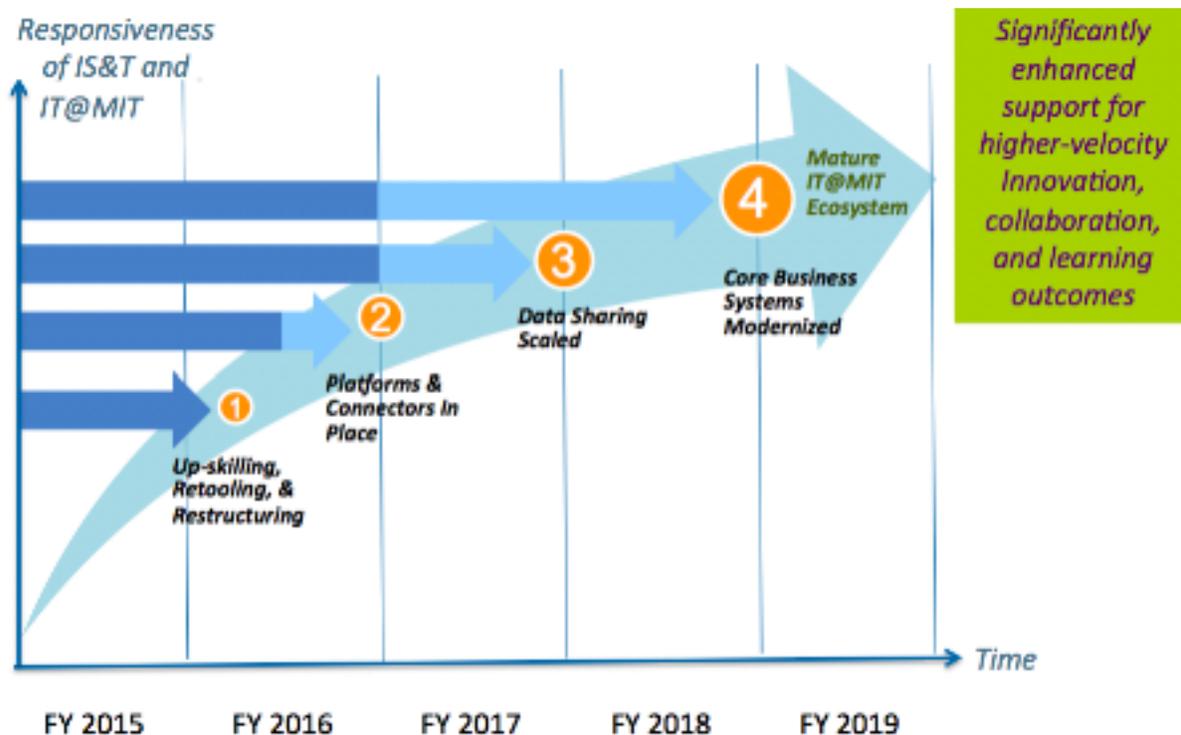


Vice President for Information Systems and Technology

Information Systems and Technology (IS&T) continued its transformation in FY2016 to an organization with a new operating model and organizational structure. Informed by guiding principles from the Office of the Executive Vice President and Treasurer and by MIT's 2020 IT Vision, the department has focused on addressing the evolving needs of MIT's diverse user community. In terms of infrastructure, this included transitions to web-scale technology architectures and cloud-based service offerings. To foster transparency around its strategic direction, the department increased its portfolio and project management resources and engaged its employees through new communications channels. Outreach to the community remained a key priority.

Transformation Milestones



Information System and Technology's Evolving Operating Model

Last year, IS&T reorganized into three capability groupings—Emerging Solutions, Enabling Services, and Planning and Administration. This year, with lessons learned since the transformation began, IS&T made additional organizational changes. Several teams were created or expanded to improve collaboration with the community and to promote best practices. These changes include the following.

- Creation of community partnership teams comprised of business analysts, each aligned with a community segment to create a clearer path for engagement with the department. These teams are partnered with academic administration and records; departments, labs, and centers (DLCs); faculty and students; facilities and environment, health and safety; human resources; student financial services, student life, and admissions; and the Office of the Vice President for Finance.

