MIT IT Leaders Meeting

May 16, 2016
Agenda

■ Welcome – John Charles, Vice President, Information Systems and Technology
■ Sloan Technology Services – John Letchford, Sloan School of Management
■ IS&T Cloud Migration Efforts
  – David LaPorte, Director, Infrastructure Design & Engineering
  – Nathan Thaler, Senior Manager, Cloud Platforms
■ Update on IS&T Transformation– John Charles
Welcome

John Charles
Vice President of Information Systems and Technology
MIT SLOAN SNAPSHOT

MISSION: TO DEVELOP PRINCIPLED, INNOVATIVE LEADERS WHO IMPROVE THE WORLD AND TO GENERATE IDEAS THAT ADVANCE MANAGEMENT PRACTICE.

Master’s Students: 1,350
PhD Students: 87
Undergraduate Major: 44
Faculty: 118
Other Academic Staff: 66
Staff: 355

Action Learning Labs: 15
Executive Education Participants: 5000+/yr
MIT Sloan Alumni: 30,000 in > 90 countries
Companies founded by MIT Sloan Alumni: >650
11 Academic Programs
16 Research Centers
SLOAN CULTURE

- “Innovation, entrepreneurship and experimentation are core to the culture. “
- “Our database tables have more columns than rows…”
- “…Highly customized and white glove service…”
- “…Grass-root innovation traditionally trumps school-wide coordination/governance…”
- “Why use something that exists when you can build something better?..”
- “… Sloan is a microcosmic ecosystem that proudly reflects how things get done in the real world”
TECHNOLOGY AT SLOAN

- A great foundation has been built over the past few years
- STS is seen as a responsive customer service organization
- The MySloan portal is solid and continues to improve levels of personalization and usability
- Research Computing services continue to evolve
- Classroom technology works well but current distributed support model is ineffective
- Technology management is very distributed across the school
- Demand for STS time outstrips available resources
- STS could and needs to do a better job in managing perceptions and communicating its message to the school
- Users have very high expectations around usability of applications but systemic issues go beyond technology and platform challenges
ABILITY TO INNOVATE

LEVEL OF STANDARDIZATION
(COMMUNAL SENSE OF CONVENTIONAL WISDOM)
STS PURPOSE STATEMENT

TO ENABLE THE SCHOOL TO EXCEL IN ITS MISSION BY TRANSFORMING THE RESEARCH, ACADEMIC AND ADMINISTRATIVE INFORMATION LANDSCAPE
Enable Sloan to excel in its mission by transforming the research, academic and administrative information landscape

SLOAN TECHNOLOGY SERVICES – GOALS FRAMEWORK

Success of Research & Academic Programs

- Support revolutionary research computing through platforms, tools, consultative services and access to world-class research data
- Create an instructional technology environment that is reliable, intuitive, and enables innovation in teaching and learning across the School

Streamlined IT Delivery

- Drive IT efficiencies
- Leverage cloud and other service partners to improve agility, scalability, resilience, and to increase staff productivity
- Simplify and personalize the online user experience

Usage of Data as a Strategic Asset

- Enable the School to identify and protect sensitive information
- Catalyze data sharing and collaboration across the School, Institute and beyond
- Develop visualizations and analytics to stimulate innovative approaches to challenges

High-Performance Work Culture within STS

- Generate and use data to inform decision making
- Demonstrate and promote the value of technology
- Cultivate an engaging work environment
- Encourage exploration and experimentation
### SOME FOCUS AREAS FOR FY17

<table>
<thead>
<tr>
<th>IT Helpdesk</th>
<th>Instructional Technology</th>
<th>Research Computing</th>
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| • Publish a formal STS Service Catalog  
• Formalize service management practices across STS  
• Pilot Partner Solutions to streamline workload (e.g. have vendors take on routine device imaging activities) | • Stabilize Service Delivery  
• Complete Annual Classroom AV Maintenance & Upgrades  
• Implement new Staffing and Service Model  
• Develop better model for engaging faculty in relation to technology needs for teaching and learning | • Begin transition from existing research grid to more modern grid at the Massachusetts Green High Performance Computing Center (MGHPCC)  
• Enhance level of research support consultative services  
• Increase access to commercially available datasets for faculty, students and researchers |

<table>
<thead>
<tr>
<th>Infrastructure, Operations &amp; Security (IO&amp;S)</th>
<th>Application Development</th>
<th>Project Management</th>
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| • Implement Tools to enhance situational awareness  
• Work through backlog of upgrades  
• Start migrating services to the Cloud  
• Implement a Cybersecurity program | • Integration of A&DS and PPMO into a new single team  
• Implement new Agile project management processes & tools  
• Pilot new business process mapping/user story methods with departments across School  
• Do comprehensive evaluation of Salesforce.com as a school wide platform  
• Upgrade MySloan Sharepoint environment |
### SPOTLIGHT ON CYBERSECURITY

