

Blackboard 5

Release 5.5 Platform Overview White Paper

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What types of organizations license Blackboard e-Education software?

More than 1,800 clients in more than 70 countries, including:

- *Colleges and universities*
- *Corporations and associations*
- *K-12 (district-level and statewide)*
- *Leading commercial education providers*

BLACKBOARD 5 AT A GLANCE

Blackboard 5™ is a Web-based server software application that enables a complete e-Education enterprise including online teaching and learning, campus communities, and institutional services. Blackboard 5 can be integrated with multiple business and administrative enterprise software systems or deployed as a stand-alone application. Whether locally installed or hosted via Blackboard Application Service Provider (ASP) Solutions, the 5.5 release includes the following core features and functionality:

COURSE MANAGEMENT

- Course development and management tools
- Communication and collaboration capabilities
- Online assessment engine with integrated gradebook
- Content sequencing and delivery

ONLINE COMMUNITIES AND INSTITUTIONAL SERVICES

- Customizable, role-based academic portal modules and information services
- Web-based email interface
- Community-building and organizational management
- Institutional services administration

ONLINE ACADEMIC RESOURCES

- Pedagogically tailored, discipline-specific information, resources, and communities

DIGITAL COURSE CONTENT

- Support for Blackboard Course Cartridges—customizable material available from the world's leading academic publishers and content providers
- Sequencing of instructor-generated content into “lessons”

ADVANCED INTEGRATION AND SYSTEM MANAGEMENT

- System and administrative management
- Snapshot and event-driven (real-time) user and course management
- End-user authentication
- Support for security protocols such as LDAP and Kerberos
- User interface customization
- Remote system management
- Building Blocks (B2) extensions for third-party learning applications and interfaces

ENTERPRISE PLATFORM ARCHITECTURE

Blackboard believes that enterprise software solutions are central to the way the education industry operates. Colleges and universities worldwide have steadily become more efficient by implementing enterprise resource planning (ERP) systems that connect back-office administrative systems. For many institutions, information moves more fluidly across administrative functions and geographic boundaries. These back-office ERP systems tend to focus on unifying databases, providing faster information transactions and real-time data, and improving financial and administrative management.

Blackboard's vision for e-Education enterprise solutions is to integrate these back-office systems with the "front end" of education. That front end includes a common interface and single login for teaching and learning, student and faculty services, and advanced rights and roles management to enable the creation of discrete online communities for students, instructors, prospective students, alumni, and more. We believe this integration will come to define the full potential for Web-delivered software solutions in education.

What is e-Education?

While our software is anchored in teaching and learning, we believe the e-Education enterprise should unify three key educational imperatives that affect the daily lives of instructors, students, and administrators:

Course management

- Web-enabled and distance learning

Campus communities

- curricular and extracurricular

Institutional and auxiliary services

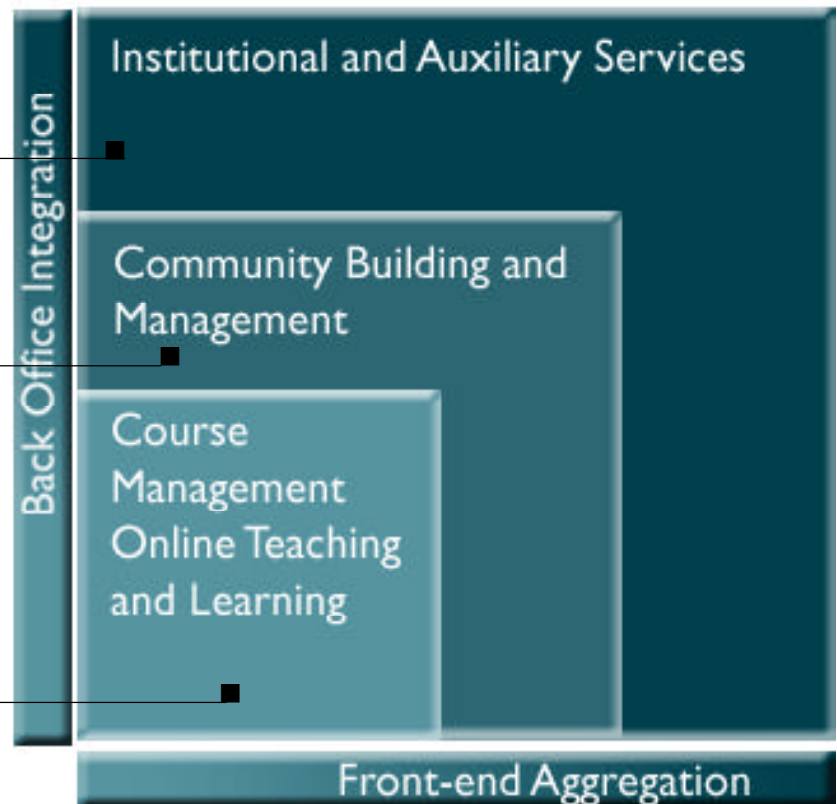
- including student services

Benefits for users on the front end:

- Common interface and central point of aggregation for courses, campus communities and services
- Industry-leading course management system as a central point of access to online communities and services

Benefits for administrators on the back end:

- Administrative efficiency through back-office automation of enrollment, courses, users, etc.
- Data integration with multiple administrative systems and databases
- Single login
- System-wide security protocols



What operating systems and Web servers are supported by Blackboard?

Microsoft Windows NT™ 4.0 (Service Pack 6) with Microsoft Internet Information Server

Microsoft Windows 2000™ (Service Pack 1) with Microsoft Internet Information Server

Sun Solaris™ 2.8

Red Hat Linux™ 6.2

What databases are supported by Blackboard?

