dr. Clements joined Professor Holford in developing a multistate statistical model (Markov model) for smoking behavior in the United States.

Strategies for controlling lung cancer mortality are very diverse, according to Professor Holford. These strategies range from the adoption of policies, to the reduction of cigarette smoke exposure, to the screening of high-risk subjects who are susceptible due to smoking or genetic history. Hoping to explore cost-effective prevention strategies of lung cancer, Professor Holford’s team has already uncovered results.

Research Services is providing the necessary computing high-performance resources that make this effort feasible. The team is using data from the National Health Interview Surveys, conducted between 1965 and 2012, to construct a model that describes smoking histories of initiation, cessation, and mortality for those born since 1890. The approach employs a system of Kolmogorov differential equations, which estimate transition probabilities by using penalized likelihood estimation. Computational efficiency is aided through the use of parallel processing. Research Services helped optimize the configuration of the cluster of computers, making it possible to achieve significant progress on this project quickly.

To view a video about this project, visit www.itsannualreport.yale.edu/research/high-performance-computers-aid-lung-cancer-research.

Central Database Organizes Med Grant Funding

ITS’s Medicine & University IT Partners group has created a database that extracts and standardizes information on trainee students and faculty, as well as publication records from eight separate source systems. The database will be used initially to generate required reports for National Institutes of Health (NIH) T32 and Medical Science Training Program grants upon which future funding depends.

NIH requires historical data for prior trainees tracked over 10 years in a highly specific format. Data tracking and report generation by involved departments has been arduous and error prone, a reason why grant funding has been recently lost. Phase 1 was a pilot centered on a small number of grants and additional work is still required to fully complete the system and training for its use.

While initially used in support of grant reporting, information on pre- and post-doctoral students will likely have other applications.
Research

Multidisciplinary Scholarly Analysis Assists Himalayan Collections Course

Weaving together the rich cultural collections, the classroom, and technology, Mark Turin’s course “Himalayan Collections at Yale” offered students a valuable, multidisciplinary learning experience. The course met at four different Yale locations to make connections with four different repositories of Yale collections connected to the Himalayas.

ITS’s Instructional Technology Group (ITG) worked with a teaching team that included Turin, research scholar in Anthropology; Luke Wagner, graduate student in Sociology; Sarah Calhoun, librarian for South Asian Studies; and Peter Leonard, librarian for Digital Humanities Research, to support its use of Omeka, a web-based collections publishing platform, for engaging in multidisciplinary scholarly analysis of cultural heritage.

Additional participation by experts from across Yale’s collections allowed students to make sophisticated use of the technology in working with photographs at the Yale Gallery of Art, rare religious devotional objects at the Beinecke Library, and printed archives at the Yale School of Divinity Library and Sterling Memorial Library.

Proposal Development System Transformed

Since Yale is a leading research institution, writing proposals for research funding is a way of life for many students and faculty members. Close to 6,500 new proposals are submitted annually, along with many more renewals and extensions. Yale received $680 million in research funding for the 2012-2013 academic year.

Under the leadership of the Office of Research Administration, Yale partnered with vendor InfoEd to expand the functionality of its Proposal Development system to meet the needs of our complex and high-volume research environment. ITS set up technical infrastructure, worked with the vendor to improve quality, implement reporting and data integration, prepare training materials, establish ongoing support procedures, and perform many hours of testing. Deployment to Yale’s research community was completed late in 2013, reaching all academic departments that submitted more than 10 proposals annually.

Today, 92 percent of Yale’s research funding proposals are developed using Proposal Development, and the Office of Research Administration hopes to increase Proposal Development submissions to 98 percent. Administrative work on the part of faculty, academic departments, and central administration has been reduced through standardization of process, automation of approvals, and improvements in data quality. Eligible proposals are submitted to the funding agency electronically, cutting even more administrative work out of the cycle.

The Office of Research Administration and ITS continue their partnership to focus on research protocols, and further reduce administrative time and cost related to research administration.
Research

Science Network Expanded to Assist Researchers on Campus

In 2012, Yale University was awarded a National Science Foundation (NSF) grant to construct a high-speed network to connect important computational and storage systems together, which was the start of the Yale Science Network on campus.

After completing the interconnection of HPC facilities at West Campus, 300 George, and the Research Storage Solution (RSS) system, it became obvious to the project team that to be even more valuable, we would need to interconnect researchers’ labs across the campus to this new high-speed network. This was the spark behind the LABNet network that is interconnected with the Science Network and a direct dedicated 10gbps Internet2 connection. This allows researchers in their on-campus labs to connect at a very high speed to these resources. It also specified an optimized data transfer application called Globus that optimizes these large data transfers.

