Massachusetts Institute of Technology

IS&T Transformation Strategy: Enabling the 2020 Vision for IT@MIT

IT Leaders Meeting
February 26, 2015
Agenda

- Welcome
- Summary of PoCs
- What this is (and is not)
- Our enormous opportunity
- Transformation plan (agility-oriented structure, processes & infrastructure)
- Organizational agility
- Transitioning IS&T to the new structure – change management & timelines
- Considerations for DLC & admin unit IT service providers
- Questions
Assessment of the Institute’s needs: Drove convergence on a vision, guiding principles, target architecture, new operating model, new capabilities model, & new org structure

Assessment 2009

Assessment 2011

Advisory Council Final Report August 2012

Listening Tours

EVPT Guiding Principles & Themes

New Infrastructure

• High Velocity Innovation
• Adaptable for Rapid Changes
• Easy Access to Data for Decision Making
• Open & Extendable Architecture to Meet Differentiated Needs
• APIs, Cloud & Integration Platforms

New Processes

• Transformative Digital Service Models
• Engaging User Experiences
• Mobile & Context Aware Approaches
• Lifecycle Portfolio Models

Up-skilled People

• Agile Methodologies
• Automated Deployment Methodologies
• Social Coding Methodologies

2020 Vision for IT@MIT*

Guiding Principles for IT

Target Architecture

Operating Model

Capabilities Model

Org Structure

PoCs

Excellence through modernization; and a strategic focus on enabling innovation
PoCs validated and calibrated the target architecture & new operating model

<table>
<thead>
<tr>
<th>PoC</th>
<th>Participants</th>
<th>Components of New Model Tested</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Admin App</td>
<td>RLE (Mark Mondol)</td>
<td>DLC independent use of an IS&amp;T-provisioned model-driven software development kit (SDK) to rapidly develop an easily updateable cloud-based app</td>
<td>Validated target architecture, non-IS&amp;T use of agile SDKs, &amp; automated deployment</td>
</tr>
<tr>
<td>P-Card App</td>
<td>CSAIL (Karen Shirer)</td>
<td>IS&amp;T use of a SDK to rapidly develop an easily updateable SAP-integrated app for a DLC w/o customizing SAP</td>
<td>Validated rapid dev &amp; secure use of SAP APIs, engaging UX, &amp; transformational digital service model</td>
</tr>
<tr>
<td>Compensation Analysis App</td>
<td>HR (Wayne Turner)</td>
<td>IS&amp;T use of SDK to rapidly develop an easily updateable SAP- &amp; Success Factors-integrated app for an Admin Unit w/o customizing SAP</td>
<td>Validated secure use of SDK with SaaS and SAP APIs via an integration platform architecture</td>
</tr>
<tr>
<td>Student Acct App</td>
<td>SFS (Mark Waters)</td>
<td>IS&amp;T use of IS&amp;T-provisioned APIs to rapidly add a modern cloud app (Nelnet) on top of MITSIS w/o customizing MITSIS</td>
<td>Validated rapid &amp; secure use of API connectors into MITSIS</td>
</tr>
<tr>
<td>2.009 PM Platform</td>
<td>ME (Prof David Wallace)</td>
<td>Faculty use of an IS&amp;T-provisioned API for a cloud service platform (Dropbox) to independently &amp; rapidly extend functionality to meet differentiated needs</td>
<td>Validated rapid &amp; secure non-IS&amp;T use of API connectors to create new services</td>
</tr>
<tr>
<td>Beaver Dash App</td>
<td>MIT Student Team</td>
<td>Student use of IS&amp;T-provisioned APIs to rapidly &amp; securely create new services</td>
<td>Validated student use of APIs to create new services</td>
</tr>
</tbody>
</table>

Infrastructure

- High Velocity Innovation
- Adaptable for Rapid Changes
- Easy Access to Data for Decision Making
- Open & Extendable Architecture to Meet Differentiated Needs
- APIs, Cloud & Integration Platforms

Processes

- Transformative Digital Service Models
- Engaging User Experiences (UX)
- Mobile & Context Aware Approaches
- Software Development Lifecycle Model

People

- Agile Methodologies
- Automated Deployment Methodologies
- Social Coding Methodologies

Architecture & Operating Model Validated… Essential Capabilities Identified… Buy-in Demonstrated & Confirmed
Successfully demonstrated that the new model & architecture can unlock business value & enable innovation