- Creation of a platform engagement team for the delivery of new platform-based systems, services, and solutions. In collaboration with other MIT groups, projects have included Access MIT, updates to the financial review and control application, and a pilot of the staff appointments and distributions application. Expansion of the IT ecosystem architecture team to provide technical leadership and oversight.
- Creation of a systems analysis team responsible for requirements gathering, solutions analysis, and configuration of new and existing enterprise platforms, including SAP, the MIT Student Information System, Stellar, Learning Modules, and the MIT developer portal.
- Consolidation of two teams into a single enterprise-wide integration team, responsible for process-driven development, integration, and optimization of enabling applications, data, and infrastructure, including systems of record for MIT's administrative and education systems. IS&T also created the platform development and support team—both for existing and for new platforms ready to be deployed at scale—and the formalization of the project and portfolio management team.
- Establishment of new advisory and decision-making teams, including the work prioritization team and the architecture review board, to improve project prioritization and consistency.
- Creation of a user experience (UX) and design team, which focuses on the community's experience with IS&T's products, services, and applications—their utility, usability, accessibility, appeal, and engagement. In addition, a new UX review board helps keep projects aligned to a unified UX strategy.
- Creation of the business operations group, comprised of the business logistics, finance, and software asset management teams, each reporting to the newly appointed director, Chris Bunn.

To foster transparency around decision making, IS&T has instituted office hours with its directors and senior leaders. These sessions promote a better understanding of the MIT 2020 IT Vision and strengthen communication channels throughout the department. The department also offered agile office hours and now hosts project delivery workshops. Staff engagement has been enhanced through the popular Lunch 'n Learn series and a variety of social events.

Governance

The [Information Technology Governance Committee](#) held two meetings with agendas that included Duo, a two-factor authentication application; status and future of the research computing project; the Faculty IT Policy Committee report; transformation of IT@MIT; IS&T portfolio and project management demo; IT Policy Committee update; Internet Protocol Version 4 status; FY2017 funding; update on the Administrative Systems Steering Committee; update on DLC projects, including Web Grad Aid and the Salary Distribution Dashboard; IT risk and audit update; and an IS&T transformation update.

Highlights

FY2016 was a year of continued change for IS&T. The department moved forward with its transformation and delivered on several fronts to better meet the needs of the community.

IS&T adopted application integration platforms, such as SAP HANA; continued to develop Atlas, an important community portal; and provided new avenues for application development by launching the [MIT Developer Connection](#) and its application programming interfaces (APIs). New cloud-based services were added to improve data access and sharing. IS&T expanded its use of the ServiceNow platform for improved IT service management and knowledge management.

The following are highlights of work completed in FY2016, in alignment with themes from the Executive Vice President and Treasurer.

Enabling MIT's Future

Network Improvements

As part of ongoing work to improve network connectivity, IS&T upgraded IT infrastructure on several fronts.

- IS&T completed upgrades to the campus wireless network, adding 1,100 access points (for a total of over 5,600 access points). It also extended wireless outdoor coverage along Main Street in Kendall Square.
- To improve in-building cellular service, IS&T installed AT&T neutral-host distributed antenna systems (DAS) in six additional buildings on campus.
- IS&T facilitated an agreement with AT&T and Verizon to add Verizon equipment to the DAS; this improved Verizon coverage in 33 buildings on campus.
- Through capital renewal and major construction efforts, IS&T improved the network infrastructure in Buildings 2, E52, W16, W70, and NW23.
- IS&T added more uninterruptible power supply (UPS) systems for improved resiliency to Edge equipment racks on campus. Fifty percent of [MITnet](#) is now backed up by UPS systems. The department also upgraded over 225 legacy Edge networking switches to current hardware.
- IS&T migrated over 30% of its managed server environment to VMware's [vCloud Air](#) service: over 670 systems consuming over 7 terabytes of memory and 100 terabytes of storage.
- IS&T provisioned a 100-gigabit connection between researchers at the Bates Research and Engineering Center and the Large Hadron Collider Compact Muon Solenoid experiment.
- Jabber/Extensible Messaging and Presence Protocol services were migrated from OpenFire to the Cisco unified communication cluster. The integrated [Jabber](#) client offers instant messaging, group chat, and voice.
- Over 4,500 analog lines were migrated off the 5ESS (an older electronic switching system for phones) to a centralized Voice over Internet Protocol system.

- The department completed the standards document for IT infrastructure installations and telecommunication room construction.

Network and Campus Security

IS&T improved network security in FY2016, and also contributed to safety and security on campus.

- IS&T installed enhanced security features in over 300 telecom and data rooms on campus.
- The department successfully ran an emergency operations center on the 4th of July for the MIT Open House on April 23, and for Moving Day activities on May 7 collaborating with MIT and local law enforcement to ensure safety and security throughout these events.
- Matt Isgur, senior manager of campus safety and security infrastructure, received an investigative achievement award from US Attorney Carmen M. Ortiz for Isgur's work in the US v. Dzhohkar A. Tsarnaev case.