Windows NT: SQL Server 7 (Service Pack 2)

Windows 2000: SQL Server 7 (not bundled) with Service Pack 2 or SQL Server 2000 (not bundled)

Sun Solaris: MySQL Oracle8i (not bundled)

Red Hat Linux: MySQL or Oracle8i (not bundled)

To deliver this vision of an e-Education enterprise and build on its position as an industry innovator, Blackboard offers the following in its flagship product:

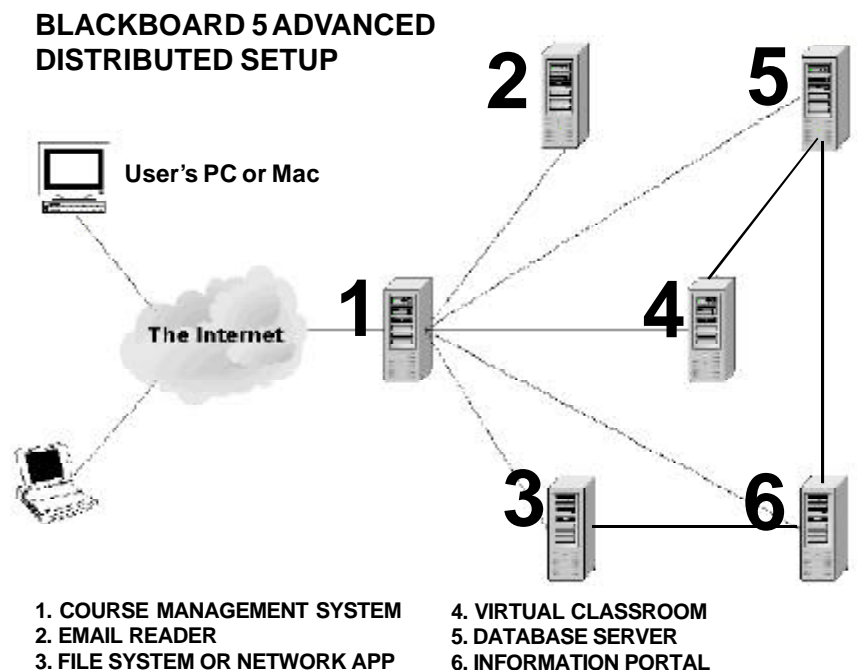
- Scalable, modular and interoperable product architecture
- Relational database at the course management level
- System extensions for third-party tools and content
- Compliance and advocacy for industry standards

SCALABLE AND MODULAR ARCHITECTURE

At institutions worldwide, individual Blackboard 5 installations are powering e-Education environments consisting of thousands of courses and tens of thousands of users. This level of platform scalability is achieved with Blackboard 5 through its modular architecture and the resulting ability to distribute various applications within Blackboard 5 to multiple machines.

- The architecture of Blackboard 5 is three tiered. It encompasses a database on the back end and a Web server interacting with the Blackboard application (written in object-oriented Java and Perl) in the middle, accessible by a browser on the front end.
- Blackboard 5 can be licensed with a two-machine configuration that features a Java Servlet Engine (WebLogic) and an HTML-based mail reader that aggregates information through a browser.

Many Blackboard clients choose to use a distributed, multiplexed, or clustered setup to achieve optimal scalability and responsiveness. The following diagram illustrates an example of a distributed setup:



What are some examples of Blackboard-enabled system extensions?

Leading providers of the following e-Education competencies will develop Blackboard-enabled applications:

- *Web-delivered assessment and quiz functionality*
- *Institutional content and file management*
- *Web-based mathematical functionality and scientific notation*

In addition, hundreds of Blackboard-enabled Course Cartridges in dozens of academic disciplines are available through the following leading publishers:

- *Pearson Education*
- *McGraw-Hill*
- *Thompson Learning*
- *W.W. Norton & Co.*
- *XanEdu (course-packs)*

RELATIONAL DATABASE

Blackboard 5 utilizes a relational database throughout the platform. Microsoft SQL Server 7, Microsoft SQL Server 2000, and Oracle8i, all supported by Blackboard 5, are designed for scalability and are used daily by Fortune 500 companies. Many competing course management systems rely on flat-file databases within their learning management architecture. Unlike relational databases, these flat-file databases store multiple entries of identical data in disparate locations. This database configuration is inherently redundant and materially reduces scalability.

SYSTEM EXTENSIONS

Blackboard recently announced the most ambitious development effort in its history: the Building Blocks (B2) Initiative. By metaphorically describing our product development efforts in terms of building blocks, the B2 initiative seeds the vision for a sophisticated infrastructure that enables integration of tools, system services, and interfaces developed independently of Blackboard. Examples of platform innovation in this area include:

- The ability to dynamically interact with third-party learning applications, system services, and interfaces within the teaching and learning environment and throughout the e-Education enterprise.
- The Blackboard Platform Builder™, a development environment for programmers, which facilitates the creation of customized, role-based HTML modules in the portal interface. These modules can target students, alumni, prospective students, instructors, etc.

This flexibility to integrate new and existing tools from Blackboard, proprietary functionality from clients, and commercial applications from third-party vendors secures Blackboard's role as the standard operating system for e-Education.

STANDARDS COMPLIANCE AND ADVOCACY

Blackboard is a strong advocate for open industry standards and supports standards efforts such as Instructional Management System (IMS), AICC, and SCORM, and interoperability with JASIG portal technologies. In addition, Blackboard 5.5 implements Section 508 of the Federal Rehabilitation Act. As a result of Blackboard participation in these initiatives, Blackboard 5 is a flexible and reliable platform for the development of content in multiple formats as well as for digital content available through downloadable publisher Course Cartridges.

Why do our clients choose Blackboard over competing applications?

The most frequently cited reasons for choosing Blackboard include:

Ease of use and innovation

Clients cite Blackboard's proven track record as an industry leader that delivers continuous innovation in teaching and learning functionality while maintaining a simple and intuitive experience for users and administrators

Enterprise technology and scalability

Clients require an e-Education environment that can be scaled to support thousands of courses for tens of thousands of users

Flexibility and modular product architecture

Blackboard is the only e-Education solution that unifies course management, academic portal and community building technologies, institutional services, and extended online academic resources

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All Blackboard content management and content development tools are IMS-compliant, ensuring portability within the Blackboard platform or externally to other IMS compliant e-Learning applications.

