



**Blackboard**

# Setup Guide for Windows<sup>®</sup>

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**Release 6.3**  
***Blackboard Community System™***

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## About the *Blackboard Community System* Setup Guide

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### Overview

The goal of the *Blackboard Community System* Setup Guide is to provide institutions with all the information needed to make the *Blackboard Community System*™ continuously available to users. Institutions have the choice of hosting their own installation or having their Blackboard installation hosted by Blackboard ASP Solutions.

Institutions that choose to have their installation hosted by Blackboard ASP Solutions will find the information in this Guide to be informative, but not necessary to making the *Blackboard Community System* continuously available to users.

This guide will cover:

- Prerequisites for establishing a continuously available installation of *Blackboard Community System*
  - Installation of *Blackboard Community System*, other licensed products, and supplemental components
  - Maintenance and fine tuning of *Blackboard Community System*
  - *Blackboard Community System* architecture and file structure
  - Utilities for administering the system
-

## Manual Conventions

To make this manual easier to use a number of conventions appear throughout. These conventions are detailed in the table below.

Symbol	Description
<b>Bold type</b>	A button or field name.
Courier font	Code samples, file names, and commands.
<b>Steps</b>	Tasks users should perform.
<i>Italics</i>	Italicized text is used for titles as well as to identify some variables.

**Note:** Examples in this manual use C:\blackboard as the *Blackboard Community System* home directory.

## **Introduction to the *Blackboard Community System***

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### **Who uses the *Blackboard Community System*?**

Many different types of institutions use the *Blackboard Community System*, including:

- Elementary and secondary schools
- Universities and colleges
- Vocational schools
- Corporations

Each institution customizes the content and appearance of the *Blackboard Community System* to meet its goals.

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**Why do institutions choose *Blackboard Community System*?**

Institutions that use the *Blackboard Community System* have access to the course management, integration, and portal features that are part of the platform. The features of the *Blackboard Community System* can also be expanded using Blackboard System Extensions. Blackboard System Extensions allow institutions to install custom tools and features that they build themselves or that are built by vendors other than Blackboard.

In addition to the almost limitless number of tools and features available for the *Blackboard Community System*, institutions can customize and brand the *Blackboard Community System* according to the needs of specific groups of users.

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**About Blackboard Inc.**

Blackboard Inc. develops, licenses, and supports enterprise software applications for the global education market. Working in concert with over 2,600 client-institutions and dozens of technology partners, Blackboard is committed to enabling client innovation and enriching the educational experience through information technology and offers the industry 's leading e-Education platform. Blackboard 's suite of enterprise applications includes the *Blackboard Learning System*™, *Blackboard Community System*™, and *Blackboard Transaction System*™. Through the use of *Building Blocks*™ technology, Blackboard's suite of applications has been architected and designed to deliver a flexible, customizable, and seamlessly integrated operating environment for e-Education.

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## Chapter 1—Before Installing the *Blackboard Community System*

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### Overview

This chapter presents some topics that must be addressed before installing the *Blackboard Community System* to ensure a successful installation and rollout. It includes information on technical and personnel considerations as well as some items to consider in the planning and preparation process.

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### In this chapter

Chapter 1—Before Installing the *Blackboard Community System* includes the following topics.

Topic	Description
<a href="#">Technical Requirements</a>	This topic covers the technical requirements for installing the <i>Blackboard Community System</i> .
<a href="#">Preferred Technical Skills</a>	This topic offers suggestions on the skills needed to successfully install and maintain the <i>Blackboard Community System</i> .
<a href="#">Planning and Preparation</a>	This topic offers some issues to consider during the planning for the installation and rollout of the <i>Blackboard Community System</i> .
<a href="#">Hardware Configurations</a>	This topics covers the most common hardware configurations used with the <i>Blackboard Community System</i> .
<a href="#">SQL Server Failover</a>	This topic describes how SQL Server Failover can be used with the <i>Blackboard Community System</i> .

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## Technical Requirements

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### Overview

The hardware and software requirements for the *Blackboard Community System* are published as the *Blackboard Community System* Minimum Hardware and Software Requirements. These charts are available on the Behind the Blackboard extranet.

To access Behind the Blackboard, login at <http://www.blackboard.com/products/services/support.htm>. After logging in, navigate to the Reference Center to view *Blackboard Community System* documentation.

In addition to those requirements there are also a couple of software applications, available for free, that are required.

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### Java™ 2 Software Developer's Kit, Standard Edition

**Note:** For more information on Java technologies used with the *Blackboard Community System*, please see Knowledge Base article **181-856**. This article also includes instructions for updating the Java 2 SDK.

For use with the Blackboard Community System (Release 6.3), Blackboard requires:

Java™ 2 Software Developer's Kit, Standard Edition, version 5.0 or higher patch level.

Release 6.3 should be installed and run using Java 2 SE version 5.0.

Download and apply the latest version from <http://java.sun.com/j2se/1.5.0/download.jsp>

J2SE must be installed on the application server and the path must be accessible by the *Blackboard Community System*.

Do not use any spaces in the path to the J2SE. For example, use C:\J2SE\ rather than C:\Program Files\Java\.

Sun updates the J2SE frequently. If the links above do not show the required version, then look in the archives section of the site for the correct version: <http://java.sun.com/products/archive/>.

**WinZIP.**

WinZIP is a popular file compression program. The *Blackboard Community System* required version can be found at:

<http://www.winzip.com>

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**Supported file system**

Blackboard Community System will only work with the NTFS file system. It will not work correctly if the Windows 2000 file system is FAT32.

To check the file system in use on a disk, follow these steps:

- Step 1** From the Desktop of the Windows 2000 operating system open **My Computer**.
  - Step 2** Right-click on the disk where the *Blackboard Community System* will be installed.
  - Step 3** Select **Properties**.
  - Step 4** The **File System** field should show NTFS. If it shows FAT32, consult the operating system documentation for instructions on converting the disk to a NTFS file system.
- 

**IIS 5.0 Compatibility Mode**

IIS 6.0 must be run in IIS 5.0 compatibility mode. IIS 6.0 is included with Windows 2003 Server.

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## Preferred Technical Skills

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### Overview

Installing and supporting a Blackboard installation hosted at the institution requires some specific technical skills. It is important that human resources that understand the installation and support of enterprise software are available to install and maintain the *Blackboard Community System*.

Before attempting to install, please ensure that the appropriate skill sets are available to support the installation and maintenance of the *Blackboard Community System*.

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### Database Skills

The following database skills are recommended for installing and maintaining the *Blackboard Community System*.

- Experience with Microsoft SQL Server 2000
  - Accessing database and running SQL scripts
  - Online and offline database backup and restore
  - Monitor and reconfigure database parameters to meet growing demand
  - Tune the performance of the host machine and the database server
- 

### Network Skills

The following networking skills are recommended for installing and maintaining the *Blackboard Community System*.

- Troubleshooting network bottlenecks
  - Experience with threading
  - Knowledge of authentication and experience with institutional authentication methods (LDAP, Active Directory®, or similar method)
  - Experience supporting 24/7 network environments with failover contingencies
  - Experience configuring load-balanced solutions
-

### **Operating System and Web/app server skills**

The following operating system and Web/app server skills are recommended for installing and maintaining the *Blackboard Community System*.

- Experience with IIS
  - Experience with the Windows® operating system including file management and permissions
  - Experience in optimization and monitoring techniques
  - MCSE certification or comparable knowledge and experience
  - Comfortable with using a text editor to make changes to configuration files
  - Experience installing software
  - Knowledge of starting and stopping applications on the server to avoid damaging or corrupting the workstation or database
  - Knowledge of creating scheduled jobs to automate system processes such as backup and log file management
  - Experience installing and troubleshooting operating systems
  - Comfortable using the command line interface
  - Understand how Web/app servers work and be able to start and stop the various servers and system processes
  - Knowledge of how to add hardware to the server
  - Perform tape backups and tape archive programs and understand how to use these backup tools to move files around the system and between machines
  - Experience running a mission-critical application
  - Experience managing multiple points of integration
-

**Developer skills**

The following skills are recommended to create System Extensions or to use the Event-Driven API.

- Familiar with compiling software
- Relational database experience
- Java developer experience comparable to a mid- or senior-level programmer
- Experience programming Java Server pages
- Experience with JDBC 2.0
- Experience with Java 2
- Connection pooling
- Creating and testing JSPs
- Object-oriented programming

For assistance with integration, please contact Blackboard Technical Solutions. System Extension developers can find more information in the Blackboard Developer's Center through the Behind the Blackboard extranet service (<http://www.blackboard.com/dev/index.htm>).

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## Planning and Preparation

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### Overview

This topic covers some issues that may need to be addressed while planning and preparing for the *Blackboard Community System*. Each school or institution that uses the *Blackboard Community System* is unique and will require specific and detailed planning to implement the *Blackboard Community System*. The information in this topic should not be used as a comprehensive guide but rather as a set of items that should be considered and adapted to each institution.

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### Develop a learning model

Before installing the *Blackboard Community System* or making it available to users it is important to define how it will be used at the institution. Having a sound plan for how the *Blackboard Community System* will be used helps ensure that configuration and security decisions are aligned with the goals of the institution. Some items to consider:

- Define a naming convention for courses and users on the system.
- Determine what information and areas of the system are accessible to each set of users (Instructors, Students, Guests, and so forth).
- Identify the other information systems will interact with the *Blackboard Community System*. Define which system owns the data.
- Build a team to manage the system, support users, and develop tools and content.

These are just a few examples of the decisions that go into developing a learning model. Each institution will have a unique approach appropriate for its users.

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**Create a test environment**

Creating a test environment is a critical step in the process. A test environment allows system and database administrators to tune the software for maximum performance based on the needs of the institution. Developers use the test environment to build System Extensions prior to rollout as well as developing tools for integrating with other information systems at the institution.

