

# Blackboard 5<sup>TM</sup>

---

*Introducing the Blackboard 5: Learning System*

---

*Authored by...*

David Yaskin  
Vice President  
Product Management

*and*

Stephen Gilfus  
Corporate and Product Strategy  
SVP Strategic Development

---



---

## TABLE OF CONTENTS

Blackboard Introduction .....	2
Blackboard 5™ at a Glance.....	2
Course Management .....	3
Building Blocks™ Architecture .....	7
Advanced Integration and System Management.....	8
Enterprise Platform Architecture .....	12

---

**B**lackboard software solutions and services are at the forefront of the emerging e-Education industry. Licensed by more than 2,000 clients across the globe, Blackboard offers a suite of e-Education systems that include:

- *Blackboard Learning System*
- *Blackboard Community Portal System*
- *Blackboard Transaction System*

---

## INTRODUCTION:

Today's education landscape is characterized by rising enrollments, changing demographics, and greater demand for anytime/anywhere learning. Expectations by all stakeholders in the e-Education enterprise have never been higher. Students expect a seamless online environment that unifies academics and student life. Administrators are pressed to do "more with less" - and expect scalable, enterprise-wide solutions that provide maximum flexibility and choice. CIO's expect that today's investments in IT infrastructure will yield immediate benefits, interoperate with complementary technologies, and provide a clear path for seamless platform upgrades as emerging technologies and innovations come to market.

Blackboard Inc. offers a suite of e-Education solutions designed to meet the emerging challenges facing educational institutions. Today, more than 2,000 institutions worldwide rely on Blackboard to provide best-in-class solutions through the following products:

- **Blackboard Learning System**
- **Blackboard Community Portal System**
- **Blackboard Transaction System**

This white paper provides a comprehensive overview of the Blackboard Learning System, the industry-standard enterprise course management system.

---

## BLACKBOARD 5: LEARNING SYSTEM (RELEASE 5.6) AT A GLANCE

Blackboard 5™ is a Web-based server software system that offers industry-leading course management, an open architecture for customization and interoperability, and a scalable design that allows for integration with student information systems and authentication protocols. Whether locally installed or hosted via Blackboard ASP Solutions, the current 5.6 release includes the following core features and functionality:

- **Course management**
- **Blackboard Building Blocks<sup>SM</sup> architecture for interoperability and customization**
- **Advanced integration and system management**

**W**hat types of organizations license Blackboard e-Education software?

More than 2,000 clients in more than 70 countries, including:

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

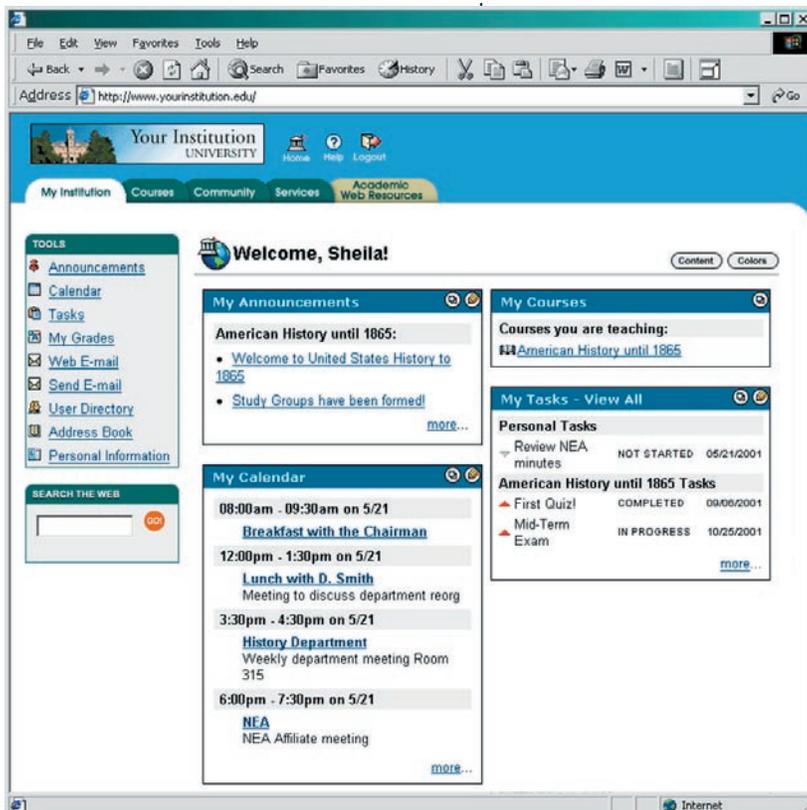
## COURSE MANAGEMENT

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
- **Assessments**—test and quiz capabilities, gradebook
- **Control**—instructor management utilities for instructors

## Content Management

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



- See announcements, calendar events, tasks, and grades from multiple courses in one aggregated view

- Access 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

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

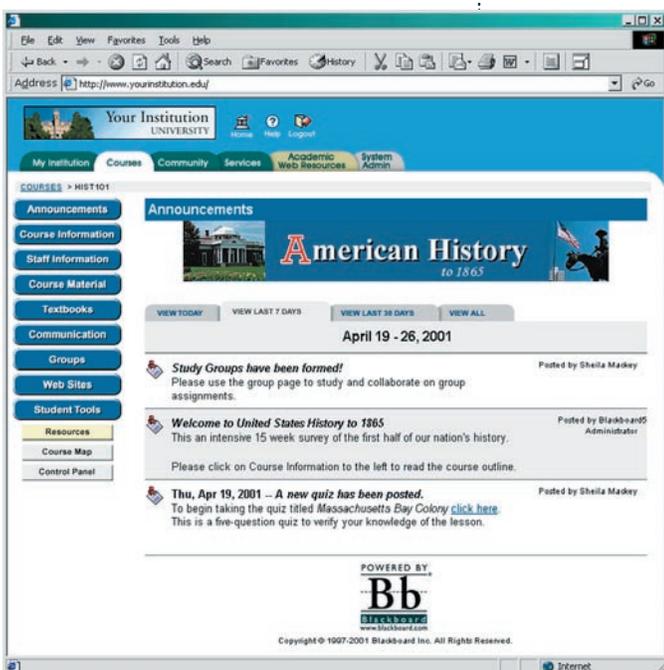
- Create folder structures to organize content

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

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

- Browse discipline-specific information, and resources and communities - just one 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
- Access and download free training materials (in PDF and multimedia formats) to learn how to use Blackboard products more effectively



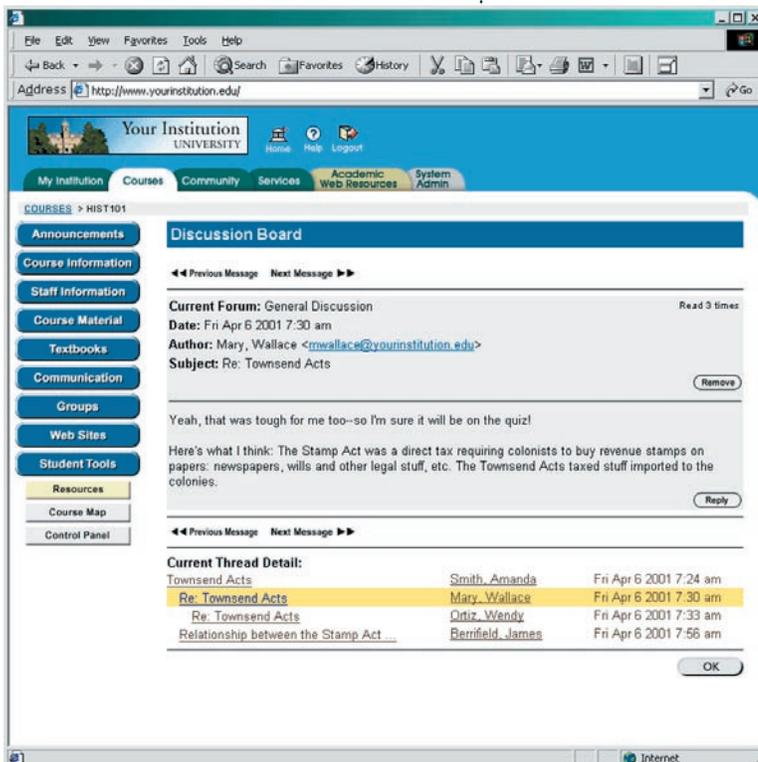
Instructors can access complete sets of teaching tools for import to Blackboard-powered course Web sites.