During the implementation of the LABNet, the team again looked to optimize its use. In collaboration with Y. Richard Yang in the Department of Computer Science, the team has applied for another NSF-funded grant to implement Yale computer science innovations around software defined networking (SDN) across the LABNet and Science Network. The system will allow the network to be dynamically optimized based either on current network conditions, predefined rules, or dynamically based on input from other applications. This work is potentially transformative to the Yale Network and networking in general.

“I’m tremendously honored to have had the chance to work together with colleagues across the scientific and technology communities at Yale on the creation of the dedicated science network. This network connects high performance computer clusters and centralized storage. Researchers have already begun to speed the rate of knowledge discovery.

— David Galassi, Director, Network Service
Research

ITS Photo & Design Digitizes Jonathan Edwards Sermon Artifacts

ITS Photo & Design recently digitized the complete sermons of 18th-century preacher, philosopher, and theologian Jonathan Edwards for the Beinecke Library.

The sermons and other materials were manuscripts handwritten on small paper scraps that had been hand-bound by Edwards himself. The delicacy of the manuscripts required special handling and care. Because of the large volume of 33,000 manuscripts, a special procedure was set up using a small monitor near the copy station to allow the photographer to see the images immediately after being shot, thus reducing errors in sequencing.

Processing was done in batches, and the whole procedure was vetted by Beinecke Library representatives prior to commencement. A harsh winter made it difficult to keep the digitizing on a tight schedule.

The entire collection will now be available to scholars anywhere for research, whereas previously only very small sections of it had been digitized upon request.

Every job has its own peculiarities. Photographing the sermons and papers for Beinecke Library stands out because of the very specific technical requirements, the special handling required, and the size of the job. Richard La Plante and I worked on this project for several months, and no errors were reported.

—William Sacco, Photographer at ITS Photo & Design

33,000 Jonathan Edwards manuscripts photographed
Committee Guides University Clinical Research Technologies

The Clinical Research Committee guides strategy, direction, and decision-making to advance the mission of the university through the use and support of clinical research. Members will be asked to help influence and vet decisions, including sharing the perspective of colleagues and students, and influencing others within the institution.

The Clinical Research Committee provides a team of trusted health and medicine faculty and professionals to advise the University Technology Initiatives Committee (TIC), Schools of Nursing, Medicine, and Public Health, Yale New Haven Health Systems, and Yale Health leadership in advancing Yale’s technology footprint and support in clinical research and practice.

Connecticut Coalition on Research Computing (CCRC) Founded

The Connecticut Coalition on Research Computing (CCRC), a multidisciplinary group formed in 2013, is facilitating a broad consideration of Connecticut’s need for computational research across the research technologies landscape.

The CCRC currently is assessing the value of developing a shared center for research computing, which will foster a broad and mutually beneficial interaction across both public and private sectors, offer a tiered set of research computing services, and support a high performance computing (HPC) infrastructure.

To date, Yale University, University of Connecticut, University of Bridgeport, and Wesleyan University have joined the coalition. A shared research HPC facility has the potential to attract top talent to the state, generate the intellectual surprise and creativity that connecting industry partners with researchers at top institutions often delivers, and meet critical challenges in a breadth of fields that exploiting advances in Big Data, the Internet of Things, and Data Science would deliver.

The very significant economies of scale in HPC mean that the initiative would provide infrastructure to universities and small businesses more effectively, and would potentially be a boon to the competitive position of state firms. Furthermore, this shared computational facility would complement the Department of Economic and Community Development’s (DECD) Bioscience cluster that looks to strengthen Connecticut’s position within the East Coast healthcare corridor.

Ultimately, bringing the HPC facility to fruition should spur economic growth in Connecticut, improve the competitive position of existing companies, create new jobs, and enrich the state’s talent pool. As a result, the state will appear more attractive as a location in which to develop new firms, and will increase the likelihood for novel discoveries.
Workday Project Moves Forward

The Workday@Yale Program kicked off in July 2013 to transition the university’s legacy administrative systems to the campus-wide unified human capital management, payroll, and finance information system, Workday. The conversion to Workday is a strategically significant initiative that not only is replacing obsolete systems, but is giving Yale the opportunity to reimagine our business process environment, making it easier to get work done without making mistakes. Workday employs the transformative power of cloud computing to provide greater information accessibility and green sustainability, allowing Yale to remain a truly global university.

The Vision & Plan phase launched in July 2013 and concluded January 30, 2014. During this initial phase, the Program Team conducted discovery sessions, engaged business function subject matter experts and community leaders to define the project scope, and planned the timeline and requirements for implementation. In February 2014, the project entered the Architect Phase, during which the Program held discovery workshops to initiate knowledge transfer on Workday terminology and concepts, discuss business process improvement opportunities, and capture functional requirements. In fiscal year 2015, the program moves forward with implementation, which will occur over a two- to three-year period using a multiple release approach. The initial rollout of Workday in March 2015 will include the delivery of human capital management and payroll modules. Concurrently, Yale will partner with Workday on the development and subsequent delivery of the Workday finance module (July 2016).