Finally, a test environment helps resolve potential issues with hardware or software before rolling out the *Blackboard Community System* to users.

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**Establish a support infrastructure**

Having qualified, trained staff to support users is important to operating smoothly with little interruptions to users. Define what level of support is required and when it should be available to users. Some institutions may require 24/7 support while others can operate with less. After training staff and defining support availability and expectations be sure to communicate this information to users.

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**Run a pilot program**

After the software is installed, configured, and tested and the support staff is trained it is a good idea to launch a pilot program. A pilot program lets a few users on the system to work with the software in the context of the learning model. This is a good time to spot roadblocks or issues that may impact users when the software is rolled out. Also, the pilot program participants (especially the Instructors) can take a leadership role among their peers when the software is rolled out. These users can train other users on the software and help them successfully adopt the learning model.

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**Rollout**

When the *Blackboard Community System* is ready for users it is important to communicate key information to users. Make sure the user base has access to training sessions, support, and other resources to help them begin using the system.

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## Basic Hardware Configurations

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### Overview

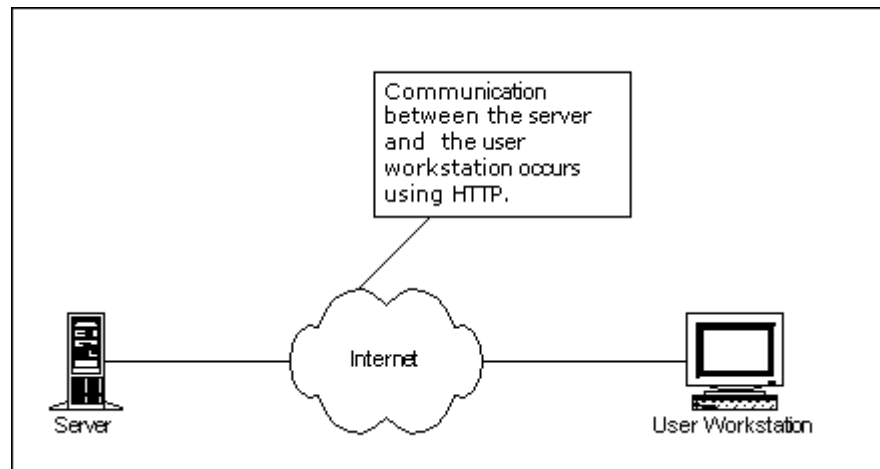
Most *Blackboard Community System* installations are run on a one server or two-server configuration. Each of these hardware configurations is described in more detail in this topic. For more information on the separate application components please see [Chapter 3—Blackboard Community System Application Architecture](#).

---

### One server

When running the *Blackboard Community System* on one server all components are run on the same machine. This is a good solution for small institutions that do not have a heavy load or content-rich courses.

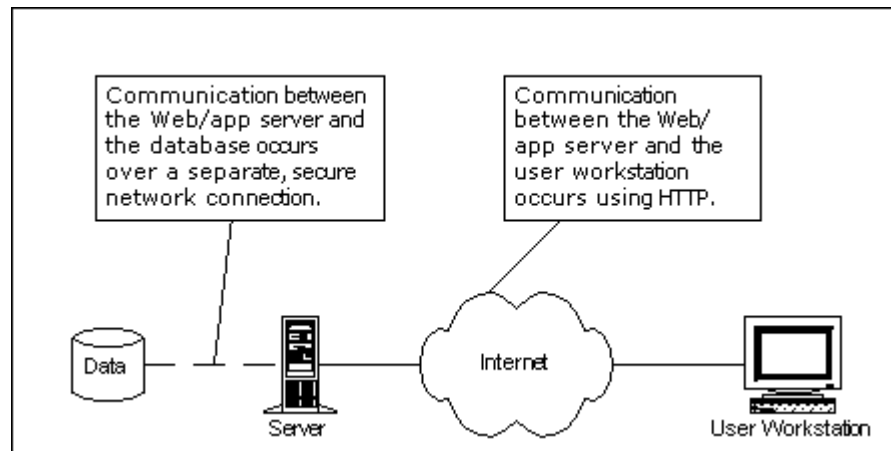
A one-server configuration is a very simple design as shown in the diagram below.



## Two servers

One server acts as the Web/app server and the other server is a dedicated database server in a two-server configuration. Communication between the database server and the Web/app server should be done through a private network connection. This is a good solution for medium or large institutions that anticipate heavy load and content-rich courses.

A typical two-server hardware configuration is shown in the diagram below.



## Advanced configurations

The *Blackboard Community System* also supports SQL Server® Failover. SQL Server Failover adds an additional database server or servers as backups to the live database. These additional databases are not put into use unless the live database experiences an error that forces it to cease functioning. For more information on SQL Server Failover please see the [SQL Server Failover](#) topic.

## SQL Server Failover

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### Overview

The *Blackboard Community System* is designed to work with Microsoft SQL Server Failover clusters. SQL Server Failover provides added fault tolerance to the database by using another database in the cluster in the case of an error that causes the production database to fail.

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### What is a Microsoft SQL Server Failover cluster?

A SQL Server Failover cluster is based on the same design as a Windows cluster. A group of servers are joined together to provide continual service in the event of an outage or failure. When SQL Server 2000 is forced to shut down another server steps in to handle requests.

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### Process for setting up a Microsoft SQL Server failover cluster

The process for setting up a Microsoft SQL Server failover cluster is done at the operating system and database level before installing the *Blackboard Community System*.

- Step 1**      Setup the Microsoft server cluster.
  - Step 2**      Install SQL Server 2000 and configure the failover cluster.
  - Step 3**      Install the *Blackboard Community System*.
- 

### Tips

The following is a list of tips for setting up a SQL Server failover.

- Use four public IP addresses: node 1, node 2, Windows cluster server, and virtual SQL server.
- The local disk of each node must be attached to a separate SCSI controller. It should not use the same one that is attached to the RAID system.
- The RAID SCSI controller IDs of the two nodes must be different.
- RAID SCSI BIOS must be setup to enable cluster (shared bus).

- The names of the network cards cannot contain spaces or special characters.
  - Do not use the default instance name for installing SQL server on a virtual server.
  - MSDTC service must be running before starting SQL server setup.
- 

**For more information**

For more information about installing and configuring a Microsoft SQL Server failover cluster please see Microsoft TechNet at <http://www.microsoft.com/technet/>.

**Note:** While Blackboard supports SQL Server failover with the *Blackboard Community System*, Microsoft is the best resource for information on installing and configuring a Microsoft SQL Server failover cluster.

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## Chapter 2—Installation on One or Two Servers

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### Overview

The most common *Blackboard Community System* Installations run on one server or two servers. With a two server installation, the database is maintained on a separate server to better handle the load.

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### In this chapter

Chapter 2—Installation on One or Two Servers includes the following topics.

Topic	Description
<a href="#">Installation Process</a>	This topic provides an overview of the installation.
<a href="#">Installation Checklist</a>	This topic is a checklist of items that must be completed before beginning the installation.
<a href="#">Installation Worksheet</a>	This topic is a worksheet that includes all the information required by the installer.
<a href="#">Step by Step Instructions</a>	This topic goes through the installation step-by-step.
<a href="#">Installation Troubleshooting Tips</a>	This topic covers some of the most common problems that may occur during the installation and provides solutions.
<a href="#">Uninstall the Blackboard Community System</a>	This topic covers how to uninstall the <i>Blackboard Community System</i> .

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## Installation Process

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### Overview

The most important part of the *Blackboard Community System* installation process is the preparation. A properly configured and supported environment to host the *Blackboard Community System* will help prevent future problems.

The *Blackboard Community System* installer must be run on the Web/app server. Unlike previous versions, such as *Blackboard 5*, there is not a separate installation process for the database component or for the advanced integration tools. If installing *Blackboard Community System* on two servers, simply run the installer once on the Web/app server to install the application, database, and advanced integration tools.

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### Process

The *Blackboard Community System* installation process occurs in the following order:

- Step 1** Review the [Installation Checklist](#). Do not proceed until all items in the list are checked.
- Step 2** Complete the [Installation Worksheet](#). This worksheet includes space to record all the information that the *Blackboard Community System* installer will require.
- Step 3** Follow the [Step-by-Step Instructions](#) to run the software installer.
- Step 4** Verify *Blackboard Community System* installed correctly by logging in.
- Step 5** If *Blackboard Community System* did not install correctly, troubleshoot the problem. Uninstall *Blackboard Community System* and repeat the installation process if necessary.

Optional step:

- Step 6** Integrate *Blackboard Community System* with other information systems at the institution.
-

## Installation Checklist

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### Overview

The installation checklist below and the installation worksheet that follows should be completed before installing *Blackboard Community System*. Completing both the checklist and the worksheet prior to installation will help ensure a successful installation. Please note that if *Blackboard Community System* will only be installed on one server, the machine must pass the checklist for both the Web/app server and the database server.

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### Blackboard basics

Review the following list to make sure that Blackboard has provided everything necessary to begin installation.

- A valid *Blackboard Community System* license file is accessible from the Web/app server.
  - The *Blackboard Community System* installer is available either on CD-ROM or from the Blackboard Download site.
  - The Administrator has contact information for Blackboard Technical Support and a login for the Behind the Blackboard extranet at <http://www.blackboard.com/products/services/support>.
- 

### Web/app server checklist

Review the following list to make sure that the Web/app server is prepared for installation.

- The machine is connected to the network and powered on.
- The machine meets the minimum hardware requirements.
- A supported operating system is installed on the machine.
- The supported version of Java 2 SDK is installed on the machine.