Advancing Agility of Departments, Labs, Centers, and Administrative Units

Deployment of Enterprise Software

FY2016 saw the release of more cloud-based, enterprise software solutions at MIT. IS&T worked with vendors and other MIT offices to make this happen. Production rollouts of software to the MIT community included the following:

- [Tableau](#), a family of interactive data visualization and business intelligence software that lets users explore, visualize, and share data securely
- [LabArchives](#), an electronic lab notebook platform
- [DocuSign](#), a service that enables users to send, sign, track, and store documents in the cloud, providing an audit trail of signatures;
- [Qualtrics](#), an enterprise survey tool that lets users collect and analyze survey data online—via a web browser and mobile app—and collaborate on surveys with other Qualtrics users at MIT;
- [LastPass Enterprise](#), a password management system that fills login information into web forms automatically; generates new, stronger passwords; and gives multiple people access to shared accounts
- [Duo Security](#), a two-factor authentication application, which provides additional security for web applications using MIT Touchstone and MITnet VPN connections; now required for all MIT faculty, staff, students, and affiliates

IS&T also evaluated, developed, and updated other software releases that benefited DLCs and administrators.

- IS&T developed and deployed a new undergraduate admissions decisions application with improved scalability, performance, and mobile device support. This enabled the serving of 11,486 decisions on Pi Day (March 14).
- IS&T completed analysis, integration, and testing for Coupa, MIT's new cloud-based, buying and paying procurement solution.
- The Financial Review and Control application was updated.

Provider and Customer Support

IS&T provider and consumer support offered a range of services for the MIT community, from resolving help requests, to producing eLearning courses, to releasing encryption tools and IT management software.

The IS&T Service Desk — along with Field Service Engineering and the VIP Help Desk — fills an essential role at the Institute, helping community members get answers to their IT questions.

- In FY2016, the IS&T Service Desk resolved 61,843 tickets; Field Service Engineering resolved 9,726 tickets; and the VIP Help Desk resolved 1,390 tickets. The Service Desk saw a 43% increase in volume; the Field Service Engineering client base expanded by 45%; and the VIP Help Desk client base expanded by 27%.
- The IS&T Service Desk implemented ServiceNow Incident Management to track, manage, and resolve help requests from the community. It also began to implement ServiceNow Knowledge Management, migrating more than 11,000 Knowledge Base articles from Confluence to ServiceNow.
- The Service Desk evaluated three vendors for 24/7 telephone, email, and chat support and chose CDI Corp., based on their experience and references. After extensive onboarding, IS&T and CDI began a limited, after-hours pilot with trusted MIT partners; expansion of the program is planned for later in FY2017.

IS&T provider and consumer support also provided many other services to the community and to its distributed support customers.

- The team worked with IT partners to complete the rollout of Duo authentication at MIT, leading events, roundtables, and roadshows to further the effort.
- IS&T made Microsoft Office 2016 the default install to replace Office 2013 in both Windows and Mac images, and rolled out Windows 10 as the default image on all new deployments.
- Implemented Microsoft System Center Configuration Manager and provided it as a service to the MIT community.
- Announced BitLocker as the IS&T-recommended encryption tool for Windows to replace PGP, and turned on BitLocker for all newly deployed computers in the WIN domain.
- Provided Casper (for management of Apple devices) to the community and worked with a Casper instructor to provide on-site training for IT consultants.

- Provided FileVault 2 for encryption for Macs, with escrow keys in Casper for managed computers.
- Oversaw requests for VMware license keys for all of the MIT licensed products.
- Established monthly meetings to build community around endpoint management and assist with the adoption of IS&T's provided services.
- Added 10 applications to the IS&T Software Grid, ranging from Mac OS X El Capitan to SnapGene.

Modernizing User Experiences

IS&T deployed or migrated a range of releases of importance to the community. Version 8 of the Atlas administrative portal was released, with enhancements to the Learning Center, Charitable Contributions, Commuting Benefits, Event Planning, Journal Vouchers, and New Hire applications. It also included updates to the Atlas framework and enabled Touchstone for several applications.

Nine SAP R/3 systems in MIT data centers were migrated to SAP HANA database technology, as well as to the SAP HANA Enterprise Cloud. This move provides improved performance, availability, and bi-coastal disaster recovery, and sets the stage for MIT to upgrade to the next generation of SAP's Enterprise Resource Planning software. The department also completed initial design and discovery work for migrating the MIT Data Warehouse to SAP HANA technology, which will provide real-time access to data and improved performance.

In collaboration with the MIT Transit Lab, IS&T developed AccessMyCommute, an online dashboard that lets commuters compare transit modes and analyze their carbon footprint. It also uses points, rewards, and incentives to encourage the use of public transportation and carpooling, as well as walking and biking to work. This tool is closely aligned with the new Access MIT program, which offers free public transit to MIT employees.

Administration

IS&T planning and administration worked closely with senior leadership, team leaders, and staff to manage overall IT resources and IS&T's portfolio of projects and services. The group coordinated planning, management, and execution of multiple projects; managed the workforce planning and administration functions, including oversight for IS&T's organizational change management; and provided transparency through communications to our community and staff.