Business Intelligence/Data Warehouse Changes Reduce Costs

The Business Intelligence/Data Warehouse (BI/DW) group took over the outsource support arrangement from IT staffing firm TEKsystems, saving the department external spend money. In all areas of support, the BI/DW team was able to accomplish this transition without an impact to end users. The group reduced the amount of time it spends on routine support by implementing our three-tier support model by actively engaging with the help desk, and more effectively partnering with our client support areas. As part of the Workday program, the BI/DW team effectively reached out to multiple areas on campus to discuss reporting challenges and gather input to effectively bring about change in our infrastructure. The change will allow better reporting capabilities at the university with a simpler infrastructure, which will continually reduce maintenance efforts.

Cost of Application Support Reduced for Business Systems

Over the course of the year, the Business Systems Group (BSG) significantly reduced the cost and effort required to maintain current applications. Across BSG, the percentage of time spent doing ready-to-serve (RTS) work has been reduced from 62 percent of staff time, to 54 percent. This 8 percent reduction resulted in an annualized increase in project capacity of 3.7 full-time equivalents (FTEs), and has been a major factor in the team’s ability to support the Workday program.
**Administration**

**Microsite Improves Student Life**

The Student Life microsite (http://studentlife.yale.edu/) is a great calling card for ITS’s new Campus Community Technologies Web Services team. The microsite contributes to a more unified Yale, as it improves both customer satisfaction (for students and Student Life staff) and student access to relevant content that affects their Yale experience.

**Event Management Systems Used for Salovey Inauguration**

On October 12, 2013, Yale University instated its 23rd president, Peter Salovey. The official inauguration was preceded by a week of celebrations and activities coordinated by the Office of the Secretary. It was an immense effort celebrating a time-honored tradition that enabled students, faculty, and staff to congratulate President Salovey at various venues on campus.

ITS was honored to collaborate with the Secretary’s office on the selection and implementation of an event registration software system for the prestigious event. The system enabled guests from around the globe to register for various symposia, the ceremonial procession, and numerous social activities, including dinners, a parade, and a block party, all of which took place during inauguration week.

The Campus Community Technologies team collaborated with the Secretary’s office to design the registration site, ensure it was secure, test it, and open it to invitees according to schedule. The system allowed for online or paper responses; interacted with the official inauguration website; and provided a variety of reports, including individual agendas and attendance tracking.
Administration

Yale Energy Explorer Lowers Cost and Promotes Sustainability

To meet strategic goals addressing sustainability and fiscal savings, the Department of Facilities committed to reduce spending on utilities by $9 million over the next three years. While this effort will have many facets, one of the key goals Facilities hopes to achieve in order to meet this objective is making the end users more aware of and responsible for the usage that occurs in their areas.

Recognizing a need for a more streamlined and focused method of disseminating usage information to those who have the greatest ability to affect change, Facilities has undertaken an architectural overhaul of the Energy Explorer web application to better serve the needs of the community. This overhaul will allow stakeholders to easily view and track the month-to-month and year-to-year changes in demand, thus allowing them to more easily pinpoint issues as they arise, and mitigate those that already exist. In addition, the architecture change has allowed a previously PC-only based application to be made mobile, cross-platform, and browser independent.

The Office of Facilities believes that by exposing a wider audience to the information and making it easier to acquire and digest, target reductions in usage will be achieved.

Course Catalog and Schedule Replacement Tool Nears Completion

With the implementation of the bridge linking the Courseleaf module WEN to the Banner student information system, a year-long project to move management of the Yale College course catalog and schedule of offerings off-site is nearly complete.

Yale College has traditionally managed its course offerings under a paradigm that confused the roster of approved titles and course outlines with its actual schedule of offerings for a given year and term. The Courseleaf tool suite now moves Yale College to a more conventional model separating catalog management from the building of its schedule of academic year offerings.

Within this division of function, the WEN module provides the specialized interface for departments to select courses from the standing catalog and create a term offering, schedule one or more sections of the course, assign teaching staff and department room locations, view the department’s aggregate schedule of offerings graphically to check for balanced distribution throughout the week, and apply a standard approval workflow.

The WEN bridge, developed by the Academic Administration team, allows the WEN module to send approved schedule-offering changes in real time to the student information system, which remains the system of record.

Financial Improvements Save University Money

On July 1, 2013, ITS Vendor Management launched the Vendor Management System (VMS), which enabled cradle-to-grave automation for all ITS contractors acting in a staff augmentation capacity. The VMS provides capabilities such as workflow approval and automated marketplace distribution, preferred staffing agencies, work order creation and acceptance by agencies, and consolidation and submission for the payment of monthly invoices for each agency.