- ❑ The machine is dedicated to the *Blackboard Community System* and has no unnecessary software installed.
- ❑ The supported version of IIS is installed. IIS 6.0 must be run in IIS 5.0 compatibility mode.
- ❑ The Administrator has a plan for managing log files.
- ❑ The Administrator has a plan for backing up the application file system.
- ❑ The (Domain Name Server) DNS Server is set to correctly resolve the server name. Note that the server name should not contain underscore characters. Microsoft Internet Explorer 6 blocks cookies from machines with an underscore in the name as a security measure.
- ❑ The SQL Server 2000 Client libraries are installed on the Web/app Server (if the database is running on a separate server).
- ❑ Any firewalls are configured to allow access to the *Blackboard Community System* ports. These ports are defined when the installer is run. It is not possible to use a firewall to redirect to a different port. The *Blackboard Community System* must be available to users on the ports specified during the installation and not served through an alternate port. For more information on the ports used by the *Blackboard Community System*, see the next topic, [Installation Worksheet](#).
- ❑ The server clock is synchronized with the other server or servers used in the *Blackboard Community System* configuration. If the server clocks are not synchronized there may be differences between the displayed availability of time-sensitive content and the actual availability of time-sensitive content.
- ❑ The Windows 2000 file system is set to NTFS. The *Blackboard Community System* will not work with a FAT32 file system.

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### Database server checklist

Review the following to make sure that the database server is prepared for installation.

**Note:** If using a SQL Server failover cluster make sure that the cluster is configured and SQL Server 2000 is running properly.

- ❑ The machine is connected to the network and powered on.
- ❑ The machine meets the minimum hardware requirements.
- ❑ A supported operating system is installed on the machine.
- ❑ A supported version of SQL Server 2000 is installed on the machine.
- ❑ The person installing *Blackboard Community System* knows the SQL Server Administrator password and what instance of SQL Server will support the *Blackboard Community System*.
- ❑ The machine is dedicated to *Blackboard Community System* and has no unnecessary software installed.
- ❑ SQL Server 2000 is installed on the root directory.
- ❑ SQL Server 2000 is configured with Mixed Mode Security authentication.
- ❑ SQL Server 2000 is installed using a local account.
- ❑ SQL Server 2000 is running. If SQL Server 2000 was installed just prior to *Blackboard Community System*, restart the database machine after installing SQL Server 2000 and prior to installing *Blackboard Community System*.

- ❑ The database administrator has a plan for backing up the database and managing database log files.
  - ❑ The Windows 2000 file system is set to NTFS. The *Blackboard Community System* will not work with a FAT32 file system.
  - ❑ If a database instance other than the default will be used make sure the instance name includes only alphanumeric characters. Do not use punctuation or other characters, including underscores.
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## Installation Worksheet for Windows

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### Overview

The installation worksheet identifies all the information required by the *Blackboard Community System* installer. Filling out the worksheet prior to installation will help the installation process run smoothly.

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### Using special characters

The following special characters should never be used in an attribute such as a User Name, password, database user, Course ID, and so forth.

%&# < > = +

These characters are only safe to use when adding content into a text box, such as adding the description for a course.

When creating attributes a good rule to follow is to only use alphanumeric characters, underscores, dots, and dashes (do not use spaces!).

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### Information required prior to running installer

The following information is needed by the installer to complete the installation.

#### License File:

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The path to the License File. If a License File is not available, please contact Blackboard to request one. The License file determines which products and features are installed.

**Note:** The installation will fail if the license file is accessed through a network path. Make sure the license file is on the Web/app server before beginning the installation.

**Setup Type:** choose from one of the following options:

- New Install. Database on same server.** Select this option if installing on only one server. This Setup Type is appropriate only when the application and database will run on one server.

- New Install. Database on remote server.** Select this option if installing *Blackboard Community System* on more than one server. This Setup Type is appropriate when the application and the database will be hosted on separate servers.

**Administrator Name:** \_\_\_\_\_

The name of the Administrator.

**Administrator Email:** \_\_\_\_\_

The email address of the Administrator.

**Company:** \_\_\_\_\_

The institution that will be using *Blackboard Community System*.

**State:** \_\_\_\_\_

The state, province, or territory where the institution is located.

**ZIP Code:** \_\_\_\_\_

The ZIP Code where the institution is located.

**Institution Type:** choose from one of the following options

- K-12
- Higher Education
- Continuing Education
- Corporate
- Professional Association
- Hobby

**Application Directory:** \_\_\_\_\_

The path to a directory on the application server where the *Blackboard Community System* will reside. Note that the installer will create a directory called blackboard within this directory.

**JDK Directory:** \_\_\_\_\_

The path to the Java 2 SDK. The Java 2 SDK must be installed on the Web/application server.

**Web server Machine Name:** \_\_\_\_\_

The name of the Web server.

**Hint:** To find the machine name of a server, follow the steps below.

1. Right-click **My Computer** and select **Properties** from the context menu.
2. Click the **Network Identification** tab.
3. The full computer name and the domain name both appear. The full computer name is the Web/app server Machine Name with the domain name appended (webservermachinename.domain).

**Web server Domain Name:** \_\_\_\_\_

The name of the domain where the Web server resides.

**Note:** The Web server Machine Name and the Web/app server Domain Name form the URL for Blackboard (<http://webservermachinename.domain>). Because these names form the URL do not use any characters other than standard letters and numbers (underscores and spaces will cause problems) in the Web/app server name or the domain name.

**Web server Port Number:** \_\_\_\_\_

The port that the Web server will use for http connections with clients.

**Application Server Port Number:** \_\_\_\_\_

The port that the application engine uses.

**Collaboration Server HTTP Port:** \_\_\_\_\_ The default port is 8011.

**Collaboration Server TCP/IP Port:** \_\_\_\_\_ The default port is 8010.

HTTP and TCP/IP port information is required for Collaboration Server to communicate with the applet running in the Web browser. TCP/IP performs better and is the preferred method to communicate,

however, HTTP will be used if TCP/IP communication is not available; so both ports must be set.

**Database Machine Name:** \_\_\_\_\_

The machine name where the SQL Server 2000 database that *Blackboard Community System* will use is installed. The database machine name can be found the same way as the Web server machine name.

**Database Domain Name:** \_\_\_\_\_

The domain name where the database server resides.

**SQL Server Instance Name:** \_\_\_\_\_

The name of the SQL Server instance that will run the *Blackboard Community System* database. This may be left blank if *Blackboard Community System* will run on the default instance of SQL Server.

**SQL System Database Administrator Password:**

\_\_\_\_\_

The SQL System Database Administrator password associated with the 'sa' login. By default, there is no password associated with this login although a password may be assigned for security reasons.

**Blackboard Database User Password:**

\_\_\_\_\_

A password for a SQL Server 2000 user that *Blackboard Community System* creates at install. This account is also used by the application to access the database.

**Blackboard Database Report User**

**Password:** \_\_\_\_\_

This is the password for the Database Report User. This is a SQL Server user that the *Blackboard Community System* uses.

**Database Data Directory:** \_\_\_\_\_

The directory that will store the *Blackboard Community System* database data files (.mdf). This directory will not store application data or content. This directory must be on the database server.

**Database Logs Directory:** \_\_\_\_\_

The directory that will store the *Blackboard Community System* database log files (.ldf). This directory will not store application or Web logs. This directory must be on the database server.

**SMTP Server:** \_\_\_\_\_

The full hostname (example: smtp.blackboard.com) of the SMTP server that *Blackboard Community System* will use to send emails.

**Administrator Password:** \_\_\_\_\_

The Administrator account has full Administrator privileges. This account and the root\_admin account are the only two accounts that can login until more users are created.

**Root Administrator Password:** \_\_\_\_\_

The root\_admin account has full administrative privileges.

**Integration User Password:** \_\_\_\_\_

The integration user is used only to facilitate *Blackboard Community System* Snapshot operations. This account cannot be used to login through the GUI nor does it appear in any lists of users in the user interface. To change the password for this account, use the Integration Password feature available on the System Control Panel.

For more information on how the integration account is used during Snapshot processes, please see the *Blackboard Academic Suite Advanced Integration and Data Management Manual*.

---

## Step by Step Instructions

---

### Overview

The instructions below detail each step needed to successfully run the *Blackboard Learning System* installer for a one-server or two-server configuration.

---

### Install *Blackboard Community System*

- Step 1** Complete the pre-installation checklist and the pre-installation worksheet prior to running the *Blackboard Community System* installer.
- Step 2** Download the *Blackboard Community System* installer executable file from the Blackboard download site onto the Web/app server. Or insert the *Blackboard Community System* CD into a CD-ROM drive on the Web/app server and locate the *Blackboard Community System* installer executable file. Obtain a license file.
- Step 3** Double-click the *Blackboard Community System* installer executable file. The *Blackboard Community System* installer will launch after a few moments.
- Step 4** Accept the terms of the license agreement and click **Next**.

**Note:** There is a **Back** button for correcting mistakes on previous pages. Once the license file has been set on this page, do not return to this page and enter a new path to the license file. If a change to the path needs to be made after the path has been set (by clicking **Next**) the installer must be canceled and restarted.

- Step 5** Enter the full path to the *Blackboard Community System* license file or click **Browse** to locate the file. When the path to the license file appears correctly in the **License File** field, click **Next** to accept the path and continue to the next installer page.