<table>
<thead>
<tr>
<th>BUILD Applications Better &amp; Faster</th>
<th>RESPOND Quickly to Changes &amp; Opportunities</th>
<th>ENABLE the DLCs &amp; Admin Units to Accelerate Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reduce time-to-market</td>
<td>• Capitalize on new opportunities before they are gone</td>
<td>• Reduce project bottlenecks</td>
</tr>
<tr>
<td>• Accelerate app development by 10x</td>
<td>• Accommodate constant updates</td>
<td>• Open platforms to extension by others</td>
</tr>
<tr>
<td>• Significantly lower cost (approximately 25% of previous costs)</td>
<td></td>
<td>• Enable units to move at their own pace</td>
</tr>
</tbody>
</table>
What this is (and is not): It’s a refreshing departure from past experiences

- Transformation PoCs validated the target architecture & generated buy-in
  - Senior leaders & key stakeholders like what they saw – and have pledged their support
- Senior leaders understand that this is NOT a typical “reorg” – it’s a transformation of IS&T – and it’s an enabler for transforming IT@MIT
- It’s also NOT about downsizing IS&T, layoffs, or budget reductions
  - Everyone is needed, and everyone will have opportunities to play important roles
- It’s a strategic multi-dimensional transformation – a transformation involving urgently needed transitions to:
  - An agile-oriented structure;
  - Agility-oriented processes & methodologies;
  - Agility-oriented architectures, infrastructure & tools; and
  - Agility-oriented mindsets & behaviors

Simply put, it’s about taking IT systems & services to the “next level” – a 10x leap forward in enabling the 2020 Vision for IT@MIT
We are positioned well to seize this truly amazing opportunity.

**MIT’s Talented IT Staff**

- **Leadership Team** (Rafael Reif, Marty Schmidt, Israel Ruiz, & Tony Sharon)
- **Strategic Initiatives** (Innovation, Learning, Energy, etc)
- **Financial Health** (Investments in Facilities & Infrastructure)
- **Maturity of Enabling Technologies** (aPaaS, iPaaS, SDKs, DevOps, etc)

We have an opportunity to make a **10X** difference in the value delivered by IT@MIT.

If we handle this right, we will be creating an entirely new agility-oriented operating model for IT@MIT – an innovation in the delivery of IT services for research institutions – and a transformation which everyone will be deeply proud to have been part of.
The IT Context has Changed
The pace of change seemed somewhat linear in the past – but its exponential nature is now clearly apparent.

We typically optimized for:
- Performance
- Reliability
- Cost

But, now we must first optimize for:
- Time-to-market
- Rapid changes
- User experience

In order to keep pace, we must transition to an agile-oriented structure, agility-oriented processes & methodologies, agility-oriented architectures, infrastructure & tools, and agility-oriented mindsets & behaviors.
Planning Process
Assessment of the Institute’s needs: Drove convergence on a vision, guiding principles, target architecture, new operating model, new capabilities model, & new org structure

Assessment 2009

Assessment 2011

Advisory Council
Final Report
August 2012

Listening Tours

EVPT Guiding Principles & Themes

New Infrastructure
• High Velocity Innovation
• Adaptable for Rapid Changes
• Easy Access to Data for Decision Making
• Open & Extendable Architecture to Meet Differentiated Needs
• APIs, Cloud & Integration Platforms

New Processes
• Transformative Digital Service Models
• Engaging User Experiences
• Mobile & Context Aware Approaches
• Lifecycle Portfolio Models

Up-skilled People
• Agile Methodologies
• Automated Deployment Methodologies
• Social Coding Methodologies

2020 Vision for IT@MIT*

Guiding Principles for IT

Target Architecture

Operating Model

Capabilities Model

Org Structure

PoCs

Excellence through modernization; and a strategic focus on enabling innovation
New Operating Model
New Operating Model

**Enabling Services**
- Cloud & API-centric Architectures
- Open & Extendable Platforms
- DevOps Culture
- Data & Code Repositories

Handoff to Enabling Services frees-up the Emerging Solutions team to focus on next round of innovation

**Emerging Solutions**
- Work with Innovation Teams
- Fast Track Agile Methodologies
- Focus on User Experiences
- Leverage Platforms

![Diagram with various stages and resources](image)

- **Deploy** (Invest Resources)
  - IT Modernization Funds, Infrastructure Modernization Funds, or TNSC Funds
- **Manage** (Seek Efficiencies)
  - GIB Funding, or Deferred Maintenance Funds
- **Innovate** (Invest Resources)
  - Software Development Funds
- **Retire** (Reallocate)
  - GIB Funding

- Discovery, Pilot, or Sandbox
- Sunset or Alternatively Source
- Deploy-at-Scale, Grow, Replace, or Modernize
- Run, Maintain, or Optimize
**Required Capabilities for IS&T:** Support the work of innovation teams, enable rapid deployment of new services, and drive operational excellence across all systems and services.