Prior to VMS, ITS was creating more than 150 annual purchase orders, 1,200 invoices, roughly 150 Statements of Work, and using 13 disparate timesheet systems. Due to the new automated process, as well as enhanced visibility of cost and price information within VMS, ITS has been able to save roughly $800,000 annually based on reduced markups and competitive rates from electronic bidding.

- - -
Enterprise Governance, Risk and Compliance (eGRC) System Implemented

In response to a senior management mandate to mitigate overall risks at Yale with the highest priority being the protection of health, life, safety, and security of 27,000 students, faculty, and staff, Yale chose to deploy the following modules for the first release of the enterprise GRC (governance, risk, and compliance) solution.

- **Enterprise Management (EM), in production since June 2013.** The foundation of any GRC Program, it provides an integrated view of the enterprise and brings insight for effective and proactive decision-making. This module is powered by several critical data feeds sourced from Human Resources, the Office of Facilities, and Yale ITS.

- **Business Continuity Management (BCM), in production since June 2013.** The BCM module supports business continuity, disaster recovery planning, and crisis management. Yale has elevated its existing capabilities by replacing manual processes with an integrated, efficient, and real-time solution. Several actual events over the last fiscal year have proven the viability of the solution. Currently, the BCM team has leveraged this solution to identify over 80 Essential Functions, and completed over 60 Business Impact Analyses. Yale’s implementation of the BCM module was recognized by the developer of our GRC solution with an Excellence in Business Resiliency Award in June 2014.

- **PCI Compliance, in production since November 2013.** This application provides an effective means for Treasury Services and Information Security, Policy & Compliance (ISPC) to manage operational tasks for a growing population of electronic merchants across campus. More important, it has transformed Yale’s annual attestation process by enabling Yale to consolidate (what would have been) close to 200 Self-Assessment Questionnaires (SAQs) into four accurate and complete SAQs.

- **Policy Management (PM), in production since December 2013.** The PM module is a collaborative platform with a lifecycle approach that manages and supports governance capability, and fosters a culture of compliance across the enterprise. This module is linked to a comprehensive authoritative source of governance documents, generally accepted industry standards, and best practices.

- **Compliance Management (CM), in production since June 30, 2014.** The CM module is a collaborative platform for the Compliance team that manages the risk assessment and system remediation effort for server-based systems. The platform addresses applicable security and compliance requirements such as HIPAA (protected health/personal data), GLBA (financial data and consumer privacy), and FERPA (student data). This module also provides a self-service platform for management, IT Compliance Officers, system owners, and system custodians to request assessments, view status, manage assessment and remediation effort, and to create customized reports.

Using [this application] you have streamlined the annual attestation process, the quality of the SAQs has improved greatly, and we have an efficient method of tracking our Merchants and the various payment processing methods they employ.

— Karen Harris
Associate Controller,
Treasury and Gift Administration

I was notified that a sprinkler head had burst in HGS. Because of this application, I was able to quickly determine what departments were affected or had the potential of being affected by the water. I had the contact information for the Operations Managers and within an hour or so of the event they were notified, mitigating potential issues. I promise you, that is fast”

— Maria Bouffard
Director, Office of Emergency Management
Infrastructure

Help Desk Implements Cloud Solution for Automated Call Distribution

In June 2014, the ITS Help Desk successfully implemented a cloud-based solution for automated call distribution (ACD), 8x8. The 8x8 ACD is a virtual contact center (VCC), which works in conjunction with voice-over-IP (VoIP) phone service and a softphone application.

This new ACD system provides the ITS Help Desk with multiple benefits, including the flexibility to allow off-site work, multi-channel management (queues for incoming calls and voicemail), call recording and monitoring, the ability to add Interactive Voice Response options that can automate interactions with clients, and Web Callback, an API that can allow forms to be integrated with our website to have clients request a callback.

Thousands of Documents Moved to Cloud Solution

In fall 2013, Yale University kicked off a project to upgrade and move 620 users and nearly six million documents to Knowledge Capture (KC) Online. This upgrade from an application based in-house to a cloud solution, is one of the first examples of Yale’s data and service moving entirely to the cloud.

KCOnline/FileNet is an enterprise content management software platform that offers users the ability to manage business documents in a controlled and secure environment. Specifically, documents can be loaded, categorized, and stored in the application for ongoing use. Users can collaborate with others in their departments by retrieving and editing documents while managing the versions with ease. For example, the Accounts Payable department uses KCOnline/FileNet as part of the expense reimbursement process and storing of associated documents.

