Information Services and Technology Community Forum

Friday, April 28, 2006
Agenda and Outcomes

Agenda
- IS&T Overview
- Research Tools for Teaching and Learning
- Planned Changes in the MIT Network (MITnet)
- Role of the new Infrastructure Software Development and Architecture Group
- Future Plans for MIT’s Student Information Systems

Outcomes
- Share information about key IS&T programs with the community
- Obtain input from the community for current and future programs
The IT Landscape at MIT
MIT IT Spending (FY05)

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>~ $28 M</td>
</tr>
<tr>
<td>Teaching &amp; Learning</td>
<td>~ $15 M</td>
</tr>
<tr>
<td>Academic Departments</td>
<td>~ $34 M</td>
</tr>
<tr>
<td>Central Administration</td>
<td>~ $40 M</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>~ $117 M</td>
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</table>

Based on SAP data; not including Lincoln Lab
## IS&T FY2006 Gross Expense Budget

<table>
<thead>
<tr>
<th>Component</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>Operational Support &amp; Service</td>
<td>$23 M</td>
</tr>
<tr>
<td>Maintenance &amp; Enhancement</td>
<td>$25 M</td>
</tr>
<tr>
<td>New Services &amp; Products</td>
<td>$12 M</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$60 M</strong></td>
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<tr>
<td>Rate Recovered Costs</td>
<td>$20 M</td>
</tr>
<tr>
<td>% of MIT IT Spending</td>
<td>~ 35%</td>
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</table>

### Definitions:
- **Operations** = Performing a function in the course of carrying out or delivering IT services.
- **Maintenance** = Upgrading IT services or replacing IT equipment so that current functionality & purpose is maintained.
- **New Services** = Introducing IT services that do not exist or upgrading existing services so that new functionality is provided.

**Pie Chart:**
- Operation: 38% (Green)
- Maintain: 41% (Yellow)
- New Services: 21% (Orange)
IS&T New Services for FY2006

Administrative Systems
- Payroll System
- EHS System
- Administrative Portal Project
- Hyperion Pilot Project

Client Support Services
- Departmental Consulting and Application Development
- Client Relationship Management Program
- IS&T Web Page Redesign Project

Telephone & Network Services
- VoIP Pilots
- Cellular telephone service capability in Stata Building
- Web-based survey tools

Academic Computing Services
- Stellar/Sakai Development
- OKI OSIDs Development
- Partner with Faculty to Deliver Educational Technology Tools and Software
- Applications for Digital Content Repositories project
- Bringing Research Tools into the Classroom Project
- Integrated Communications Planning Project
IS&T Strategic Themes

- Service orientation
- Technological innovation and leadership
- Collaboration
- Excellence in project execution and management
- Strong fiscal responsibility coupled with sound financial management
- Personnel development
IS&T Strategic Themes

- **Service orientation** – understanding the goals and missions of the people and organizations at MIT to foster a collaborative environment for solving problems and planning for future information technology needs

- **Technological innovation and leadership** – generating the ideas and experiments that will lead to the next generations of IT services

- **Collaboration** – working with other IT departments on campus, computer users throughout MIT, as well as colleagues on other campuses to ensure that IS&T is providing the highest and most cost effective information services support and technology available

- Excellence in **project execution and management** – on schedule, on budget delivery of hardware and software systems that meet or exceed client expectations

- A high degree of **fiscal responsibility** coupled with sound financial management

- **Personnel development** – giving each member of the IS&T community the opportunity to contribute to the full extent of his or her capabilities
IS&T Organizational Chart

Jerry Grochow
VP for Information Services & Technology

Vijay Kumar
Director
Academic Computing

Theresa Regan
Director
Operations & Infrastructure Services

Wilson D’Souza
Director
Infrastructure Sftw. Develop. & Architecture

Steve Winig
Manager
Relationship Management

Jane White
Interim Director
Client Support Services

Christine Meholic*
Director
Student & Admin. Information Systems

Allison Dolan
Director
Telephony and IS&T Shared Services

* Effective June 1
IS&T Areas of Focus

- Become a trusted partner with the community
- Improve the IT user experience
- Provide high quality, ubiquitous IT services
# IS&T Areas of Focus in Action