- Step 6** After entering the license file path and clicking **Next**, the Setup Type page will appear. Select the Setup Type from the listed options. The available options are:
- **New Install. Database on same server.**  
This Setup Type is appropriate only when the application and database will run on one server.
  - **New Install. Database on remote server.**  
This Setup Type is appropriate when the application and the database will be hosted on separate servers.
- Step 7** Click **Next** to accept the Setup Type. The Installation Destination page will appear. Enter the directory where the *Blackboard Community System* application will reside when installed in the **Directory Name** field. The Installer will create a directory called blackboard within the directory entered. Click **Browse** to search the application server's file system for an appropriate directory. If the directory entered does not exist (but the drive is valid!) the *Blackboard Community System* installer will create the directory. Blackboard recommends installing *Blackboard Community System* on the root drive.
- Step 8** Click **Next**. The Institution Information page will appear. If a mistake was made entering the directory name, click **Back** to return to the previous page. Fill out the fields with the appropriate information about the System Administrator and the institution. Values must be entered in all fields to continue with the installation.
- Step 9** After completing the fields on the Institution Information page, click **Next** to advance to the Institution Type page. If a mistake was made entering the institution information, click **Back** to return to that page and make corrections. Select the institution type from the available options.
- Step 10** Click **Next** to advance to the Java 2 SDK Location page. If a mistake was made on the Installation Destination page, click **Back** to return to that page. Enter the path to Java 2 SDK in the **Directory Name** field. Click **Browse** to locate the correct path.
- Step 11** Click **Next** to advance to the Collaboration Server Setup page. Enter the TCP port number and the HTTP port

number that the Collaboration Server will use. The default values are 8010 for the TCP port and 8011 for the HTTP port.

- Step 12** After entering the port numbers for the Collaboration server, click **Next** to advance to the Web Server Setup page. If a mistake was made entering the port numbers, click **Back** to return to the Collaboration Server Setup page. Enter the appropriate information on the Web server. Please refer to the [Installation Worksheet](#) with any questions regarding the information required by these fields.
- Step 13** Click **Next** to advance to the Database Server Location page. If a mistake was made on the Web Server Setup page, click **Back** to return to that page. Enter information on the database server in the appropriate fields. If the *Blackboard Community System* will run on the same machine as the *Blackboard Community System* database, the **Database Machine Name** and **Database Domain Name** fields will already be populated. If the default SQL Server Instance is to be used simply leave that field blank (this is true in most cases).
- Step 14** Click **Next** to advance to the Database Passwords page. If a mistake was made on the Database Server Location page, click **Back** to return. Enter the passwords for the SQL System Database Administrator, the Blackboard Database User, and the Blackboard Database Report User. The SQL System Database Administrator password is set when the database is installed. The SQL System Database Administrator default login is 'sa' and no password. The Blackboard Database User and Blackboard Database Report User is created during the *Blackboard Community System* installation. The password entered here will be associated with that user.
- Step 15** Click **Next** to advance. Enter passwords for the Administrator, Integration, and Root Administrator (root\_admin) accounts.
- Step 16** Click **Next** to advance to the Database Data File Locations page. If a mistake was made entering the database passwords, click **Back** to return. Enter or **Browse** to a directory to store the *Blackboard Community System* database Data Directory and the *Blackboard Community*

*System* database Log Directory. The Data Directory stores the Blackboard Database data files (.mdf). The Blackboard Log Directory stores Database log files (.ldf). Please note that these Directories will not store application data or application logs. These directories must be stored on the database server.

**Step 17** Click **Next** to advance to the SMTP server page. If a mistake was made on the Database Data File Locations page, click **Back** to return. Enter the full hostname of the SMTP server that *Blackboard Community System* will use to send email messages. The full hostname should be: machine\_name.domain\_name.

**Step 18** After clicking **Next** on this page the installation will begin. If a mistake has been made, click **Back** to view the previous pages and make corrections. Do not change the path to the Blackboard license or the one server, two server, or additional Web/app server setting. Changes to these variables will cause the installation to fail. Instead, quit the installer and begin again. When all the settings are correct, click **Next** and *Blackboard Community System* will install.

**Note:** While the installer is running a few DOS windows may appear on the screen. Do not close these windows or the installer will fail.

## Installation Troubleshooting

---

### Overview

This topic offers some suggestions for where to go for help if the installation is not working properly.

---

### Installation Checklist and Worksheet

Look through the Installation Checklist and Worksheet again and make sure that the system is fully prepared for the installation.

---

### Log file

The *Blackboard Community System* installer creates the following log file:

Bb6\_install\_log.txt

This file is found in the directory from which the installer was launched.

If the installer fails, check the log file to help determine the problem. The log file includes a considerable amount of information about the installation process. Also, if the installer is run more than once the log file will contain a record of each attempt—make sure to focus on the latest attempt (each attempt is appended to the log file so the latest attempt is the last in the list).

Because of the amount of information in the log file it can be frustrating to locate the problem. Try searching for the following strings: BUILD FAILED or Root Cause. Look closely at the log file both above and below the search string (BUILD FAILED or Root Cause) for the reason the installation failed.

If the log file does not help diagnose the problem please keep a copy of the file in case you need to contact Blackboard Technical Support. Blackboard Technical Support may be able to use the log file to diagnose the problem.

---

### Blackboard Support Site and Knowledge Base

The Blackboard Knowledge Base, accessible through the Behind the Blackboard extranet, includes several articles that may address your problem. If a login for Behind the Blackboard is unavailable please contact a Blackboard Account Manager.

**Contact Blackboard Technical Support**

Please see the Behind the Blackboard extranet for information on contacting Blackboard Technical Support. The URL for Behind the Blackboard is:

<http://www.blackboard.com/products/services/support.htm>

---

## Uninstall *Blackboard Community System*

---

### Overview

*Blackboard Community System* includes an easy-to-use uninstall program. The *Blackboard Community System* Uninstaller is installed in a separate directory (\_Blackboard6Uninstall) at the same level as the blackboard directory. Inside the directory is uninstaller.exe, an executable that will launch the uninstaller.

**Note:** The uninstall log is written to the \tmp directory.

---

### Uninstall *Blackboard Community System*

Follow the steps below to uninstall *Blackboard Community System*.

- Step 1** Open the *Blackboard Community System* uninstaller through **Add/Remove Programs** on the Windows Control Panel or by launching the executable in the \_Blackboard6Uninstall directory.
  - Step 2** The uninstaller wizard will open and display what will be removed. Click **Next** to advance to the next page.
  - Step 3** Select the features that should be uninstalled. Click **Next** to advance to the Confirmation page.
  - Step 4** View the Confirmation page and verify that the correct features will be uninstalled. Click **Next** to uninstall *Blackboard Community System*.
-

## Using a Proxy Server

---

### Overview

Some institutions require an outbound proxy server to comply with government regulations or institution practices. The Blackboard Community System allows the use of an outbound proxy server to secure communications. In particular, the proxy server works with Course Cartridge downloads and RSS feeds incorporated into Community System modules.

---

### Configure the Proxy Server

Follow these steps to configure the Blackboard Community System to use an outbound proxy server.

- Step 19** Install the proxy server according to the institution standards.
  - Step 20** Open the `C:\blackboard\config\bb.config.properties` file.
  - Step 21** Add the domain name or IP address of the proxy server to the `bbconfig.webserver.ouboundproxyurl` property.
  - Step 22** Save the file.
  - Step 23** Run the `PushConfigUpdates` command to finalize the setting.
-

## Install eCommerce Features

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### Installation Process

The eCommerce features are installed with the Blackboard Community System. Before using the eCommerce features, some additional software must be installed to enable communication between the Blackboard Community System and the Blackboard Transaction System. When using the Blackboard Transaction System—UNIX Edition, a Lantronix device must also be set up and installed.

After installation, please see the topic Setup eCommerce in the Blackboard Community System Administrator Manual for instructions on configuring the connection between the Blackboard Transaction System and the Blackboard Community System.

---

### eCommerce Prerequisites

The following prerequisites must be met before the e-Commerce functions are available.

<b>Blackboard Transaction System—Windows Edition Prerequisites</b>	<b>Blackboard Transaction System—UNIX Edition Prerequisites</b>
Blackboard Transaction System—Windows Edition, package 212 or higher	Blackboard Transaction System—UNIX Edition Release 9.0
Blackboard Community System	Blackboard Community System
SSL-enabled	SSL-enabled
EnviServ	OptiServ
	Lantronix UDS-10 Device

Please consult the Blackboard Transaction System documentation for information on installing the Blackboard Transaction System.

**Note:** For SSL to work with the MyAccounts module it must be set systemwide. If SSL Choice is configured to only use SSL with some parts of the application, the MyAccounts module will not be secured under SSL. Also, it is not possible to make purchases in the eMarketplace without an SSL certificate.

Instructions for installing the EnviServ middleware, the OptiServ middleware, and a Lantronix device can be found below.

**Note:** The EnviServ and OptiServ versions must match the version of the Blackboard Community System.

---

## EnviServ Installation

The EnviServ server enables communication between the Blackboard Community System and the Blackboard Transaction System—Windows Edition. The EnviServ middleware is installed on the Blackboard Transaction System server.

Follow these steps to install the EnviServ server software.

- Step 1** Download EnviServ to the Blackboard Transaction System server.
- Step 2** Run the EnviServ .exe file.
- Step 3** Confirm the license agreement and click Next.
- Step 4** Enter the Destination Location, for example, C:\blackboard\enviserv\- Step 5** Set the server configuration to match the Blackboard Community System Web/application server. Click Next.
- Step 6** Enter the Server IP, Port, and Key for the Blackboard Transaction System—Windows Edition. The Key must be 16 characters long and can be any combination of alphanumeric characters chosen by the client.
- Step 7** Click Finish.
- Step 8** Once the installation is finished, start the service through the Windows operating system.

---

## Lantronix Installation

A Lantronix UDS-10 device is needed to enable communication between the Blackboard Community System and the Blackboard

Transaction System—UNIX Edition. Follow the steps below to set up the device. Be sure to also consult the Lantronix UDS-10 documentation.

- Step 1** Configure the UDS-10 IP address using hyperterminal and the Lantronix documentation.
- Step 2** Connect the UDS-10 device using Cable 044 to the Network Processor. Connect the UDS-10 device to the Blackboard Community System server using the DB25 serial connector.
- Step 3** Turn on the UDS-10 device and confirm the serial data lights flash, indicating power transfer.
- Step 4** Obtain the following three files from Blackboard. The following steps must be done from a machine running Windows that is connected to the network.  
  
