

# Blackboardlearn<sup>+</sup>

*Release 9.1 Service Pack 2*

*Release Notes*

*9.1.482.2*



**Blackboard**

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## About the Release Notes

The Release Notes provide System Administrators with information about the changes from the previous release to this Service Pack of Release 9.1. These changes have been categorized into three different types that are meant to assist you with planning your upgrade to this maintenance release. The highlights below are meant to be a quick reference of changes that we believe will impact most usage scenarios. You should always review the entire document and consider the impacts listed below to your specific usage patterns.

If you are upgrading to Release 9.1 from Release 9.0, 8.0, 7.x, or CE 8, CE 4 or Vista, please go to the [Upgrade Center](#) for information targeted to your needs.

- ☑ **End User Impacts:** Items that fall into this category will generally be new features or enhancements that will improve the experience, but may require training.
  - Service Pack 2 of Release 9.1 includes very few enhancements that are outlined in the [New Features and Enhancements](#) section.
    - The new CaféScribe Blackboard Building Block™ from Follett has been included.
    - A new name field has been added to alleviate pain in countries where the Last Name Prefix is common but should not be used for list sorting.
  - With every release [Resolved Issues](#) may impact your end users. While we hope this is a positive impact, you should review the list for any changes you may want to communicate to your community.
    - Remaining Course Conversion issues from the 9.1 Beta have been resolved.
    - Course Tool links are now functioning consistently.
    - The Assignment title now updates upon modifying the title in the Grade Center.
    - Users subscribed to a discussion board thread and disabled via Snapshot no longer receive subscription emails.
  - We have provided a link to a regularly updated list of [Known Issues](#) specific to this release that provides a description and targeted path to resolution.
- ☑ **System Administration Impacts:** Items that fall into this category typically only impact the administration of the system.
  - The Xythos core technology (powers Course Files and the Content Management system) has been upgraded to the latest release.
  - Support for Apple Safari 5.0 has been added. Support for Safari 3.2 has been dropped.
  - With every release, the Release Notes include updates to the following information to help you prepare your system for the upgrade and make performance tuning adjustments.
    - [Performance and Scalability](#) – Details the latest analysis from our Performance Engineering team and how to tune an installation of this release.

- [Supported Technologies](#) – Gives an overview of the changes to supported platform technologies and client technologies in this release.
- [Installation and Upgrade Information](#) – Provides the supported upgrade paths to this release as well as tips for running the updater.

☑ **Integration Impacts:** Items that fall into this category impact the APIs within the system that may require a review of building blocks, snapshot or other integrations.

- Changes are only necessary if the institution chooses to use the new name fields with the snapshot utility or Building Block APIs. Otherwise, there is no impact.

### Document updates since DRAFT publication

Approximately 2 weeks before the General Availability of this Service Pack, Blackboard published a DRAFT version of these Release Notes. This is the FINAL version of the Release Notes for 9.1 Service Pack 2. If you read the DRAFT Version, please take note of the changes in these sections:

- New Features:
  - Last Name Prefix has more detailed description of the change.
  - The SafeAssign Building Block was not upgraded in this release.
- Known Issues: The Known Issues section now includes any issues discovered during testing that have been deferred.
- Supported Technologies: The section on importing and restoring courses has been updated to reflect support for course conversion from Vista and CE products.

# New Features and Enhancements

The Release Notes provide a high-level overview of the New Features and Enhancements from the previous service pack on Release 9.1. Release 9.1 Service Pack 2 does not contain any substantial enhancements or changes in functionality for almost all users coming from Service Pack 1.

If you are new to Release 9.1, please refer to the “Understanding the Change” document, available for each product through Behind the Blackboard, to get a comprehensive look at the features and functions of Release 9.1 and how they compare to the your current production version. Also please work through the Upgrade Center where we have provided a step by step planning guide to assist you through this process.

## System Administration Features

### New fields “Suffix” and “Other Name”

To improve the usability of sorting for countries where a last name prefix (e.g. “van der”) is common but should not be used for sorting, additional user information fields, `suffix` and `other name`, have been added.

In some locales, the `suffix` might be used for {Jr., Sr., II, III, etc.}, while in other locales it will be used for last names which contain multiple words like Van der Waals where “Waals” is the last name and “Van der” is the suffix (a.k.a Last Name Prefix).

The `other name` field provides for additional flexibility and freedom. Administrators can use this field to indicate a user's nickname, additional id, or an entirely different purpose which meets their needs.