- Blackboard-enabled Course Cartridges are available from leading academic publishers via the Blackboard cartridge server
- Seamlessly download professional digital course content into any Blackboard teaching and learning environment
- Instructors can customize downloaded Course Cartridge materials to supplement their courses with these publisher content modules
- Hundreds of Course Cartridges are available in dozens of academic disciplines through Blackboard’s Course Cartridge server.

## 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



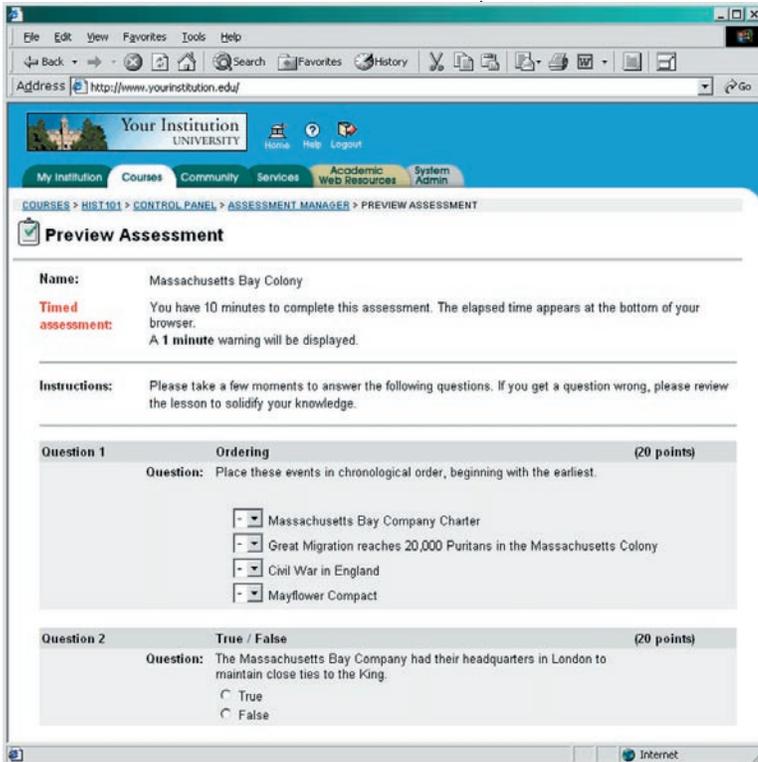
- Manage participation in forums by sorting messages according to thread, author, date, or subject; tracking read and unread messages; and collecting multiple messages onto one page for easy reading, comparison, and printing

- Manage forums by assigning students administrative responsibilities, locking messages so they 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 up Web pages in updated virtual classroom environment

- Submit work and assignments through the digital dropbox

- Create groups of students for collaborative work and enable protected discussion boards, virtual class rooms, 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 a simple, step-by-step process to create quizzes and surveys
- Mix and match diverse question types: multiple choice, multiple correct, true/false, matching, ordering, fill in the blank and essay
- Include multimedia or other attachments with assessment questions
- Create question pools that can be shared across courses
- Import prepared test banks from external sources
- Provide question randomization and reuse 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, which allows for sequential release
- Create statistical reports of student answers

