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OnCourse 2000

OnLine Teaching and Learning at Indiana University

The Authors:

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Jay Fern is the Manager of Online Learning Technologies at Indiana University. Fern received his DMA in Music Education at the University of Southern California with special emphasis in the application of technology to music instruction. He earned a MM in Music Education at University of Nevada Reno and a BME at Murray State University in Kentucky. He is a member of the graduate faculty for the Masters of Science in Music Technology degree and also teaches courses in the undergraduate music minor. He is currently developing a new multicultural music project named Global Voices. Since joining the University in 1996, Fern has also served as a consultant to the University Library at IUPUI, where he helped develop the team concept of the library and helped librarians effectively integrate library concepts into instructional teams within University College.

The Institution:

Indiana University is a public university composed of a residential campus in Bloomington, an urban campus in Indianapolis, and six other campuses located in Richmond, Fort Wayne, Kokomo, Gary, South Bend and New Albany. IU currently serves 92,000 students and employs nearly 17,000 faculty and staff. It is one of the largest institutions of higher education in the United States.

The Abstract:

In January of 1999, Indiana University deployed Oncourse, an IU-developed online course management application that allows faculty and students to create, integrate, use, and maintain Web-based teaching and learning resources. For students, Oncourse presents learning tools in a single, consistent Web interface. For faculty, Oncourse provides a framework for building teaching environments that can include multimedia content and a wide range of online tools, without requiring users to know programming or HTML.

Oncourse works automatically with University student information databases to create course templates that instructors and enrolled students may access via their University usernames and passwords. Each dynamically generated course Web site includes an up-to-date class roster of all registered students. In addition, course sites include a user profile (home page) for everyone associated with the class; tools for chat, mail, and conferencing; and the ability to integrate online testing, Web authoring, and multimedia resources.

In this presentation, we will share our successes and challenges from the first year of implementation.

OnCourse 2000

OnLine Teaching and Learning at Indiana University

Oncourse is an online application that allows faculty and students to create, integrate, use, and maintain Web-based teaching and learning resources.

Oncourse provides students with a single entry point to their classes for each semester and personal web-based workspace. Each student has a Profile page and can maintain favorite bookmarks, notes, and access "File Manager" to store files on a central server. The Profile page also includes links to each class for a semester. Within each class students can access the course syllabus and assignment schedule, exchange e-mail with faculty and classmates, and participate in live chat sessions and discussion forums. Students can also see assignment grades and use other web-based tools provided by the faculty a particular course.

For faculty, Oncourse provides a framework for building teaching environments that can include multimedia content and a wide range of online tools, without requiring users to be acquainted with programming or HTML. Faculty can establish a syllabus, schedule assignments, and provide links to other web-based resources for each course as well as receive mail and completed assignments from students. An online grade book is available to record grades and share them with students.

Oncourse is available to students and faculty at all eight campuses of Indiana University 23 hours a day, 7 days a week.

Oncourse is integrated with other Indiana University systems and provides:

- User authentication and password management via central messaging systems. This is based on NT Domain authentication. We use a freeware module for performing the authentication.
- Automated population of course offerings and faculty teaching assignments as class schedules are created. Data comes from Student Systems data on an Amdahl mainframe computer and is bulk loaded every morning at 5:00am.
- Automated population of course rosters with student registration data, also from the Amdahl mainframe. Also loaded every morning at 5:00am.

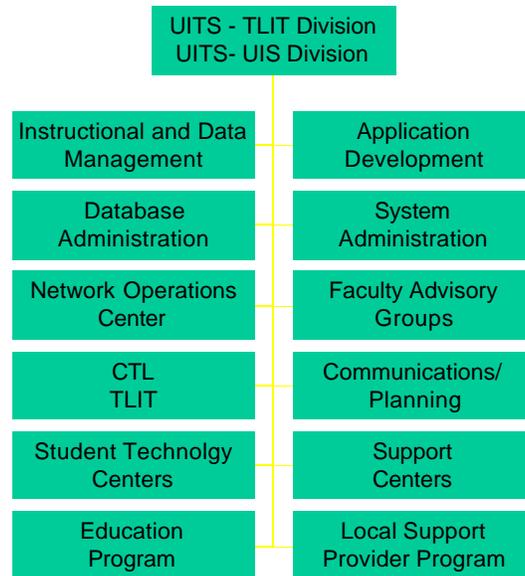
The address for the main page of Oncourse is <<http://oncourse.iu.edu/>>.

