



Bringing Education Online™

Blackboard

Product Strategy and Development Roadmap

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This white paper provides the most recent outline of specific innovations in Blackboard's product development pipeline, and is intended to inform our clients of development priorities that will shape our development efforts in the foreseeable future. It has been developed in advance of the release of Blackboard 5.5 to provide insight into our next release as well as to outline development efforts under review for Blackboard 6 and beyond.

Accompanying this white paper is Blackboard's white paper describing the Blackboard® Building Blocks (B²) initiative—our vision for an industry standard operating system powered by Blackboard-enabled tools, infrastructure, and content.

Blackboard's product strategy and development process combines internal research and development with external feedback from our clients and partners. Many of the innovations described in this paper come directly from requests made by Blackboard's most valued partners – the more than 1,000 unique institutions licensing the Blackboard e-Learning platform. We work closely with our clients as well as with industry analysts and business partners to determine the future direction for our platform.

To develop an effective path for implementing our product vision, we have implemented the following planning and development guidelines:

- ♦ *Release Schedule:* Beginning with Blackboard 5.5, we will release new versions of our product each spring followed by performance enhancements during the November timeframe. This is important to note, as it is an influential factor in determining the scope and prioritization of our product releases.
- ♦ *Development Priorities:* Blackboard releases a product vision based largely on user feedback, which will shape the evolution of our platform. The vision is then used as a benchmark for measuring change and determining feature, function, technical, and architectural modifications over time and allowing us to measure product development achievements effectively. It is sufficient to set overall priorities and flexible enough to accommodate immediate critical needs consistent with our methodologies for spring and fall releases.
- ♦ *Phased Development Cycle and Standard Software Life Cycle:* All of the feedback that we receive, both technical and functional, is reviewed based on development complexity and priority and then mapped to our software life cycle including requirements development, design and prototyping, coding, testing, and launch efforts. Development initiatives that span many releases

need an extended timeline, and are phased to accommodate risk factors and guarantee quality and stability.

Based on the B² initiative and our product strategy process, we expect to deliver innovation in the following key areas:

- ◆ Learning Management Tools
- ◆ Content Management
- ◆ Platform Architecture
- ◆ Breadth of Platform Functionality
- ◆ Platform Modularity
- ◆ Platform Customization
- ◆ Platform Management
- ◆ Advanced APIs and Extensibility Tools
- ◆ Integration of Value-added Web Resources
- ◆ Support for Open Industry Standards
- ◆ ADA Compliance and Accessibility
- ◆ Wireless

LEARNING MANAGEMENT TOOLS

The course management system has always been the core of the Blackboard platform. While Blackboard has received praise for its ease-of-use and functionality in this area, the company continues to address evolving user demand for new and improved functionality. As a result, we plan to focus heavily on improving the functionality of the key learning tools that support faculty and students. Some of the planned innovations in this core component of the platform include:

- ◆ Pedagogical flexibility – Allow faculty members to further customize the course environment by renaming and reordering navigation buttons and by exposing course Web site areas selectively by date, student, or course module completed, etc.
- ◆ Ease of use – Further streamline course navigation and wizard functions (e.g., syllabus and lesson builders).
- ◆ Communication tools – Include streaming video, Web-casting, archiving, etc.

- ◆ Assessment engine – Allow for additional question types, better feedback mechanisms, more advanced question pooling, and randomization, etc.
- ◆ Grade book functions – Enhance sorting capabilities of student assessment results.
- ◆ Student tracking – Provide instructors and academic advisors with the ability to follow the progress of a student through a course and set of courses.
- ◆ Adaptive learning – Selectively expose new content areas and learning modules to individual students within a course based on their performance on assessments.

CONTENT MANAGEMENT

Innovation in the area of content management is a significant development imperative for Blackboard. As an enabling technology, Blackboard will provide access to vast amounts of content (created by proprietary and third-party publishers) that may be easily customized for use in distinct courses or learning environments. Blackboard will continue to build into its platform more sophisticated ways of leveraging both proprietary and third-party publisher content into the online teaching and learning environment.

- ◆ Identify and import third party content based on IMS metadata and import standards.
- ◆ Browse and download publisher content cartridges from centralized online content repositories.
- ◆ Use shared content libraries to manage institutional academic resources.
- ◆ Cross-populate and migrate content to and from multiple courses.
- ◆ Use content APIs – allowing users to insert, modify, and delete content within the grade book feature.