An important feature of the cloud application is enhanced security. This document-sharing system can securely store medical, financial, and research information, enabling faculty and staff to work with colleagues without compromising security. The upgrade also introduced an improved look and feel with simpler navigation features.

The introduction of the KC Online/FileNet cloud-based system is a win for all parties involved, making document management and storage a simpler task. To view a video about this project, visit http://itsannualreport.yale.edu/infrastructure/thousands-documents-moved-cloud-solution.

Added Protections Increase Yale Network Security

In FY14, Yale ITS completed a project to apply additional protections to all devices connected to Yale’s network and network resources. Past network configurations opened devices up to direct scanning and attacks from anyone in the world.

Yale ITS has substantially reduced the number of ways these attackers can succeed, while preserving the ability to easily share files with colleagues outside of the university. Moreover, the new protections ensure that the completed remediation is persistent and remains effective in the new network and device configuration standards.

- **VPN connections per week**: 4,578
- **documents moved to the cloud**: 6,000,000
Infrastructure

5,000 Windows XP Machines Converted to Windows 7

Campus Technology Services upgraded more than 5,000 PCs from Windows XP to Windows 7. Designated Support Providers (DSP) accomplished this feat on top of their existing work with no additional help, resulting in a 10 percent increase in productivity.

The DSP teams faced numerous challenges, including machines that were too old to be upgraded and needed to be replaced; clients who had difficulty accommodating the business interruption; departments that could not be converted at once; and managing a complex campus-wide upgrade schedule.

Next-Generation Firewalls Improve Yale Network Security

A recent internal audit identified areas where Yale’s legacy firewalls (many of which are still in use) were not able to offer the same granular protection for Yale’s digital assets that Yale’s next-generation firewalls are currently able to provide. As a result, a decision was made to add two next-generation firewalls to the current legacy firewalls.

In addition to providing all of the protections afforded legacy firewalls, the next-generation firewalls are capable of recognizing and stopping external attacks and malicious software from infecting systems behind them. By installing these next-generation firewalls in front of critical IT assets, it affords additional time for Yale to migrate to newer hardware in addition to providing a much needed additional layer of protection to safeguard our most critical digital assets.

IT Resiliency Program Supports Emergency Management

As part of a multi-year effort in support of Office of Emergency Management’s Business Continuity Program, Yale ITS has made significant improvements to the resiliency of IT services. Achievements in FY14 include launching a faster and more secure process for off-campus storage of important data. Also, ITS has reviewed disaster recovery plans for IT infrastructure and applications supporting critical university functions.

Planned improvements will continue into FY15 as we continue to enhance the resiliency of systems critical to university operations, refine our disaster recovery plan, and coordinate recovery testing, in alignment with the Business Continuity Program. We expect the improvements made as part of the Resilient IT Program to yield university-wide benefits with regards to keeping IT services running with minimal interruptions.
Becton Data Center Decommissioned

In July 2013, ITS began the final stages of a two-year project to consolidate and remove one of its oldest data centers, the Becton Data Center. The decision to remove this center was simple, due to aging cooling and electrical systems that would require a $2.5 million capital investment, and demand moving to our virtualization platform. Overall savings on an annual basis for ITS and the university is $65,000 for environmental maintenance and another $100,000 for power and cooling usage.

The Becton Data Center was occupied by ITS initially in 1978 as an alternate site for a handful of applications located in another data center on central campus that was decommissioned in 2008. Over time, the Becton Data Center became the home of a fully functional center for ITS and IT Partners with more than 300 servers and storage devices servicing many applications for administration, academic, and research computing. Located next to the Watson building, the data center hosted many tours for students as well.

Yale ITS has returned the space to the Office of the Provost to use for future expansion of engineering labs.

Technology Road Maps Created for Applications

The Office of the Chief Technology Officer led the adoption of Gartner’s application portfolio management Sustain-Invest-Migrate-Eliminate (SIME) paradigm, and the creation of technology road maps for all technologies supporting applications labeled Invest or Sustain.

The first goal of this initiative was to validate that IT investment tracks with strategic technologies are providing significant value to the university. The Office of the CTO initiated the classification process with all ITS teams, provided support and review, and identified shared definitions and criteria. We partnered with the Application Lifecycle Management performance improvement team and Deloitte to review Deloitte’s methodology for Technology Lifecycle Management (TLM) and align the Yale approach.

Of the 913 classified applications, initial findings reveal that 33 percent of the application portfolio classifies as Migrate (21 percent) or Eliminate (12 percent), with 48 percent Sustain and 18 percent Invest. Core Technology Road Maps are presently under review.
Technology & Organizational Leadership

Yale Hosts Inaugural Health and Medicine IT Ivy+ Group

Yale ITS’s Medicine & University IT Partners group has established an Ivy+ group for Health and Medicine IT, providing a forum to discuss operations and strategy around the unique challenges of IT support for research, clinical, teaching and learning, and administration in medical schools and their affiliated hospitals.