INTEGRATION AND CUSTOMIZATION

For many clients, large-scale usage and adoption of Blackboard software requires an infrastructure that provides data integration and customization to optimize operational and administrative system management. As a result, Blackboard leads the industry by providing a comprehensive e-Education platform that can be readily integrated with an institution's business and administrative software systems. Core to Blackboard's product development mission is a commitment to integrate with any leading student information system (SIS) or back-office ERP system. Currently, Blackboard's Technical Solutions team manages more than 100 high-scale projects that include integration with the following administrative and authentication systems:

- SCTPlus 2000™
- SCT Banner 2000™
- PeopleSoft 7.6™
- Datatel 16™
- Kerberos
- LDAP

In order to successfully manage growth and integrate course management with multiple related functions, Blackboard provides advanced tools that allow institutions to manage security and authentication, enrollment, customization at the course, department, or institution level, and seamless integration with multiple administrative applications. This technology is based on three core objectives:

- Security
- IMS compliance
- Scalability (for multiple systems and multiple administrators)

DATA INTEGRATION

Data integration involves the transfer of user, course, enrollment, and staff data between an institution's information systems and Blackboard 5. The information model used by Blackboard 5 is that defined by the IMS consortium. Data integration may be achieved through the snapshot tool, which allows users to schedule one-time or periodic (hourly, daily, weekly) data integration from existing SIS systems that

The most frequently cited reasons for choosing Blackboard:

Operational and administrative efficiency

Administrators require automation of course creation, user enrollment, course management, and the ability to integrate with multiple administrative systems

Commitment to open standards

From its inception, Blackboard has actively promoted open industry standards and was a primary contractor to the IMS. Blackboard continues these efforts through the Blackboard Building Blocks (B2) Initiative promoting an open architecture and platform interoperability

automate user data and allow total control for the institution's users, courses, categories, course templates, and organizations. In addition, data integration may be achieved through real-time, event-driven information transactions.

SNAPSHOT TOOL

The snapshot tool offers administrators a command line interface to update the Blackboard 5 database with information contained in a flat file or XML file. The Blackboard 5 database can be updated with a manually controlled explicit operation or through snapshot mode, which automatically synchronizes data and performs logic based on this interaction.

EVENT-DRIVEN API

The event-driven API provides a collection of Java classes that programmers can use to insert, update, delete, or actively disable information in the Blackboard 5 database based on data extracted from an institution's information systems. While similar to the snapshot tool in that each achieves data integration, the event-driven API allows an institution to create robust software to manage the data link.

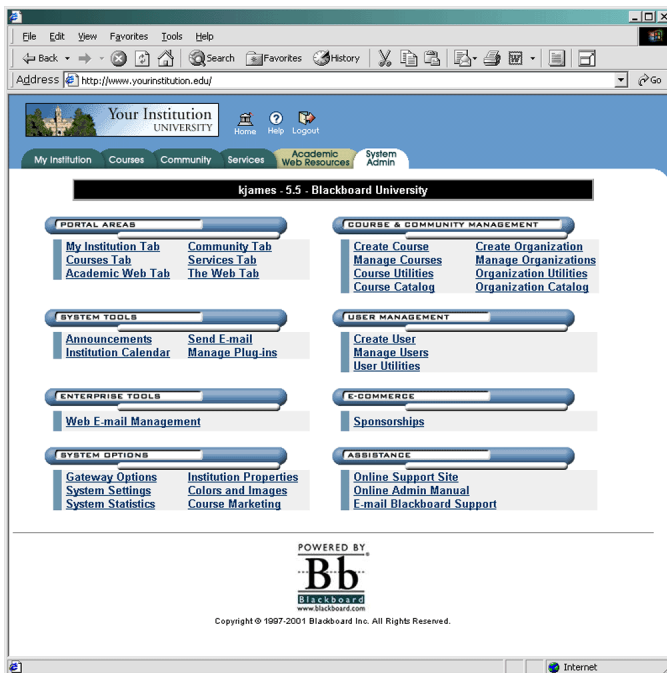
Both the snapshot and event-driven methodologies provide essential administrative and operational flexibility, enabling institutions to:

- Automate entry of users to replace manual administration and to manage diverse users from disparate databases including SIS, HRMS, alumni system and adult education, for example
- Coordinate passwords with role-based management for system authentication
- Address FERPA guidelines
- Track course sections and section changes, and manage content use and reuse across academic terms and for multiple sections
- Manage add/drops
- Categorize courses
- Populate courses with required templates at the college, department, and discipline level
- Disable student access at the end of the semester
- Delete obsolete or redundant user and course data
- Enforce consistency in access policies
- Promote institutional branding at many levels
- Establish and maintain standards
- Provide consistency within and across departments and organizations
- Establish best practices in instructional design, accessibility, and student involvement

SYSTEM MANAGEMENT – ADMINISTRATIVE FEATURES AND FUNCTIONS

Blackboard system management features focus on providing clients with a framework for total control over their e-Education enterprise, including customization and aggregation. These system management tools provide the ability to:

- Monitor and administer an institution's online teaching and learning environment, all from a Web browser
- Customize page headers by adding institution logos or graphics
- Control security permissions and enable/disable features for selected user roles
- Perform batch user enrollment /un-enrollment for institution-specific and course-specific functions
- Manage preferences/options for multiple courses from one central system administrator panel
- Track and report statistics for faculty, students, and courses
- Plan and manage system hardware requirements through disk quotas for content storage—all customizable on a per-course or per-institution basis
- Issue system-wide announcements to users about system maintenance or other institutional matters