Energize and Motivate Employees

IS&T continues to support growth, development, and engagement of our employees. We hired 35 new employees and promoted 11 employees. There were 210 Spotlight Awards and seven Infinite Mile Awards in FY2016. Near the end of FY2016, IS&T's human resources team met with 22 focus groups (162 employees) to discuss current job families.

In FY2016, IS&T staff participated in, contributed to, and played key formal and informal leadership roles in various professional and industry organizations, such as Internet2, Educause, the Common Solutions Group, the Northeast Regional Computing Program, the Boston Consortium, the Ivy Plus groups, the Internet Engineering Task Force security and calendaring standards groups, the SAP International Higher Education and Research conference, the Association of American Universities Data Exchange, and the Research University CIO conclave, among others. IS&T staff also collaborated with a wide range of vendors and outside groups.

Summary of Financials

IS&T provides its IT services through various funding models, which include the General Institute Budget, software development, revenue recovery, and service centers. In fiscal year 2016, IS&T underspent its recurring General Institute Budget of \$40.7 million by \$680 thousand. Year-end gross expenses were over budget by \$2.5 million, while revenue and transfers to the service centers exceeded their budgets by \$1.3 million and \$1.8 million, respectively. The main driver of the \$2.5 million variance in gross expenses is due to increased demand for Server Operations and Service Center (SOSC) services (revenue recovered), higher than anticipated Oracle license costs, unbudgeted Software as a Service (SaaS) expenses, and depreciation and interest related to increased SOSC capital spending. These amounts are partially offset by open-position savings.

In addition to the above expenses, in FY2016, IS&T invested \$26.1 million in the adoption of cloud computing services for its enterprise services, as well as in a shift from a capital investment model to SaaS for many of its service offerings. Approximately 57% was spent on administrative systems (transition to the SAP HANA Enterprise Cloud Platform and continued virtualization of data center environments). The remaining 43% was spent on data access services and productivity tools (Dropbox, QuickBase, Tableau, etc.).

IS&T spent \$20.8 million in software development dollars (\$4.3 million in recurring software development funds, and \$16.5 million in IT modernization funds). Approximately 44% was spent to support development and modernization projects for the Administrative Systems Roadmap (Atlas 8, Coupa, and eBuilder). An additional 17% was spent to support development and modernization projects for the Education Systems Roadmap (Student Dashboard, Scheduling Program, and Undergraduate Admissions Decisions Application). The remaining 39% was spent on support and enhancement work for MIT's core enterprise systems.

Approximately 7% of IS&T activity, or \$4.7 million, was funded from services provided to departments, labs, and centers for telephone and network infrastructure services, server management and colocation services, desktop support, software distribution, and departmental website and database consulting and development.

The Telephone and Network Service Center ended the year with net operating expenses of \$24.9 million, which is \$2.3 million higher than the FY2016 budget of \$22.6 million. This unfavorable variance was due to network connectivity expenses related IS&T's

Disaster Recovery Data Center in California. Investment in new capital assets totaled \$10.9 million, which was lower than the FY2016 capital budget of \$11.1 million.

Looking Forward

Informed by MIT's 2020 IT Vision, IS&T is focusing on the following three strategies for FY2017:

- Continue to move the department toward the new model of IT@MIT
- Develop effective employee engagement and staff development initiatives that increase transparency around decision making and strategic direction
- Strengthen relationships and partnerships with the DLCs for all community-facing areas of the department.

As part of its move into the future, IS&T has embraced the cloud era, making enterprise software available to the community and leveraging cloud applications to accelerate the modernization of MIT's core systems of record. In adopting a cloud infrastructure, with data centers and servers owned by outside vendors, IS&T has been a leader in a lift-and-shift migration strategy. This enables applications or servers to be moved, as is, to a cloud environment.

In line with these transitions, IS&T is moving its IT Service Management model from an operations-centric model to one that aligns services with the need of its customers. The ServiceNow platform enables more self-service choices, common standards and triage functions, and service delivery metrics. Employee engagement and staff development have been enhanced through office hours with senior leaders, project delivery workshops open to all staff, and the Lunch 'n Learn series, among other activities.

IS&T is committed to strengthening its work with the DLCs through its community partnership teams. Collaborating with targeted groups, these teams help define business requirements and support implementation and testing of solutions. The MIT Developer Connection, with its portal and APIs, is yet another venue for encouraging a thriving and healthy IT ecosystem at the Institute.

With its internal initiatives, collaboration with the community, and strategic partnerships with outside vendors, IS&T is committed to delivering innovative services on reliable platforms. It is well on its way toward achieving MIT's 2020 IT vision.

John Charles

Vice President for Information Systems and Technology