The Indiana University WebLab developed the Oncourse application as a Research and Development project. Oncourse was piloted at our Indianapolis campus in the fall 1998 semester. The pilot was extended to the Bloomington campus in the spring 1999. During the pilot period the application architecture and features were tested and problems and enhancements were identified.

Indiana University was faced with a decision as to whether to deploy Oncourse or to buy a vended product. Oncourse was selected for various reasons. We owned Oncourse and it already contained most if not all of the features available in other vender products. We also liked the fact that with our own product, development was reflective of our users needs including the control of all future decisions and directions. The decision to pursue continued development of Oncourse as our online teaching and learning environment was a difficult process but the process proved to validate our assumptions of similar products on the market.

Oncourse was selected as a key component of IU's strategic plan in early 1999 to create a Web-based teaching and learning environment, particularly in support of distributed education. In February 1999, a cross-functional management team was formed and charged with the goal of making Oncourse available across the enterprise in time for the start of the fall semester (by July 1999). The management team coordinated the efforts of many units involved in the production implementation. The team paid special attention to change management procedures, communications strategies, user training and the barriers to implementation at the regional campuses.

Implementation Team



The implementation effort required significant contributions from several units including:

- Support for production implementation planning and hardware acquisition from Instructional and Data management group, who managed pilot implementations at the Indianapolis and Bloomington campuses prior to February 1999. They also contributed to assessment of pilot efforts and identified issues critical to the success of enterprise-wide implementation as well as developed hardware and system software specifications necessary to support enterprise-wide deployment.
- Application support came from the University Information Technology Services (UITS) department. Application developers delivered enhancements required for the July release and established mechanisms to support the delivery of the application across all campuses. Database administration staff established production databases, data loads and maintenance procedures. System administration staff configured the servers to provide a robust application platform. All contributed to the effort to verify that the Oncourse environment was Year 2000 ready.
- Application hardware management by the UITS Network Operations Center in Indianapolis instituted procedures to monitor hardware and system software status, instituted backup and recovery procedures for application data, included Oncourse in established change management procedures and included Oncourse in established outage notification procedures.
- Faculty guidance in the development of functionality in Oncourse from the Faculty Advisory Group identified and prioritized emergency fixes and enhancements as well as tested application changes and provided sign-off.
- Faculty support from the Center for Teaching and Learning (at Indianapolis) and Teaching and Learning Technologies Lab (at Bloomington) established linkages with similar organizations on regional campuses as well as established linkages on each campus to provide Oncourse support.
- Communications support for all Oncourse users from the UITS Communications and Planning group provided communications about the project progress via e-mail lists and campus and university level media resources, designed new university level "front door" page for Oncourse,

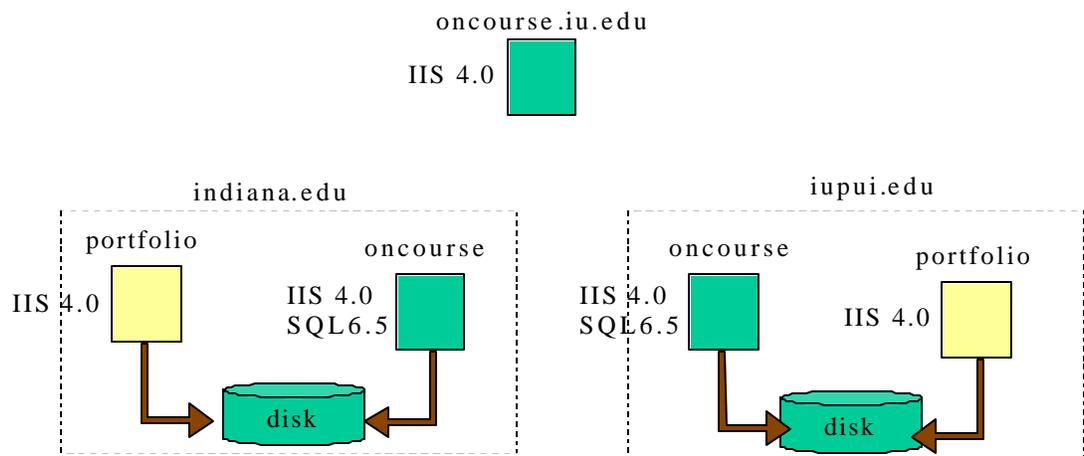
redesigned campus level login pages and established news, information and training resources within the Oncourse environment.