TEACHING AND LEARNING ENVIRONMENT – FEATURES AND FUNCTIONS

OVERVIEW

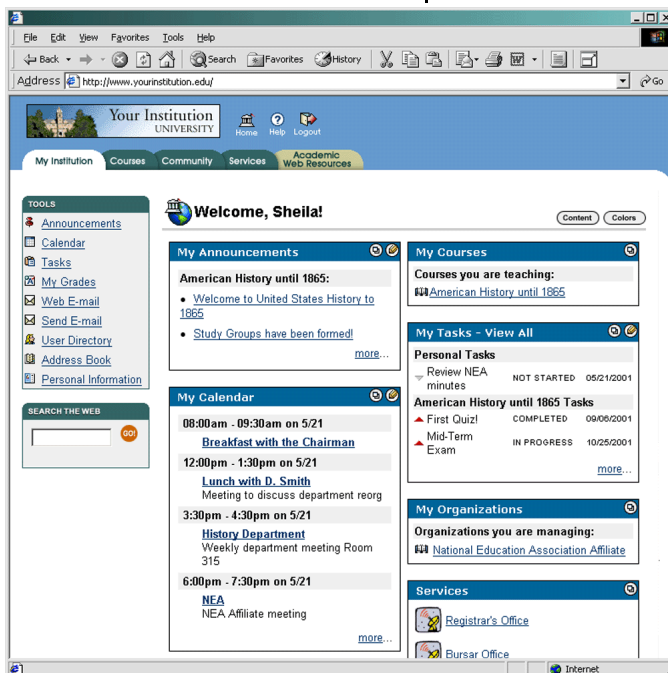
The Blackboard 5 teaching and learning environment is widely regarded as the industry's leading course management system on the basis of ease of use, widespread adoption, pedagogical flexibility, and breadth of intuitive features and functions for either Web-enhanced or distance learning. Blackboard's online teaching environment includes four primary areas of functionality:

- **Content management** – personal information, course elements and documents, academic Web resources, publisher-provided digital material
- **Communication** – asynchronous and synchronous collaboration tools
- **Control** – instructor management utilities
- **Assessments** – test and quiz capabilities, gradebook

CONTENT MANAGEMENT

PERSONAL INFORMATION

Students, instructors, administrators, and all other users are presented with basic course and personal information management tools through a user-centric “My Institution” portal.

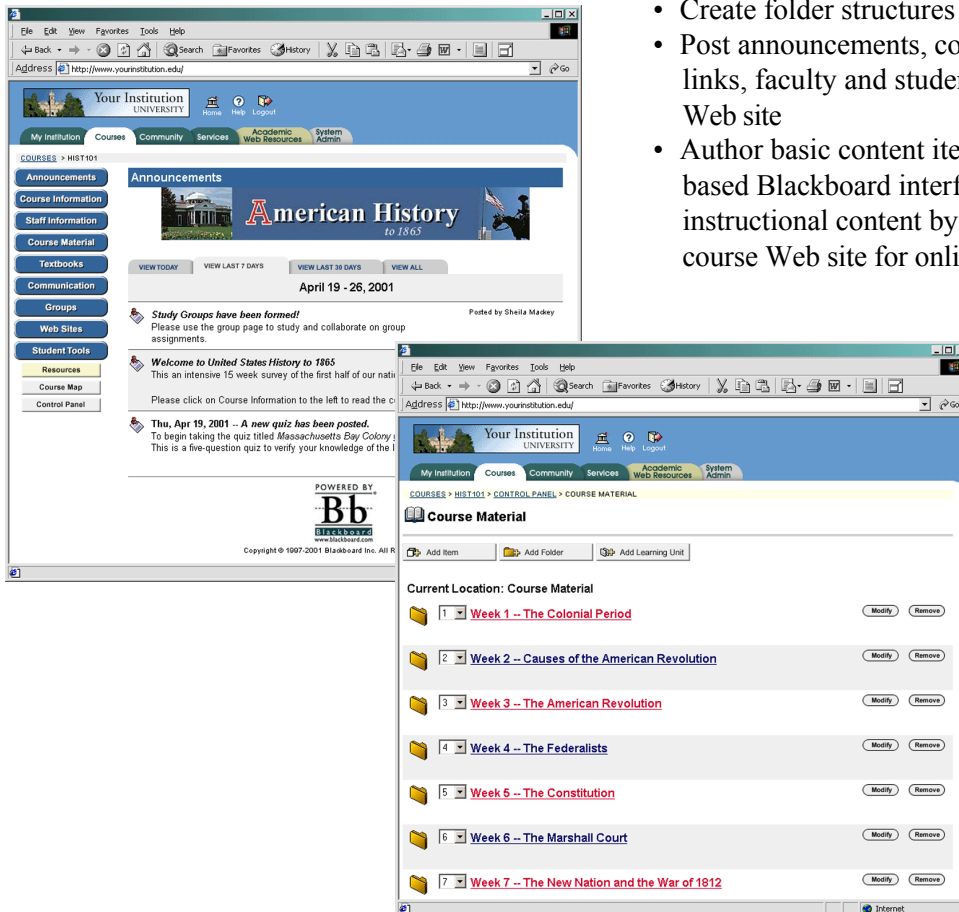


- See announcements, calendar events, tasks, and grades from multiple courses in one aggregated view
- Access the courses through direct links in the portal
- View a comprehensive institutional course listing and browse guest-accessible courses through the course catalog
- Maintain personal calendar, address book, user directory and to-do lists

COURSE ELEMENTS AND DOCUMENTS

Through easy-to-use course Web sites, instructors, and instructional designers can make learning materials available to students anytime and anywhere.