ITxe500.rom  
uds10encryp.cfg  
DeviceInstaller.exe
- Step 5** Double-click DeviceInstaller.exe and choose File>Add Device.
- Step 6** Enter the Lantronix IP address and click Get Device Information. Click Save to add the device to the list. Click Cancel.
- Step 7** Choose Tools>Upgrade Firmware and Browse to the location of the Itxe500.rom file.
- Step 8** Click Upgrade FW File.
- Step 9** Click Tools>Device Manager>Set Configuration. Browse to the uds10encryp.cfg file. Click Set. Click OK to bypass the warning message.
- Step 10** When the configuration is complete, click Done and Exit Device Installer.

---

## OptiServ Installation

The OptiServ middleware enables communication between the Blackboard Community System and the Blackboard Transaction System—UNIX Edition. The OptiServ middleware is installed on the Blackboard Community System Web/application server. Instructions for installing OptiServ on both Windows and UNIX

operating systems are below. A Lantronix device must be installed and configured before installing Optiserv.

If the Blackboard Community System is running on a Windows operating system, follow these steps to install the OptiServ middleware.

- Step 1** Download EnviServ 6 to the Blackboard Community System Web/application server.
- Step 2** Run the Windows OptiServ .exe file.
- Step 3** Confirm the license agreement and click Next.
- Step 4** Enter the Destination Location. Use : \blackboard\optiserv\- Step 5** Set Service to the <schoolname> used as part of the directory in step 4. Set the server configuration to match the Blackboard Community System Web/application server.
- Step 6** These fields will populate with information from the server. Make any changes and click Next.
- Step 7** Enter the Server IP, Port, and Key for the Blackboard Transaction System—Windows Edition. The Key is provided by Blackboard. Click Next.
- Step 8** Enter the Lantronix server IP, Port, and Key. Click Next.
- Step 9** Enter the Blackboard Transaction System Tender information on the following screen and click Next.
- Step 10** Enter the Privilege/Reader configuration and click Next.
- Step 11** Click Finish.
- Step 12** Once the installation is finished, start the service through the Windows operating system.

If the Blackboard Community System is running on a UNIX operating system, Follow these steps to install the OptiServ server software.

- Step 1** Download EnviServ 6 to the Blackboard Community System Web/application server.
  - Step 2** Run the Windows OptiServ .exe file.
  - Step 3** Confirm the license agreement and click Next.
  - Step 4** Enter the Destination Location. Use sr/local/blackboard/optiserv/<schoolname> as the location. Note that the schoolname is a variable.
  - Step 5** Set Service to the <schoolname> used as part of the directory in step 4. Set the server configuration to match the Blackboard Community System Web/application server.
  - Step 6** These fields will populate with information from the server. Make any changes.
  - Step 7** Enter the Server IP, Port, and Key for the Blackboard Transaction System—Windows Edition. The Key must be 16 characters long and can be any combination of alphanumeric characters chosen by the client.
  - Step 8** Enter the Lantronix server IP, Port, and Key.
  - Step 9** Enter the Blackboard Transaction System Tender information.
  - Step 10** Enter the Privilege/Reader configuration.
  - Step 11** Once the installation is finished, start the OptiServ service.
-

## Install a Community System Update, Service Pack, or Hot Fix

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### Overview

Those users that do not use the eCommerce features must simply follow the standard instructions when applying an update, service pack, or hot fix. When using the eCommerce features, the EnviServ or OptiServ software must be uninstalled and the latest version installed whenever updating the Blackboard Community System.

---

### Which Version of EnviServ or OptiServ Applies?

Always install the version of EnviServ or OptiServ that corresponds to the Blackboard Community System release.

For App Pack 3, Service Pack 1 use 6.3.1.424.

---

### Update Instructions

Follow these steps when running an update on a system that uses the eCommerce features:

1. Record the eCommerce configuration settings. Make sure that all the settings required to connect to the Blackboard Transaction System, through EnviServ or OptiServ, are recorded.
2. Follow the instructions for running the Blackboard Community System update. Remember to back up the database and file system and test the restore process. Also, plan for enough downtime.
3. Once the new version of the Blackboard Community System is installed and working correctly, uninstall the OptiServ or EnviServ software. EnviServ and OptiServ both have easy-to-use uninstallers in the /optiserv or /enviserv directory.
4. Install the version of OptiServ or EnviServ that corresponds to the new version of the Blackboard Community System.
5. Apply the configuration settings recorded in step 1.

## Chapter 3—Blackboard Community System Application Architecture

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### Overview

This chapter describes the *Blackboard Community System* from the operating system and database perspective.

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### In this chapter

Chapter 3—*Blackboard Community System* Application Architecture includes the following topics.

Topic	Description
<a href="#">File System</a>	This topic covers the directory and file structure of the <i>Blackboard Community System</i> .
<a href="#">Databases</a>	This topic covers the databases and database users that are installed as part of the <i>Blackboard Community System</i> .
<a href="#">Services</a>	This topic covers the services that run as part of the application.
<a href="#">Performance Tuning</a>	This topic covers some basic information on tuning the application for best performance.
<a href="#">Backup and Recovery</a>	This topic introduces system-wide backups and incremental course and organization data protection.
<a href="#">Command Line Tools</a>	This topic covers the utilities that are available from the command line.
<a href="#">Blackboard Community System Maintenance</a>	This topic covers updates to the Blackboard system.
<a href="#">Operating System and Database Maintenance</a>	This topic covers updates to the supported operating systems and databases.

---

## File System

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### Overview

The *Blackboard Community System* installs into a home directory that is always named "blackboard". This directory not only holds all the application files but it is also the location where content items and log files are stored.

Administrators should not have a reason to delete or modify any of the application files. Doing so may cause the system to fail. This topic reviews several of the more important areas of the file system.

---

### Command line tools

Most of the command line utilities are stored in C:\blackboard\tools\admin\. The tools for batch archive/restore/export/import and batch copy are found in the C:\blackboard\apps\content-exchange\bin\.

For more information on the command line tools please see [Command Line Tools](#) later in this chapter. For more information on the batch archive/restore/export/import and batch copy tools see the *Blackboard Community System Administrator Manual*.

---

### Content storage

Content is stored in the C:\blackboard\content\bb\_bb60\ directory. Within the directory there are the following folders:

- **admin:** This directory stores images associated with System Reporting.
- **branding:** This directory stores the HTML that determines how the Gateway page is displayed. Information for modifying the Gateway page can be found in the *Blackboard Community System Administrator Manual*.
- **courses:** This directory includes storage areas for each course and organization. Content items uploaded to the course or organization are stored here.
- **images:** This directory stores images used on the system.
- **modules:** This directory stores .jsp pages for portal modules.

- **plugins:** This directory stores System Extensions.
  - **recyclebin:** This directory includes deleted course content. Content must be removed from this directory or it will be stored indefinitely.
  - **sessions:** This directory stores session-specific data for users.
  - **sponsors:** This directory stores sponsorship information and images.
- 

## Logs

All logs are stored in the C:\blackboard\logs directory. Logs can be managed and viewed from the Logs link on the System Control Panel in the user interface. For more information on managing and viewing logs, please see the *Blackboard Community System Administrator Manual*.

The verbosity of some logs can be adjusted to provide more or less information. Adjusting the verbosity of a log file will require running `PushConfigUpdates` to take effect.

### `\blackboard\logs\PerlEx\*.log`

The verbosity of this log is controlled by the `bbconfig.perl.tracelevel` property in the `bb-config.properties` file. The default value, 0, logs only fatal events. The other options are 1, which logs simple warnings, and 3, which logs warnings with stack traces.

### `\blackboard\logs\bb-services-log.txt`

The verbosity of this log is controlled by the `blackboard.service.log.param.logdef.default.verbosity` property in the `service-config.properties` file. The default value, fatal, logs only fatal events. The valid options from less verbosity to more verbosity are: "fatal", "error", "warning", "information", "debug".

Additional PerlEx specific logging information can be added to the error logs by changing a setting in the Windows registry. Set the following registry key to a value from 0 to 4 with 4 being the most verbose and 0 being the least verbose.

```
HKEY_LOCAL_MACHINE\Software\Blackboard Inc.\PerlEx\trace
```

---

## Databases

---

### Overview

The *Blackboard Community System* initially installs three databases and three database users. This topic reviews the databases and database users of the *Blackboard Community System*.

Administrators should not add data directly to the database or modify data in the database directly. Doing so may create serious problems in the system.

---

### bb\_admin

This database manages information about the databases.

---

### bb\_bb60

This is the main database. It manages all the data.

---

**bb\_bb60\_stats**

This is the statistics database. It is useful for Administrators who wish to generate reports on usage, performance, and so forth. Tracking data is sent to this database daily. For more information on generating reports and managing the information in this database please see the Advanced System Reporting topic in the *Blackboard Community System Administrator Manual*.

---

**Database users**

The following database users are created when the *Blackboard Community System* is installed.

- bbadmin
- bb\_bb60
- bb\_bb60\_report
- bb\_bb60\_stats

Change the value in the `bb-config.properties` file and then run the `PushConfigUpdates` command to change the password of a database user. Remember that the password must also be changed within the database to match the new password or the *Blackboard Community System* will not work properly.

---

## Services

---

### Overview

Once *Blackboard Community System* is installed, it adds the bb-collab and bb-tomcat services to the Windows 2000 operating system. In addition, for *Blackboard Community System* to run properly the IIS service must be running and the SQL Server database must be started. When performing maintenance or upgrade tasks it may be necessary to stop some of these services.

For most upgrade tasks, including installing *Blackboard Community System* software updates, the bb-collab, bb-tomcat, and IIS services should be stopped but the database should be running. While this is a good general rule, please refer to the specific instructions for each task to confirm.

---

### Definition of Blackboard Services

**bb-collab:** The bb-collab service runs the Collaboration Tool within *Blackboard Community System*. Stopping this service will make the Collaboration Tool unavailable to users.

