Massachusetts Institute of Technology

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

Alumni Association Board Meeting
March 14, 2015
Agenda

- Overview of Strategic Planning Process
- 2020 Vision for IT@MIT
- Transformation of the Global Business Landscape & the New Context for IT
- Target Architecture for IT@MIT & Summary of Proof-of-Concepts
- New Operating & “Capabilities” Models
- Organizational Agility (Structure, Mindsets, & Behaviors)
- Transformation Roadmap for IT@MIT
- Considerations for DLCs, Admin Units, & MIT’s AA
- Questions
The Strategic 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

Evpt Guiding Principles & Themes

Assessment 2009

Assessment 2011

Advisory Council Final Report August 2012

Listening Tours

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

Target Architecture

Guiding Principles for IT

2020 Vision for IT@MIT*

Operating Model

Capabilities Model

Org Structure

PoCs
The 2020 Vision for IT@MIT
MIT’s 2020 IT Vision has two complementary and mutually supporting elements:

- IT excellence through modernization; and
- A strategic focus on enabling members of the MIT community to innovate IT services in response to the diverse needs of their respective research, education, student life, and administrative functions.

**What it means:**

- IT services will be packaged for intuitive, mobile, self-service use
- Faculty will be able to leverage APIs* and data to create new services and platforms for teaching and research
- Students will be able to leverage APIs and data to create new applications and sites by properly using institutional data that can be made available to them
- DLCs and administrative units with suitable capability will be able to independently create new services and platforms that address their specific needs
- DLCs and administrative units in need of greater assistance from IS&T will be better served by IS&T's enhanced capacity
- Individual members of MIT’s increasingly global community will be able to create new data and applications
- IS&T will have greater capacity for supporting innovation

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*APIs (application-programming-interfaces) are used to abstract application software and logic from the underlying operating platforms.*
The expansion of IS&T, DLC, and administrative unit capacities for innovation will be facilitated by the adoption of open APIs and “platform-based” models that are designed to create and connect ecosystems of diverse participants as producers and consumers of IT services.
The Global Business Landscape is Transforming, and the IT Context has Changed
Businesses are increasingly shifting from old “push” models to new scalable “pull” platforms.

**Long term forces driving the transformation of the global business landscape:**
- Digital infrastructure improvements advancing exponentially (cloud services reducing entry barriers)
- Public policy evolution leading to economic liberalization (free flow of ideas & resources across boundaries)

**Mounting pressure on performance:**
- Return-on-assets is steadily declining (sharing economy)
- Growing disconnect between the way world is evolving & the way many “older” businesses are operating

**Three levels of “pull” platforms:**
- **Level 1:** “Access” (ability to find people & resources when needed)
- **Level 2:** “Attract” (ability to attract relevant people & valuable resources, when unaware of their existence)
- **Level 3:** “Achieve” (ability to achieve greater results leveraging the core & edges of the institution & ecosystem)
The pace of change seemed somewhat linear in the past – but its exponential nature is now clearly apparent.

**1990’s**

- We use to optimize for:
  - Performance
  - Reliability
  - Cost

**2010’s**

- Today we must optimize for:
  - Time-to-market
  - Rapid changes
  - User experience
  - “Pull” platforms

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**.
The Target Architecture & Proof-of-Concept Projects
Platform Thinking – What Changes for IT Service Providers?

Design

• A platform is a service that is designed to enable developers to quickly build new apps and solutions by eliminating the time and headaches associated with provisioning and maintaining the underlying hardware, software, and middleware services.

Network Effects

• Platforms have communities, products have features.