The inaugural meeting was held at Yale in early May 2014 with representatives from Dartmouth, Harvard, Brown, Columbia, UPenn, Cornell, Stanford, and UCSF. Yale attendees presented on Informatics/Business Intelligence and Information Security.

The meeting was well-received by all participants. We agreed unanimously to continue the group, and Stanford has volunteered to host the 2015 meeting.

Administrative Committees Align with ITS Governance Model

Early in FY14, the Business Systems Group (BSG) established a local governance model for our supported business areas that works in concert with the broader ITS governance model. Establishing local governance has created additional partnership between the business units and ITS, and has also strengthened the communications and decision-making between the organizations.

The foundation of the local governance is the Business Systems Group Program Committee and a dedicated local governance committee for each business area: Human Resources/Payroll/TMS, Finance, Procure to Pay, Business Intelligence (BI)/ Data Warehouse (DW), Yale School of Medicine (YSM), Business Management System (BMS) HR, Faculty Information System (FIS), Integrated Research Enterprise Solution (IRES), Pre-Award, Institutional Animal Care and Use Committee (IACUC), Yale Animal Resources Center (YARC), Child Study Center (CSC), and the Graduate Student Payment System (GSPS).

The Business Systems Group Program Committee provides oversight and guidance on IT projects, ready-to-serve (RTS) efforts, and overall portfolio operations. Program committee membership includes leaders from the units that the BSG supports. The local governance committees select and prioritize work within their areas of responsibility and provide oversight of day-to-day operations. The local governance committees are chaired by the BSG client partner and technical lead, as well as the lead client for the area.

Working with the committees throughout the year, the Business Systems Group was able to collectively make decisions on day-to-day operations and initiate two key projects. One project will streamline the procure-to-pay process for the Yale Shared Services organization, and the other will help maintain regulatory compliance and strengthen our internal controls. The committee also worked together to review and disposition other investment ideas that came up throughout the year and helped to review, prioritize, and in some cases reduce discretionary-related work, allowing resources to be applied to the highest priority work.
New Team Provides User Experience, Design, and Web Technologies

This year, Yale built a new team to meet the needs reflected in our 2012 Community Satisfaction survey. Over the course of the year, we added four new staff members and transitioned the Yalesites services back to ITS from the Office of Public Affairs with no interruptions in service. This new team is rolling out website planning and building services, as well as new “consultative packages,” designed to elevate the campus web developers and site owners’ understanding of topics including user experience, search engine optimization, and accessibility.

Creating this team was tremendously rewarding—ITS is now ramping up our online user experience capabilities. With the help of Lec Maj and Lisa Sawin, we’ve added new services for usability and accessibility consulting, holistic website design and development along with a variety of infrastructural improvements that are in the works.

—Jane Livingston
Associate CIO, Campus Community Technologies

Career Development Program Develops Talent and Stimulates Innovative Thinking

As part of its response to the results of a workplace survey, Campus Technology Services (CTS) created a Career Development Program (CDP). A CDP opportunity consists of a six-month paid rotation within a CTS team. A CTS colleague’s Individual Development Plan (IDP) provides guidance to ensure that the CDP opportunity is aligned with his or her career interests.

The CDP reflects the importance that CTS has placed on professional career development. It also demonstrates how innovative thinking can be used to develop internal talent, stimulate excitement, improve morale, and help mature the organization.

To date, CTS has piloted five Desktop Support Professional (DSP) career development assignments. Two more pilots are planned within Endpoint Engineering in the first quarter of the fiscal year. The hope is that CTS’ CDP will serve as a model for other teams within ITS.
Technology & Organizational Leadership

Integration Competency Center Established

In October of 2013, ITS established the Integration Competency Center (ICC) with a mission to deliver comprehensive, flexible, and lightweight application and data integration services for Yale University. Just nine months later, the first phase of the ICC standup is nearly complete with the production availability of Yale’s first institutional SOA Gateway and integrated Application Processing Interface (API) portal.

A Service Oriented Architecture Gateway (SOA Gateway) is a platform on top of which the university can offer managed services. By offering services with normalized policy specifications and a high degree of management, the university can utilize out-of-the-box reporting capabilities. In addition, the university can provide audit capabilities to learn who is using what services and when, and how well the services are performing. This will enable ITS to offer service platforming with minimal cost and effort, a high level of security, and the ability to set and manage service-level agreements and security at a very detailed level.

In July 2014, the ICC and the Identity and Access Management teams were fully integrated. Now anyone looking to add a new application to our ITS ecosystem and requiring access provisioning, identity data, and feeds of other master data can utilize a unified team that will own that delivery soup to nuts. Watch for the rollout of our updated developer website for APIs coming in Fall 2014, as well as the incorporation of these new technologies into our integration toolkit to enable us to deliver integrations faster, more economically, and with higher quality and control than ever before.