**bb-tomcat:** The bb-tomcat service runs the Java<sup>®</sup> servlet engine. Stopping this service makes any Java servlet pages unavailable to users, including the Login page.

*Blackboard Community System* uses IIS 5.0 to manage Web services with Windows 2000 and IIS 6.0 with Windows 2003.

---

### Starting and stopping services

The `ServicesController` utility is used to start and stop services. This utility must be run from the command line.

Command syntax:

```
C:\Blackboard\tools\admin\ServiceController <argument>
```

Where the arguments are defined in the table below.

Argument	Description
services.start	Starts all the services related to the <i>Blackboard Community System</i> .

services.stop	Stops all the services related to the <i>Blackboard Community System</i> .
services.restart	Stops and immediately starts the services related to the <i>Blackboard Community System</i> .
services.appserver.start	Starts the bb-tomcat service.
services.appserver.stop	Stops the bb-tomcat service.
services.appserver.restart	Stops and immediately starts the bb-tomcat service.
services.webserver.start	Starts the IIS or Apache® Web service.
services.webserver.stop	Stops the IIS or Apache Web service.
services.webserver.restart	Stops and immediately starts the IIS or Apache Web service.

### Starting and stopping the bb-collab service

In rare instances it may be necessary to stop only the bb-collab service but leave all other services running. For example, when setting up a dedicated collaboration server in a multiple Web/app server configuration it is necessary to stop the bb-collab service on all servers except the collaboration server.

The bb-collab service (as well as the IIS and bb-tomcat services) can be controlled individually through the Services panel on Windows 2000 operating systems.

Follow these steps to stop the bb-collab service through the Windows 2000 interface.

- Step 1** Click **Start** on the desktop.
- Step 2** Select **Settings** from the Start Menu.
- Step 3** Select **Control Panel**.
- Step 4** Select **Services**.
- Step 5** Highlight the bb-collab service.
- Step 6** Click the Stop icon in the tool bar or right-click the bb-collab service and select **Stop**.

## Performance Tuning and Maintenance

---

### Overview

This topic reviews some of the issues that administrators should consider to help run the *Blackboard Community System* at peak performance. Performance tuning is best done through trial and error in a test environment by administrators that are familiar with the institution and its hardware.

---

### Delete content from the recyclebin and temp directories

Course content that is removed from a course is stored in the recyclebin. While it is a good safety measure in case materials are accidentally removed from a course the recyclebin will take up more and more disk space unless files are removed. Removing files from the recyclebin is done at the operating system level, simply move the files offline or delete them through the operating system.

The recycle bin is located at  
C:\blackboard\content\bb\_bb60\bbuid\recyclebin.

In addition to the recyclebin, the following temp directories should be checked and emptied on a regular schedule:

C:\blackboard\system\temp  
C:\blackboard\apps\tomcat\work\Standalone\localhost\webapps\_assessment  
C:\blackboard\apps\tomcat\work\Standalone\localhost\webapps\_gradebook  
C:\blackboard\apps\tomcat\work\Standalone\localhost\webapps\_blackboard

Also check the operating system temp directories:

C:\temp  
C:\tmp

---

### Managing Logs

Log files can grow to be quite large and should be managed so that excessive disk space and resources are not wasted. For more information on managing logs please see the *Blackboard Community System Administrator Manual*.



## Setting the number of interpreters and reloads

The number of interpreters and reloads can be adjusted to maximize performance.

**Note:** Setting the number of interpreters and reloads should only be done by experienced system administrators that are carefully monitoring the impact of each change. These settings should be adjusted in a test environment before applying them to a production server.

Interpreters and reloads are set in the Windows 2000 registry. The *Blackboard Community System* (Release 6) branch is located at:

HKEY\_LOCAL\_MACHINE\SOFTWARE\Blackboard, Inc\Blackboard 6

The *Interpreters* and *Reload* keys are set in the PerlEx directory. The IIS, bb-tomcat, and bb-collab services should be stopped before changing these values. Restart services after editing the number of interpreters and reloads.

The number of interpreters determines the capability to serve simultaneous user requests. The default number of interpreters is six. The more interpreters available, the more simultaneous processing the application can handle. This does not mean that if the value is set too low users will not be able to use the application. If there are four simultaneous requests, the fourth user will wait for one of the three interpreters to finish processing and then the request will be filled.

There are several things to consider when tuning the number of interpreters. First, each interpreter takes up approximately 20 MB of RAM – this is because the entire application is loaded into memory for fast performance. Second, since the Web is a connectionless protocol the need for simultaneous users is greatly reduced. If the average page takes 1 second to process, then 5 users can use the same interpreter simultaneously and response time will be within 5 seconds for each user.

In a lab environment the optimal number of interpreters is two times the number of processors on the Web/app server. In practice, having a few extra interpreters will help performance, especially when a user with a slow connection or large file transfer is occupying a thread.

Each interpreter will execute a defined number of times before reloading. Each time an interpreter reloads it disconnects from the database, cleans up memory leaks and uninitialized variables, then restarts. There is a small performance loss every time an interpreter has to reload. The degree of memory leak differs for each installation.

If monitoring is showing that the size of the IIS process is growing too large over time, lower the reload count. If the size of the process is consistent then increase the reload count.

---

### **Efficient use of Perl Interpreters with ActiveState PerlEx**

The *Blackboard Community System* uses the ActiveState PerlEx engine to execute Perl code. In some cases, a file upload to *Blackboard Community System* can occupy a Perl interpreter for several minutes while the file is chunked into memory.

Working together, Blackboard, Microsoft and ActiveState have designed a means by which with the latest ActiveState PerlEx engine, files are uploaded and cached before invoking the target script, releasing the Perl interpreters from devoting themselves entirely for the time it takes to upload the file.

The latest version of the ActiveState PerlEx engine is included with *Blackboard Community System* (Release 6).

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## Blackboard Community System Maintenance

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### Overview

Blackboard is dedicated to proper maintenance of the *Blackboard Community System*. Blackboard will make available maintenance releases as needed.

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### Release 6 updaters

The Release 6 Updaters are used to move from one specific release to another, for example, from Release 6.0.11 to Release 6.1. Updaters must be run in sequence and may not be skipped. For example, to update from 6.0.3 to 6.0.5, two updaters must be run. The first will update from 6.0.3 to 6.0.4. The second will update from 6.0.4 to 6.0.5.

The Release 6 Updaters and step by step instructions can be found at <http://www.blackboard.com/products/services/support.htm>. An administrator login and client ID is required.

Information about the issues that are resolved in each update are found in the Release Notes. The Release Notes are located in the Reference Center at <http://www.blackboard.com/products/services/support.htm>. An administrator login and client ID is required to view the Release Notes.

**Note:** To determine which release a Blackboard System is running, check the information at the bottom of the Login page or at the bottom of the System Control Panel.

---

### Documentation updates

Blackboard maintains the product documentation after release with updates and additions. The cover of each document shows the published date and the last date the document was revised.

Changes to the documentation are published in the appendix of each manual. Previously, all changes were logged in a separate document.

---

## Operating System and Database Maintenance

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## Overview

Blackboard supports operating system and database service packs and security patches for the operating systems and databases supported for use with the *Blackboard Community System*. Blackboard will test, certify, and, if necessary, provide fixes to ensure that Blackboard systems work with service packs and security patches.

There is, necessarily, a short lag time between a service pack release and the completion of testing. Even during this interim testing period, however, Blackboard will provide support for just released operating system and database service packs and security patches.

**Note:** This policy does not include support for subsequent releases. For example, if Blackboard supports version 1 of a database system any security patches or service packs for version 1 will be supported.

Blackboard will not support a version 2 release of the same database system until that version has been properly tested and published as part of the *Minimum Software Requirements* (available in the Reference Center on <http://www.blackboard.com/products/services/support.htm>) for that release of the Blackboard system.

---

## Applying a service pack or security patch after installing the Blackboard system

Follow these steps to install a service pack or a security patch to the operating system or database.

- Step 1** Back up the system.
- Step 2** Shut down the Blackboard system.
- Step 3** Check with Blackboard Product Support for any prerequisite maintenance that may be required to ensure compatibility with an OS or DBMS service pack or security patch.
- Step 4** Apply the operating system or database service pack or Security patch to the test/development environment.
- Step 5** Restart the test/development server.
- Step 6** Ensure that system is still shutdown. If auto start mechanisms are configured to restart Blackboard after a server restart, remember to shut down the Blackboard system before continuing.

- Step 7** Apply any necessary Blackboard prerequisite maintenance to the test/development Blackboard systems.
- Step 8** Restart the Blackboard systems.
- Step 9** Check the results either by testing your critical path features or by running your verification procedures.
- Step 10** If results are satisfactory, back up the system again. (If not, please log a service request with Blackboard Product Support through <http://www.blackboard.com/products/services/support.htm> describing the failure.)
-

## Backup and Recovery

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### Overview

This topic offers some tips on system-wide backups and describes the tools in the *Blackboard Community System* for incrementally backing up courses and organizations.

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### System backup and recovery

System administrators should backup the database and file system according to the needs of the institution. *Blackboard Community System* supports full backup and restores at the operating system and database levels. As a general rule, daily backups should be kept for two weeks, as errors may not appear for several days. Recovery plans should include how to restore the entire system. For assistance restoring the system, please contact Blackboard Technical Support.

---

### Incremental data protection

The *Blackboard Community System* includes the following utilities for incrementally backing up individual courses and organizations.

**Export/Import:** Export takes course content and puts it in a package that can be used in another course at a later date. One or more course areas can be included in the package.

**Archive/Restore:** The Archive Course function creates a record of the Course including user interactions. It is most useful for recalling Student performance or interactions at a later time. The archive package is saved as a .ZIP file that can be restored to the system at another time.

The command line tool that processes batch operations for Export/Import and Archive/Restore is a powerful tool for backing up course and organization data. For detailed information on using these utilities please see the *Blackboard Community System Administrator Manual*.