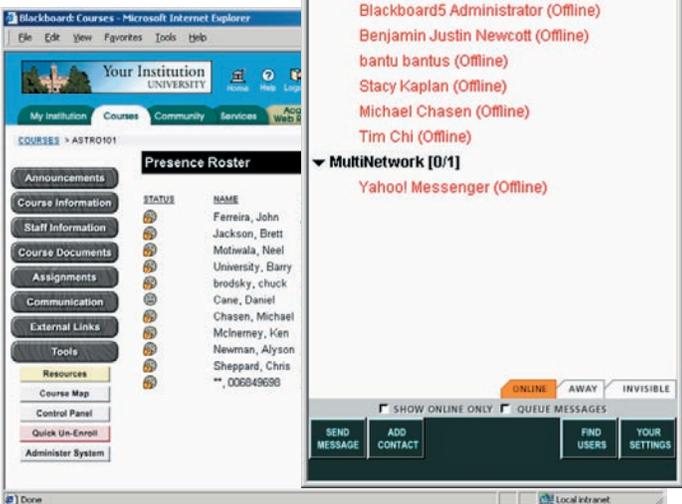
## Control

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

## BLACKBOARD BUILDING BLOCKS:



## BUILDING BLOCKS™ ARCHITECTURE

The Blackboard Building Blocks Program is a dynamic architectural component of Blackboard’s approach to e-Education. Blackboard Building Blocks centers on an open platform architecture, which enables clients to seamlessly integrate tools, content, and commercially licensed or homegrown applications with the Blackboard platform. This supportable framework for platform customization not only provides flexibility and choice, but also maintains the integrity of the core system, ensuring seamless upgrades and cross-application interoperability. Among the many benefits of the Blackboard Building Blocks Program:

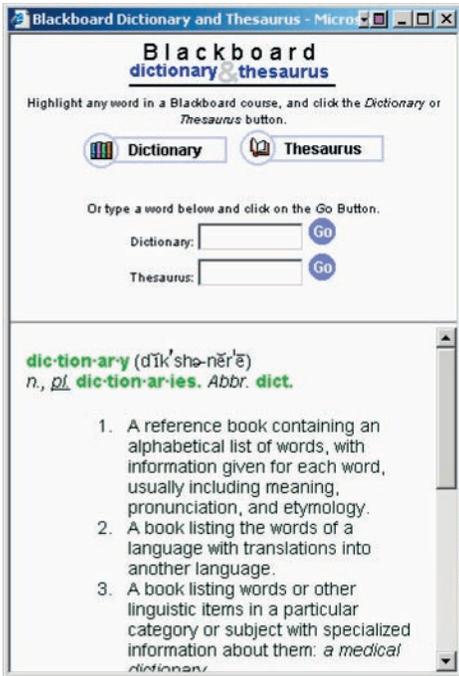
- Integrate home-grown technology with Blackboard and share it with other institutions
- Interoperate with commercial technology
- Plan and develop freely distributed or commercially supported applications as extensions to the Blackboard platform.
- Access existing Blackboard functionality and graphical interfaces through standard supported APIs

Examples of currently available Building Blocks system extensions include:

**Bantu Instant Messenger:** This web-based Instant Messenger will allow students, instructors and faculty to communicate in real time, and lets instructors easily create curricular study groups or online “office hours.” The Messenger itself is fully customizable by both students and instructors.

**Blackboard Link Checker:** With this tool, instructors can validate the Web links within the External Links area of their course.

**Blackboard to Go:** Synchronize Blackboard course data with a handheld device (Palm OS or Microsoft). Currently in beta testing, this capability will be generally available in January 2002.



**Dictionary and Thesaurus:** This is a student and instructor extension that allows the user to highlight any word in a Blackboard course and look up the dictionary or thesaurus.

**WYSIWYG Editor:** This editor allows users to change the font, bold, underline, and color of text, all without knowing HTML. A built-in spellchecker is included for additional convenience.

Dozens of additional system extensions will be available concurrent with the upcoming release of Blackboard 6 in the spring of 2002.