<table>
<thead>
<tr>
<th>IS&amp;T Service</th>
<th>Become a Trusted Partner with the MIT Community</th>
<th>Improve the IT User Experience</th>
<th>Provide High Quality, Ubiquitous IT Services</th>
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<tr>
<td>Research Tools for Teaching &amp; Learning</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
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<td>Planned Changes in the MIT Network</td>
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<td>✔️</td>
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<tr>
<td>Infrastr. Software Development &amp; Architecture</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Future of MIT’s Student Information Systems</td>
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<td>✔️</td>
<td>✔️</td>
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</tbody>
</table>
Software Tools for Academics and Researchers

Dr. Vijay Kumar
Academic Computing, Director
Academic Computing

Educational Technology Consulting
- Stellar/Sakai Support
- Mathematics, Engineering & Symbolic Representation
- Faculty Support for Instruction
- Geographical Information Systems and Spatial Data
- Communications

Math Support

Spatial Data

Applications for Digital Content Repositories

Software and Tools
- Athena Software Acquisition & Deployment (Educational Computing Environment)
- Applications for Digital Content Repositories
- Bringing Research Tools to the Classroom

Installations, Spaces, and Environments
- New Teaching and Learning Spaces
- Collaborative Spaces
- Laptop Loaners
- MIT Cable TV

Bringing Research Tools to the Classroom

Special Initiatives
- Open Knowledge Initiative
- Residential Technologies
- Integrated Communications

New Teaching and Learning Spaces

Collaborative Spaces

Laptop Loaners

MIT Cable TV
Applications for Digital Repositories
Software Tools for Academics and Researchers

- Make research tools usefully available for education
- Prepare students to participate in research
  - Software tools to create provocative and interactive lab exercises
  - Make legacy research tools easy to use
- Harness available HPC resources from anywhere on and off campus
- Partition solutions and promote software reuse
- Sustainability
Software Tools for Academics and Researchers

**Visualization Framework**

Developed and used for Physics at MIT

Applied to Biology (Protein Visualization)

Applicable to Quantum Chem: Chem E.

star PDBViewer will be used for:

*Experimental Biology & Communication*
Software Tools for Academics and Researchers

GenePattern

Workflow creation and execution framework
Developed and Used by Broad Institute and Harvard
Applied to Material Science
Applicable to Hydrology, Chemistry, Ocean Science
Software Tools for Research and Teaching

Targets: What are we simplifying?

Setup & Licensing  Model Preparation  Troubleshooting  Analysis

Administration  Executing  Extracting  Learning & Discussion

Scripting  Cleanup
Software Tools for Research and Teaching

Result: Focused learning remains
Software Tools for Research and Teaching: Ahead…

• Stellar integration
  • Authorized support and course site access

• Visualization across the curriculum

• A software tools for academics and researchers portal
Vijay Kumar

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- Phone: 617.253.5023

Questions? Comments?
The MITnet Today, Tomorrow, and Beyond

Theresa M. Regan
Operations and Infrastructure, Director
The Internet circa 1982
The Internet circa 2006
Getting to the Desktop

Internet

Campus Switches And Backbone

Horizontal cabling

Building Switches

Vertical Risers

Floor switches

100Mb-1Gb

54Mb

10Gb

10Gb

10Mb-1Gb

10Mb-1Gb

10Mb-1Gb

10-100Mb (1Gb requires diff. adapter)

Notebooks using wireless

Desktop PCs
What does “MITnet” represent?

- Campus Network
- MIT.EDU Namespace
- Electronic Mail
- Calendaring
- Enterprise Windows
- Remote Access
- Web Infrastructure
- Directory
- SIP VoIP Service
- Authentication and Security
Challenges and Solutions in Network Infrastructure

Challenge
- Student demand for ubiquitous coverage and more mobility
- Support both a research and utility network within same physical structure
- Interconnecting research clusters across campus
- Interconnecting research computing beyond the campus
- Moving large (terabyte) data sets at gigabit speeds across campus
- Sufficient network capability for faculty, students, and staff
- Providing high speed network access to students in FSILGs

Solution
- Provided MIT with complete wireless campus using 3,000 access points
- Developed and deployed integrated virtual network (VLAN) environment
- Implemented large fiber infrastructure throughout campus
- Acquired intercity dark fiber between Boston and New York (and then to the world)
- Upgrade campus backbone to highest speed available today
- Began deployment of 1Gb/s to the desktop using new ethernet switch design
- Upgraded all remote network T1 connections
Current Map of MIT Wireless Network
Current Map of the Wired Network
A look behind the MITnet curtain