- **Emerging Solutions**
  - Systems Integration
  - User Experience and Design
  - Systems Implementation
  - Data Analytics/Science

- **Enabling Services**
  - Partnerships Coordination
  - Sourcing and Vendor Management
  - Project and Portfolio Management
  - Application Support and Maintenance
  - Systems Integration
  - Data Warehouse, BI, and Reporting
  - Technology Consulting
  - IT Ecosystem Architecture
  - Infrastructure Design & Engineering
  - Support for IT Service Providers and for IT Service Consumers
  - Platforms, Infrastructure and Operations
  - Cloud and Hybrid Cloud Operations

- **Social Communication**
- **Run, Maintain, & Optimize**
- **Sunset or Alt Source**
- **Innovate**
  - Discover, Pilot, Sandbox
- **Deploy**
  - Deploy-at-Scale, Grow, Replace, &/or Modernize

- **Planning, Administration, Staffing, and Finance Services**

- **Managing Life Cycle**
  - **Manage**
  - **Retire**

- **Innovate**
- **Deploy**
- **Run, Maintain, & Optimize**
- **Sunset or Alt Source**

- **Develops new services and supports innovation**
- **Deploys new services-at-scale, operates & maintains established systems**
Transforming IS&T Team Structures
Current IS&T Organization: Divided into 7 groups with 37 teams

- John Charles
  VP of IS&T

  - Bart Dahlstrom
    Administrative Systems
      - Project Management
      - User Experience Program
      - Enterprise Architect
      - Fin, EHS, Sourcing, Facilities
      - HR-Payroll
      - SAP Administration
      - Tech Services

  - Eamon Kearns
    Education Systems
      - Project Management
      - Business Systems Analysis
      - Software Dev and Ops
      - Learning Mgmt Apps and Services
      - Tech Architect and Framework

  - Mary Weisse
    Data Management
      - Project Management
      - Data Admin and Warehousing
      - Database Administration
      - Business Intelligence

  - Steve Buckley
    Systems Engineering
      - Project Management
      - Quality Assurance
      - DCAD
      - Training
      - Kerberos
      - Software Release Mgmt
      - Mobile Platform

  - Barbara Goguen
    Customer Support
      - Project Management
      - Flexible Staffing & Training
      - Usability and Accessibility
      - Faculty and Student Experience
      - Help Desk
      - Software Release Mgmt
      - Mobile Platform

  - Mark Silis
    Operations and Infrastructure
      - Project Management
      - Operations/Program Mgmt
      - Network Security and Security Ops
      - Program Management
      - Network Installation and Projects

  - Diana Hughes
    Administration
      - Finance
      - Human Resources
      - Site Team
      - Program Management
      - Network Installation and Projects

- Eamon Kearns
  VP of IS&T

- Steve Buckley
  VP of IS&T

- Diana Hughes
  VP of IS&T
New IS&T Organization Structure: Consolidated into 3 “capability” groupings with 14 teams
Agility-Oriented Operating Model: Designed for speed – strategic urgency

Emerging Solutions
Mission - Collaboration with innovation teams to create new services
Rapid iterative-experimentation is a built-in principle, along with agile methodologies & platform-thinking

Enabling Services
Mission - Rapid deployment of new services, operational excellence, and enabling & nurturing the IT@MIT ecosystem
Platform-thinking is a built-in principle, along with DevOps, agile methodologies, open & extendable API-centric architectures

Planning & Administration
Mission - Project & portfolio management support, vendor management, staffing & financial planning
Fostering agility-oriented approaches, programs & practices is a built-in principle
“Bridging” Strategy for Managing Risks & Workloads
## “Bridging” Strategy