---

## Command Line Tools

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### Overview

*Blackboard Community System* includes a set of system administration tools that must be run from the command line. Trying to execute a utility by clicking the .bat file in the Windows GUI will return errors and possibly cause the system to stop functioning.

This topic covers each tool and the syntax to invoke the tool. All of the commands described in this topic are found in the C:\blackboard\tools\admin\ directory.

---

### LicenseReplace

This tool is used to add additional options and features to the *Blackboard Community System* by upgrading the license.

Syntax:

```
LicenseReplace.bat <full_path_to_new_license_file> -FORCE
```

-FORCE is only used when downgrading a license.

**Note:** The new license file must be accessible on a local drive and not from the network.

---

### PurgeAccumulator

Every day an automatic process runs that synchronizes the data in the stats database with the data in the main database and then deletes the statistical data from the main database that is more than 180 days old. This process can be run at any time using the `PurgeAccumulator` tool. The `PurgeAccumulator` tool can also be used to delete data from the statistics database.

**Note:** Administrators may modify the length of time that statistical data is kept in the main database. This is changed by editing the `days_to_keep` value in the `config/bb-tasks.xml` file.

Syntax:

```
PurgeAccumulator <command> bb_bb60 <days_or_date>
```

Argument	Description
----------	-------------

<command>	<ol style="list-style-type: none"> <li>1. <code>purge-live</code> –Takes data from the <i>Blackboard Community System</i> database and syncs with tables in the statistics database. After syncing, it purges statistical data in the main database that is older than the number of days or date set.</li> <li>2. <code>purge-stats</code> – goes to stats DB and purges all data older than the last x days or older than a specific date.</li> </ol>
<days_or_date>	The number of days (from the current date) that should not be processed by the <code>PurgeAccumulator</code> tool. It is also possible to set a date in <code>yyyy-mm-dd</code> format. Only data older than the date will be purged.

### PushConfigUpdates

This tool updates the configuration according to the settings in the `bb.config.properties` file.

**Note:** Running this command will redeploy all of the properties files. If any customizations have been made to these files they will be lost.

Syntax:

```
C:\blackboard\tools\admin\PushConfigUpdates.bat
```

### RotateLogs

This tool processes a log rotation outside the scheduled log rotations configured through the Manage Log Rotation page. The tool stops all necessary services and starts the services after the rotation is finished.

```
C:\Blackboard\tools\admin\RotateLogs.bat
```

This command does not take any arguments. If logs are manually rotated using this tool it will not interrupt the regular intervals. However, the logs that were rotated manually will not be included in the archive files created at the regularly scheduled rotation.

For example, if the log rotation is set at 30 days and the logs are manually rotated after 15 days, only the last 15 days of logs will be included in the archives at the next scheduled log rotation.

For more information on managing logs see the *Blackboard Community System Administrator Manual*.

---

## ServiceController

This tool is used to start and stop services.

```
C:\Blackboard\tools\admin\ServiceController <argument>
```

Argument	Description
services.start	Starts all the services related to the <i>Blackboard Community System</i> .
services.stop	Stops all the services related to the <i>Blackboard Community System</i> .
services.restart	Stops and immediately starts the services related to the <i>Blackboard Community System</i> .
services.appserver.start	Starts the bb-tomcat service.
services.appserver.stop	Stops the bb-tomcat service.
services.appserver.restart	Stops and immediately starts the bb-tomcat service.
services.webserver.start	Starts the IIS or Apache Web service.
services.webserver.stop	Stops the IIS or Apache Web service.
services.webserver.restart	Stops and immediately starts the IIS or Apache Web service.

## SystemInfo

This command will create a detailed report of system settings. The report can be viewed in the C:\blackboard\logs\system-info directory. The name of the report will be named yyyyymmdd\_OS.log. Where OS is the operating system and yyyyymmdd is the date in year-month-day format.

Syntax:

```
C:\blackboard\tools\admin\SystemInfo.bat
```

---

## Chapter 4—Setting Up SSL

---

### Overview

This chapter reviews how to use the Secure Sockets Layer (SSL) protocol to secure communication between a *Blackboard Community System* Web/app server and a client machine.

---

### In this chapter

Chapter 5—Setting Up SSL includes the following topics.

Topic	Description
<a href="#">About SSL and SSL Choice</a>	This topic introduces SSL and the <i>Blackboard Community System</i> feature, SSL Choice, that lets Administrators select which areas of the system are secured with SSL.
<a href="#">Configure SSL for IIS</a>	This topic gives detailed instructions for configuring IIS to use the SSL protocol. This must be done before using the SSL Choice feature.
<a href="#">SSL Choice</a>	This topic reviews the SSL Choice feature available through the user interface.

---

## About SSL and SSL Choice

---

### Overview

Secure Sockets Layer (SSL) is a protocol for protecting Internet communications. SSL ensures that a communication is not read or changed by another entity. The *Blackboard Community System* uses SSL to secure all or some communications between the Web server and the client machine. This feature that allows Administrators to select which areas of the *Blackboard Community System* are secured using SSL is called SSL Choice.

**Note:** SSL may also be used to secure the connection between the *Blackboard Community System* and a separate server for authentication (such as an Active Directory server). If SSL will be used both for connecting to an authentication server and for client sessions, SSL for the authentication server **must** be configured first. For more information on configuring SSL for securing with an integrated authentication server please see the *Blackboard Academic Suite Authentication Manual*.

### How does SSL Work?

SSL works through public key encryption. Transmissions are decrypted and encrypted using certificates. The steps below outline the process for establishing a connection over SSL:

- Step 1** Client contacts the server with a list of encryption methods.
- Step 2** The Server returns its certificate and a public key. These initial communications are scrambled with random data.
- Step 3** Client validates the certificate.
- Step 4** Client creates a secret string using an encryption method recognized by both the client and the server. The string is combined with the server's public key and sent back to the server.
- Step 5** Both the client and server create session keys based on the secret string.
- Step 6** The client sends a message to the server that it will now use the session key to encrypt and decrypt communications.
- Step 7** The server responds that it will also use the session key.

- Step 8** After each side confirms, the session keys are used to encrypt and decrypt communications during the session.
- 

### Obtain a certificate

The simplest way to obtain a certificate for use with a Web site is through a vendor known as a Certifying Authority (CA). The process, shown in the steps below, is relatively simple.

- Step 1** Generate a certificate request.  
**Step 2** Send the request to a CA.  
**Step 3** The CA creates and registers a certificate.  
**Step 4** Make this certificate available to the Web Server (IIS).

Certificates created in this way are usually registered and good for one year. After one year the certificate will no longer work and a new certificate must be obtained.

---

### How does SSL appear to users?

SSL works with the Hypertext Transfer Protocol (HTTP) to secure connections between the *Blackboard Community System* Web server and the client machines. It is fairly easy to see when a Web page is using SSL to secure transmissions because an "s" is appended to the http at the beginning of the address.

Without SSL:

<http://blackboard.yourinstitution.com>

With SSL:

<https://blackboard.yourinstitution.com>

It is important to understand that if SSL is used to secure the Web page in this example then the first URL (without SSL) is invalid and will return a 404 error.

---

### SSL Choice

The SSL Choice feature is available in the user interface from the System Control Panel. It allows an institution to decide if all, none, or some of the *Blackboard Community System* is secured with SSL. If SSL is to be used, it is most effective when applied to the entire Web site and not just selected areas.

**Note:** SSL must be configured on the Web Server before using the SSL Choice feature. If SSL Choice is turned on before the Web server is configured then any areas set to use SSL will be unavailable to users!

---

## Configure SSL for IIS

---

### Overview

To use SSL to secure the *Blackboard Community System* the IIS Web server must first be set to use SSL.

**Note:** Configuring SSL should only be done by an experienced Microsoft System Administrator.

Once SSL is configured, the SSL Choice feature (accessible from the Learning System's Administrator Control Panel) will function correctly. Trying to use the SSL Choice feature before configuring SSL for Apache can result in serious system errors.

---

### Step by step

Follow these steps to configure SSL for the IIS Web server.

- Step 1** Open the Internet Services Manager.
- Step 2** Right-click on the blackboard\_bb\_bb60 Web site and select **Properties** from the menu.
- Step 3** Click the Directory Security tab.
- Step 4** Click **Server Certificate** in the Secure communications frame at the bottom of the tab.
- Step 5** The Web Server Certificate Wizard will appear. **The Status of your Web server** should report that there is not a certificate installed and there are no pending requests. If anything else appears, there may be a certificate installed or a pending request already. Click **Next** to advance.
- Step 6** Select **Create a new certificate** and click **Next** to advance.
- Step 7** Select **Prepare the request now, but send it later** and click **Next** to advance.
- Step 8** Enter a name for the certificate (the name of the Web site in IIS is the default) and select a bit length from the drop-down list. Blackboard recommends a bit length of 1024. Click **Next** to advance.

- Step 9** Enter the name of your Organization and your Organizational unit in the fields. This information is important to ensure that your certificate is unique and easily identified. Click **Next** to advance.
- Step 10** Enter the **Common name** of the Web site. The host plus the domain name works best (example: blackboard\_server.yourinstitution.edu). Click **Next** to advance.
- Step 11** Enter the appropriate geographical information for your institution. Click **Next** to advance.
- Step 12** Enter a file name for the certificate request or click **Next** to select the default and advance.
- Step 13** Click **Finish** to create the certificate request.
- Step 14** Send the certificate request to a Certifying Authority. There are several commercial vendors or you can sign your own if you have the capability. The output from the Certifying Authority will be a file with the extension .cer.
- Step 15** Once you have obtained a .cer file, return to the Web Server Certificate Server as described in Steps 1-4.
- Step 16** Select **Process the Pending Request** and click **Next** to advance.
- Step 17** Enter the location of the .cer file and click **Next** to advance.
- Step 18** Click **Next** to advance through the summary steps (be sure to review the summaries to make sure you are installing the correct certificate!).
- Step 19** Return to the Properties box for the blackboard\_bb\_bb60 Web site as described in Steps 1 and 2.
- Step 20** If the Web Site tab is not active, select it.

