The MIT OpenCourseWare Story

MIT OpenCourseWare (MIT OCW) is the remarkable story of an institution rallying around an ideal, and then delivering on the promise of that ideal. It is an ideal that flows from the MIT Faculty's passionate belief in the MIT mission, based on the conviction that the open dissemination of knowledge and information can open new doors to the powerful benefits of education for humanity around the world.

MIT OCW is a large-scale, Web-based publication of the educational materials from virtually all of the MIT faculty's courses. This unique initiative enables the open sharing of the MIT faculty's teaching materials with educators, enrolled students, and self-learners around the world. MIT OCW provides users with open access to the syllabi, lecture notes, course calendars, problem sets and solutions, exams, reading lists, even a selection of video lectures, from 914 MIT courses representing 33 academic disciplines and all five of MIT's schools. The initiative will include materials from 1,800 courses by the year 2008.

The hope is that the concept of "opencourseware" will spur a movement toward the open sharing of educational content at colleges and universities around the world. Thus, as an organization, MIT OCW has a dual mission:

- Provide free, searchable access to MIT's course materials for educators, students, and self-learners around the world
- Extend the reach and impact of MIT OCW and the "opencourseware" concept

Educators around the globe are encouraged to utilize the materials for curriculum development, and self-learners and students may draw upon the materials for self-study or supplementary use. Course materials contained on the MIT OCW Web site may be used, copied, distributed, translated, and modified by anyone, anywhere in the world. All that is required of adopters of the materials is that the use be non-commercial, that the original MIT faculty authors receive attribution if the materials are republished or reposted online, and that adapters openly share the materials in the same manner as MIT OCW.

Truly a global initiative, the site has received users from more than 215 countries, territories, and city-states since our pilot site opened to the world two years ago. Materials have already been translated into at least 10 different languages.

"MIT is delivering on the promise of OpenCourseWare, and we are pleased that educators and learners from all parts of the globe tell us that OCW is already having an impact on teaching and learning," President Charles M. Vest said. "We hope the idea of openly sharing course materials will propagate throughout many institutions and create a global web of knowledge that will enhance the quality of learning and, therefore the quality of life worldwide."

Since April 2001, MIT has received more than 20,000 e-mail messages from around the world endorsing the vision of MIT OCW and the potential benefits of sharing knowledge

freely. A typical message came from Andrew Wilson of the United Kingdom in October 2003: "There can be no greater hope for humankind than the belief that wisdom generated through increased learning will ultimately lead to a better world. With OCW, MIT has taken an ethical stand against the belief that knowledge should only be accessible to those who can pay for it or are in proximity to it."

MIT is committed to MIT OCW remaining free and openly available. MIT OCW is not a degree-granting initiative, and there will not be a registration process required for users to view course materials now, or in the future. Over time, we expect that virtually all of MIT's graduate and undergraduate courses will be available, allowing users of MIT OCW to follow the entire track for a particular curriculum, from the first class through the graduate level.

In order to accomplish the publication of 914 courses, MIT OCW has joined with several strategic partners. OCW received generous financial support from the William and Flora Hewlett Foundation and the Andrew W. Mellon Foundation.

To achieve its programmatic and publishing goals, MIT OCW partnered with Sapient Corp., a Cambridge, MA-based consulting and technology services firm that helped MIT OCW develop its strategy, create its publication program, and deploy one of the largest content management systems in higher education. MIT first began working with Sapient in 2002, and in 2003, MIT OCW was officially launched to the public, meeting MIT's goals to provide free, online access to the first 500 courses by September 2003.

For more information, contact Jon Paul Potts, MIT OCW Communications Manager, at jpotts@mit.edu or 452-3621.

1 — Organization

In establishing and evolving the MIT OpenCourseWare organization, some of the main lessons learned were:

- The faculty are the key stakeholder group and a key enabler of an opencourseware initiative. The opencourseware organizational focus must be very "faculty centric" and involve faculty as early as possible on the program advisory board.
- You must have clear institutional executive support, including school deans and department heads. Build support with department heads and have them become advocates to the faculty.
- The organization must promote a very service-oriented mindset with a focus on establishing and meeting service levels for faculty and end-users alike. As at MIT, in many institutions, faculty participation is likely to be voluntary. Faculty will be motivated to participate if they perceive that there is an effective support organization that can add value to their own work and minimizes their investment of time.
- The opencourseware team has to constantly sell and advocate the value of participation in the opencourseware program to the faculty and department leadership.
- The organization must have the skills to support and drive the required processes. For example, leaving the publication process to the faculty will not work — they are too busy. However, over time, it makes sense to work with faculty to make their course materials more directly compatible with opencourseware to make the content migration process as straightforward as possible.
- To keep the organization to its optimum size, establish early on which services can be handled by existing groups within your institution, which should be handled by the core opencourseare team, and which should be outsourced.

Key Decisions
The following key decisions were made by MIT and had an impact on the organizational structure of the program.

- **Voluntary Participation:** Participation of MIT faculty in MIT OCW is strictly voluntary, although judging by the number who already actively utilize the Web as part of their teaching, we expect that by the year 2008, virtually all MIT courses will be available on the MIT OCW Web site.
- **Hybrid organization:** For MIT OCW to be successful, it chose a hybrid staffing structure that includes both centralized MIT OCW staff and department-based staff who support MIT OCW efforts (possibly in addition to other departmental duties). One key assumption is that department-based staff have more knowledge of course content and a working relationship with faculty, and this helps to make the MIT OCW publication process as transparent as possible to faculty.
- **Outsourced production:** During both the initial pilot phase and the first-year production phase, MIT OCW determined that it would not be feasible from a management, financial, and workspace perspective to build an internal staff of the size that would be required to accomplish the volume of production work for an effort the magnitude of MIT OCW. Accordingly, while MIT OCW retains all planning, management,

coordination, faculty contact, and other key roles, much of the production (Web site building) and end-user support is performed by an outside partner, under MIT OCW direction.

- **Outsourced technology design, implementation, and support:** To assist with the selection and implementation of the content management system (CMS), and the ancillary support systems, MIT OCW engaged an outside systems consulting/integration/support firm (Sapient Corp.). MIT OCW has neither the ability nor the long-term need to staff internally for these kinds of functions.
- **Department-based approach:** MIT OCW chose to developed a department-based approach for production goal-setting and faculty recruitment, working closely with academic department heads. As a result, published courses reflect the academic department's Web publishing goals, as well as the publishing goals of MIT OCW.
- **Universia.net translation partnership:** Universia.net is a consortium of 724 universities in Argentina, Brazil, Colombia, Chile, Mexico, Peru, Portugal, Puerto Rico, Spain, and Venezuela. Its mission is to foster the use of technology to enhance instruction and communication. One of its core activities is to translate high-quality educational materials into Spanish and Portuguese for use by faculty at its member universities. Under a pilot agreement with MIT OCW, Universia.net translates a selection of published MIT course materials (75 through 10/4/04), and makes them openly available in local languages through its Web portal at http://www.universia.net.

MIT OCW Stakeholders

Although no two opencourseware initiatives are likely to be the same, there are many potential stakeholders to consider. The figure below shows the major stakeholder groups that have influenced or been impacted by the MIT OCW initiative:
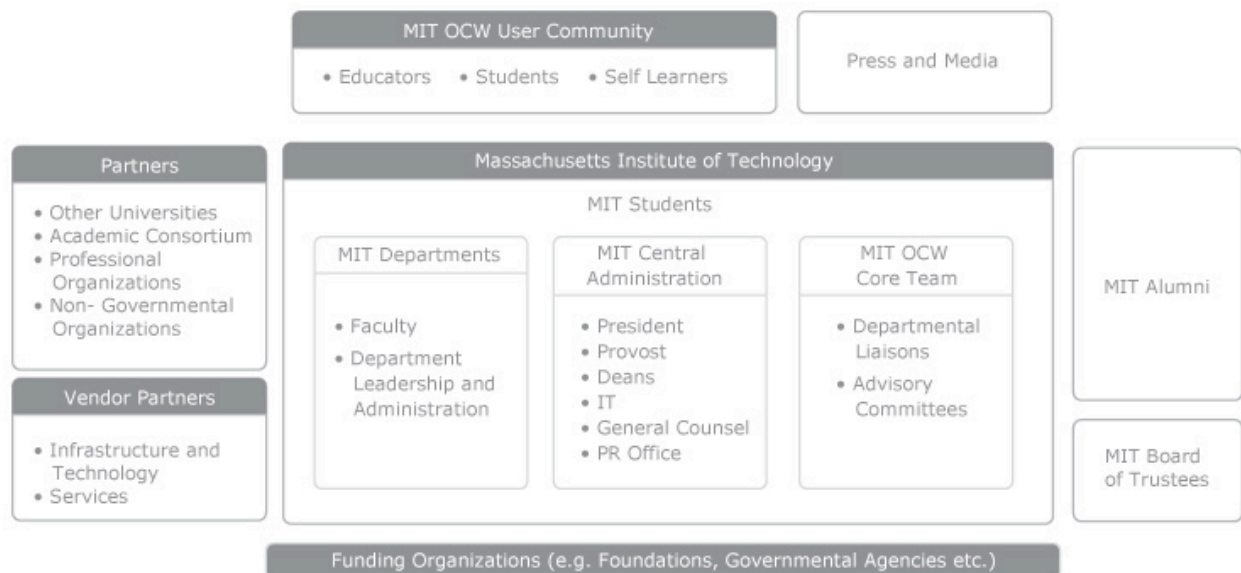
MIT OCW Governance

The MIT OCW organization is a unit of the MIT Provost's office with the Executive Director reporting directly to the Provost. This has enabled closer collaboration with academic department leadership and an appropriate level of direct executive sponsorship. Guidance and oversight of the MIT OCW program has come from an evolving set of advisory committees that have had key stakeholder representation. Specific advisory boards that are

in place today are:

- **Faculty Advisory Board:** Given the importance of faculty buy-in to the structure and approach to MIT OCW, early on we established a Faculty Advisory Board. This main advisory group for MIT OCW provides advice and guidance for key faculty related matters. It helps us to understand faculty needs and concerns. The executive committee, a subset of the full Advisory Board, also assists in MIT OCW fund-raising efforts.
- **Evaluation Advisory Board:** This was gathered from a group of internal and external experts to provide guidance to us in the area of evaluation and measurement of the program and associated processes.

Other informal advisory groups have been formed on a temporary basis. In addition, in recognition of the importance of our external audience, we actively solicit feedback from our users and have established an email newsletter, "The MIT OpenCourseWare Update," for users who are interested in receiving progress reports and updates about MIT OCW.

MIT OCW Functional Areas

MIT OCW is a unit of the MIT Provost's Office, and the Executive Director reports to the Provost. We currently have four functional teams.