PLATFORM ARCHITECTURE

Blackboard is an “e-Learning infrastructure” company that integrates tools, services, and interfaces. While achieving mission-critical thresholds for scalability is an important component of this vision, the major long-term development initiatives offered by our new architecture are reflected in the ability to cluster and configure disparate environments in order to power an underlying educational “operating system.” This initiative is discussed in the B² initiative strategic white paper. Some specific areas now under development that support these objectives include:

- ◆ Pursue aggressive load and stress testing for large-scale deployments. As the market evolves, Blackboard continues to learn of new customer usage patterns that can be applied to our testing of the platform prior to release.
- ◆ Deliver more options and advice for high-availability deployments. Blackboard will continue to develop criteria and configurations for enterprise deployments, experimenting with Blackboard on different hardware and network configurations to advise clients of best-practice configurations to support large numbers of users.

BREADTH OF PLATFORM FUNCTIONALITY

With Blackboard 5™, Blackboard has broadened the scope of our e-Learning platform to provide our industry-leading course management system and to deliver an end-to-end portal that integrates disparate administrative systems and other Web services that support the academic experience online. With APIs and other advanced interfaces, we will provide seamless integration between a variety of academic, administrative, and role-based contextual systems in the following areas:

- ◆ Admissions
- ◆ Alumni relations
- ◆ Bookstore services
- ◆ Bursar services
- ◆ Campus commerce services
- ◆ Career counseling
- ◆ Registrar services

PLATFORM MODULARITY

In delivering an e-Learning platform flexible enough to meet the unique needs of a broad range of institutions, Blackboard will continue to develop a module-based platform that enables administrators, faculty members, and students to select from and tailor functional modules to make the platform more relevant, role-based, and effective for all users.

- ◆ Develop the module-based architecture of Blackboard 5 portal environment for all areas of the platform (course environment, communities, administrator panels, etc.)
- ◆ Allow system administrators to enable/disable modules throughout all areas of the e-Learning platform (e.g., communities, third party services).
- ◆ Enable administrators to browse and download Blackboard-developed and third party functional modules available at Blackboard.com (e.g., new library search module or student services module).
- ◆ Let instructors enable/disable modules throughout the course environment (e.g., real-time chat, external Web services).
- ◆ Allow students to enable/disable modules throughout the personalized online campus environment (e.g., personal calendar, address book, news, weather).

PLATFORM CUSTOMIZATION

Blackboard realizes that each institution's constituents and requirements are different; therefore we are making the Blackboard platform as customizable as possible. Some specific initiatives include the following:

- ◆ Customization within all areas of the e-Learning platform to reflect each institution's unique brands (e.g., My Institution page).
- ◆ Institutional branding and domain management, providing uniquely-branded environments for different schools or branch campuses within a single institution.
- ◆ Modular architecture so that institutions can choose from Blackboard-provided or third party components (e.g., assessment engine) throughout the online campus.
- ◆ A common method for incorporating Blackboard modules, carrying third party functional modules, or accessing information or functionality on the Internet – all without having to custom program or learn multiple methods of integration.
- ◆ Role-driven services so that prospective students, students, faculty members, administrators, and others can enjoy relevant campus services enhancing convenience.
- ◆ Support for commercial licensees to further customize the Blackboard platform to suit their unique for-profit needs (e.g., tuition billing, linking to multiple systems).

PLATFORM MANAGEMENT

To help our clients support the growth of the Blackboard platform at their institutions, we are committed to delivering more robust platform management capabilities, such as:

- ◆ Automation capabilities for system administration (e.g. system backups at a pre-determined date and time; making course registration modules available during pre-determined registration periods).
- ◆ Tools for archiving course Web sites to a backup file during non-active academic terms, and archiving course data and discussion boards during the semester.
- ◆ Mobility of courses and content between different versions of Blackboard, in support of having multiple versions of Blackboard “live” on campus.
- ◆ Automatic collection and reporting of campus-wide and course-specific usage statistics and report to system administrators.

ADVANCED APIs AND PLATFORM EXTENSIBILITY

Blackboard strives to provide an e-Learning platform that is both easy-to-use and flexible because each client institution is different and has its own unique needs. To make the Blackboard platform as extensible and customizable as possible, Blackboard plans to release a line of extensibility products beginning with the Blackboard® Platform Builder™ released in December 2000.