- Student support from the Student Technology Centers insured that Student Technology Centers student workstations could deliver Oncourse as well as trained STC Support Staff to assist students with Oncourse questions.
- Oncourse general user support and problem tracking from the UITS Support Centers at IUPUI and IUB trained STC staff and established phone support procedures for users who contact the Support Center and established queues to track problems and refer problems to other groups for resolution.
- Student and Faculty training from the UITS Education Program developed training sessions and materials for faculty on the use of Oncourse in conjunction with faculty support units and developed training sessions and materials for students on the use of Oncourse.
- Resources for departmental and regional campus support providers from the UITS local support provider program established contacts at the campus and departmental level and established mechanisms to enable the distribution of Oncourse course administration responsibilities at the campus and department level.

The new version of Oncourse (Version 1.01) was moved to production on July 10, 1999. Three software developers, one DBA and one NT system administrator support the application. The application environment consists of 7 production servers housed in the Network Operations Center at the Indianapolis campus. Currently the Bloomington, Indianapolis and Columbus campuses have access to all features of Oncourse including automatic population of course data and NT domain authentication via central services. IU is working on a "global name space" project that will allow the other campuses to utilize these automated features of Oncourse in the near future.

At this point, there are approximately 800 IU courses, which use the Oncourse application each semester. The Oncourse servers receive on average of a half of a million page hits per day.

Oncourse 1.01 - System Architecture



The Oncourse application was coded using Active Server pages with VB Script and Java script. No COM objects have been written or are used except those that are inherent in database access and session parameters. Cookies are used for authentication. The database is MS SQL Server 6.5. The web servers are

Microsoft's IIS 4.0. The application is delivered on servers running NT 4.0, service pack 5. Client browsers must be Netscape 4.0 or IE 4.0 or better with cookies enabled. We are also using a product called Web Trends to monitor activity on the web servers.

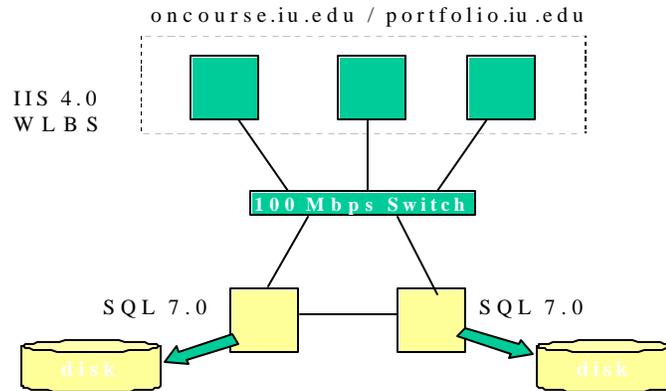
The Oncourse server environment consists of 3 pairs of rack-mounted Dell PowerEdge 6300 servers with cluster kit and Powervault disk storage. Two of the pairs of servers contain four 400 MHz processors each while the newest pair contain four 550 MHz processors each. All six servers contain two GB of RAM and four 4GB SCSI drives. Each of the three pair contains 80GB of disk in its cluster. One server in each pair contains a tape drive. There is also another small server that is used to serve on the front page.