<table>
<thead>
<tr>
<th>IDENTIFY</th>
<th>PROTECT</th>
<th>DETECT</th>
<th>RESPOND</th>
<th>RECOVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop the organizational understanding to manage cybersecurity risk to systems, assets, data and capabilities</td>
<td>Develop and implement the appropriate safeguards to ensure delivery of critical services</td>
<td>Develop and implement the appropriate activities to identify the occurrence of a cybersecurity event</td>
<td>Develop and implement the appropriate activities to take action regarding a detected cybersecurity event</td>
<td>Develop and implement the appropriate activities to maintain plans for resilience and to restore any capability or services that were impaired due to a cybersecurity event</td>
</tr>
</tbody>
</table>

- **IDENTIFY**
  - Asset Management
  - Business Environment
  - Governance
  - Risk Assessment
  - Risk Management Strategy

- **PROTECT**
  - Access Control
  - Awareness & Training
  - Data Security
  - Data Protection Processes and Procedures
  - Maintenance
  - Protective Technology

- **DETECT**
  - Anomalies & Events
  - Security Continuous Monitoring
  - Detection Process

- **RESPOND**
  - Response Planning
  - Communications
  - Analysis
  - Mitigation
  - Improvements

- **RECOVER**
  - Recovery Planning
  - Improvements
  - Communications
SPOTLIGHT ON CYBERSECURITY

1. General Training & Awareness Program
   - IS&T SANS training materials
   - Sloan security website & community page
   - Brown bag lunches
   - STS attend departmental meetings
   - Digital Signage content
   - Bling!

2. Targeted Discovery & Risk Mitigation
   - Pilot new Discovery & Assessment process with initial groups to develop WISPs and Action Register
   - Expand pilot across school and make adjustments
   - Develop scale up strategy
   - Rollout Broadly (with 3rd party?)

3. Technology Solutions
   - Develop Technical Solutions within each of the 5 NIST areas
   - Examples:
     - Identity Finder
     - Deploy Endpoint Management
     - Implement Enhanced Monitoring & Data Aggregation Tools

4. Policy
   - Develop Policy Framework (e.g. approval processes) and Templates
   - Develop School specific policies around managing data
THANK YOU.

QUESTIONS?
IS&T Cloud Migration Efforts

Nathan Thaler, Senior Manager, Cloud Platforms
Dave LaPorte, Director, Infrastructure Design & Engineering
On-Prem Pain Points

1. Flexibility
2. Resiliency
3. Sustainability
4. Staffing Capacity
5. Uneven Investment
Why Cloud?

• Increases agility, decreases time to deployment

• Better orchestration/scalability, infrastructure is code

• Allows staff to concentrate on more interesting problems
Cloud Taxonomy

**Public Cloud**
- For use by the general public (“paying customers”). Infrastructure is maintained on the premises of the cloud provider.

**Private Cloud**
- For exclusive use by a single organization, maintained on- or off-premise by the organization or a third-party.

**Hybrid Cloud**
- Two or more distinct cloud infrastructures (private, community, or public) bound together by technology.
IS&T’s Cloud Journey

Benefits of Cloud

- **Flexibility**
- **Time to deployment**
- **Scalability**
- **Elimination of deferred maintenance**
- **Consistent, predictable costs**
- **Increased capacity**
- **Sustainability**
- **Reduced on-premise footprint**
IS&T’s Cloud Journey

- Deploying new servers to a cloud infrastructure environment is common in industry
- But, large institutions have decades of existing servers that can’t be easily moved.
- Two strategies have emerged, Lift-and-Shift and Refactoring

**Refactoring**

- Reducing application to component parts and re-architecting to take maximum advantage of Cloud Infrastructure environment
- Like rebuilding an engine

**Lift-and-Shift**

- Moving an application or server as-is to a Cloud Infrastructure environment
- MIT has been a leader in pushing the boundaries of this migration strategy
Hybrid Cloud is the **fastest growing** cloud deployment model.

What is the primary cloud model your organization will deploy in 3 years?

![Percentage change chart](chart.png)
Why vCloud Air?

• Leverages existing knowledge and skills

• Partnership relationship and ability to shape offering

• Success through rapid, incremental improvements

• Unique hybrid capabilities

• No business continuity disruption or vendor lock-in
vCA Connectivity - Physical

NYC->Philadelphia->DC->Ashburn VA->Chicago->Kansas City->Denver->Salt Lake City->Reno->Sunnyvale
vCloud Air Connectivity - Logical

On Premises vCenters
- Data Center 1
  - vCenters
  - Hybridity Stacks
- Data Center 2
  - vCenters
  - Hybridity Stacks
- Data Center 3
  - vCenters
  - Hybridity Stacks

On Premises Data Center Networking

VMware vCloud Air NJ
- MIT-NJ-DEVTEST vDC
  - 660Ghz
  - 5.4TB RAM
  - 150TB Disk
- MIT-NJ-PROD vDC
  - 660Ghz
  - 5.4TB RAM
  - 150TB Disk