- ◆ The Blackboard Platform Builder
 - Allows the institution to develop, test, and deploy their own custom modules for their e-Learning portal configuration. (e.g. customized modules that enable students to search the library card catalogue through the institution's portal interface, or a modules that allow students to purchase books from the campus bookstore online.)
 - Allows developers to build portal modules with the Blackboard 5 platform using server side Java.

- ◆ APIs
 - Integrates Blackboard with other systems on campus.
 - Products will include a Blackboard Security Bridge, Blackboard-PeopleSoft Bridge, Blackboard-Datatel Bridge, Blackboard-SCT Banner Bridge, etc.

INTEGRATION OF VALUE-ADDED WEB RESOURCES

As an integral part of its e-Learning platform strategy, Blackboard seeks to make the best of the Internet available to clients. In July 2000, Blackboard launched the redesigned Blackboard.com Web site, featuring three Web channels: CourseSites, Resources, and Communities. These Web channels, when integrated into the Blackboard platform, deliver real-time Internet services specifically tailored to academic institutions. For example, the Resources channel provides 253 discipline-specific academic resource sites complete with news, an academic search engine to locate journal articles, research tools, links to external Web sites, and more. Blackboard plans to provide tighter integration between the core platform and the Web channels, as follows:

- ◆ Power the CourseSites (course creation) channel on Blackboard.com, the world's largest site for online courses, with Blackboard.
- ◆ Expand Blackboard 5 to support other channel services, such as online communities and course marketing.
- ◆ Tighten integration of channel services into the user interface of platform, creating a seamless experience for faculty and students accessing both the institutional portal and relevant information from the Internet.
- ◆ Enable access to Blackboard's Web channels, ensuring that a single campus log-in allows users to navigate through to Blackboard's Internet services.

WIRELESS

Blackboard is actively preparing for a future where students, faculty members, and administrators all access the online through handheld Internet appliances. Wireless initiatives will:

- ◆ Provide capabilities for Blackboard users to work offline and synchronize work and data between the user's PC or handheld device and the Blackboard platform server.
- ◆ Enable Blackboard access from wireless PDAs and network appliances – Blackboard is already working with Palm Computing to provide access to Blackboard installations through the Palm VII personal digital assistant.

SUPPORT FOR OPEN INDUSTRY STANDARDS

Blackboard supports a variety of industry standards because standards speed innovation and system compatibility and protect client investments in technology. Specific industry standards initiatives supported by Blackboard include:

- ◆ IMS Standards – Blackboard was the original technical contractor to the IMS standards and continues to support this effort. The emerging IMS standards provide a common format for content interchange and content meta-data, and other areas of platform interoperability.
- ◆ Shareable Courseware Object Reference Model (SCORM) – A Department of Defense Advanced Distance Learning initiative, SCORM aims to standardize the runtime environment and re-use of Web-based educational content. SCORM represents the harmonization of several standards, including IMS and AICC, and will be supported by Blackboard as the standard evolves.

- ◆ Schools Interoperability Framework (SIF) – Blackboard supports this effort of the Software and Information Industry Association, that is working to create technical standards to benefit K-12 schools nationwide, lowering their support costs and improving services to students.
- ◆ JA-SIG – Blackboard is closely monitoring the development of this higher education portal initiative, with the goal of providing compatibility for JA-SIG portal modules and the Blackboard institutional portal.

ADA COMPLIANCE AND ACCESSIBILITY

Blackboard is committed to the accessibility of our e-Learning platform. We are working with leaders in the accessibility field to bring our software into compliance with industry standards and federal guidelines for accessibility.

- ◆ Blackboard is working with with Utah State University, The TLT Group, PBS, and Western Governors University in a Learning Anywhere Anytime Project (LAAP) federal grant, Web Accessibility In Mind (WebAIM). WebAIM focuses on educating instructors, administrators, and course designers on how to build accessible online learning environments. Blackboard is participating as the online learning platform for this project, and we will be working with experts in the WebAIM team to build out the accessibility features and accessibility standards compliance of Blackboard software during this four year project.
- ◆ Standards For Accessible Learning Technologies, or the SALT Partnership, is a four-year initiative to develop and promote open access specifications and effective models that enable people with disabilities to have equal access to the growing wealth of online learning resources. Blackboard is collaborating with the National Center for Accessible

Media and the IMS Global Learning Consortium in this LAAP project, and the Department of Education will provide a \$1.8 million, four-year grant as funding for this endeavor.

