



# Education Systems Roadmap

2011 – 2014



**Education Systems Partnership:**

- Offices of Dean for Undergraduate Education
- Offices of Dean for Graduate Education
- Offices of Dean for Student Life
- Information Systems & Technology

**Roadmap Recommended By:**

- Student Systems Steering Committee
- Education Systems Sponsors

# MIT Education Systems Roadmap

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## Introduction

The Education Services partnership is charged with implementing enterprise information service systems that support the education needs of faculty, students, alumni and administrators throughout the MIT community and beyond. Our vision is to provide a student system worthy of MIT, achieved by implementing high impact customer facing functionality in parallel with incremental technical stabilization.

The Student Information System is at a critical juncture of accommodating new and diverse business requirements while providing technical stability. Moving this system forward will require a strategic approach that considers synergies between cross departmental business needs, technical solutions, and system sustainability. Education Services business and IS&T partners will be provided rich opportunities to consider and implement change that results in increased efficiency and customer service. This document contains a 3 year roadmap which will accomplish the first major strides in progressing towards our vision.

The approach for the Next Gen Student System is to:

- evolve our student system by incrementally adding critical business functionality
- assure long-term sustainability rather than replace the entire system
- enhance the user experience for faculty, students and staff
- stabilize the technical infrastructure.

# History

The Education Systems Roadmap takes into account recent year efforts to gather business and technology direction. These include:

- **The MIT Student System VISION project:**  
This project was an MIT-wide initiative to develop a vision and strategy for student systems to meet the needs of our students, faculty and staff for the coming decades. The project team worked with the MIT community to perform a comprehensive and critical analysis of how we do our core business, and to think broadly and look into the future for new and better solutions to our information management needs.
- **Next Generation Student Systems (NGS3) Project**  
NGS3 was the successor to the VISION project. The goal of this project was to create an effective, sustainable, user-centric means of delivering Student Services to Faculty, Students and Staff. Components of this project included involvement in the Quali Student community source initiative, scoping business processes, analyzing and designing potential functional solutions in the area of enrollment, and technical strategy and solution assessments.
- **DUE Digital MIT**  
In response to the MIT Task Force report DIGITAL MIT theme, the DUE offices collected their ideas to replace paper based processes with more efficient processes supported by modern day technologies.
- **Student System Steering Committee (SSSC)**  
The SSSC consists of the primary Student System stakeholders. Members of the steering committee have submitted and prioritized their shorter term SIS enhancements and project requests.
- **SIS Technology Roadmap**  
The SIS team performed an assessment of the SIS technologies in order to develop a technology replacement roadmap. The steps taken to develop the roadmap included:
  - Assessing the lifecycle of current SIS technologies
  - Setting a technology strategy going forward
  - Ranking high risk applications
- **Next Gen Learning Management System**  
The Learning Management Systems (LMS) committee was established in the fall of 2009 to advise IS&T on the future of MIT's Learning Management System. The Committee benefited from research accomplished by IS&T in 2008-2009 in evaluating possible alternatives to the current Stellar platform. This evaluation was initiated due to concerns regarding Stellar's ongoing costs and technical shortcomings in meeting current pedagogical needs

## Stakeholders

The Stakeholder groups that utilize education systems include the largest and most comprehensive bodies in the MIT Community. They include:

<b>Applicants</b>	Education Services supports admissions application processes for undergraduate, graduate, transfer, special, and visiting students. Support is also provided for financial aid tools.
<b>Students</b>	Records are created for each student which includes personal information (such as biographic and emergency contact information), registration, grading, degree audit, student accounts, tuition and fees, student employment, UROP, degree applications, and physical education. Students interact with the system to view, transact, and update data as well as view information such as course offerings, tuition tables, teaching evaluations, financial aid, etc.
<b>Faculty</b>	Faculty rely on the student system to realize, track, and administer its Rules and Regulations, particularly those that relate to education. The system responds to faculty mandates, publishes subject and degree offerings, records registration enrollment and grading, tracks satisfactory progress and degree auditing, and schedules space for teaching. Faculty also rely on the system for learning management tools, teaching evaluation, advising assistance, and program enrollment.
<b>Senior Administration</b>	Senior Administration frequently requests data and statistics that are utilized in decisions in such areas as the Institute's general budget, enrollment management, research, space planning, faculty hiring, etc. Statistics are also required for surveys, rankings, senior leadership speeches and publications, etc.
<b>Administrative Departments</b>	Numerous administrative departments throughout the institute are dependent upon data from the student system to support their functions. For example, student enrollment information is utilized by Housing, Medical, the Card Office, Libraries, the International Students Office, etc. Critical data such as tuition and fees is transferred to financial systems.
<b>Academic Departments</b>	Academic departments rely on the student system to track UROP projects, IAP offerings, academic records of students enrolled in their programs, RA/TA assignments, degree tracking, class lists, classroom information and scheduling, subject and program documentation, and teaching evaluations.
<b>Alumni</b>	Alumni frequently request transcripts and other certification documents which validate their academic record at MIT. The Alumni Association relies on the data stored within the student system to populate their system as students shift to Alumni status and Donor Relations subsequently utilizes this information in its work.
<b>External Constituents</b>	External constituents such as higher education institutions, businesses, and government agencies, consider our student system data as the official source of information for financial aid including the actual administration of Federal Aid, enrollment degree verifications, statistics, etc.

# Guiding Principles

These principles will guide the work of the Roadmap:

- Encourage collaboration of business and IS&T that supports both the daily operations and the new project experience
- Develop cross departmental business strategy (not silos)
- Support SIS Framework evolution and sustainability
- Adopt common standards supporting software development and technology
- Provide MIT project oversight to ensure consistency in standards
- Consider system integration needs to eliminate redundancy and enhance the user experience
- Provide the flexibility to respond quickly to change
- Focus on student and faculty needs
- Support faculty policy (existing or proposed), federal and state laws
- Enhance face-to-face relationships between students, faculty, and staff
- Ensure consistency, practicality, resiliency, and efficiency in design through self service, workflow automation, streamlined processes and a common user interface.

# Priorities

This roadmap is built around five strategic priorities:

 <b>Strategic Priority</b>	<b>Goal</b>
<b>Digitization</b>	<ul style="list-style-type: none"> <li>• Create efficiencies in business process by replacing paper with online self service and workflow review. This will modernize and streamline business processes to meet community expectations.</li> </ul>
<b>Enrich Advising Support</b>	<ul style="list-style-type: none"> <li>• Enrich advising through meaningful communications, curriculum planning tools, and context sensitive help. This will allow advisors to spend better-focused time discussing academic, personal and career issues with students; and provide timely information to students so they are better able to steward their academic and financial records.</li> </ul>
<b>Seamless User Experience</b>	<ul style="list-style-type: none"> <li>• Provide a consistent, coherent, unified view between and among processes and to information. This will streamline work, provide system integration efficiencies, and support a consistent user experience.</li> </ul>
<b>Technical Stabilization</b>	<ul style="list-style-type: none"> <li>• Provide standard structure and components for new and replacement software being developed by SIS. This will provide a foundation for system sustainability.</li> <li>• Develop roadmap to incrementally replace obsolete system components to reduce technology risk and support sustainability.</li> <li>• Provide ongoing operational support for SIS</li> </ul>
<b>Fulfill Mandated Changes</b>	<ul style="list-style-type: none"> <li>• Respond appropriately to address government or faculty mandated changes.</li> </ul>

## End State for Business and Technology

The roadmap vision for Education Systems support changes in business and technology to bring us closer to a future end state of digitization, a seamless user experience, an enriched advisor experience and technical stabilization. Some examples follow:

<b>Current Business State</b>	<b>Future Business State</b>
No mobile integration with student scheduling.	Students have ability to view their schedules on a mobile device.
Final Grades are submitted on paper and manually entered into MITSIS.	Final Grades are submitted online.
Registration is a paper process with significant data entry.	Registration is an online process.
The Undergraduate Admissions reading process is carried out on paper.	The Undergraduate Admissions process is paperless.
The International Student Office (ISO) process is paper driven.	The ISO process is paperless.
Integration issues exist between PowerFails and MITSIS.	Seamless integration between PowerFails and MITSIS.
Current student accounts system is not scalable.	Enhanced student accounts system that is capable of supporting current and future business needs.
Approx 80 forms and petitions currently submitted by students are not available on line and must be filled on paper and submitted to the relevant department.	All required forms and petitions are available online.
The Learning Management System is often unable to respond to new pedagogical use cases.	The Next Generation LMS is on a platform that is capable of supporting MIT classroom innovation.
Graduate Admissions processes are fragmented with multiple application providers and numerous shadow systems.	Graduate Admissions processes are centralized with one recommended application provider.
Request and delivery of official transcripts are not available online.	Request and delivery of official transcript are available online.
Teaching data is entered in multiple locations resulting in duplicate data entry.	Teaching data is entered in one location.
There is no one stop area for students.	A Student Gateway is available for one stop student needs.
The LMS and MITSIS are minimally integrated.	Interfaces defined to ensure the LMS and MITSIS work seamlessly together to support pedagogical needs and innovations.

By following the technical stabilization projects on the Roadmap over the next three years, we will have completed 35 – 40 % of the future technical state of the student system.

<b>Current Technical State</b>	<b>Future Technical State</b>
A number of core applications use high risk obsolete technologies that are no longer supported.	All education system applications are using standard supported technologies.
Large portions of the student system rely on Oracle Forms technology.	Oracle Forms technology is removed from student system.
Current java applications are running on unsupported java version.	All java applications are running on supported java version.
Applications are not built and deployed on a regular basis. Deployments need to be requested and initiated manually. It is often difficult to pinpoint when changes occurred that caused issues.	A continuous integration environment automatically builds and deploys code when any new changes are checked in and reports any build issues. This ensures issues can be easily tied to recent code changes.
Currently there are minimal unit tests for student system applications. It is hard to know if changes to code affect other parts of application or other applications.	Each new application will have an automated test suite that will be run as part of the continuous integration environment. Code coverage tools give metrics on percentage of code covered and parts of code that have no tests.
The current database schema doesn't enforce data integrity in all cases. Data sometimes is stored in multiple places making it difficult to be consistent when different developers are writing code to retrieve data.	Database design improvements will be carried out incrementally as part of the projects.
A majority of older applications contain common functionality and don't share code resulting in changes often having to be carried out in multiple places.	Creation of a common code base for all new applications to use. The goal is to have any common functionality added to this code base. All new applications will consume this common code ensuring applications will be able to share and reuse code and functionality and avoid duplication.
Multiple application servers are used to support student system.	All student system applications are running on one application server.
Code reviews are not consistently carried out.	Regular code reviews ensure that all new code meets new defined standards and is maintainable and scalable.

## Timeline

The high-level 3 year timeline presented below reflects the projects which will be undertaken to progress towards the Education Systems vision. The timeline resulted from an analysis of open projects from prior years, SSSC proposals, VISION study and NGS3 initiatives, DUE Digital MIT proposals, and the IS&T Education Services technical roadmap. Specific projects were evaluated against the Education Systems priorities (see page 5), political / community expectations, logical sequencing (from both functional and technical perspectives), and the amount of impact they might have on community expectations and/or technical stabilization. General initiatives are inclusive of numerous smaller projects that will be reflected in a more detailed project plan.

Embedded within all projects and initiatives are underlying components. For example, it is our expectation that Oracle Forms will be reduced and replaced in each applicable project, with an underlying goal that the system's reliance on them will progressively decrease. All projects will review and consider where mobile applications or emerging technology can be incorporated. Finally, a consistent technical framework will be adhered to as applications are created, upgraded, or enhanced.