<table>
<thead>
<tr>
<th>Risk Descriptions</th>
<th>Mitigation Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capability Risks</strong></td>
<td>• Provide flexible &amp; comprehensive training and professional development activities</td>
</tr>
<tr>
<td>• Competency gaps</td>
<td>• Recruit appropriately skilled &amp; experienced talent to fill staff vacancies</td>
</tr>
<tr>
<td>• Capacity shortfalls</td>
<td>• Use consultants (&amp; temp help) to fill near-term competency &amp; capacity shortfalls</td>
</tr>
<tr>
<td>• Velocity challenges</td>
<td></td>
</tr>
<tr>
<td><strong>Operational Risks</strong></td>
<td>• Staff-up to backfill staff for transformation tasks</td>
</tr>
<tr>
<td>• Service interruptions</td>
<td>• while pressing forward with approved roadmaps and steady-state operations</td>
</tr>
<tr>
<td>• Conflicts with previous</td>
<td>• Leverage ITGC processes to affect retirement of legacy infrastructure</td>
</tr>
<tr>
<td>commitments</td>
<td></td>
</tr>
<tr>
<td>• Persistent use of aging</td>
<td></td>
</tr>
<tr>
<td>&amp; duplicative infrastructure</td>
<td></td>
</tr>
</tbody>
</table>
Transformation Roadmap
Transitioning to the Target Architecture

- Cloud services should be the first option for new services and for replacing legacy services.
- When evaluating solutions, favor those that can be run on cloud infrastructure.
- Select services that run as high up the stack as possible – selecting SaaS over PaaS, and PaaS over IaaS.
- Give strong preference to services with robust sets of application programming interfaces (APIs).
- Develop and apply rigorous data classification and security safeguards.
- Give strong preference to services that embrace the use of “anti-fragility” resiliency tools.

Future Portfolio

- Public Cloud Software-as-a-Service (SaaS)
- Public Cloud Platform-as-a-Service (PaaS)
- Public Cloud Infrastructure-as-a-Service (IaaS)
- On-Premises Platforms & Private Cloud

Current Portfolio

- Cloud
- On-Premises Solutions

Flip & Expand the IT Portfolio
Responsiveness of IS&T and IT@MIT (Success Stories)

Key Performance Indicators (KPIs):
- IT service provider & consumer satisfaction ratings
- Percentage of systems converted to cloud architectures
- Velocity trends for transformed software development teams
- Talent retention & recruitment trends
- Annual cost study trends
- Code sharing & reuse trends

Time

FY 2015
- Up-skilling, Retooling, & Restructuring
- Org structure that facilitates the transformation
- Change management in place
- Staff with foundational skills to support the new operating model

FY 2016
- Innovation Platforms & Connectors In Place
- The fast-track Emerging Solutions group is handling all new innovation & modernization projects
- Safe, secure, & easy access to Institute data

FY 2017
- Portfolio of Enabling Services Available
- Mature services that enable IS&T, DLCs and admin units to quickly & easily build new solutions
- Ubiquitous access to enabling services, including next-gen collaboration services and robust self-service capabilities

FY 2018
- Core Business Systems Modernized
- Transformed business systems that offer best-of-breed functionality, as well as intuitive and engaging experiences
- Well-integrated and easily updateable administrative business processes

FY 2019
- Mature IT@MIT Ecosystem
- Flexible environment that enables high velocity innovation
- Faculty, researchers, students, and IT staff engaged in creating, sharing and reusing solutions & code
- Mature governance structure and processes

Significantly Enhanced Support for High Velocity Innovation
Importance of Organizational Agility
Fostering agility-oriented mindsets & behaviors

We need each individual to fully embrace the Vision, Guiding Principles, and KPIs – thereby aligning everyone’s efforts along the same vector of thrust – and making it safe and powerfully productive & rewarding for each individual to:

**Be Proactive**
- **Initiate** – Actively search for opportunities to contribute to organizational success and take the lead in pursuing those that appear promising
- **Improvise** – Devise and implement new and creative approaches to pursuing opportunities and dealing with challenges

**Be Adaptive**
- **Assume multiple roles** – Perform in multiple capacities across levels, projects, and organizational boundaries (often simultaneously)
- **Redeploy rapidly** – Move quickly from role to role
- **Spontaneously collaborate** – Engage often and easily with others with a singular focus on task accomplishment

**Grow & Share**
- **Learn** – Continuously pursue the attainment of proficiency in multiple competency areas (eschewing overspecialization and complacency)
- **Educate** – Actively participate in the sharing of information and knowledge throughout IS&T, as well as with our partners and collaborators
Transitioning to the New Structure – Change Management & Timelines
Key transition activities underway

- Developed new & revised position descriptions with industry leading titles
- Realigned staff within the new consolidated team structures
- Created a change management team to assist with the transition
- Heavily focused on communications to keep everyone informed
- Preparing for transition of roles & responsibilities – targeting a 30-day transition window
- Identifying and planning training & professional development activities
- Planning recruitment of additional staff where we have key vacancies
### Some New Positions