- **Publication team:** Works with MIT faculty to collect and assemble their teaching materials, convert those materials to MIT OCW formats, and digitally publish them internally within MIT and externally to the world. This team undertakes liaison with and support of MIT faculty authors and other contributors of course materials; intellectual property (IP) clearance and course material formatting and Web production; and Web format and template design.
- **Technology team:** Has overall responsibility for planning, oversight, coordination, and support of all technology related parts of the MIT OCW program. In collaboration with both internal and external partners, architects and creates the technologies to gather, format, tag, link, store, and disseminate MIT OCW course materials. Works with internal and external production service organizations that provide the technology infrastructure that performs and supports MIT OCW. Monitors and tunes the infrastructure for optimum performance and service levels consistent with MIT OCW requirements. Provides support to external users of MIT OCW materials.
- **Communications team:** Provides information about MIT OCW and published course materials to users and other interested individuals and institutions directly and via publication media. Keeps MIT OCW sponsors, MIT faculty, and other constituencies informed about our progress.
- **Evaluation team:** Measures MIT OCW internal production throughput and efficiency, and monitors and assesses external usage of MIT OCW materials. Partners with academic research groups and specialists to evaluate the effect of MIT OCW materials on educational outcomes.

The current organization for MIT OCW is shown on the next page:
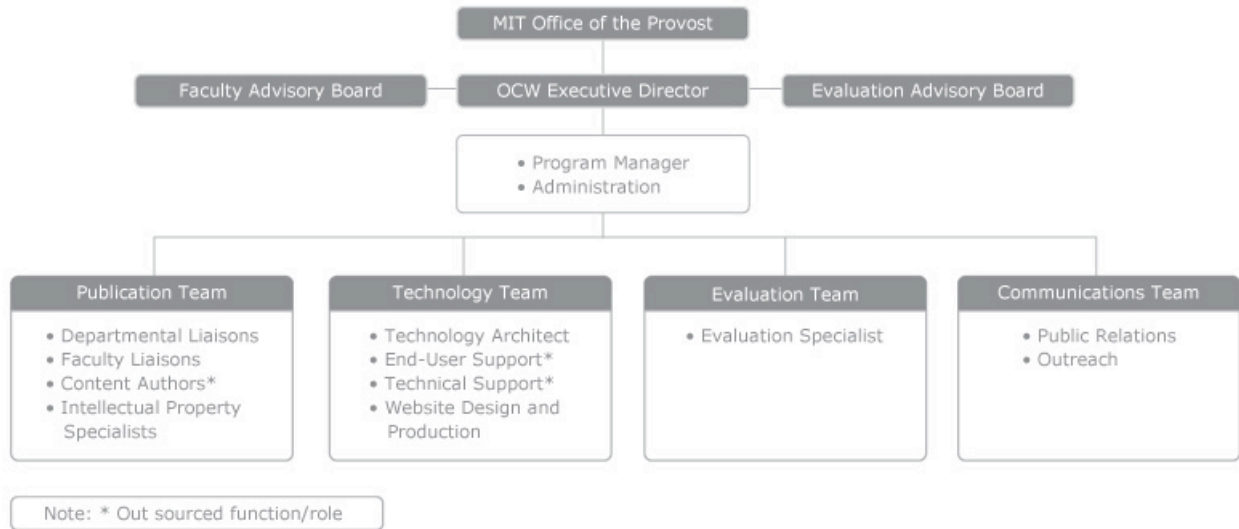
MIT OCW Organizational Evolution

During the initial pilot and production start-up phases, the MIT OCW organization has constantly evolved. MIT OCW work was and is being handled by mix of MIT staff and external partners including:

- Regular MIT OCW staff
- Staff from other MIT units and individual collaborators at MIT or other educational institutions
- External contractors and consultants
- Commercial service providers

The evolution of MIT OCW's organization is illustrated in the following figure:
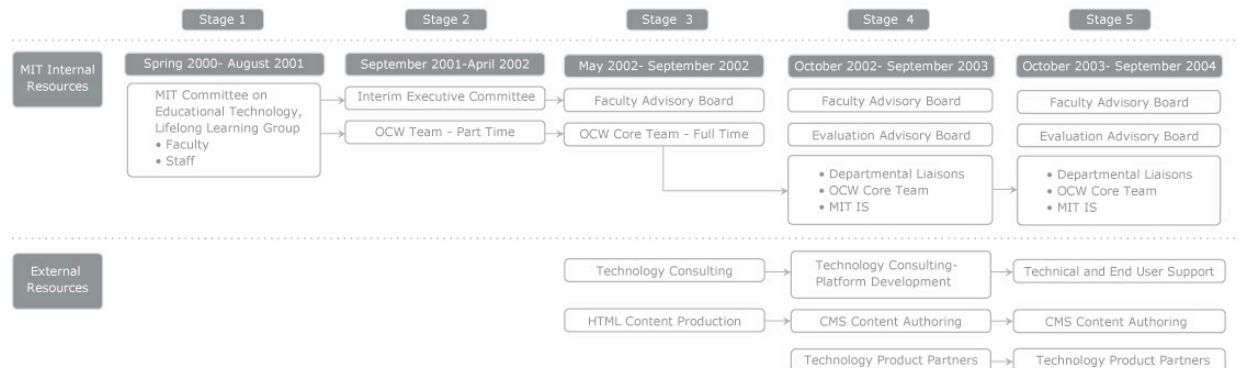
As the MIT OCW program moves forward, the mix of providers and level of staffing will continue to change as the program moves into a more "steady state" mode of routine maintenance, renewal, and expansion of course materials in the MIT OCW repository. For the steady state mode, it is envisioned that there will be a small, permanent group of staff, serving primarily in production and support roles. This group will be part of the ongoing academic support structure of MIT.
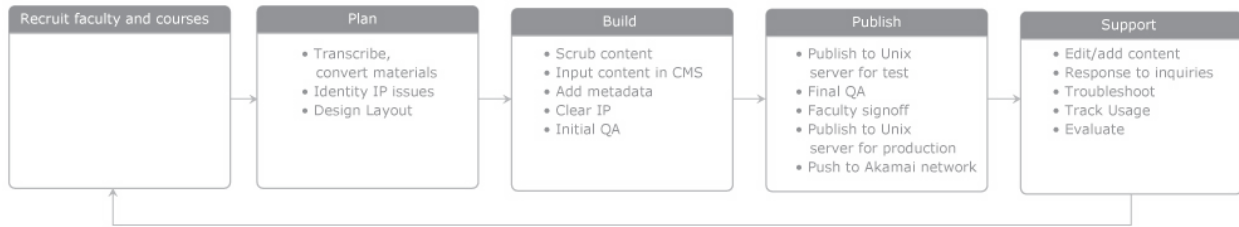
2 — Publishing Process

The content publication lifecycle is the core process of any digital publishing organization. There were several key decisions that MIT had to undertake in order to ensure a successful high-level publishing process for the MIT OpenCourseWare (MIT OCW) initiative, including:

- **Recruit faculty and courses:** MIT OCW's content lifecycle starts with the recruitment of faculty and the collection of their course materials. Our pipeline plan identifies target department, faculty, and courses. Faculty and course recruitment involves the following steps:
  - Review faculty meeting guidelines
  - Review faculty benefits document
  - Initial meeting with the faculty
  - Update specifications and iterate
  - Obtain intellectual property (IP) signoff from faculty
  - Send faculty closure email

- **Course planning:** The next step in the MIT OCW content lifecycle is course planning. Course planning is comprised of the following steps:
  - Assign course publication cycle (batch)
  - Start IP review and clearance process (See "Intellectual Property" chapter for more details on this process)

- **Course Building:** Building a course involves the following steps:
  - Review course specifications
  - Retrieve course-packing slip and course input documents
  - "Scrub" source documents of MIT-specific contextual information and copyright information
  - Convert documents into PDF format, where appropriate
  - Make documents accessible
  - Pre-process large files
  - Upload files to content management system (CMS)
  - Author content in CMS
  - Capture metadata for sections and resources
  - Capture copyright information and update IP status
  - QA content
  - QA metadata and IP

- **Course Publication:** Publishing a course to the MIT OCW Web site involves the following steps:
  - Final QA of content
  - Perform pre-staging verification steps
  - Stage course
  - Obtain faculty signoff
  - Iterate final changes as per faculty requests
  - Conduct final pre-publication quality assurance

- o Publish course

- **Course Support:** Once a course is published on the MIT OCW site, the course transitions into the maintenance/support mode. Support activities include:
  - o Updating course content (spelling errors, replacements, etc.)
  - o Fix broken links
  - o Update content (based on user feedback or new materials becoming available)
  - o Respond to user queries (see "Support" chapter for more information)

The MIT OCW content publication lifecycle is modeled a high-level process. The diagram below summarizes the high-level steps in the MIT OCW content publication lifecycle:

Recruit faculty and courses	Plan	Build	Publish	Support
	• Transcribe, convert materials • Identity IP issues • Design Layout	• Scrub content • Input content in CMS • Add metadata • Clear IP • Initial QA	• Publish to Unix server for test • Final QA • Faculty signoff • Publish to Unix server for production • Push to Akamai network	• Edit/add content • Response to inquiries • Troubleshoot • Track Usage • Evaluate

MIT OCW also has a detailed step-by-step process flow, spanning the entire content lifecycle:
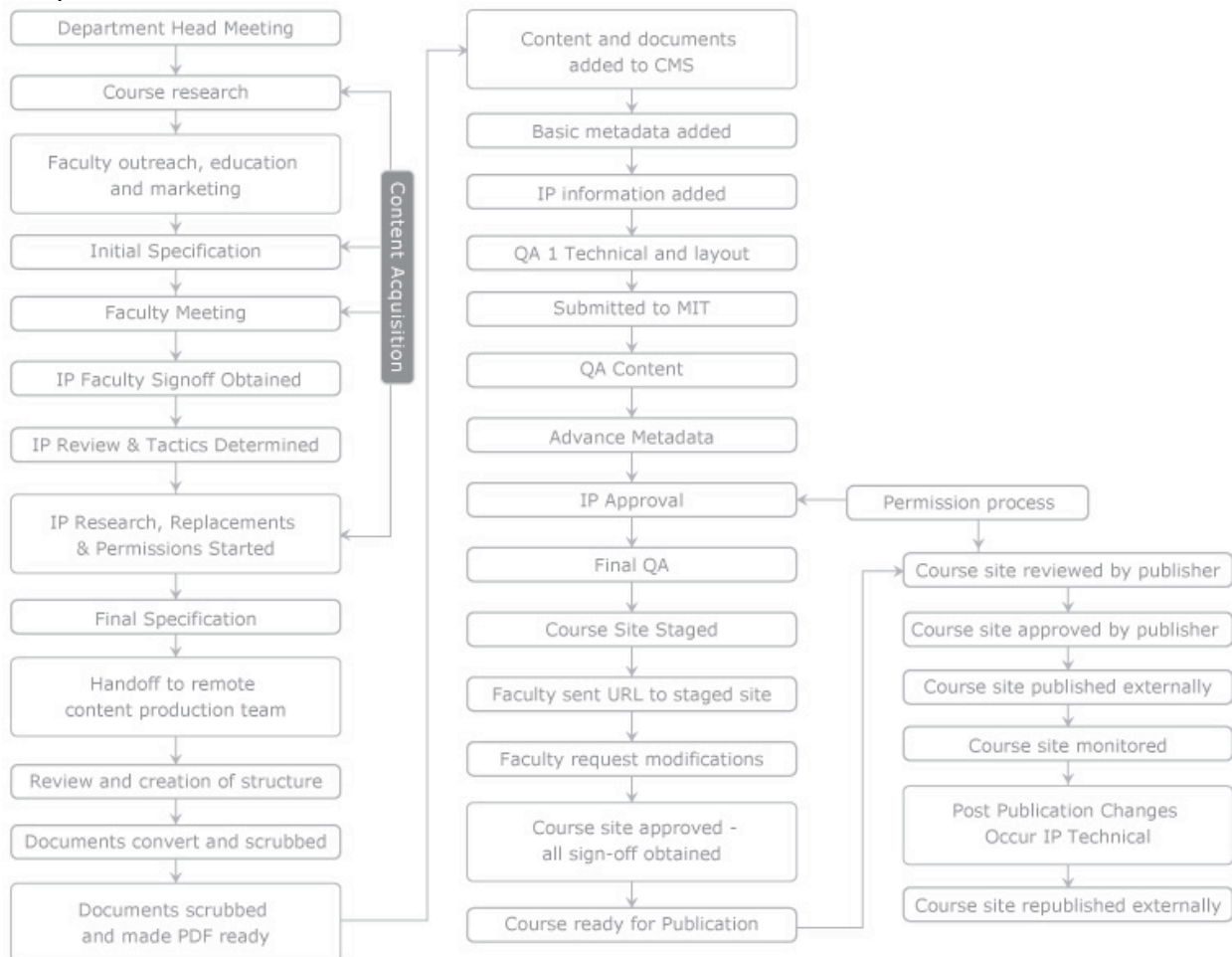
3 — Intellectual Property & Licensing