- Step 21** Enter 443 for the **SSL Port** in the Web Site Identification frame at the top of the tab.
- Step 22** Select the Home Directory tab.
- Step 23** In the Application Protection field, use the drop-down list to select Low. SSL settings cannot be changed if the Application Protection is set to high. If desired, change the Application Protection to high after configuring SSL Choice.
- Step 24** Restart the server to complete the process.
-

## SSL Choice

---

### Overview

If IIS is configured to support SSL, then the communication between users and the *Blackboard Community System* can be configured using the SSL Choice feature. SSL Choice allows Administrators to determine if none, all, or some of the *Blackboard Community System* is secured with SSL.

**Note:** If the SSL Choice is set to use SSL before SSL is configured in IIS the *Blackboard Community System* will not be accessible! To ensure that users can always login, configure IIS for SSL prior to changing the security options on the SSL Choice page.

If planning on using SSL, Blackboard recommends enforcing SSL on the entire system. This ensures that all proprietary data is secured. If the choice option is chosen, it is important to update SSL settings whenever a new tool is enabled or a System Extension added.

The screenshot shows the 'SSL Choice' configuration page in the Blackboard Administration Panel. The page is titled 'ADMINISTRATION PANEL > SSL CHOICE' and 'SSL Choice'. It is divided into four numbered sections:

- 1 Instructions:** Select the areas of the application that will require Secure Sockets Layer communication between the Blackboard server and the client browser. A note states: 'Changes to these settings may require restarting your webserver, and possible webserver configuration changes.'
- 2 Entire System:** Contains three radio button options:
  - Disable SSL System-wide
  - Enable SSL System-wide
  - Enable SSL in select areas of the system (as indicated in subsequent sections)
- 3 System Specific Areas:** Contains two checkbox options:
  - Personal Information Areas
  - Admin Tab
- 4 Blackboard Tools:** Contains a grid of checkboxes for various tools:
 

<input type="checkbox"/> Academic Resources	<input type="checkbox"/> Address Book
<input type="checkbox"/> Announcements	<input type="checkbox"/> Collaboration
<input type="checkbox"/> Communications	<input type="checkbox"/> Community Tab
<input type="checkbox"/> Content Area	<input type="checkbox"/> Courses Tab

### Find this page

Click **SSL Choice** from the Security and Integration section of the System Control Panel.

---

## Fields

The table below details the fields on the SSL Choice page.

Field	Description
<b>Entire System</b>	
<b>Disable SSL System-wide</b>	Select this option and SSL will not be used to secure any of the communication between users and the <i>Blackboard Community System</i> .
<b>Enable SSL System-wide</b>	Select this option and SSL will be used to secure all of the communication between users and the <i>Blackboard Community System</i> .
<b>Enable SSL for the following areas</b>	Select this option to determine which areas of the <i>Blackboard Community System</i> will be secured through SSL. Select the different areas from the check boxes on this page.
<b>System Specific Areas</b>	
Select the check box for each area that should be secured using SSL.	
<b>Blackboard Tools</b>	
Select the check box for each tool, tab, or course content area that should be secured using SSL.	
<b>System Extension Tools</b>	
Select the check box for each System Extension that should be secured using SSL.	

## Configuring SSL for the Collaboration Tool

---

### Overview

Setting up SSL to encrypt connections to the *Blackboard Community System* does not secure the Collaboration Tool because the Collaboration Tool uses Tomcat, not Apache or IIS, to handle user connections and serve pages. Securing the Collaboration Tool requires using a separate SSL certificate with Tomcat.

Most institutions do not need to worry about securing the Collaboration Tool because the Collaboration Tool is not used to transmit sensitive data. It should also be noted that using SSL with the Collaboration Tool slows down performance of the tool. Consider both the need for security and the performance slow down associated with applying SSL before deciding to use SSL with the Collaboration Tool.

As part of the process, a keystore and a self-signed certificate are created. A keystore is a file that stores certificates. A self-signed certificate is a certificate created by you that is not submitted to a Certifying Authority.

**Note:** Macintosh users running Netscape, Internet Explorer, or Safari may use self-signed certificates to configure SSL. A pop-up warning may appear during the process; select **Continue** to complete the process.

If users would prefer to use a signed certificate see <http://java.sun.com/j2se/1.4.2/docs/tooldocs/windows/keytool.html> for information on obtaining a signed certificate and including it in the keystore.

In most cases, taking the extra step to go through a Certifying Authority is not necessary when securing the Collaboration Tool. Certifying Authorities are used to prove to users of a Web site that the connection is secure and verified by a trusted third party. Users accessing the Collaboration Tool from your *Blackboard Community System* most likely do not require the validation of a third party before using the tool.

The process for configuring SSL for the Collaboration Tool has two steps:

- Step 1** Create a keystore.
- Step 2** Configure Tomcat properties to use SSL encryption.

---

### Load-Balanced configurations

It is important to perform the following additional tasks when setting up SSL for the Collaboration Tool on a load-balanced configuration.

- The same certificate must be used on each server. For detailed instructions on how to install the same certificate on each server please consult Microsoft Knowledge Base article 310178 at <http://support.microsoft.com/default.aspx?scid=kb;en-us:310178&Product-win2000>
  - Services on each Web/app server must be restarted after changing the SSL Choice option.
- 

### Create the keystore

After creation the keystore contains a self-signed SSL certificate specifically for Tomcat, <tomcat>.

To create the keystore and certificate, follow these steps:

- Step 1** Log on to the Web/app server as the user that runs the *Blackboard Community System*.
- Step 2** Run the following from the command line:

```
%JAVA_HOME%\bin\keytool -genkey -alias tomcat -keyalg RSA  
-keystore <path_to_keystore>
```

The keystore will be created at the <path\_to\_keystore>.

- Step 3** The first prompt asks for a password for the keystore. The default password that Tomcat expects is "changeit", but it is recommended that another password be used. Tomcat can be configured later to accept the new password.

- Step 4** The next few prompts ask for information about the person creating the certificate. This information will appear to users when they first access the Collaboration Tool over SSL. Users are prompted to accept the certificate so it is important to provide accurate information so that users trust the certificate. The information recorded is:

- First and Last Name
- Organizational Unit
- Organization
- City or Locality

- State or Province
- Two-letter country code

**Step 5** The last prompt asks for the password for the <tomcat> certificate. This password must be the same as the password entered in Step 2. Simply press ENTER to confirm that the same password will be used.

The keystore will be created in the specified directory.

---

### Configure Tomcat to work with the SSL Certificate

After creating the keystore and certificate, the last step is to edit the blackboard\apps\collab-server\http\tomcat\conf\server.xml file. Follow these steps to edit the file to work with SSL:

**Step 1** Make a backup of the following file:

```
blackboard\apps\collab-server\http\tomcat\conf\server.xml
```

Keep it safe so that the original settings can be restored. Note: changes are made to the server.xml.bb file. At the end of the process PushConfigUpdates is run. This changes the server.xml file to match the settings in the server.xml.bb file.

**Step 2** Open the server.xml.bb file in Notepad or an XML editor.

**Step 3** Find the following code sample in the file. Note that the sample is commented out.

```
<!-- Define a SSL Coyote HTTP/1.1 Connector on port 8443 -->
<!--
  <Connector className="org.apache.coyote.tomcat5.CoyoteConnector"
    port="8443" minProcessors="5" maxProcessors="75"
    enableLookups="true"
    acceptCount="100" debug="0" scheme="https" secure="true"
    useURIVValidationHack="false" disableUploadTimeout="true">
    <Factory
className="org.apache.coyote.tomcat5.CoyoteServerSocketFactory"
clientAuth="false" protocol="TLS" keystorePass="PASSWORD"
keystoreFile="<path_to_keystoreFile>" />
  </Connector>
-->
```

The Connector element defines the standard attributes of the send/receive processes. Only the Factory element may be embedded within a Connector element.

- Step 4** Uncomment and edit the code block to configure Tomcat to work with SSL. The `keystorePass` attribute must be added to the `Factory` element and the value must match the password for the keystore and the `<tomcat>` certificate within the keystore. (If the default password, "changeit" is used, it is not necessary to include the `keystorePass` attribute. However, keep in mind that changing the password is recommended for better security.)

```
<!-- Define a SSL Coyote HTTP/1.1 Connector on port 8443 -->

<Connector className="org.apache.coyote.tomcat5.CoyoteConnector"
    port="8443" minProcessors="5" maxProcessors="75"
    enableLookups="true"
    acceptCount="100" debug="0" scheme="https" secure="true"
    useURIVValidationHack="false" disableUploadTimeout="true">
    <Factory
className="org.apache.coyote.tomcat5.CoyoteServerSocketFactory"
    clientAuth="false" protocol="TLS" keystorePass="PASSWORD"
    keystoreFile="<path_to_keystoreFile>" />
</Connector>
```

When editing the code block keep the following in mind:

- If the `port` attribute is changed remember to change the `redirectPort` attribute in the other configured `Connector` elements to point to the new port value.
- Do not change the `port` attribute to a port below 1024.
- To set a the location for the `.keystore` file, add the `keystoreFile` attribute to the `Factory` element and include the full path to the file.

- Step 5** Save the file.
- Step 6** Run the `PushConfigUpdates` tool.
- Step 7** Test the system. When accessing the Collaboration Tool, a prompt should appear to accept the certificate. After accepting the certificate, the Collaboration Tool will open and communications will be secured using SSL encryption.
- Step 8** Edit the `\blackboard\config\bb-config.properties` file to add the default collaboration ssl port number:  
`<bbconfig.collabserver.portnumber.ssl.default=8443>`