—John Sobel
Director, Systems and Data Integration

Efforts Promote Communication Between ITS and IT Partners

Yale ITS’s Medicine & University IT Partners group has coordinated an approach to support and collaborate with IT Partners centered on three groups: Professional Schools Plus, IT Partners “First Fridays,” and Medical IT Partners. All three groups hold well-attended monthly meetings.

ITS administers the program and agenda for each group and invites guest speakers from ITS or partner units. Between meetings, issues are raised and discussed via an online collaboration tool or mail lists. This provides, for the first time, an informative and regular process for bilateral communication between ITS and our IT Partners throughout the university.


Technology & Organizational Leadership

Prioritizing IT Investments in a Dynamic World

In FY14, ITS implemented several significant changes to improve decision-making related to investments in IT.

The first change was shifting the annual process of reviewing IT investments from the spring to the fall so the requests for funding for these investments are in alignment with the university’s budgeting cycle. This shift in timing provided university leadership with valuable information about the estimated costs of proposed investments in time for them to incorporate the funding request into the upcoming budget.

The second improvement was the introduction of three-year road maps that align with key communities within the university (such as Research or Teaching & Learning) and with the three-year IT Strategic Plan. Created by special interest committees, the road maps communicate the projects and activities that should be implemented in order to address the technology needs of a community, and indicate the relative priority of the possible investments. These road maps provide valuable context for making decisions about where to invest today in order to achieve longer term objectives.

The third improvement to the processes for selecting IT investments was moving from an annual review process to one in which new investments are evaluated quarterly. This change recognizes the dynamic nature of technology and the emerging needs of the Yale community. The quarterly reviews result in an up-to-date prioritized list of investments that allows us to react more quickly as resources (funding and/or labor) become available throughout the year.

Finally, ITS launched effort-reporting functionality within the existing Project & Portfolio Management (PPM) Tool to provide a consolidated financial view, and to help us understand demand versus capacity and the cost of delivering our services.

Help Desk Earns Certification

In 2013, the Yale University ITS Help Desk became the first team in Connecticut to achieve the HDI Team Certified Award. The HDI Team Certified Award recognizes the ITS Help Desk for its commitment to service excellence through the adoption of best practices and the acquisition of enhanced skills and knowledge. HDI is the professional association and certification body for the technical service and support industry.

The annual award requires that 80 percent of the team must be HDI-certified. As the ITS Help Desk has 20 members, earning the award was quite an accomplishment. Team members each must have one of several specific certifications to qualify for team certification. More than 90 percent of the ITS Help Desk team has received the HDI Support Center Analyst certification, which confirms that technicians who directly interact with clients have the knowledge and skills required to provide quality service and support. Those awarded this certification have demonstrated problem-solving, troubleshooting, and communication skills. This certification also verifies that technicians understand service management processes, ITIL processes, and best practices.

—I have enjoyed working with the community and IT leaders to develop and communicate a shared vision of how technology can strengthen the university in the future. As individual projects that move us closer to that vision are approved and implemented, I am excited to be a part of the process that makes it possible.

—Faith Brown
Director of Strategy, Portfolio Management, and Governance
Technology & Organizational Leadership

Careers in IT Program Promotes the Diversity of IT Jobs

Through its Careers in IT initiative, ITS is sparking interest among youth and women by showcasing the possibilities and viability of careers in information technology. Addressing the question “What is IT?” as a theme, 27 ITS staff members with differing career focuses spoke to students from nine high schools and three colleges about working in IT. To support these initiatives, videos featuring ITS staff members speaking about their career paths were published on the Careers in IT website (its.yale.edu/careers).

In partnership with Yale’s New Haven and State Affairs Office, ITS launched a Summer Internship Program for College Students. The program offers 10-week internships with teams across ITS and supports New Haven Promise Scholars and other students interested in IT careers. The program began in June with 11 interns who went through an extensive interview process.

The previously established High School Internship Program grew in 2014. ITS hosted 17 New Haven and local area high school students who were placed within various IT teams.

The Post-College Graduate Internship Program is employing four recent college grads who are completing three six-month rotations within IT areas over a span of 18 months. The second group of four post-college interns begin their rotations in August 2014.

Women in IT at Yale is a forum that promotes the advancement of women working in information technology with Shauna King, VP of Finance and Business Operations, as Executive Sponsor. Several events took place, including the workshop “Using Social Media to Create Personal Visibility” and the community event “Women in IT: Path to Leadership,” with Shauna King as key speaker.