As the MIT OpenCourseWare (MIT OCW) project progressed through its pilot and production launch phases, intellectual property (IP) clearance and licensing were major focus areas. A number of lessons learned were identified in the area of IP and licensing:

- An opencourseware initiative may require cultural changes in faculty practices related to both their own IP and the IP of others. Gaining buy-in to this will be necessary.
- IP clearance is a time-consuming process and because of the level of effort and risks involved, it is one of the biggest barriers to faculty participation.
- An organization undertaking an opencourseware initiative must have a clear understanding of IP do's and don'ts and apply them as part of a consistent IP clearance process.
- To effectively manage the considerable level of effort involved in clearing third-party IP, it is important to determine criteria for the levels of third-party materials that will be required to make the course materials valuable to the target audience.
- Over time, it will be beneficial to educate faculty regarding IP best practices. The more IP-friendly materials that are used, the lower the support burden for the organization.

Key Decisions
The following key decisions were made by MIT that impacted the area of IP and Licensing:

- **Faculty Ownership:** As a matter of MIT policy, MIT faculty own the rights to course materials they author. Also, MIT, like most universities, cedes the ownership of textbooks written by faculty members to the faculty author. Most professors have assumed that this same policy applies to their regular lecture notes and similar materials. The MIT administration resolved the question by confirming that faculty continue to own the electronic versions of the materials they create for their courses, even when those materials are transformed into Web-compatible formats by the MIT OCW staff.
- **IP strategy:** IP has proved to be a greater challenge than was initially anticipated. Many faculty incorporate third-party elements in their course materials. Generally, these require copyright clearance in order to be published on MIT OCW. After much experimentation with permission requests, MIT OCW has determined that when permissions are denied, or when they are granted with restrictions or royalty demands that are incompatible with the MIT OCW open publication policy, MIT OCW will instead find or create (with faculty consent) an alternate object.
- **Use of the Creative Commons License:** Creative Commons (http://creativecommons.org) is a non-profit organization dedicated to encouraging open sharing of information. Its aims are congruent with the MIT OCW open publication philosophy. Creative Commons has developed an innovative model license that it hopes will become a standard for open publication. MIT OCW supports the goals of Creative Commons and adopted its model license effective with the January 2003 publication of MIT OCW.

MIT OCW Licensing
In summer 2002, MIT OCW created our original license for users, which was issued with the

initial pilot in September 2002 on the original legal notices page. That fall, the MIT OCW staff was introduced to Creative Commons (through Professor Hal Abelson, an MIT faculty member who has been involved with MIT OCW since its early inception and who is also associated with Creative Commons).

After reviewing the Creative Commons license, MIT OCW determined that it was remarkably similar to the independently developed MIT OCW license. Since MIT OCW is committed to encouraging the open sharing movement, we signed on with Creative Commons as a charter licensor and replaced our homegrown version with a Creative Commons-based license. Note, however, that the resulting MIT OCW version of the Creative Commons license is slightly customized from the default offering, though the major terms (attribution, non-commercial, and share-alike) are the same.

One additional attraction of the Creative Commons license is that, to the extent it becomes a standard in future, its icons and meta tags (machine readable license terms) will make the offerings of MIT OCW and those of all other users of the license easily recognizable and understandable to end users without their having to wade through all the detailed license terms offered by every licensor.

IP clearance processes
The IP review and clearance processes used by MIT OCW have evolved over the pilot and production launch phases. The overall process has two main objectives:
- Gain MIT faculty permissions for publishing their course.
- Clear all IP by identifying content ownership, determining how to deal with third-party IP objects and seeking permissions from the owner of copyright where appropriate.

The figures on the next page show the detailed business processes used by MIT OCW for most of the production launch phase, for the publication of 500 courses in September 2003:

IP review and clearance process

Candidate Course for Publication

Recruit

FL Collects Course Materials (work with Author)
- Electronic files
- Paper Documents
- Other Media (images, audio, video)
- Computer programs

Complete Faculty IP Release Document

FL Reviews Course Materials -Catalog IP Objects

2

- Images
- Diagrams
- Readings
- Software Input/Output

Plan

Prelim. Course Publication Go No-Go

No

Stop

Yes

Plan to use

Decide IP Object Use Strategy

OK to delete

- Course Author Owns
- Clear citation
- Public Domain
- MIT owns Copyright

Replace Images
- Images and photographs

Delete Object From Course Materials

Build

Obtain citation for research & OCW site captions

ID replacement options
- Graphics
- Photo Editor
- Approved source

No

Permissions Process

1

Obtain or create replacement
- Find photo
- Draw graph or image
- Create data table

Approve

Yes

Publish

Clear Object for Publication

Clear Course for Publication

Third-party IP permissions sub-process
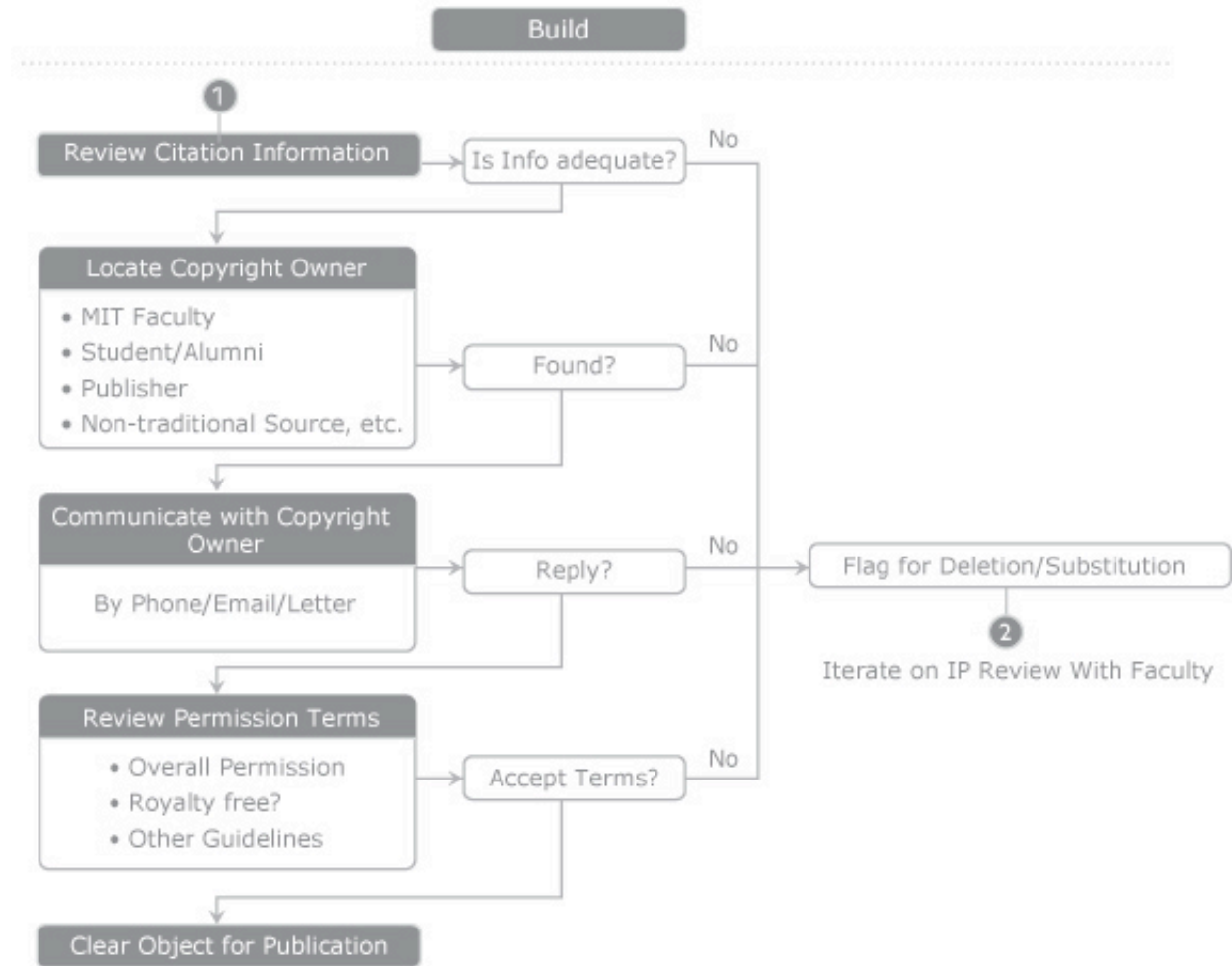
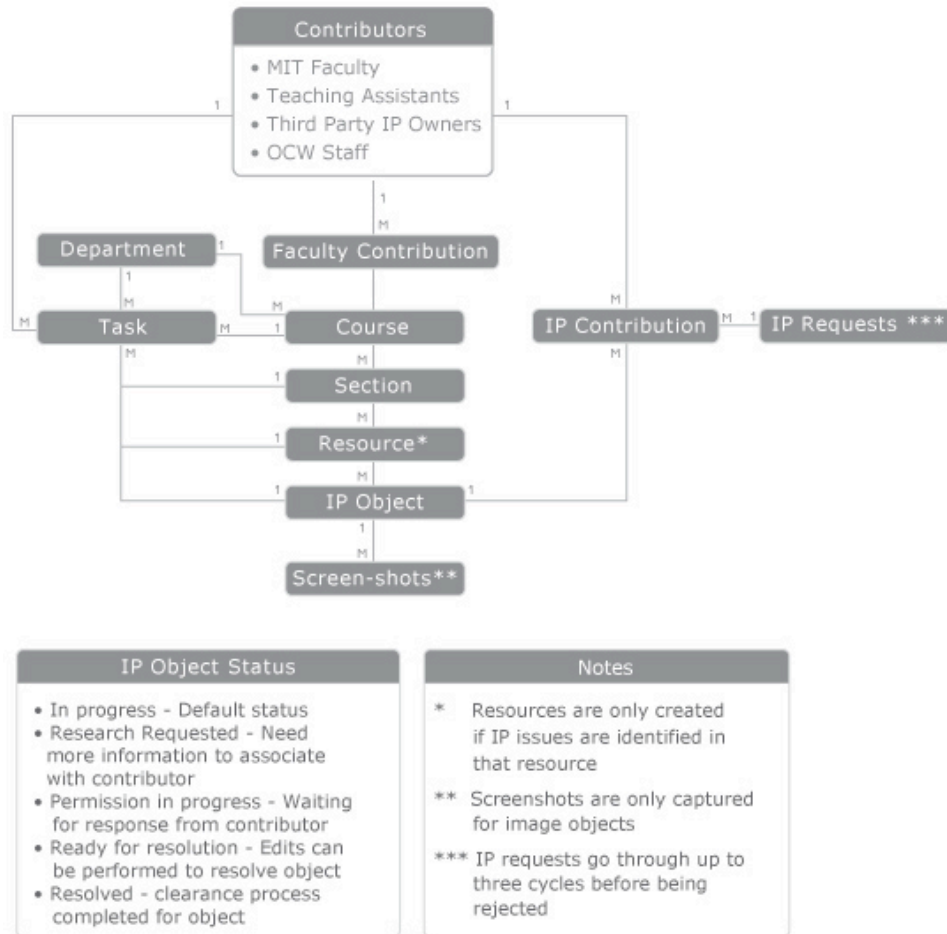Once all IP objects are cleared for a resource or document, the resource is flagged in the MIT OCW content management system (CMS) as ready for publication. To manage the large volume of IP object processing, the MIT OCW team developed a simple database tool in FileMaker Pro that supports the basic workflow that is used to manage the processes shown above. This database tool is used in conjunction with main authoring/publishing workflow built into the CMS. The following diagram summarizes the structure of the FileMaker data model showing how the key elements are related. It also the identifies process states associated with the IP objects:

Contributors
- MIT Faculty
- Teaching Assistants
- Third Party IP Owners
- OCW Staff

Department

Faculty Contribution

Task

Course

IP Contribution

IP Requests ***

Section

Resource*

IP Object

Screen-shots**

IP Object Status
- In progress - Default status
- Research Requested - Need more information to associate with contributor
- Permission in progress - Waiting for response from contributor
- Ready for resolution - Edits can be performed to resolve object
- Resolved - clearance process completed for object

Notes
* Resources are only created if IP issues are identified in that resource
** Screenshots are only captured for image objects
*** IP requests go through up to three cycles before being rejected

IP clearance is expected to continue to be a major issue that will impact opencourseware initiatives in the future. Some of the key long-term strategies to manage the issue that MIT OCW are considering are:

- Inform faculty about IP issues and encourage them to consider these along with pedagogical factors in choosing materials for use in new or updated courses
- Engage department-based staff to expedite labeling and citations for IP objects in course materials
- Forge alliances with "open-friendly" publishers, other universities/libraries/non-profits, and other sympathetic copyright owners and encourage the use of materials from these groups in future MIT courses
- Develop databases of and links to public domain and sharable works
- Participate in national efforts to influence copyright legislation in favor of more open educational use

IP clearance rules
One of the major challenges of IP clearance is tracking the status of the large amounts of material passing through the process. MIT OCW processed more than 500 courses in less than a year to achieve its Fall 2003 publication, which involved approximately 3,500 IP objects. As described above, the IP review and clearance process is based on processing IP objects in a course to a set of defined rules. We prepared a detailed set of rules that they

use for all IP clearance activities. These are included in the "Rules for IP Objects" Excel file that can be downloaded from the "IP & Licensing" chapter of the "Opencourseware How To" Web site.

The following is a list of useful Web links to resources on the subject of IP and Licensing:
- Copyright Clearance Center — http://www.copyright.com
- Copyright: Coalition for Networked Information — http://arl.cni.org/scomm/copyright/uses.html
- Creative Commons — http://www.creativecommons.org
- Multimedia Law Handbook: A Practical Guide for Developers and Publishers — http://www.eff.org/pub/CAF/law/multimedia-handbook
- The Copyright Website — http://www.benedict.com
- The International Intellectual Property Institute — http://www.iipi.org
- The World Intellectual Property Organization — http://www.wipo.org
- U.S. Copyright Act — http://www.law.cornell.edu/usc/17/501.html
- U.S. Copyright Office Home Page — http://lcweb.loc.gov/copyright/
- When Works Pass Into the Public Domain — http://www.unc.edu/~unclng/public-d.htm

4 — Support

Most (over 99%) of the emails received through the "Feedback Page" on the MIT OpenCourseWare (MIT OCW) Web site are answered. A central Help Desk team is responsible for triaging each email by answering the email with an FAQ answer, or by coordinating with other MIT OCW team members or faculty (if necessary) to develop a proper response to emails. The Help Desk also tags, archives, and reports on email trends for evaluation and data collection purposes.

The detailed MIT OCW email support process is described below:
1. User submits feedback/question to OCW@mit.edu (using the Feedback Page on the MIT OCW Web site).

2. The mail system sends out an automated acknowledgement to the user.

3. Help Desk team member receives the email.
   o If the email can be answered using a standard FAQ response (currently our script has over 75 standard responses), the Help Desk sends out a response.
   o If the email is reporting a technical issue (e.g.: broken link), the Help Desk team validates the issue and logs an incident for the MIT OCW Technical Support Team.
   o If the end-user's technical issue cannot be replicated, the Help Desk sends an email to the user explaining the issue cannot be recreated on an MIT OCW operating system. Technical issues that cannot be reproduced are not logged into the case tracker.
   o Any other queries are logged into the case-tracker system for triage by the MIT OCW Support Coordinator.

4. The MIT OCW Support Coordinator reviews case tracker daily to triage open email requests. Requests marked as "Open" are those that the Help Desk could not answer using standard FAQs, or they are technical issues that the Help Desk could reproduce and thus, must be addressed by the MIT OCW Technical Support team.
   o If the query is concerning specific course content or requires faculty input, an email is sent to the MIT OCW Faculty Liaison (FL) responsible for that course.
   o If the feedback or question is about MIT OCW goals, published articles, press releases, etc., an email is sent to the MIT OCW Communications Manager.
   o If the feedback or question is about high-level technical issue (e.g.: architectural questions, questions about reusing the MIT OCW platform, etc.) an email is sent to the MIT OCW Technology Director.
   o Replies to all other are provided by the MIT OCW Support Coordinator. If necessary, the MIT OCW Support Coordinator works with other MIT OCW team members to develop a proper and appropriate answer to the end-user query.
   o Support Coordinator forwards response to the Help Desk.

5. FLs reviews any user feedback addressed to specific course content.
   o FLs provide answers to any content-related questions.
   o If a query requires input from individual faculty, FLs work with the faculty to provide

the appropriate response (NOTE: Appropriate response might simply be that the faculty does not have the time or interest in developing an answer).
- o FL sends response to the Help Desk.

6. MIT OCW Communications Manager reviews any end-user feedback forwarded by the Help Desk.
   - o Communications Manager might interact with MIT OCW Executive Director if necessary (e.g.: queries related to partnerships, funding, etc.)
   - o Communications Manager responds to MIT alumni queries.
   - o Communications Manager composes response and sends it to the Help Desk.

7. MIT OCW Technology Director reviews any high-level technical questions, and sends appropriate response to the Help Desk.

8. Help Desk forwards response from MIT OCW team members to the end user.
   - o Email is tagged appropriately in the case tracker.
   - o Case tracker issue is closed.

9. If a query occurs frequently, MIT OCW Support Coordinator works with other team members to update the email standard FAQs.

10. MIT OCW Evaluation Coordinator runs weekly and monthly reports on the case tracker system to determine trends.

5 — Communication

The goals of MIT OpenCourseWare's (MIT OCW) communications and outreach program include generating internal support for MIT OCW, disseminating information about the overall progress and accomplishments of the MIT OCW program, and highlighting available content on the MIT OCW site. The communication and outreach program has had two distinct focus areas:

- Internally to both faculty and other MIT constituencies
- Externally to a range of constituencies including potential users, partners and funding organizations

MIT OCW's communication and outreach approach includes elements of public relations, marketing, and partnership development, as well as dissemination of appropriate practical information and documentation relating to most aspects of the program. This activity is conducted in support of the overall program's goals, and generally works in close conjunction with evaluation activities and program leadership.

Communications and outreach have been foundational activities for MIT's OCW initiative. MIT OCW's position as the first initiative of its kind has had its benefits and drawbacks. It has been a benefit to be the first opencourseware since the program has generated significant external media interest and coverage. It has been a drawback since MIT OCW has had to invest significantly in defining the value of MIT OCW to a broad range of constituencies, both internal and external to MIT.

Some of the main lessons learned by the MIT OCW team from building the communication and outreach program are:

- Internal communication is required at every level in the institution. Also, because MIT OCW represents a new concept, communication with key stakeholders is required on a continuous basis.
- Involving Senior MIT leadership in internal communications has been very effective at building both awareness and buy-in from faculty.
- "If you build it, they will come" is not the case in today's crowded Internet world. There is a vast array of educationally related offerings of all shapes and sizes available. Your communication strategy is the key to building awareness of your offering, which will potentially lead to usage and impact.
- Determine who your audience is and what your key messages are before deciding what communication channels to use.
- Understand your audience concerns and what your opencourseware initiative's value proposition is for them, before you begin to communicate.
- Determine with what, and how, you will differentiate your initiative from the range of offerings available to your audience, from eLearning-related initiatives to other "courseware" projects in the wider Internet marketplace.
- Ensure that your organizational message is aligned with your institutional message and brand.

Key Decisions

Key decisions that MIT OCW made related to its communication plan included:

- **Launch strategy:** Decided on a soft, low-key launch because the initial MIT OCW proof-of-concept pilot was an experiment, potentially subject to startup problems. We decided against sending out broadcast press releases or hosting a media event, and instead quietly communicated information about the pilot to interested parties. Traffic to the site grew substantially due to word-of-mouth communication and some limited press coverage.
- **Universia.net Partnership:** Universia.net is a consortium of 724 universities in Argentina, Brazil, Colombia, Chile, Mexico, Peru, Portugal, Puerto Rico, Spain, and Venezuela. One of its core activities is to translate high-quality content into Spanish and Portuguese for use by its members. Under a pilot agreement with MIT OCW, Universia.net will translate published MIT course materials and make these openly available through its Web portal at http://mit.ocw.universia.net. Universia has also played a role in communicating with and building awareness among potential Spanish and Portuguese-speaking users around the world.
- **Email Newsletter:** In January 2003, we launched the first monthly edition of "The MIT OpenCourseWare Update," an email newsletter that informs users about new course offerings, technical tips for use of the site, and other information to enhance the user experience. To populate the initial subscription base of the newsletter, we sent it out to everyone who had contacted MIT by email since MIT OCW had been announced publicly in April 2001, about 4,000 email addresses. We received few unsubscribe messages from that initial edition of the newsletter, and we now provide a link to register for the newsletter on MIT OCW's front page. As of October 4, 2004, our subscription base had grown to more than 25,500 people who have voluntarily engaged with MIT OCW to receive our newsletter.