- Create folder structures to organize content
- Post announcements, course materials, assignments, links, faculty and student profiles, and more to the course Web site
- Author basic content items directly through the form-based Blackboard interface or incorporate existing instructional content by uploading the files into the course Web site for online delivery

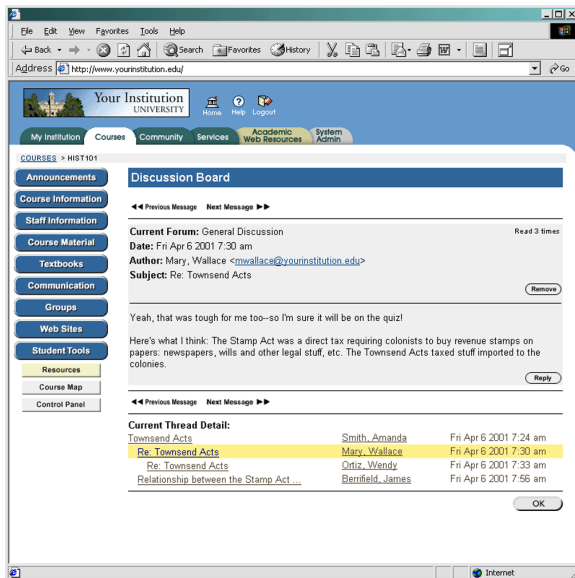


- Create learning units to define sequential learning paths through content and assessments
- Navigate course Web sites easily with pop-up site maps
- Schedule and automate the release and recall of content for specific dates and times
- Support for uploading and delivering an unlimited number of file formats through Blackboard, such as: Microsoft Office, Adobe Acrobat PDF, HTML, digital images, digital audio files, digital video files, multimedia (e.g. Flash, Shockwave, Authorware, etc.)

COMMUNICATION

Students and instructors enjoy enhanced collaboration with asynchronous discussion boards and synchronous chat tools

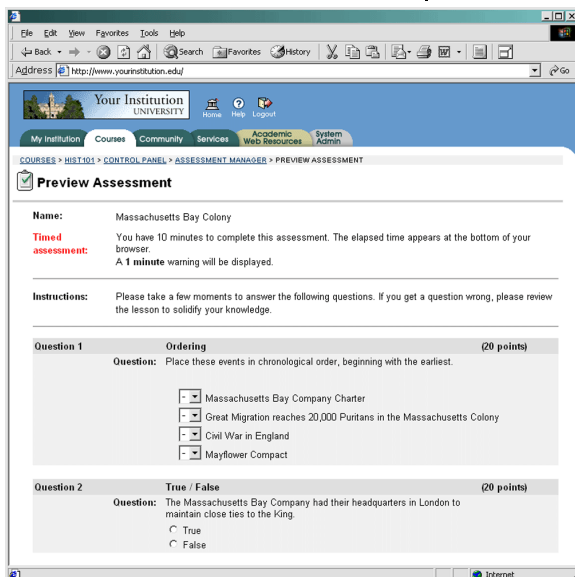
- Enable collaborative learning through discussion boards, real-time virtual classroom interaction, and group communication
 - Create an unlimited number of forums within the discussion board, each with a distinct set of properties to allow for various pedagogical approaches to managing interaction
 - Manage participation in forums by: sorting messages by thread, author, date, or subject; tracking read and unread messages; and collecting multiple messages on one page for easy reading, comparison, and printing
 - Manage forums by assigning students administrative responsibilities, locking messages so the messages can be viewed but not modified or replied to, and creating archives of past messages
 - Manage live online text chats, draw in a shared whiteboard, and collaboratively browse and graphically mark Web pages through the updated virtual classroom
 - Submit work and assignments via the digital dropbox
 - Create groups of students for collaborative work and enable protected discussion boards, virtual classrooms, and file exchanges for each group



ASSESSMENTS

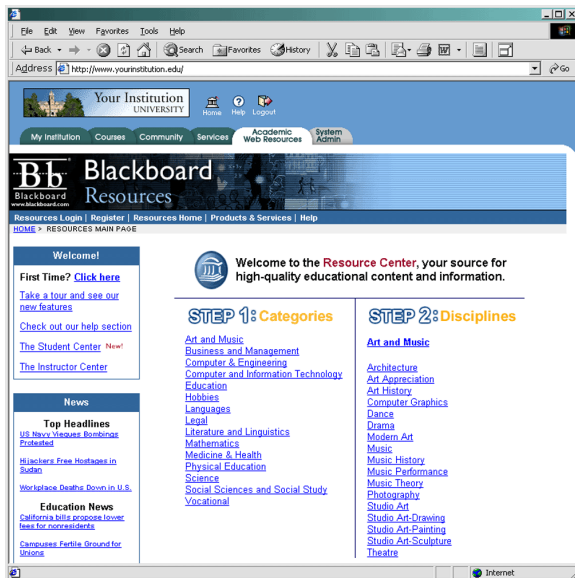
Instructors can increase student preparedness, measure student progress, and customize lessons by creating and administering quizzes and surveys.

- Follow simple, step-by-step process to create quizzes and surveys
- Mix and match multiple question types: multiple choice, multiple correct, true/false, matching, ordering, fill in the blank and essay
- Include multimedia or other attachments with questions
- Create question pools that can be shared across courses
- Import prepared test banks from external sources
- Provide question randomization and reuse questions and tests from question pools
- Provide password-protected tests, timed tests, and instant feedback to students
- Schedule and automate the release and recall of assessments by date and time allowing for sequential release
- Create statistical reports of student answers



ACADEMIC WEB RESOURCES

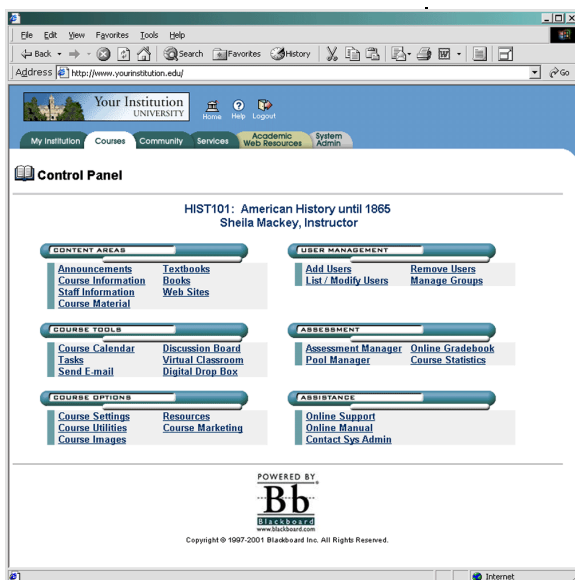
Students can access high-quality, supplemental educational content and resources through the Blackboard academic resources Web tab.