Challenges

- Poor lighting
- No HVAC to protect equipment
- Old cabling
- Lack of rack space
- Lack of wall space
- Shared Service areas
- Unprotected, non-dedicated power services
MIT Dark Fiber IRU
MITnet Timeline

<table>
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<tr>
<th>Cost</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
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<tbody>
<tr>
<td>$4M/$1M annual</td>
<td>Wireless build out</td>
<td></td>
<td></td>
<td>Outdoor wireless &amp; continued renewal (802.11n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$40-50M</td>
<td>Improve network service to all campus buildings</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>$4M</td>
<td>Create 10Gb/s backbone</td>
<td></td>
<td>Create a 40Gb/s backbone</td>
<td></td>
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<tr>
<td>$4M</td>
<td>Offsite recovery for web and email</td>
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<td></td>
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<tr>
<td>$750k/$300k annual</td>
<td>Remote Site T1 Upgrades</td>
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<tr>
<td>$2M</td>
<td>MIT Regional Optical Network</td>
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Contact Information

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- Phone: 617.258.7358

Questions? Comments?
The role of Infrastructure Software Development and Architecture (ISDA) at MIT

Wilson D’Souza
ISDA, Director
A quick introduction to ISDA

- A newly created organization within IS&T
- ISDA team members came from several parts of IS&T
  - Team listing at http://web.mit.edu/ist/org/isda

Current services in ISDA:

**Authentication Services**
- Kerberos, Web / Personal Certificates

**Authorization**
- Roles, Moira, Mailing Lists

**Directory Services**
- LDAP, MIT ID Database

**Data Services**
- Data Warehouse, Reporting Services

**Application and System Software**
- OKI
- AFS and other Athena services
ISDA Charter

- To create, maintain and promote a flexible infrastructure software architecture populated by components and with interfaces that are easily usable (and used) by software developers across MIT

- Conceptualize and define an Enterprise IT Architecture for MIT; ITAG, ISTAB, and other MIT community forums will be key partners in this effort

- Maintain an appropriate balance between engaging in development for MIT and the world-at-large
Why ISDA?

Today

- Point Solutions
- Measures
- Principles
- Common Interfaces

Many Pieces Don’t Quite Fit Together… but with the MIT Architecture and Integrated Roadmap…

Tomorrow

- Integrated Roadmap
- Enterprise Architecture
- IS&T and MIT vision alignment
- Common Guiding Principles
- Consistent Measures
ISDA Operating Model

- **Client Focused** – Assemble and build a service oriented application architecture
- **Delivery Focused** – Measure success by our delivery pipeline, meeting timelines, and usage metrics
- **Collaborative** – Partner with other areas in IS&T, MIT community, higher education colleagues, and vendors
- **Agile** – Reduce time from concept to delivery, be more proactive, and anticipate client and industry changes
- **Innovative** – Introduce and promote new innovative services that add real value to MIT
Top Focus Areas

- Envision and publish a sustainable enterprise architecture via engagement with ITAG, members of the community and strategic vendors
- Software tools and plug-ins to access IT infrastructure, developer guides, and common developer repositories
- Reference Data Repository (RDR) – Evolution of the Data Warehouse with rich interfaces for access, reporting services, and self-service tools
- Directory Services and Identity Management Roadmap encompassing authentication, federated identity, authorization, and accounting
So what does this mean for the MIT community?

- **Partner in Developing:**
  - An Enterprise Architecture that outlines our Infrastructure integration strategy
  - Ramps (Software) to access the Infrastructure “Highway”
  - Rules (IT Guidelines) for leveraging infrastructure (Architecture statements and guides)
  - Directions on our services (product and service roadmaps with regular refreshes)
So what does this Enterprise Architecture look like?