MIT OCW constituencies

The diagram below illustrates the groupings of constituencies that MIT OCW has identified and has proactively communicated with:
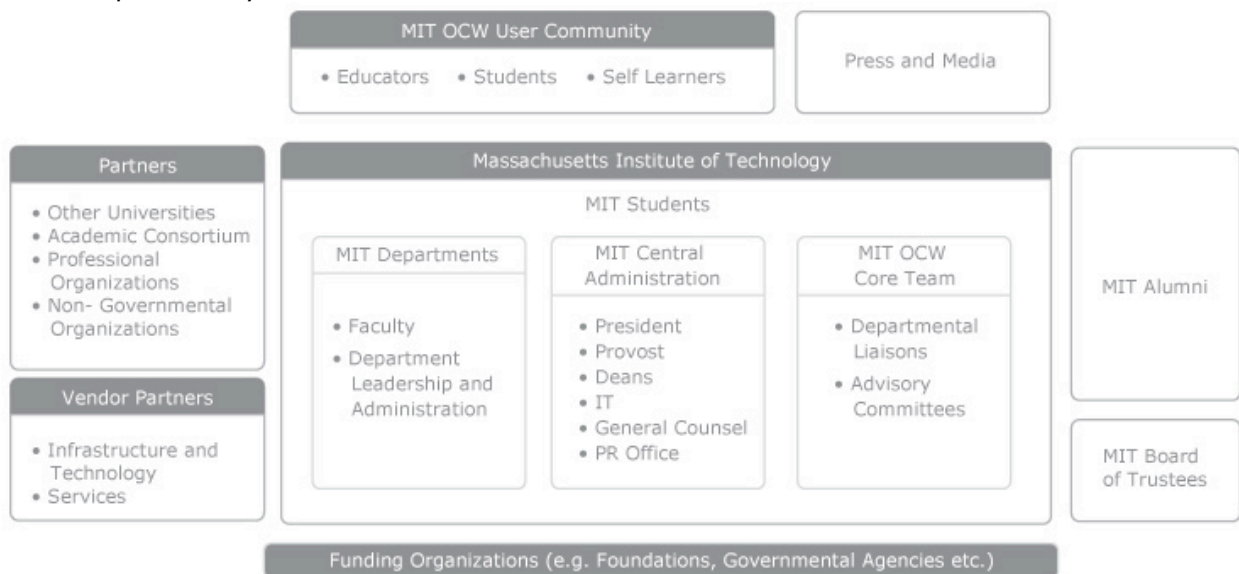
These constituencies fall into two broad sub-groups:

- **Internal constituencies.** The MIT faculty, senior administration, staff, students,

advisory committees, and sponsors. All are all to some extent or other interested in the benefits, progress, and performance of MIT OCW. Of these, the focus has been on faculty and other teaching staff since they are an especially important constituency given their role as primary providers of the published materials.

- **External constituencies.** Educators and students at other institutions, individual self-learners, and the public at-large have all shown interest in the concept of opencourseware and MIT's OCW program. These groups stand to benefit from the open sharing of knowledge and educational materials and are interested in the progress of the program, the availability of course materials, and information on how to use them.

Internal communication activities

MIT OCW internal communication focuses on building awareness of and support for the program among the key constituencies identified above. The most influential are MIT's executive leadership and the faculty who will be providing content. MIT OCW has found that enlisting the support of faculty has also provided a valuable link to the broader academic community for external awareness building.

Considerations MIT OCW used when building the internal communication and outreach plan include:

- Identifying all internal constituencies that may impact the initiative, in both a positive and negative sense.
- Defining a list of target audiences for the messages (for example, institutional leadership, faculty and other teaching staff, departmental leadership, IT staff, etc).
- For each target audience (a group or individual person), MIT OCW then identified their current awareness and position regarding the initiative and how they could support (or hinder the initiative). Specific focus areas included:
  - o The target individual's or group's current feelings and understanding of the program
  - o The understanding of the value and benefits that the initiative will bring the target group and expectations in terms of involvement
  - o The strategy for approaching the target group (possibly to the point of determining the messaging) and the individual on the MIT OCW team who will lead the communication activity
  - o The outcome or action needed to move the project forward

External communication and outreach

For an opencourseware program to achieve impact, it is necessary to do more than simply build a Web site. As has been proven time and time again, "If we build it, they will come" does not generally apply in today's crowded online world. MIT OCW has followed a proactive program of outreach and marketing using all appropriate channels to build awareness of and use of the Web site and its content.

External Communications channels
Traditional Media
MIT OCW benefited from being the first initiative of its kind and has received global press coverage in traditional and non-traditional media. Some of the more prominent media impressions included CNN, the BBC, *The Chronicle of Higher Education, Wired Magazine*, along with major daily newspapers such as *The New York Times*, Spain's *La Vanguardia*, and France's *Le Monde*. MIT OCW has also seen a strong correlation between increases in traffic on the site and key media coverage and/or outreach activity. This is being tracked at the regional level, using, as examples, coverage in the Brazilian, Indian, and Chinese media.

The recently completed "MIT OCW Evaluation and Measurement Report" showed that more than a quarter of MIT OCW users became aware of MIT OCW through offline media articles such as those that appeared on CNN, in *Wired Magazine*, *US News & World Report*, and *Le Monde*. Some of these media articles are an explicit result of MIT OCW marketing efforts, while others come from unsolicited press coverage. Note that self-learners more frequently report offline media as the mechanism through which they became aware of MIT OCW.

Traditional, offline media represent the broadest, and least precise, audience targeting channels, but they have clearly provided access to the largest, most diverse group of potential users.

Online Media
Online media is frequently used by people who would be likely users of an opencourseware program. In the recently completed evaluation MIT OCW users frequently reported that on-line media references are the way they find out about MIT OCW. Our evaluation study shows that 37% become aware of MIT OCW through online media including BBC Online, MSNBC, Web logs, and a range of online magazines.

Word-of-Mouth
The recent evaluation of MIT OCW confirmed that word-of-mouth has proven to be a significant awareness-building channel for MIT OCW. A range of activity at an institutional, community or individual level has occurred that has promoted awareness of the program:
- Links to MIT OCW from other Web sites. Within the corporate environment, the evaluation highlighted a situation at Raytheon where an email was sent out from the company to employees regarding the MIT OCW Web site and indications that some companies are linking to MIT OCW from Intranet sites.
- Discussion threads, Web logs and chat rooms (unmoderated and otherwise), on community sites that have an interest in MIT OCW course offerings.
- Ad-hoc word-of-mouth communication via peer-to-peer sharing, and such electronic channels as email, personal web-logs or instant messaging. The evaluation report showed that nearly a quarter of all referrals to the site come through word-of-mouth communication between existing users and non-users and almost 40% of MIT OCW users surveyed indicated that they had already communicated with others about MIT OCW.

MIT OCW has found that there are some variations in the most effective communications channel depending on the role of the target user:
- Educators may be more effectively reached through targeted communication with their institution's leadership or through professional groups and associations. Some examples highlighted in the evaluation report include at Masaryk University in Brno, Czech Republic, where a university-wide email from one educator led a number of people in the university community to visit the site.
- Students may also be reached through their institution-based relationships with educators and department administration. At the Bannari Amman Institute of Technology in India, a set of MIT OCW materials have been put up on the university's LAN and students and staff regularly browse the available course materials.
- Self-learners are the most loosely knit and diverse group, comprising representatives of many, varied communities.

Maintaining a User Community
Once users are aware of MIT OCW and are visiting and using the site, they become part of

an active user community. This community is another key source of wider awareness through word-of-mouth and other mechanisms.

Some techniques being used by MIT OCW to proactively engage with external users include:

- **Email newsletter:** MIT OCW created a monthly email newsletter with useful content such as articles on specific courses, updates on recently published content, other tips and topical spotlights, etc. Alternatively, set up a Web log for the site. The newsletter currently has a distribution list of around 25,500 users as of October 4, 2004.
- **Being a responsive organization:** People want to feel like there is someone at the other end of the line or behind the Web site. MIT OCW invites feedback from users and has a full-time support organization that reviews and responds to this input. The team also uses this feedback and email input from users to evolve the MIT OCW offering.
- **Interactive learning communities:** MIT OCW considered creating an interactive community support infrastructure. Options considered ranged from a moderated email discussion thread to chat room capability. However, at this time, providing community support of this type with an adequate level of support to manage the potential risks of unmoderated environments was determined to be too much of a drain on the small MIT OCW team. Currently, additional approaches are being explored.

Outreach

The specific materials an opencourseware offers, and the attendant audience that may draw, will determine the best approach for outreach activities. MIT OCW has engaged in a wide range of outreach, which can be grouped into a set of focus areas:

- Interaction with governmental and non-governmental bodies that are focused on education and learning. This has been of particular value for reaching potential audiences outside of North America.
- Participation in a wide range of conferences and other appropriate sponsored forums. Placement of articles in newsletters of professional societies and other targeted communication activity.
- Engaging regional partners. Since MIT OCW has a goal of reaching audiences in developing regions, we have identified a number of partners such as Universia.net, covering Latin America and other Spanish/Portuguese speaking nations. Among other activities related to MIT OCW, Universia is helping build awareness for the program.

Moving Forward

Based on the outcomes of the 2003 MIT OCW evaluation, MIT OCW is refining its target audience and this will lead to a refinement in the use of various media channels and outreach activity in the coming months.

6 — Technology

The MIT OpenCourseWare (MIT OCW) technology solution supports our publishing process. This is a large-scale digital publishing infrastructure that consists of pre-content management system (CMS) planning tools, the CMS, and content distribution infrastructure. The current technical solution was developed in six months (over 1,400 person-days of effort including requirements gathering, package selection, technical design, development, testing, and rollout) and has been in use since April 2003. A four-person technical support team manages all aspects of this infrastructure (systems administration, user support, technical support, enhancements, and system maintenance).

Planning tools used include a custom application developed using FileMaker Pro, and several checklists and documents. For creating and managing content, we use several desktop tools (file conversion tools) as well as the CMS. Our CMS was developed using Microsoft Content Management Server 2002, which was extensively customized to fully support our publishing process. Our content delivery infrastructure comprises of a sophisticated publishing engine, content staging server, and a content delivery network utilizing Akamai's EdgeSuite platform. In this section, we describe the MIT OCW technical solution in detail.

MIT OCW Users
- MIT OCW Staff
  - o Responsibility: Acquire and author (including metadata) content, obtain intellectual property (IP) clearance, perform quality assurance, final publication, and ongoing maintenance
  - o Characteristics: Mostly centrally located. High-speed access to the Internet; LAN access to the CMS.
  - o Needs: Easy to use, rich content editing/formatting interface (office like)
  - o Include the following roles:
    - Faculty Liaisons (faculty relationship managers)
    - Department Liaisons (facilitates faculty publication within the departments)
    - Web content entry team
    - Librarians
    - IP Clearance team
    - QA team
    - Production team
    - Administrators

- Faculty
  - o Responsibility: Preview content and approve for final publication
  - o Characteristics: Centrally located (within MIT campus). High-speed access to the Internet. LAN access to preview environment
  - o Needs: Preview site in target delivery mode

- External Users
  - o Responsibility: Consumers of content

- Characteristics: Globally distributed; access speeds to Internet vary from very slow to dial up to broadband or better; diverse platforms and browsers; should not require any specialized software to access MIT OCW content.
- Needs: Simple, accessible, intuitive interface. Fast downloads.