There were some difficulties implementing the system. One of the major issues is that many of the people who implemented and began the initial support of Oncourse were new to the project. This includes two of the three current developers as well as the DBA and NT System Administrator. From July 10 until late August, the development group resolved minor bugs and glitches. In addition they supported the Summer semester classes which were then in progress at IUPUI and other campuses. They went through a period of resolving minor server stability issues such as bringing all servers to the same level of Service Packs. In addition to applying service packs to NT, they restructured the login process so that each major campus login is managed on a separate server and moved the "front door" page to a separate server. They also had major problems with the Clustering Service to the point where they decided to totally break the clustering component and treat each server as an individual instead of one of a pair. They have also had problems keeping IIS stable. They have temporarily solved this by implementing a daily reboot. They also acquired another set of servers so that they can test server configuration and the application in an environment that duplicates the production configuration. They also wrote a group of enhancements that were implemented between the Fall and Spring semesters.

Most of the groups who participated in the production implementation of Oncourse are also involved in the ongoing support of the application. An Oncourse Coordinator, Jay Fern has been appointed to oversee the application and coordinate the activities of the support groups. The coordinator will also communicate with a steering committee and faculty groups who will decide on future directions for the application. An Oncourse Administrator has also been appointed to perform administrative functions within Oncourse such as establishing classes for regional campuses and providing front-line support for campus and departmental Oncourse administrators. The Communications group continues to provide information about Oncourse to users in a timely manner. The Education Program and faculty support groups provides training to faculty and students. The Support Center "front ends" all questions and trouble reports from students and faculty by referring them to appropriate groups if necessary. The applications developers, server administrators and DBA continue to stabilize the production environment and will soon be involved in the development of enhancements for the next release of Oncourse slated for the Fall 2000 semester.

Looking toward the future, The Oncourse Team has developed a list of optimizations and improvements that we hope will make Oncourse a world-class teaching and learning facility.

Oncourse 2000 - System Architecture



As technology has changed, so has the need to bolster our infrastructure. In order to provide for future stability and reliability, we will institute a series of changes:

- ✓ Upgrade the databases to SQL Server 7.0
- ✓ Build more of a 3-tier environment by implementing COM objects where possible.
- ✓ Simplify by using only one SQL Server instance for the entire system
- ✓ Create a system to retain our availability. (It takes many hours to restore just one of our two data servers). We will utilize Microsoft's Replication Server to build a warm stand-by to solve this issue.
- ✓ Build a farm of at least two boxes running IIS with Windows Load Balancing software running on a third box so we can protect ourselves from an individual web server failure.

Additionally, we have developed a list of improvements from user suggestions that include:

- A User-Centric interface, including a fully customizable learning space designed by "me", about "me," and representative of "me." There will be access to all things that involve stakeholders that are important to learning. This will include such functions as My Campus, My Calendar, My School, My department, My Vita/My teaching, My Contacts, My tools, My email, My bookmarks, My clubs and activities, My class standing and others. Additionally, the user-centric interface would comply and set world-class ADA standards for online learning. (See Donald Norman "The Invisible Computer" excerpts at http://www.jnd.org/cv.html#Invisible_Computer; "The Design of Everyday Things;" and Thomas Landauer "The Trouble with Computers.")
- Build true 24 X 7 access. Currently Oncourse is available 23 X 7. Achieving full availability will require a rewrite of our data load programs and a revamping of some of our current techniques.
- Single Authentication is an important feature for our users. We need a system of authentication that transfers rights to other university systems such as library tools, Registrar and other student tools. Also within Oncourse, we will provide access to all services that are related to teaching and learning. This includes course registration, Instructional Services utilities, and all student learning services.
- Creating a more user-friendly access by providing online wizards that will step a new user through the customization of their environment.
- Implement a decision support environment so that faculty can track and flag information necessary for the betterment of teaching and learning.
- Create collaborative spaces that foster and promote communication around and about learning with multiple levels of permissions, created by the user.

- Electronic Portfolios for a single point of access to all academic career materials available in a searchable format.
- A modular system so that we will have the ability for other university applications to Plug-n-play in the environment that pass authentication, rosters and other information.
- Full integration with the external IU messaging system by passing authentication through the environment, interfacing with messaging strategies allowing seamless integration. Currently Oncourse maintains an internal email system.

In summary, the success of Oncourse has far exceeded our expectations in a very short period of time accompanied by great strides and some very difficult challenges. We continue to believe that deploying Oncourse as Indiana University's Online Teaching and Learning Environment is the right choice for us. We are committed to making Oncourse a world-class teaching and learning environment for Indiana University.