- Browse discipline-specific information, resources and communities—a click away from each course Web site
- Customize the academic Web resource site to fit individual needs and preferences
- Stay in touch with discipline-specific news and events
- Save research time by directly accessing a wide range of scholarly journals and periodicals
- Join discipline-specific communities of teachers and learners worldwide
- Join cross-discipline communities such as the instructor, student, and Blackboard user communities
- Access and download free training materials (in PDF and multimedia formats) to learn more effectively how to use Blackboard products

PUBLISHER-PROVIDED DIGITAL MATERIAL

- Seamlessly download professional digital course content into any Blackboard teaching and learning environment
- Instructors can customize downloaded Course Cartridge materials to supplement their courses
- Hundreds of Course Cartridges are available in dozens of academic disciplines through Blackboard's Course Cartridge server



CONTROL

Instructors can monitor, control and customize their course Web sites, all from a Web browser.

- Manage courses through a robust and easy-to-use course control panel
- Customize names of course Web site navigation buttons
- Easily enroll/un-enroll individuals or groups of students
- Extended student enrollment options: limited-time self-enrollment (e.g., certain dates only for self-enroll feature), password-protected enrollment, defined course duration (e.g., for self-paced study)
- Recycle courses between academic terms by automatically resetting discussion boards, assessments and other content areas
- Track student progress, grades and course content usage

ACADEMIC PORTAL ENVIRONMENT AND ONLINE COMMUNITIES – FEATURES AND FUNCTIONS

From its history as an online teaching and learning environment, Blackboard's flagship product has expanded to offer a full suite of tools to both integrate and aggregate an educational institution's courses, communities, and institutional services.

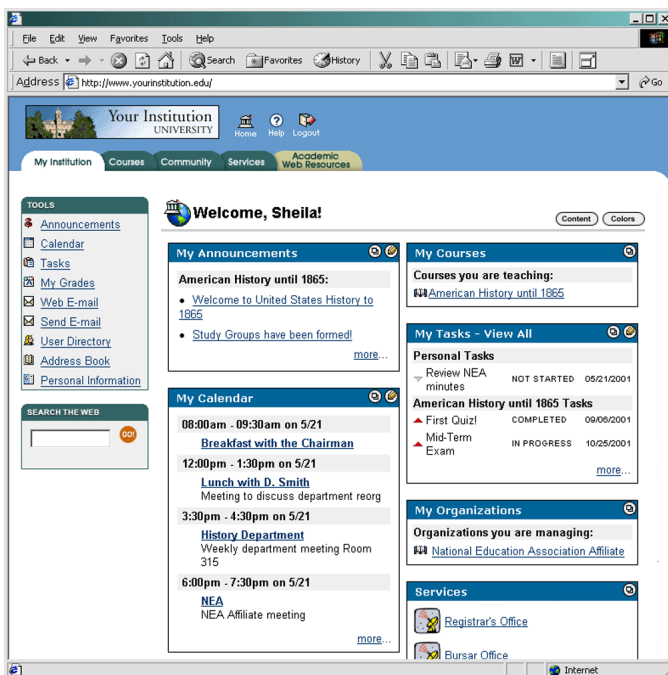
Though powerful by itself, Blackboard's e-Education environment offers flexibility and extensibility through the Blackboard Building Blocks (B2) architecture, enabling seamless integration between the Blackboard platform and leading third-party learning applications, system services, and interfaces.

The platform is powered by a sophisticated system architecture based on enterprise-quality relational databases and industry-standard Web technologies. Through multi-server configurations and load-balancing techniques, the Blackboard e-Education environment scales to support tens of thousands of users.

The Blackboard 5 environment features a tabbed format that pulls all of these resources together into a single Web-based interface, assuring that no part of the system is ever more than a few mouse clicks away.

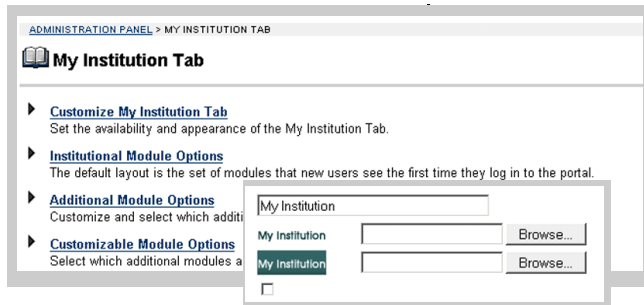
Included in this environment are:

- **My Institution:** a powerful portal each user can customize to their own preferences
- **Courses:** the entry point for Blackboard's industry-leading teaching and learning environment
- **Communities:** institution-wide community-building tools including community discussion boards and organization Web sites
- **Services:** a customizable area for integration of institutional services
- **Academic Web Resources:** High-quality online resources including full-text article databases, annotated links, academic-oriented Web searches, and academic communities



Develop customizable HTML/URL modules that provide links, announcements, and other audience-specific information for the following segments of an institutional community:

- *Students*
- *Faculty*
- *Administrators*
- *Staff*
- *Alumni*
- *Prospective students*
- *Guests*



The **My Institution** tab aggregates information such as **announcements, tasks, calendar items, grades, and email** from a user's course and organization Web sites, and displays the information in **customizable modules**, hyperlinked so the information is never more than one click away when the user logs in. In addition to the Blackboard-specific modules, users can choose from dozens of other modules including headlines from major news outlets, live weather reports, sports scores, and personal tools such as calculators and notepads. Individual institutions can expand these offerings by building their own custom portal modules through the Blackboard Platform Builder technology.