MIT OCW Key Requirements

Functional requirements are broadly categorized into the following areas. Refer to the scope matrix for detailed list of all requirements under each category:

- Course content maintenance
  - Ability to easily create and maintain structure of a course
  - Ability to enter course content using predefined templates
  - Ability to upload documents and link them

- Metadata
  - Ability to generate default metadata based on course structure and workflow assignments
  - Ability to inherit (automatically) metadata from courses to sections to resources
  - Ability to capture enhanced metadata for courses, sections and resources
  - Ability to categorize metadata for operational, search and other uses
  - Ability to publish metadata along with course content

- Workflow
  - Ability to define workflow assignments at a course level (as part of course structure creation)
  - Ability to define different workflows for courses, departments and other global pages
  - Support for MIT OpenCourseWare (MIT OCW) workflow model (including parallel workflow steps)

- Search
  - Ability to perform basic and advanced search
  - Ability to search within a specific course or across the entire MIT OCW site
  - Ability to search on metadata captured (title, author, keywords)

- Publishing
  - Ability to extract content out of the content management system (CMS) and publish it as flat HTML pages to a staging server
  - Ability to publish content to staging and production servers
  - Ability to publish courses, departments and global pages
  - Ability to control publication through a scheduler
  - Ability to capture publication history for a course, department, or global folder (channel)
  - Ability to unpublish content (remove content)

- Import
  - Ability to import content from another system using Common Data Interchange Format (CDIF an IMS content packaging specification compliant format)

- Export/Archive
  - Ability to extract content from MIT OCW CMS and generate a CDIF package
  - NOTE: Since CDIF is IMS compliant, other systems should be able to interpret the package and extract content

- Measurement
  - Ability to track external site usage
  - Ability to capture anonymous demographic information on end users
  - Ability to capture usage statistics at a page level
  - Ability to capture end user's browser and operating system types

- Surveys
  - Ability to intercept users and launch a survey
  - Ability to control intercept ratio
  - Ability to control survey activation/deactivation

- Reporting
  - Various reporting needs

The following are MIT OCW's high-level technical requirements:
- Availability
  - External site (http://ocw.mit.edu) should always be available (over 99% up-time)
  - Authoring site should be available 24 hours a day, five days a week. Weekend availability as needed (during peak publication cycles)

- Performance
  - Page size of HTML pages should be as small as possible (guideline: 50KB)
  - Most pages within the authoring environment should load within five seconds

- Scalability
  - Support for 5,000 courses, 1 million documents (average size of 100 KB each)
  - Average size of each course = 25 MB
  - Authoring environment should support up to 75 concurrent users
  - Thousands of visitors per day for the external site. Millions of page views per month

- Security
  - Internal content authoring environment uses integrated Windows authentication scheme. Active directory group membership dictates authorizations
  - External site requires no login
  - Usual Web site security requirements for external site (firewalls, isolation of Web servers from the corporate network, Web server level access control lists, etc.)

MIT OCW site structure
The diagram on the next page represents the MIT OCW site structure. In addition to global pages (such as "About OCW," the "President's Page," "Help," etc.), the MIT OCW site contains department pages and course sites. Each course is made of one or more sections. Each section has a section home page (HTML page), other detailed HTML content pages and associated resources (office documents, video files, audio files, multimedia files, MATLAB files, Java applets, etc.):
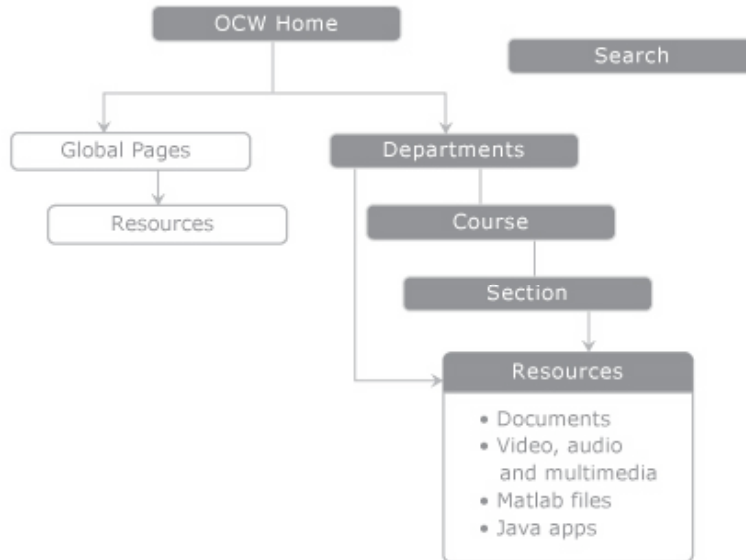
MIT OpenCourseWare (MIT OCW) publishing infrastructure

The diagram below shows flow of content from source systems to MIT OCW publishing environment, and then to archive repository (MIT Libraries DSpace).

Acquiring and Publishing OCW Materials
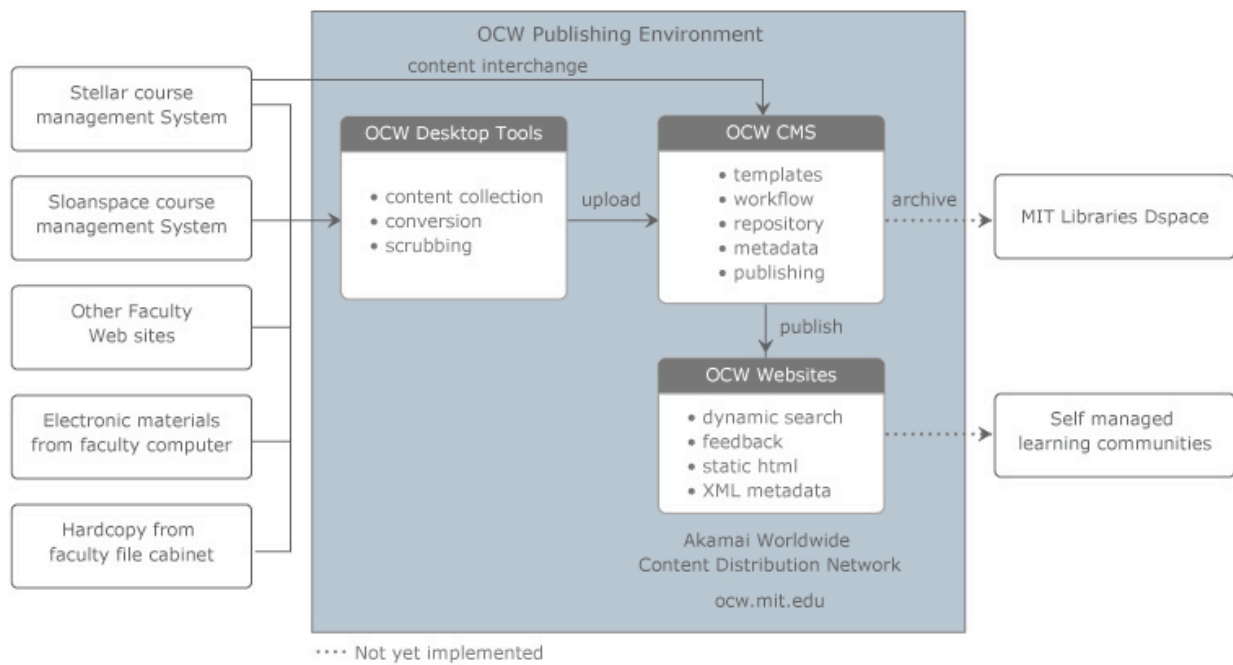
The diagram on the next page shows the tools used in various parts of the MIT OCW content publishing lifecycle:

Planning Tools (pre-CMS)	CMS	Content Distribution (post-CMS)
Recruit faculty and courses → Plan	→ Build	→ Publish → Support

MIT OCW High-Level Architecture

The MIT OCW architecture guiding principles (design goals) include:

- Disassociate content delivery and management systems
- No redundant content repositories
- Single system for management of content
- Build on open standards
- Support integration with enterprise course management systems
- Support integration with enterprise data archive
- Address fundamental system design issues such as scalability, flexibility, modularity, reliability, security, availability, interoperability, and performance
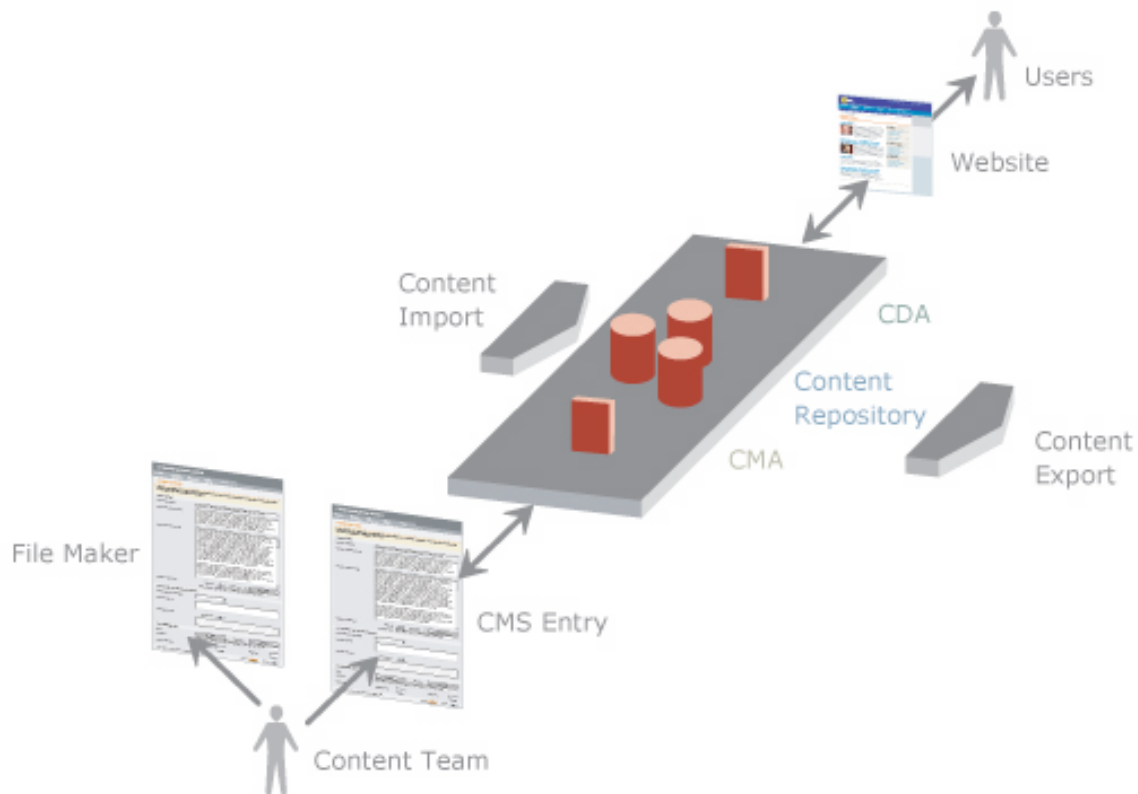
The diagram above is a high-level representation of the MIT OCW architecture. Key components of the architecture include:

- Course planning application
- Content management application (CMA)
- Content repository
- Content delivery application (CDA)
- Content import and export functionality

Course planning application

The course planning application is used to manage the process of getting content from faculty to the content management system (CMS). This application manages the upfront planning portion of the MIT OCW publishing process including identification of candidate courses, review and selection of courses for inclusion, faculty contact management, tracking of intellectual property (IP) rights concerns for each course, coordination of strategies concerning IP rights, and development and management of specifications for course construction.