Value

• Platforms open themselves to (and gain enormous value from) 3rd party contributors/developers.
Leveraging Agile & DevOps Methodologies, Cultures, & Principles to Boost Productivity

Adopting Agile development methodologies fixes this

Embracing DevOps culture & principles fixes this
PoCs validated and calibrated the target architecture & new operating model

**Example Proof-of-Concept Projects:**

<table>
<thead>
<tr>
<th>PoC</th>
<th>Participants</th>
<th>Components of New Model Tested</th>
<th>Assessment</th>
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</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>
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<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>
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<tr>
<td>Comp-Acct 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 2.009 PM</td>
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<tr>
<td>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>
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<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>
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**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>
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<tr>
<th>BUILD Applications</th>
<th>RESPOND Quickly to Changes &amp; Opportunities</th>
<th>ENABLE the DLCs &amp; Admin Units to Accelerate Innovation</th>
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<tbody>
<tr>
<td>Optimized <strong>UX</strong></td>
<td>• Reduce time-to-market</td>
<td>• Reduce project bottlenecks</td>
</tr>
<tr>
<td>Accelerate app development by <strong>10x</strong></td>
<td>• Accommodate constant updates</td>
<td>• Open platforms to extension by others</td>
</tr>
<tr>
<td>Significantly lower cost (approximately <strong>25%</strong> of previous costs)</td>
<td></td>
<td>• Enable units to move at their own pace</td>
</tr>
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</table>
New Operating & Capabilities Models
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

- Discovery, Pilot, or Sandbox
- Deploy (Invest Resources)
- Innovate (Invest Resources)
- Run, Maintain, or Optimize
- Manage (Seek Efficiencies)
- Deploy-at-Scale, Grow, Replace, or Modernize
- Sunset or Alternatively Source
- Retire (Reallocate)

- Software Development Funds
- GIB Funding
- IT Modernization Funds, Infrastructure Modernization Funds, or TNSC Funds
- GIB Funding, or Deferred Maintenance Funds

- Cloud & API-centric Architectures
- Open & Extendable Platforms
- DevOps Culture
- Data & Code Repositories
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.
Organizational Agility
Current IS&T Organization: Divided into 7 groups with 37 teams
New IS&T Organization Structure: Consolidated into 3 “capability” groupings with 14 teams

IS&T VP, John Charles

Emerging Solutions Sr Director, Eamon Kearns
- User Experience and Design
- Systems Implementation DevOps
  - Data Analytics/Science
  - Integration

Enabling Services Assoc VP, Mark Silis
- IT Ecosystem Architecture
- Infrastructure Operations
- Security & Resilience
  - Infrastructure Design & Engineering
  - Systems Optimization & Integration Solutions
  - Provider & Consumer Partnerships

Planning & Administration Sr Director, Diana Hughes
- Sourcing & Vendor Management
- Social Communications
  - Project & Portfolio Management
  - Administration
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
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
Transformation Milestones

Responsiveness of IS&T and IT@MIT (Success Stories)

- **Up-skilling, Retooling, & Restructuring**
- **Innovation Platforms & Connectors In Place**
- **Portfolio of Enabling Services Available**
- **Core Business Systems Modernized**
- **Mature IT@MIT Ecosystem**

Significantly Enhanced Support for High Velocity Innovation

- FY 2015
- FY 2016
- FY 2017
- FY 2018
- FY 2019

Time
Consideration for DLCs, Admin Units, & the MIT AA
Some considerations for DLCs & admin units

- **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 replace many of their “shadow systems” with differentiated workflow apps sitting on top of (and connected through APIs to) Institute systems of record.
  - The new platform-based API-centric architecture will make it possible for DLC & admin unit IT teams to reduce other platform & infrastructure layer KTLO 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.
Addition considerations for MIT’s Alumni Association

■ How could this platform-based approach enable the MIT AA to better meet the needs of alumni?

– “Pull” platforms could lower the barriers-to-entry and overhead necessary for scaling-up support efforts for career development, networking, amplifying nostalgia, expanding learning opportunities, and helping alumni make successful career & life transitions

– “Integration” platforms could enhance the user experience for alumni, and could help facilitate the aggregation & integration of data across multiple systems

■ How could this platform-based approach enable the MIT AA to better meet the needs of the Institute?

– “Pull” platforms have the potential to increase alumni engagement, social interaction, and satisfaction, while also increasing student enrollment, retention, and graduation rates – along with improving outcomes such as “graduating-with-jobs” and “giving back”

– “Data” platforms could help facilitate the aggregation and analysis of a wider variety of unstructured as well as structured data, and enable the use of advanced visualization and predictive analytics tools to improve situational awareness and real-time decision making
Questions?