Blackboard is continuing to research and evaluate additional assistive technology optimization, including alternate interfaces and user-level accessibility customization. As an interim solution, we are creating assistive technology guidelines to help users find and use assistive technology that will work with our software. We are also committed to expanding our training and education for accessibility issues. All users participating in a Blackboard Learning Services training session are instructed on the accessibility features of the software.

BLACKBOARD 5.5

General Availability for Blackboard 5.5 is scheduled for early May. This release focuses on platform optimization, stability, and performance. In addition to these general platform enhancements, the following new features will be introduced into the Blackboard 5.5 teaching and learning and portal environments:

- ◆ *Lesson Builder*: This enhancement to the teaching and learning environment is designed to facilitate linear pedagogy by providing modular content release and content flow. Using the lesson builder, instructors will be able to develop and deliver content sequentially.
- ◆ *Grade book enhancements*: In addition to defect fixes and graphical enhancements, several new features will be introduced to the grade book function of the assessment engine. Most notably, instructors will be able to post mid-semester and final grades, and use new tools that allow grade book columns to be sorted by student ID, first name, or last name. Additional interfaces

will also allow instructors to transfer files and data into the gradebook function more seamlessly.

- ◆ *User availability:* Instructors will be able to limit course availability for students.
- ◆ *Announcements:* The default setting for course announcements will be set to one week.
- ◆ *Portal Modules:* New portal modules will be made available for Levels Two and Three customers.
- ◆ *Accessibility:* Blackboard 5.5. will feature the following accessibility enhancements:
 - All system images will have alt tags, and instructors will be able to add alt tags to uploaded images in the content creation areas of the software (with the exception of optional assessment images, which should be described in the question or answer text).
 - Framesets will be appropriately titled and will have meaningful <noframes> content, describing the functionality of the frames layout.
 - Data tables will be optimized for use with screen readers by adding attributes to associate column headings with table content.

For Blackboard 5 Levels Two and Three customers, Blackboard 5.5 will provide new system interfaces allowing for greater customization, integration, and connectivity to external content management systems. These interfaces will include:

- ◆ Content interface
- ◆ Calendar interface
- ◆ Announcement interface
- ◆ Course creation interface
- ◆ Catalog interface

Blackboard 5.5 will provide greater customization and integration allowing our clients to seamlessly migrate to a highly scalable platform.

BLACKBOARD 6

Blackboard 6 is the next stepping-stone toward the B² initiative. A topline preview of development initiatives under review for Blackboard 6 include:

- ◆ Assessment enhancements, including grade book and quiz/test generation.
- ◆ Virtual classroom improvements that provide greater synchronous functionality and audio/video functionality.
- ◆ Added pedagogical tools and functions, such as a lesson/module builder and time/date stamping for content.
- ◆ Development of an instructor library for the movement of content to and from multiple courses.
- ◆ Web-based authoring components that provide modifications to text content and the ability to create graphical equations.
- ◆ Standard specifications and interfaces for the connectivity to other third-party tools such as Horizon-Live and Question Mark.
- ◆ Course search tool improvements and metadata upgrades.
- ◆ System standards upgrade for AICC, IMS, and SCORM implementations and content transfers.
- ◆ Accessibility upgrades for the graphical interface and added hidden navigation for screen readers.
- ◆ Redesigned Assignment submittal and tracking process.
- ◆ Increased graphical customization and greater support for multi-institutional implementations.

- ◆ New system, graphical interfaces for the easy transfer of content from institutional asset management systems.

CONCLUSION

The vision driving our platform strategy and development is straightforward. We believe strongly that a strategy based on unlimited configuration and deployment options, powered by an underlying educational “operating system” – presents the greatest value proposition for Blackboard’s client constituents – campus technologists and administrators, faculty, students, and technology partners. As an enabling technology – Blackboard has very deliberately avoided a “feature overload” product development strategy. The “cookie-cutter” approach employed by many course-authoring systems will no longer be a viable solution for dynamic e-Learning organizations because one size does not fit all. By focusing our strategy around tools, services, and interfaces, Blackboard will emerge as an industry standard e-Learning infrastructure company. This product development blueprint presents many of the features and innovations that will help us realize our objectives. As always, we welcome and greatly appreciate your thoughts and ongoing feedback.

For more information regarding Blackboard's products and services,
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