Content management application (CMA)

The CMA is comprised of content authoring interfaces (usually implemented using content management templates), workflow to manage content lifecycle, document management interfaces, and relevant reporting functionality.

Content repository

The content repository is the central (and single) store for all content in the system. All content created in the system (regardless of the interface used to create it), is stored in the content repository. The repository ensures security and integrity of content.

Content delivery application (CDA)

The CDA is comprised of processes and interfaces required to extract content from the content repository and present it in media and interface appropriate for consumer of the content.

Content import and export functionality

Integration with institution's course management systems, content archival repositories and other sources/consumers of opencourseware content is achieved through the import and export functions. For the MIT OCW site, content import and export is implemented using IMS-compliant, XML content packaging standard called a CDIF (Common Data Interchange Format).

MIT OCW System Architecture

The diagram on the next page depicts the system architecture for MIT OCW. A variety of tools and technologies used to build the MIT OCW system. The system architecture is consistent with the high-level architecture described above.

Administrator **OCW Staff**

Presentation

Desktop
- File conversion tools (Acrobat)
- Secure FX

CMS Site Manager
- CMS client interface
- Delete course
- Move resources
- Reorder sections
- CMS Administration
- User Management

OCWCMS.MIT.EDU
- Content templates
- My tasks
- Metadata & IP
- Reports
- Publication Agents

Active Directory
- Authentication
- Authorization roles

UNIX, Apache

Middle Tier

.NET, Windows

CMS & Workflow (MSCMS 2002, VS.NET)
CMS classes · Extended workflow classes

Channels & Posting
Departments, courses, sections and section pages

Workflow Model
State translation definition
User assignment

Custom

.NET, C# classes
- Course structure
- Metadata/IP
- Publication
- CDIF import
- Reports

Template Gallery
Section templates, Global page templates

Workflow Instance
State management console inputs

Resource Manager
PDF files, images, documents, html files, etc.

Business process integration through workflow

Publication Process
- Publish to Staging
- Publish to Production

Staging/Origin
→ OCW2.MIT.EDU
→ AKA-OCW.MIT.EDU

OCW.MIT.EDU (Akamai)

Repository

File Maker
- Course specs
- IP Tracking
- Course Planning

SQL Sever 2000

CMS Database
- User Roles
- Documents
- Media Files
- Templates Objects
- Placeholder Objects
- Content Objects

Workflow/Custom Data
- Course structure
- Metadata
- IP
- Publication queue
- Course status
- Audit data
- Reporting

Data integrated through CMS generated GUIDs for channels and postings

MIT OCW course planning application

This application was built using FileMaker Pro 5.5. This application went from conception to implementation and wide user acceptance within a month, and has been the system of record for tracking progress toward meeting publication goals on a team and individual basis. Additionally, it serves as the tool for delivery of course specifications to the authoring team.

MIT OCW content management application (CMA)

The content management application, used to construct courses within MIT OCW, is a Microsoft .NET application built on Microsoft CMS Server 2002 as its foundation. All customizations and extensions to the content management system (CMS) are implemented using Visual C#. Distributed n-tier architecture is used to ensure scalability and ease of maintenance. Two instances of SQL server database are used to implement the content repository.

The MIT OCW CMA includes the following key components:
- **Content management system:** Provides a scalable platform with the following functionality:
  o Data structures to represent publication concepts (page, department, course, section)
  o Components to build rich content authoring templates (WYSIWYG authoring templates)

- A rudimentary document management system (Resource gallery)
- Content auditing and versioning
- Site preview
- Administration interfaces (site manager)
- Security

- **Workflow:** This custom component (developed in collaboration with Microsoft) manages the tasks users need to complete and advances courses/pages through pre-defined workflow steps. Two different workflow models (with different business rules) are used within MIT OCW:
  - Course workflow
  - The course workflow model implements the publishing process used to create, manage and publish courses. Extensive validation checks and system rules are implemented throughout the workflow to enable proper QA of the courses prior to their publication.
  - Department/Global page workflow
  - A simplified workflow model is used for managing the content lifecycle of the department and global pages.

- **Metadata:** MIT OCW implemented a comprehensive metadata specification that was developed in collaboration with metadata specialists from MIT Libraries. This SCORM-compliant metadata specification was implemented using XML data structures (stored in SQL Server). A Web interface (implemented using C# and .NET) is provided for ease of creation and maintenance of metadata. Metadata is captured at the course, section and resource level within MIT OCW. Where possible, metadata is defaulted by the system based on available information (various sources: course structure, workflow assignments, and configuration parameters, for example). A sophisticated inheritance engine further simplifies metadata capture by automatically inheriting appropriate metadata from courses to sections to resources within the sections.

MIT OCW content delivery application (CDA)
In MIT OCW, the content delivery application (CDA) includes a content staging/preview infrastructure, content search infrastructure, Akamai Edgesuite content delivery network, and user feedback infrastructure.
- **Content staging/preview infrastructure:** When a course passes all the internal quality checks, it is published to the content staging/preview environment for faculty sign-off. The MIT OCW publishing engine is used to move content from the content management application (CMA) to the staging environment (and to the production environment upon final faculty approval). The MIT OCW publication engine is the bridge that connects the Microsoft CMS-based content management application and UNIX/Apache based content delivery/distribution network. The publication engine includes agents used to schedule courses, departments, and global folders for publication (implemented using .NET/C#), a site crawler to extract content from the content repository (implemented using Perl) and several batch scripts used to transfer content files (HTML), resources, and the associated metadata. Windows scheduler is used to control the run of the staging and production publication engines.
- **Content search infrastructure:** MIT OCW provides extensive search capabilities. Basic search is accessible from every page on the MIT OCW site. Advanced search (also accessible from all pages) provides a way to perform more complex searches (logical operators: OR, AND; search on specific metadata elements, search on specific type of content, etc.) and narrow down the result set. The MIT OCW search indexer (built using Java and Lucene APIs) rely on the metadata captured during the authoring process.

When a course is published, the associated metadata is also published. The search indexer parses text content (HTML files) as well as metadata (stored in XML files) associated with all OCW resources to build a comprehensive search index.

- **Akamai content delivery network:** Akamai's Edgesuite content delivery network serves content to the external world. Content is cached within Akamai's worldwide content network. Akamai pulls content to refresh its cache from a production UNIX server (a.k.a "origin server"). Functionality requiring dynamic interaction (e.g.: Search and Feedback) is implemented using Java, and Tomcat application server running under Apache Web server.
- **User feedback infrastructure:** Every page on the MIT OCW Web site offers a link for end users to provide feedback. The feedback page is implemented using java server pages (jsp). The tomcat application server running on the "origin server" is used to manage the feedback process. The feedback page sends an email to the MIT OCW email support team. An automated acknowledgement is then sent to the end user.

Content import and export
Content for MIT courses (before it is entered into MIT OCW) is available in a variety of electronic formats, including Office documents, individual Web sites, and course management systems. One such source of information is MIT's various course management systems.

The MIT OCW team recognized early on that it is extremely critical to build a standardized, electronic means of importing content from other systems within MIT into MIT OCW. This was accomplished by defining an IMS-compliant standard (in collaboration with the internal teams responsible for MIT's course management systems).

Although currently not implemented, the MIT OCW system has been designed to archive content using the CDIF standard. TheCDIF specification has been implemented using Microsoft .NET/C# custom classes.

Evaluation and measurement infrastructure
Another key component of the MIT OCW system architecture is the evaluation and measurement infrastructure (See chapter on "Evaluation and Measurement" for a more detailed discussion of this topic). This infrastructure includes two components:

- **Site traffic analysis:** Site traffic analysis functionality is built using Akamai's Sitewise product. See http://www.akamai.com for more information.
- **Surveys:** Site survey functionality is implemented using Netraker. See http://www.netraker.com for more information

MIT OCW physical architecture

MIT OCW Content Management and Delivery
Physical Architecture Production Environment

Akamai Network

OCW Users

AKAMAI Servers
Content caching
and delivery

Woldwide OCW users

MIT - Production Environment for Content Delivery

Origin/Search Server
Apache
TomCat
Lucene

Staging Server
Apache
TomCat
Lucene

MIT OCW Staff

Laptops and workstations from
MIT and remote locations

Production Hosting Environment for Content Management

Deployment Server
Windows 2000

Database server
Windows 2000 Advanced server
(clustered)
MS SQLServer 2000 Enterprise

Dual
processor
2 GB RAM
80 GB

CMS Servers
Windows 2000 Advanced server
MCMS 2002

Dual
processor
1GB RAM
40 GB

Firewall

Internet T1 connectivity

MIT -- Planning Environment

FileMaker
Database
Windows 2000,
FileMaker 5.5

File Server
Windows 2000

Stellar,
Sloan Space,
Athena and
other sources
of course
materials

Shared storage
(RAID device)

AD Server
Windows 2000 Advanced server
MITOCW Domain - PDC

Firewall

Ethernet connectivity

Laptops and workstations from
remote locations (Authors)

7 — Evaluation

The need for evaluation and measurement was recognized early in the process of establishing MIT OpenCourseWare (MIT OCW) and as a result, we integrated a substantial evaluation component into the overall program effort. However, in the process of defining the goals and structure of the evaluation, a number of challenges were encountered.

First, the MIT OCW team had to decide why we were undertaking this evaluation process. In the end, the team focused on two major areas:
- Tracking the usefulness and usability of MIT OCW, as well as internal efficiency, to help identify improvements to MIT OCW features and services and to set longer term direction to keep MIT OCW relevant over time.
- To support communication and outreach activities by measuring use and by demonstrating the impact of MIT OCW and the course materials MIT offers through it.

Anticipated audience questions that were considered when refining the goals for the MIT OCW evaluation process are identified in the following table:

Constituency	Questions
All, including general public	Who is using the materials, for what? What is the educational impact of MIT OCW — is it making a difference?
MIT Faculty	How are my materials being received, what is the perception of quality? What do my colleagues think about them? Have my materials been adopted anywhere? How much time are faculty putting into this? What is the "return on investment?" Is MIT OCW worthwhile for faculty? How have MIT students used the sites? What has been the impact?
Key MIT stakeholders	How is MIT OCW being received by the public? By academic colleagues? How is MIT OCW enhancing the image of MIT? Have there been any changes/impact on the MIT schools or departments that have participated in MIT OCW thus far?
Funders	Is MIT OCW's impact in line with our philanthropic program goals? Is the output/outcome/value of MIT OCW in line with our expectations and worth the money we have invested so far? Should we continue to invest?