---

## ADVANCED INTEGRATION AND SYSTEM MANAGEMENT

For many clients, large-scale usage and adoption of e-Education software requires an infrastructure that permits data integration and customization, to optimize operational and administrative system management. 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, as well as with authentication protocols. Core to Blackboard's product development mission is a commitment to integrate with any leading student information system (SIS) or back-office ERP system. Product features and functionality are backed by the Blackboard Technical Solutions team, which currently manages more than 120 high-scale integration projects. The Blackboard 5.6 Learning System can integrate with administrative and authentication systems that include:

---

### Supported Databases:

- *Windows NT: SQL Server 7 (Service Pack 2)*
  - *Windows 2000: SQL Server 7 (Service Pack 2) or SQL Server 2000 (Service Pack 2)*
  - *Sun Solaris: MySQL or Oracle 8i (not bundled)*
  - *Red Hat Linux: MySQL or Oracle 8i (not bundled)*
- ✓ SCT Plus 2000
  - ✓ SCT Banner 2000
  - ✓ Peoplesoft 7.6
  - ✓ Datatel 16
  - ✓ LDAP
  - ✓ Kerberos
  - ✓ Homegrown SIS

## **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

### **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

In order to successfully manage growth and integrate course management with other 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 from an institution's information systems into Blackboard 5. The information model used by Blackboard 5 is that defined by the Instructional Management System (IMS) consortium. Data integration can be achieved through the snapshot tool, which allows users to schedule one-time or periodic (hourly, daily, weekly) data transfers from existing enterprise systems. In addition, data integration can be achieved through real-time, event-driven information transactions.

### *Snapshot Integration*

With snapshot integration, administrators utilize a snapshot tool and 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 Integration*

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.

## Supported Operating Systems and Web Servers:

- *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*

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

- Automate entry of users
  - Replaces manual administration
  - Manages 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

### *Authentication*

The Blackboard 5.6 Learning System provides out-of-the-box support for the LDAP 3.0 authentication protocol to automate the setting, management, and resetting of user passwords.

### *System Management*

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
- 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

## 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

---

## ENTERPRISE PLATFORM ARCHITECTURE

Blackboard's flagship solution provides a powerful architecture for scalable, enterprise-wide platform deployments, anchored by three primary factors:

- Scalable, modular and interoperable product architecture
- Relational database at the course management level
- Standards-compliance and advocacy

### *Scalable and modular architecture:*

At institutions worldwide, individual Blackboard 5 installations are powering e-Education environments comprised of thousands of courses and tens of thousands of users. This level of platform scalability is achieved through its modular architecture and the resulting ability to distribute various applications within Blackboard 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 Perl scripts and Java servlets) 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.

### **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.

## Standards compliance and advocacy

Blackboard is a strong advocate for open industry standards and supports standards efforts such as IMS, AICC, and SCORM. In addition, Blackboard interoperates with JASIG and Oracle portal technologies. As a result of Blackboard participation in these initiatives, Blackboard provides 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. 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. Publisher-developed Course Cartridges are available from most of the major educational publishers, including Bedford, Freeman & Worth; Harcourt College Publishers; Houghton Mifflin; John Wiley & Sons; McGraw-Hill; Pearson Education (Addison Wesley, Allyn & Bacon Longman, Prentice Hall); Thomson Learning (Brooks/Cole, Course Technology, Delmar, Southwestern, Wadsworth); and W.W. Norton & Company, as well as course-pack publishers such as XanEdu.

**For more information regarding the  
Blackboard 5: Learning System please contact  
us at +1 (202) 463-4860 or (800) 424-9299 or  
visit [www.blackboard.com](http://www.blackboard.com)**

Copyright © 2002 Blackboard Inc. All rights reserved.



**Washington, DC Campus:**

1899 L Street, NW, 5th Floor  
Washington, DC 20036  
800.424.9299  
202.463.4860  
202.463.4863 fax

**Phoenix, AZ Campus:**

22601 North 19th Avenue, Suite 200  
Phoenix, AZ 85027  
800.528.0465  
623.476.1400  
623.476.1401 fax