For each user, the **Courses** tab lists the courses the individual is teaching or taking. The personal **Course Listing** links to each **course Web site**, turning the Courses tab into the gateway to Blackboard's industry-leading online course management system. Through the Courses tab, users can also browse the institutional **Course Catalog** to see what other courses the institution offers through Blackboard. Using Blackboard's powerful configuration settings, the institution can choose to allow students to view these other courses (or select portions of the courses) in the Course Catalog or even enroll themselves in those courses.

Classes are not the only groups at your institution that need to share content and collaborate. The **Communities** tab provides your users access to Blackboard **organization Web sites**. Leveraging the capabilities of the course management system, Blackboard has extended its technology to be used by institutional organizations, as well as courses. Now the faculty senate, the student government, the yearbook, fraternities and sororities, clubs, and other organizations can have secure sites for sharing content and collaborating online with their organization's members. The Communities tab provides an **Organization Listing** and **Organization Catalog**, similar to the Courses tab, and also enables **community discussion boards**, accessible by all users on the system.

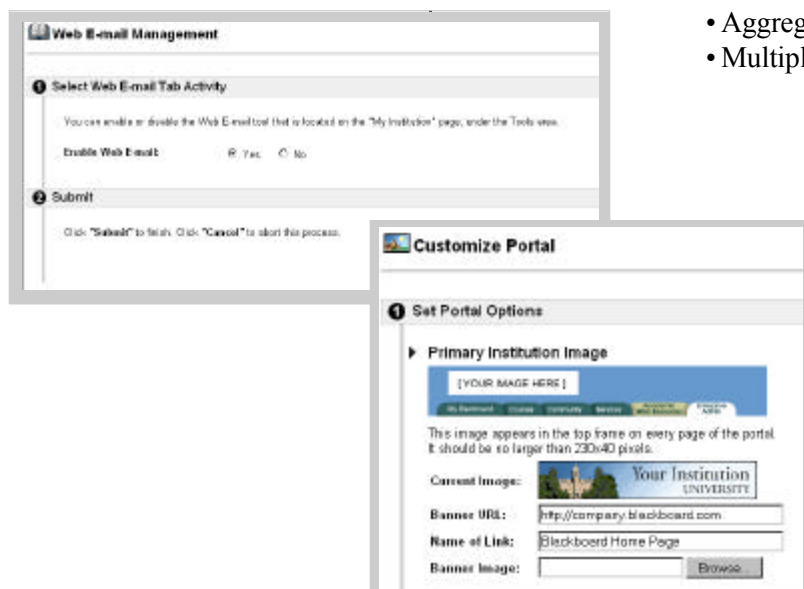
The **Services** tab is configurable by each institution. Links can be built from the Services tab to other Web-enabled technologies at your campus, to allow students to have access to all the institution's Web services without having to exit the Blackboard e-Education environment. Through Blackboard's advanced user authentication APIs, it is possible to seamlessly integrate other services directly into the Blackboard platform.

Faculty and students can access comprehensive, quality resources to support online teaching, learning, and research through the **Academic Web Resources** tab. The Resource Center is organized into hundreds of **discipline-specific resource pages**, each providing news, communities, annotated links, and a searchable database of full-text articles from leading periodicals and journals related to the particular discipline. Users will also find a **Student Center** and an **Instructor Center**, providing resources specific to the needs of each of those user populations, as well as a **Training Center** where users can access materials to learn to use Blackboard more effectively. Though accessible through the tabbed interface, the real power of the Academic Web Resources comes when it is accessed through a course Web site, because each instructor can customize the discipline-specific page for their particular group of students.

WEB-BASED EMAIL INTERFACE

The Blackboard email interface offers access to both institutional and remote mailbox options by linking with institutional or remote POP and IMAP functionality. Designed primarily to serve as an email aggregator, Blackboard's Web-based email interface provides the following functionality:

- Compose messages to anyone with a valid email address
- Set preferences for viewing, sending, and receiving mail
- Sort messages by four different headings
 - Move selected items to multiple mailboxes
 - Aggregate multiple mailboxes into one view
 - Multiple send/receive/reply options



EXTENDED OPTIONS FOR GRAPHICAL CUSTOMIZATION

Blackboard 5 allows administrators to create a customized portal with tailored institutional branding throughout the platform.

- Add institutional logos to various screens within the platform
- Modify background colors and button styles to match institutional branding
- Change names of top-level navigational tabs

BLACKBOARD CLIENTS
1,800 Worldwide Including:

Arizona State University

*California State University
Dominguez Hills*

*Columbia University-
Teachers College*

Cornell University

Florida State University

FT Knowledge

Georgetown University

*Maricopa Community
College District*

*Mortgage Bankers
Association of America*

*Public Broadcasting System
(PBS)*

Seneca College (Canada)

Temple University

*University of Huddersfield
(UK)*

*University of Southern
California*

University of Tennessee

Wayne RESA

BLACKBOARD PLATFORM BUILDER

- Provides administrators with a module development environment, allowing for custom module development for institution-specific services and resources
- Allows developers to develop custom-coded modules for the entire e-Education enterprise
- Modules can be developed in a number of programming languages, including Java, HTML, etc.

LICENSING FLEXIBILITY

Blackboard 5 meets the rapidly growing needs of institutions by providing seamless interoperability between back-office administrative software systems and front-office student services including online teaching and learning, role-based campus communities, and institutional services.