Other institutions	What does it take to publish course materials in terms of costs, organization/people? What is the impact of publishing on the institution? What benefits accrue back to the institution? Is an "opencourseware" project worth doing here?
MIT OCW staff	How effective and/or usable is MIT OCW? How efficient is our publication process? What can we do better? How effective are our communications? Are people aware of MIT OCW, especially potential users? What should we focus effort and resources on in the future?

Second, given the nature of MIT OCW and its diverse constituency groups, it was challenging to pin down what was to be evaluated and what approach to use. The MIT OCW team wrestled with issues such as:
- Was it an evaluation of actual academic educational outcomes?
- Was it an evaluation of the faculty's course content quality?
- Are we simply evaluating a Web site and it's performance and usage?
- Should we use a more "academic/research-based" approach to evaluation or a more "business/evaluator-based" approach?
- The academic/research-based approach suggested publishing the site, then examining the reactions, and from that, learning what the program's goals should be.
- The business/evaluators approach pointed to the need for a more structured process where MIT OCW would first define hypothesis and quantifiable goals around MIT OCW use and then determine if they are valid.

Consistent with the dual mission of MIT OCW, the evaluation strategy was segmented into Program Evaluation and Process Evaluation. Within each category, MIT OCW uses an "evaluation portfolio" approach that comprises a variety of data collection methods in order to achieve both breadth and depth in the evaluation.

Program evaluation
Program evaluation focuses on outputs — course materials, ancillary publications, and services — and the outcomes that result from them. We organized the program evaluation into:
- **Access:** Who is accessing the MIT OCW Web site, what are their profiles (educator, student, self-learner, other), what are their disciplines (or other interests), and where are they located?
- **Use:** How do educators and learners use MIT OCW, and is the Web site designed appropriately to facilitate that use? To what extent, and in what ways, are MIT course materials adopted or adapted for teaching purposes?
- **Impact:** What effects, positive or negative, intended or unintended, are being realized through the use of MIT OCW?

The table on the next page summarizes data being collected by MIT OCW and the tools that are being used to collect it:
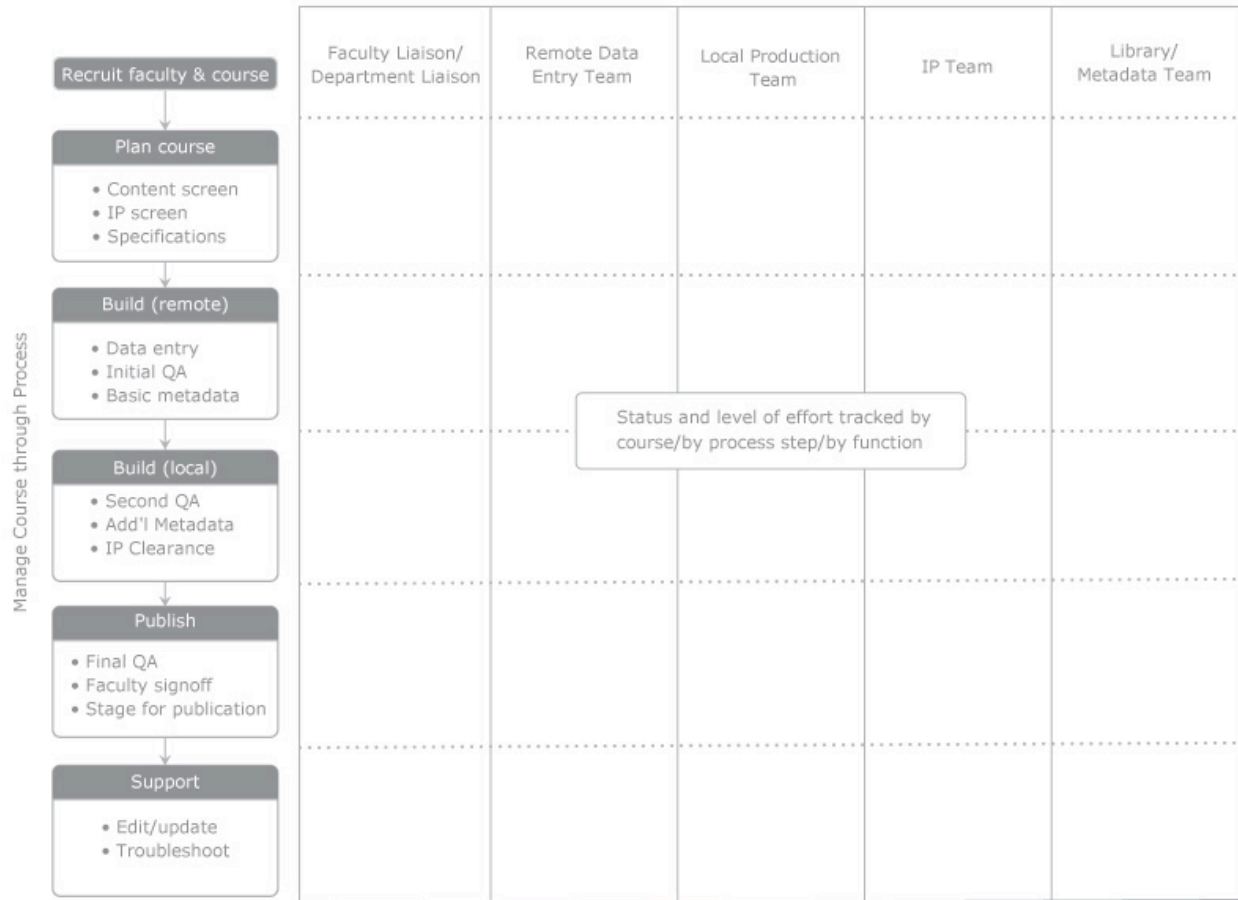
	Access Who is using MIT OCW?	Use How are they using MIT OCW and does it meet their needs?	Impact What outcomes result from this use?
Web Analytics (All site activity)	Traffic volumes, geographic origination, linked referral source, site entry points	Usage patterns, including frequently visited departments, courses, and sections	N/A
Online intercept surveys (Random, representative sampling of users; self-reported)	User profiles (role [educator, student, self-learner, other], institution profiles, country/context of origin, technology context/means of access, reliability, performance, referral source	User goals/purposes/ scenarios/tasks, user expectations, site usability and usefulness/relevance, ability to complete intended tasks, level of adoption of materials, level and nature of adaptation	Leads for further followup via supplemental surveys or interviews on significant outcomes
Supplemental surveys (Targeted sampling of users; self-reported)	Complementary to online intercept surveys to obtain richer understanding for targeted groups (e.g., educators in regions with less-developed educational infrastructure)		
Interviews (Targeted sampling of users; self-reported)	Complementary to surveys to gain in-depth insights for development of case studies of MIT OCW use; also gives opportunity to request syllabi, etc., for content analysis		
Site feedback analysis (Self-selected respondents)	Anecdotal supplement to data about access	Anecdotal supplement to data about use, especially usability and relevance of MIT OCW for specific purposes	Anecdotal information about specific outcomes (may lead to further followup)

For more detailed information on data collected by MIT OCW, see the "Evaluation Strategy Document Appendix," containing the Evaluation Indicators Matrix that can be downloaded from the "Evaluation & Measurement" chapter of the "Opencourseware How To" Web site.

Process evaluation

Process evaluation is more operations-oriented. We measure efficiency and effectiveness of our work, primarily cost, volume, and quality. This data is then used to ensure that we are reaching production goals, meeting quality expectations, managing our finances, and working efficiently with faculty contributors (minimizing their investment of time and effort). There are both quantitative and qualitative measures across the various dimensions of process evaluation. The four main reporting components of the MIT OCW process evaluation are:

- **Financial reports:** The MIT OCW budget tracks expenditures by function and by expense category. MIT OCW financial performance is analyzed monthly.
- **Level-of-effort tracking:** MIT OCW has developed process management tools that tracks status and level of effort for each course through all its production steps. The diagram on the next page summarizes the production tracking and analysis protocol:

Manage Course through Process

	Faculty Liaison/ Department Liaison	Remote Data Entry Team	Local Production Team	IP Team	Library/ Metadata Team
Recruit faculty & course					
Plan course • Content screen • IP screen • Specifications					
Build (remote) • Data entry • Initial QA • Basic metadata					
Build (local) • Second QA • Add'l Metadata • IP Clearance		Status and level of effort tracked by course/by process step/by function			
Publish • Final QA • Faculty signoff • Stage for publication					
Support • Edit/update • Troubleshoot					

- **Intellectual property (IP) operations tracking database:** Many courses have embedded third-party materials such as photos, graphs, charts, and video clips not originally authored by the contributing faculty member. All such "IP objects" must be cleared with their respective copyright owners for publication on MIT OCW. We track numbers of IP objects overall and per course and statistics on the resolution of each object (permission granted/denied, object replaced, object deleted).
- **Content audit.** MIT OCW audits all course content via reports generated by the content management system (CMS) and FileMaker databases. This is a mechanism for measuring and monitoring the richness (not the academic quality or rigor) of courses published on OCW. The audit reveals:
  - o Number of sections (component types, i.e., syllabus, calendar, lecture notes, assignments, exams, problem/solution sets, labs, projects, hypertextbooks, simulations, demonstration/learning tools, tutorials, and video lectures) per course
  - o Number of files (e.g., PDF documents, HTML pages, etc.) per course and per section within course

These reports can be sorted by school and academic department (showing differences by discipline).

In addition to the evaluation components described above, MIT OCW has adopted a management goal setting and review process. Through this process, specific operational goals are set annually in the areas of organization, publication production process, technology, communications, and planning/evaluation. Accomplishments and progress toward these goals are then reviewed quarterly. Job performance goals for individual MIT

OCW staff are linked to these management goals.

Reporting on evaluations
MIT OCW has adopted a three-tier approach to reporting on evaluation activity.
- **Annual evaluation report:** This will be the principal report of quantitative and qualitative evaluation findings, analysis, and recommendations, in particular for the program evaluation. The annual report provides summaries and detail of evaluation data along with optional, additional more detailed background materials such as synopses of interviews, case studies, and other more qualitative material developed through the evaluation process.
- **Quarterly scorecard:** The scorecard offers highlights of the ongoing components of the evaluation process. It focuses on key program indicators (particularly usage) and key process indicators. It includes a brief summary of data collected, including web analytics measures and where appropriate, survey data, as well as process measures. The scorecard presents results in a dashboard format to allow them to be efficiently used by the leadership team to evaluate progress against key program goals and metrics and make appropriate decisions based on the progress.
- **Ad-hoc reports:** Evaluation data may be mined from time to time for special analyses as may be required. Continued use of industry standard tools provided by companies like Akamai Sitewise and Netraker allows for efficient development and delivery of results to ad-hoc surveys and custom views of usage indicators.

For complete details on MIT OCW's process evaluation strategy, see the "Evaluation Strategy Document," that can be downloaded from the "Evaluation & Measurement" chapter of the "Opencourseware How To" Web site.

Additional useful resources on evaluation strategy and logic model design can be found at the Kellog Foundation Web site at http://www.wkkf.org. In particular, the W.K. Kellogg Foundation Evaluation Handbook is very useful, providing a framework for thinking about evaluation as a relevant and useful program tool. It was originally written primarily for project directors who have direct responsibility for the ongoing evaluation of W.K. Kellogg Foundation-funded projects.