The Student Technology Collaborative (STC) launched the Student Developer Program and in summer 2013, in conjunction with the Yale Entrepreneurial Institute (YEI), launched Tech Bootcamp, an opportunity for 15 Yale students to learn full-stack web development. The bootcamp provided an opportunity for young entrepreneurs to bring their ideas to fruition. The program has expanded to incorporate 30 students for summer 2014. Admission to the program was very competitive: 30 participants were selected from a pool of 120 applicants.

It is an honor to be a part of what we have achieved with the Careers in IT program. Not only is ITS providing unique opportunities for youth, minorities, and the unemployed in New Haven, Yale has become a richer, more diverse, and more productive place because of the contributions of the individuals involved in the program.

—Susan West
Associate Director
Strategic Communications

17 high school interns
11 college interns
4 post-college interns
277 student employees
**Technology & Organizational Leadership**

**Initiatives Throughout Year Strengthen Community at Yale ITS**

Throughout FY14, many events evolved into stellar opportunities for community development.

In September and March, ITS invited the campus IT community to two informative and well-received speaking events in the President’s Room at Woolsey Hall. Twenty ITS staff members and IT partners presented in the Pecha Kucha format, in which 20 slides are shown for 20 seconds. The presentations represented a broad range of issues, trends, concepts, and services relevant to information technology in higher education. Topics included research technologies, information security, IT in the Yale Police Department, statistical analysis tools used by the Office of Development, and social media.

The **ITS Knowledge Exchange** was held on May 8 at Kroon Hall. The technology fair for the Yale IT community provided an opportunity for 300 attendees to learn about 25 different areas within ITS and share their tools, processes, goals, and accomplishments.

Another initiative was **Project Management (PM) for Yale Professionals**. **Organizational Change Management (OCM)** worked with the learning center to revamp their PM Lite training to integrate more closely with **Project Management Institute (PMI)** processes. The **PM Community of Practice** established and facilitated monthly learning and collaboration meetings for project managers across the university, with various speakers talking about using Microsoft Project, Best Practices, Agile development methodologies, and more.

Staff development programs such as **Effectively Leading Change Through the ADKAR Framework**, **Innovation/Creative Problem-Solving**, and **Management Development** were delivered to 80 percent of ITS Staff.

**Technology Architecture Committee Founded**

The **Technology Architecture Committee (TAC)** provides the forum where senior technologists govern the strategic technology direction and shared vision for the university.

Vibrant discussions of many strategic technology areas took place at the TAC. Members reviewed technical designs and road maps for the following groups: **Infrastructure as a Service (IaaS)**, **Network, Information Security, Video Services, Storage Strategy, Hub, Document Management, Endpoint Backup, Integration Strategy, Identity and Access Management, Resilient IT/Disaster Recovery, Workday, Digital Repository, DARCY, and Business Intelligence/Data Warehouse**.

The TAC established a collaboration model in which multiple TAC working groups reaching beyond core TAC membership developed recommendations in many technology areas. Participants came from ITS, SOM, Law, Library, and the Institute for the Preservation of Cultural Heritage. Reference standards were approved for Development Platforms and Mobile Application Development Strategy. These standards will guide planned FY15 training.
## New & Improved Services

### NEW SERVICES

- Digital Cinema Projection service in Loria
- Collaboration and Social Media
- Short Video Production Service
- User experience/usability consulting
- Accessibility consulting
- Website design planning and development service
- Event Management Service (Cvent)
- Room scheduling and reservation services (EMS)
- Unified Messaging Service
- Campus Community & Beyond
- SQL Server Platform as a Service
- Consultation on technical design and architecture
- Integration Service

### IMPROVED SERVICES

- New PC purchase delivery times improved from 2 weeks to 2-3 days
- Help Desk call abandonment rate reduced by over 40%, speed to answer improved by 38%
- Decreased non-managed workstations by 50%
- Expanded student support to most professional schools: Art, Architecture, Divinity, and Drama
- Reservations Application expanded to multiple locations and professional schools: Art, Law, Beinecke
- Partnered with Yale Entrepreneurial Institute to launch a Tech Boot Camp
- Qualtrics survey tool training and workshops
- Expansion of ITS Health & Medicine to provide greater support

## CIO Spot Awards

### April 2014
- Jim Blau
- Norm Morales
- Dave Backeberg
- Igor Budyansky
- Dave Griesbach
- Thomas Minor
- Kirsten Daly
- Elvin Torres
- Dave Broggi
- Renee Randall

### May 2014
- Christina Molina
- Ed Torres
- Ali Makhzangi
- Robert Guarnieri
- Chris Burkhalter
- Steve Ferrara
- Mark Saba
- Kathleen Sperry

### Team Awards
- Marjorie Collins and Barbara Haberman
- Ken Hudson, Tom Hancock, Laxmi Somasundaram, & Asha Thadikemalla