Blackboard may be licensed at three distinct licensing levels:

BLACKBOARD 5 LEVEL ONE

- Industry-leading course management
- System management
- Basic My Institution modules (aggregation of course-specific information)

BLACKBOARD 5 LEVEL TWO

- Industry-leading course management
- Enterprise system management
- Multiple server configuration for enhanced scalability
- Supports Oracle8i and other relational databases
- Blackboard Building Blocks (B2) architecture, enabling seamless integration between the Blackboard platform and third-party learning applications, system services, and interfaces
- Role-based, academic portal environment for campus communities, clubs, and institutional services
- Customizable My Institution modules

BLACKBOARD 5 LEVEL THREE

- Industry-leading course management
- Enterprise system management
- Multiple server configuration
- Supports Oracle8i and other relational databases

Summary of new features and functionality in release 5.5 of Blackboard 5

- *Timed release of content and assessments—providing instructors the ability to pre-populate content and release to students as desired*
- *Learning units—enabling instructors to create sequential learning paths. Within a learning unit, instructors may embed content, graphics, assessments, etc.*

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- Blackboard Building Blocks (B2) architecture, enabling seamless integration between the Blackboard platform and third-party learning applications, system services, and interfaces
- Role-based, academic portal environment for campus communities, clubs, and institutional services
- Customizable My Institution modules
- End-user authentication and single login
- Advanced course and user management
- Real-time and event-driven integration with multiple SIS and administrative systems
- Advanced customization available via Blackboard Technical Solutions

Blackboard Platform Builder (available as an additional licensing option for Level Two and Three clients)

- Custom environment for module development and management
- Significantly expands customization capabilities

HARDWARE REQUIREMENTS

Blackboard hardware requirements are derived from client data and extensive simulated lab performance testing conducted on all supported operating systems. These requirements are based on the number of active users, defined as individuals enrolled in a course. Thus, it is likely that one enrolled student may have multiple active user accounts if enrolled in multiple courses.

HARDWARE REQUIREMENTS FOR FEWER THAN 3,000 ACTIVE USERS:

- One-server configuration
- Dual processors. Pentium III 800 MHz processors or Sun UltraSparc-II 450 MHz processors
- 2 GB of RAM
- Appropriate amount of hard drive space in a RAID array
- 10/100 network interface card

Summary of new features and functionality in release 5.5 of Blackboard 5

- *Gradebook and assessment enhancements—offering instructors added tools for customization, including grade weighting and sorting, reordering, and more*
- *Digital Course Cartridges available from the world's leading publishers—providing instructors with customizable course content covering hundreds of titles in dozens of subject areas*

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HARDWARE REQUIREMENTS FOR MORE THAN 3,000 ACTIVE USERS BUT FEWER THAN 6,000 ACTIVE USERS:

- One-server configuration
- Quad processors. Pentium III 700 MHz Xeon processors or Sun UltraSparc-II 450 MHz processors
- 4 GB of RAM
- Appropriate amount of hard drive space in a RAID array
- 10/100 network interface card

HARDWARE REQUIREMENTS FOR MORE THAN 6,000 ACTIVE USERS BUT FEWER THAN 12,000 ACTIVE USERS:

- Two-server configuration. One server for the application and file system and another server for the database
- Quad processors in each server. Pentium III 700 MHz Xeon processors or Sun UltraSparc-II 450 MHz processors
- 4 GB of RAM in each server
- Appropriate amount of hard drive space in a RAID array for each server
- Two 10/100 network interface cards in each server

Institutions with more than 12,000 active users should contact Blackboard Technical Solutions for guidance in designing a custom load-balanced configuration.

Please note that only Blackboard 5 Levels Two and Three are supported on a two-server configuration. Also, Level Three is not supported with a one-server configuration.

DETERMINING HARDWARE NEEDS

Blackboard recommends that institutions consider their anticipated growth when making hardware decisions. For example, a server with two processors, but room for four, and 2 GB of RAM, but room for 4 GB, will meet the minimum requirements for 3,000 active users and allow for a cost-effective upgrade. Please note that when moving to a configuration to support more than 6,000 active users, adding more processors and RAM to a one-server configuration will not significantly increase performance. At this point, the Blackboard 5 platform is best scaled by moving to a two-server configuration, each with quad processors and 4 GB of RAM. Blackboard 5 Level Two or higher is required to move to a two-server configuration.

Hard drive space should be allocated generously and configured in a RAID array that is easily expandable. The typical Blackboard course Web site uses about 5 MB of disk space. Course Web sites that contain numerous multimedia files often use much more. In addition, institu-

Summary of new features and functionality in release 5.5 of Blackboard 5

- *Blackboard Building Blocks (B2) system extensions—providing an open architecture that allows administrators and instructors to integrate third party learning applications, system services, and interfaces*
- *Advanced system management functionality—providing greater administrative functionality and customization*

tions should consider that, in many instances, they will store courses on the system after the course has finished. Institutions must allocate space for the application and database as well.

GUIDELINES FOR ESTABLISHING SERVER ADMINISTRATOR REQUIREMENTS

BLACKBOARD UNIX ADMINISTRATOR

- Strong knowledge/experience with Linux/Solaris
- Experience with Apache Web server
- Experience with MySQL
- Experience running mission-critical 24/7 application

BLACKBOARD WINDOWS NT/WINDOWS 2000 ADMINISTRATOR

- Strong knowledge/experience with Windows NT/Windows 2000
- Experience with Internet Information Server
- Experience with Microsoft SQL Server 7 and SQL Server 2000
- Some experience with accessing databases and SQL scripts
- Plus: MSCE certification

Also Recommended: Dedicated Database Administrator to install and configure the application.

SUMMARY AND CONCLUSION

The vision driving the Blackboard 5 platform strategy is straightforward. We believe that the greatest value proposition for our clients is our ability to deliver unlimited configuration and deployment options powered by an underlying academic operating system. Blackboard licensing flexibility, coupled with the open architecture and modular functionality, allows our growing user base of more than 1,800 clients to develop e-Education solutions that meet their particular needs. The 5.5 release of Blackboard 5 delivers dependable, intuitive, feature- and function-rich tools that represent a new, exciting era in e-Education.

For more information regarding Blackboard 5,
please contact us at 1.800.424.9299 or visit www.blackboard.com



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