VMware vCloud Air CA
- MIT-CA-DEVTEST vDC
  - 660Ghz
  - 5.4TB RAM
  - 150TB Disk
- MIT-CA-PROD vDC
  - 660Ghz
  - 5.4TB RAM
  - 150TB Disk
Scale, Speed, and Progress

• Migrated 70 VMs with 8TB of disk space in 26 hours

• Moved 23% of total VMs in six months, goal to reach 30% by 07/01

• Re-purposed development hardware for production workloads allowing production growth without additional spend

• Customers haven’t noticed a difference between on-prem and cloud!
vCloud Air Migration Timeline

- **January 2016**: 15% IS&T-managed servers migrated
- **July 2016**: 30% IS&T-managed servers migrated
- **January 2017**: 50% IS&T-managed servers migrated
- **July 2017**: 75% IS&T-managed servers migrated
- **January 2018**: 100% IS&T-managed servers migrated
Cloud Migration Progress

Systems Migrated

11/1/15 12/1/15 1/1/16 2/1/16 3/1/16 4/1/16 5/1/16
0 100 200 300 400 500 600 700
IS&T Cloud Accomplishments

- New SaaS Offerings
- Founding participant in Internet2 NET+ AWS service offering
  - Discounted AWS services to the MIT community
  - PO billing capability (a real pain point!)
  - Institute-wide view of consumption
- Exploring similar agreement for Microsoft Azure
Questions?
IS&T Transformation Update

John Charles
Vice President of Information Systems and Technology
Transformation Milestones

**Responsiveness of IS&T and IT@MIT**

- **FY 2015**: Up-skilling, Retooling, & Restructuring
- **FY 2016**: Platforms & Connectors In Place
- **FY 2017**: Data Sharing Scaled
- **FY 2018**: Core Business Systems Modernized
- **FY 2019**: Mature IT@MIT Ecosystem

Significantly enhanced support for higher-velocity innovation, collaboration, and learning outcomes.
Projected Completion of Projects for FY16

DLC and Roadmap Projects Completed

<table>
<thead>
<tr>
<th># of Projects</th>
<th>FY15</th>
<th>FY16 Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLC</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Student Services Roadmap Projects</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Admin Services Roadmap</td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>
Dropbox Use is Climbing
Dropbox Storage Volume (GB) is rising
MIT Collaboration Is Increasing

On average 48% increase in collaboration/sharing over the past 2 years

2016-04-01
Quick Glance

MIT ported 9 SAP systems from MIT data centers to SAP’s HANA database in the HANA Enterprise Cloud (HEC)
- Cutover on 12/13/15, with outreach to ~ 2100 SAP GUI users
- Lays the foundation for remaining current, and possible future migration to SAP’s S/4 version
- Will improve MIT’s Data Warehousing and Reporting environment with the addition of real-time analytics

Admissions decisions announced 6:28pm on March 14.
- Engine behind decisions.mit.edu rebuilt over 9 months by team of 10 IS&T staff members.
- Technical tools used: GitHub, Puppet, Travis CI, New Relic, BlazeMeter and RabbitMQ.
- 11,486 decisions were served, at a rate of just under 35 decisions per second.

Atlas 8: Bug fixes and new enhancements, including end-user facing, administrator-facing, and back-end SAP.
- Number of Enhancements: Learning Center (24), Events Registration (14), Journal Vouchers (4), Commuting Benefits (30), Charitable Giving (8), New Hire (6).
- Moved many legacy apps off of certificate authentication and over to Touchstone
Quick Glance

- Since May 2015, 1935 new surveys were produced.
- Total of 547 MIT community users in the last 12 months.

![Qualtrics Logo]

- In the past 12 months, 47 MIT community members used the product.
- 400 envelopes were sent.
- VPF is using DocuSign to collect information from vendors.

![DocuSign Logo]

- Available since November 2015
- Tool to help people interactively explore, visualize, understand and share data securely
- ~90 reports run/month

![Tableau Logo]
## Data & Information Access

### Financial Review & Control (FRC) [August 2015]

![FRC Image]

### AccessMyCommute / Ride Amigos Dashboard [February 2016]

![Dashboard Image]

### SANDI Pilot [February 2016]

![Table Image]

### Sustainability

- Joint sustainability data analysis committee with research faculty
- Development of a sustainability application to display MIT KPI metrics
- Analyze commuting data for options in reducing individual car use

### IT Security Network Anomaly Detection

![Histogram Image]

### Interactive Dashboards

![Interactive Dashboard Image]
The API Trend

IS&T APIs Users

Applications Using APIs

- People
- Courses
- DLCs
- Subjects
- Terms
- Classrooms

- People
- Courses
- DLCs
- Subjects
- Terms
- Classrooms
Closing Remarks