Perhaps?
One potential foundation to build on
Wilson D’Souza

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- Phone: 617.253.8966

Questions? Comments?
MIT Student System 2010-20 Vision
Project Proposal

Joint Effort of the Office of the Dean for Undergraduate Education (DUE) and IS&T

JoAnne Stevenson
Student Systems, Project Manager
Student Systems at MIT today involve 5 major sponsors, comprise more than 60 applications …

- Undergraduate Admissions
- Graduate Admissions
- Student Record Registration
- Degree Audit
- Catalog
- Scheduling (students, classrooms, exams)
- Advising, Commencement
- Tuition Assessment
- Communications Req.
- Housing
- Dining
- Medical
- Athletics
- Student Activities
- Graduate Aid
- Student Accounts
- Federal Work Study
- Financial Aid

…and a user community of more than 45,000 faculty, students, staff, and prospective applicants
Current State

- Supports uniqueness of MIT’s business processes
- Technologies are not state-of-the-art
  - Some are unsupported (technology upgrade in progress)
- Not able to meet student and faculty expectations
  - Widespread use of Internet has raised expectations
  - Forthcoming recommendations from Undergraduate Education Commons Task Force
Project Goal

Develop a Student System vision that will support the evolving needs of the MIT community and improve the student experience at MIT

Driving Factors
- Client Expectations
- Educational Commons
- DUE Strategic Plan

New Technologies
- Portals
- Podcasts
- Collaboration Tools
- SOA
- …

Ideas for New Services
- Online Registration
- Online Advising
- Subject Evaluation
- Degree Road Maps
- Expanded Web Self Service
- Online Grades
- Financial Services
- Career Development
- Admissions
- Student Scheduling
- Subject Lotteries
- Academic Portfolio
- and more….

MIT’s
Student Information System
2010

Peer Benchmarking
- Ivy + and others
Proposed Approach

- Determine scope and plan for 2010-20 vision
- Brainstorm future student system possibilities
- Study our peer institutions
  - Peer institutions spending $30-$50M for similar projects
- Understand business processes and needs of students and faculty
- Perform functional assessment and develop business cases
- Evaluate our options
- Develop a strategic plan
Where are we now?

Initial planning phase
- Review with Deans and Academic Council for go ahead
- Define scope, approach, and project plan
- Validate timeline

Next steps
- Establish broad MIT community involvement, identify:
  - Advisory groups, Steering Committee, Project Team
- Identify consulting partners
- Learn lessons from other large projects at MIT and elsewhere
MIT Student System Potential Timeline

V5

FY06-Q3 Jan-Mar 06
FY06-Q4 Apr-Jun 06
FY07-Q1 Jul-Sep 06
FY07-Q2 Oct-Dec 06
FY07-Q3 Jan-Mar 07
FY07-Q4 Apr-Jun 07
FY08-Q1 Jul-Sep 07
FY08-Q2 Oct-Dec 07
FY08-Q3 Jan-Mar 08
FY08-Q4 Apr-Jun 08
FY09-FY20

SIS Technology Migration
Address SIS Fix/Enhancement Backlog
DUE Strategic Plan

UG Educational Commons Task Force
Report
UG Educational Commons Impl.
Planning
UG Educational Commons
Recommendation Implementation
Community Source
Student System
Feasibility
Mellon Grant

Student System:
High Level Concept for Future
Student System:
Functional analysis, Package/Technology assessment
UG Educational Commons System
Implementation
Student System Implementation
(thru FY11)

Draft SIS Roadmap

Completed SIS Roadmap

Undergraduate Admissions Phase 2 –
IBM Mainframe Retired

IT projects
Client Initiatives
Outside Studies
2010 - 20 Vision

Completed SIS Roadmap
### Student System 2010-20 Vision

#### Potential Timeline V2

<table>
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<tr>
<th>FY06-04 Apr-June 06</th>
<th>FY07-Q1 Jul-Sep 06</th>
<th>FY07-Q2 Oct-Dec 06</th>
<th>FY07-Q3 Jan-Mar 07</th>
<th>FY07-Q4 Apr-Jun 07</th>
</tr>
</thead>
</table>

Student System 2010-20 Vision: Develop Project Plan

- Engage Community Brainstorming
- Business Process Review
- Evaluate options:
  - Build on MIT SIS
  - Community Source
  - Package
  - Combination
- Peer Benchmarking
- Technology Evaluation
- Develop Draft Road Map

<table>
<thead>
<tr>
<th>FY06-04 Apr-June 06</th>
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</thead>
</table>

- Draft Student System Roadmap

<table>
<thead>
<tr>
<th>FY07-Q4 Apr-Jun 07</th>
</tr>
</thead>
</table>

- Completed Student System Roadmap
Contact Information

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- Phone: 617.258.7870

Questions? Comments?
Discussion

Thank you for participating!