<table>
<thead>
<tr>
<th>Emerging Solutions</th>
<th>Enabling Services</th>
<th>Planning &amp; Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Data Engineer</td>
<td>IT Service Provider and Consumer Support Engineer</td>
<td>Project Manager</td>
</tr>
<tr>
<td>Business Systems Analyst</td>
<td>BI Analyst</td>
<td>Social Communications Specialist</td>
</tr>
<tr>
<td>Data Scientist</td>
<td>BI Engineer</td>
<td>Vendor and Sourcing Specialist</td>
</tr>
<tr>
<td>DevOps Engineer</td>
<td>Business Continuity Specialist</td>
<td></td>
</tr>
<tr>
<td>Designer</td>
<td>Business Relationship Manager</td>
<td></td>
</tr>
<tr>
<td>UX Specialist</td>
<td>Business Systems Analyst</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IT Risk &amp; Security Specialist</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SDI Data Center Engineer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SDI Network Engineer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technology Consultant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Database Administrator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DevOps Engineer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Architecture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infrastructure Coordinator</td>
<td></td>
</tr>
</tbody>
</table>
Alignment of New Positions

VP of IS&T

Emerging Solutions
- User Experience and Design
  - Designer
  - UX Specialist
  - Business Systems Analyst
- Systems Implementation
  - DevOps Engineer

Data Science
- Big Data Engineer
- Data Scientist

Integration
- Business Systems Analyst
- DevOps Engineer

IT Ecosystem Architecture
- Architecture

IT Operations
- Infrastructure Coordinator

Security & Resilience
- Business Continuity Specialist
- IT Risk & Security Specialist

Service & Process Coordination
- Business Relationship Manager
- Technology Consultant

Infrastructure Design & Engineering
- SDI Network Engineer
- SDI Data Center Engineer
- Infrastructure Coordinator

Systems Optimization & Integration Solutions
- BI Analyst
- BI Engineer
- Database Administrator
- Business Systems Analyst
- DevOps Engineer
- IT Service Provider and Consumer Support Engineer

Enabling Services

Planning & Administration

Project & Portfolio Management
- Project Manager

Social Communications
- Social Comm. Specialist

Provider & Consumer Partnerships
- Business Relationship Manager
- IT Service Provider and Consumer Support Engineer
- Technology Consultant

Administration

Sourcing & Vendor Management
- Vendor & Sourcing Specialist
# 30-Day Transition Window

## High Level Timeline

<table>
<thead>
<tr>
<th>Week of Feb 9</th>
<th>Week of Feb 16</th>
<th>Week of Feb 23</th>
<th>Week of March 2</th>
<th>Week of March 9</th>
<th>Week of March 16</th>
</tr>
</thead>
</table>
| • All Hands meeting  
• Individual meetings | • Team meetings  
• Group meetings – Enabling, Emerging, Planning & Admin  
• Transition period starts February 19  
• Org chart available | Transfer of Responsibilities | Ramp up New Responsibilities | Identify Learning and Development Opportunities | • Transition period ends March 19  
• Go-live with organization 1.0 |

- **Ongoing communication and collaboration with IS&T staff**
- **Change Management Team Support and Outreach**
Some considerations for DLCs & admin units

- **Who owns this plan?** The vision, guiding principles, target architecture, & new operating model have been accepted by the EVPT, and are owned by the IT Governance Committee

- **When can DLC & admin unit IT service providers get involved?** DLC & admin unit IT service providers are welcome to opt-in at anytime – and are welcome to take full advantage of IS&T scheduled (and funded) opportunities for formal training

- **Will DLCs & admin units have access to the new tools & platforms?** IS&T is attempting to license each new tool and platform for Institute-wide use – enabling access by individual students, faculty members, researchers, and staff

- **How could this new architecture (and the shift to agile & devops) create multiple wins for DLC & admin unit IT teams?**
  - The new platform-based API-centric architecture will make it possible for DLC & admin unit IT teams to reduce their platform & infrastructure layer KLTO workloads & costs – enabling them to align more of their efforts & resources with higher-value tasks
  - IS&T’s transformed focus on collaborating in agile ways with innovation teams across the Institute will make it possible for DLC & admin unit IT teams to more easily tap into a wider array of resources as they strive to meet the differentiated needs of their constituencies
Questions?