### Renaming the fields

To change how these new fields are displayed on the user creation screen, administrators must use the Language Pack Editor to modify the `user_column_access.properties`. Each new field has two properties that can be edited:

- `Suffix` (`suffix.default_display_title`, `suffix.display_title`)
- `Other Name` (`othername.default_display_title`, `othername.display_title`)

This can also be done from **System Admin** tab, under **Customize User Information**.

### Sorting

The administrator can modify the `LocaleSettings.properties` file in each Language Pack to modify the sorting and display order of user names. Using this file, names can be sorted in any order necessary for the locale. For example, a Dutch administrator might use

```
LOCALE_SETTINGS.COLUMN_ORDER=title,givenName,middleName,suffix,familyName,otherName
```

to display the last name prefix correctly in a student search. The same administrator might also use

```
LOCALE_SETTINGS.SHORT_SURNAME={6} {3}, {1}
```

to do the same thing in the Grade Center and related screens. These examples use the conventions set forth in the comments of the `LocaleSettings.properties` file.

### **Snapshot, Building Blocks, Web Services**

If your institution adopts `suffix` or `other name`, and currently utilizes the snapshot utility or integrations through Building Blocks and web services, these integrations must be updated to include this new data. For reference, the six name fields (plus `UserInfo` getter function names) are included below:

- title (`getTitle`)
- firstname (`getGivenName`)
- middlename (`getMiddleName`)
- lastname (`getFamilyName`)
- othername (`getOtherName`)
- suffix (`getSuffix`)

### **Installer enables /Courses content area when upgrading to 9.1.**

In 9.1 SP1 HF1 an improvement was added that enables the “/courses” content area during installation. This particular improvement is also included in 9.1 SP2. The improvement prevents failed upgrades and other undesirable behavior when coming from Learn 9.0 installations. After running the updater, the administrator has the ability to disable the “/courses” content area again. Instructors are then prompted to choose a default Course Directory when trying to add course content for the first time.

## **CaféScribe Building Block**

### **Powered by Follett Higher Education**

The CaféScribe Blackboard Building Block™ enables professors to assign and students to acquire CaféScribe digital textbooks with a single click within the Blackboard Learn environment. Once there, students and professors can read, highlight, annotate, share notes and perform other activities.

The Building Block is available for all markets.

After installation, the Building Block is “Unavailable” by default. It is free to all eligible clients, so any adopting school would simply need to make the Building Block “Available” and agree to the Term & Conditions to begin using it. The integration enables instructors to create links to specific eBook content as a new content type within a Blackboard course, so the “create content” drop down box is the only location within the user interface where this option is viewable. To verify that the Building Block was installed properly, make sure that “Add CaféScribe Content” is an option under “Add Interactive Tool”.

More information is available at <http://www.blackboard.com/CafeScribe/Resources/FAQ.aspx>

## **Other Building Blocks**

### **NBC Archives on Demand Building Block updated to version 3.0.6**

The latest version of the NBC Building Block has been bundled with Service Pack 2.



## Resolved Issues

The list of issues resolved in Blackboard Learn Release 9.1 SP2 is available on the [Resolved Issues Page](#) of the Maintenance Center.

## Known Issues

The list of known issues in Blackboard Learn Release 9.1 is available on the [Known Issues Page](#) of the Maintenance Center. The Known Issues page provides you a list of the issue ID, description, and resolution path. This page is updated regularly with new client-reported issues.

In order to provide a timely release of Service Pack 2, we have decided to release with a few of minor issues that are newly introduced. The following issues are known to be new in 9.1 SP2 and most have been targeted for the next Service Pack.

- **AS-148520** In course wikis, if the previous version of an item was edited by another user in the course, the current user is unable to view the delta between their version and the previous version.
- **AS-148499** – During installation using the Windows GUI, the blank password warning popup message does not display for missing passwords.
- **AS-147077** – In the Grade Center, after restoring an archived course with saved smart views, the smart views sometimes display the full grade center. This may happen at other times as this issue requires further isolation.
- **AS-147845** – The instructor is unable to hide the row of a student in the Grade Center using the Context Menu next to the student's name. An inline success message is displayed but the row is not hidden.
- **AS-147844** – Solaris only: the add Test option is not available in the Create Assessment drop-down menu, but instead under the Add Interactive Tool menu.

# Performance and Scalability

Blackboard continuously invests in making Blackboard Learn more responsive and able to handle greater volumes of user traffic. This section describes the performance and scalability issues in this release of Blackboard Learn.

Performance issues occur when application responsiveness for a system not under load fails to meet user expectations. Scalability issues occur when application responsiveness or stability of a page request for a system under load fails to meet user expectations.

Issues are identified by clients through our traditional support channels and as a result of the performance and scalability exercises performed as part of all Service Pack releases.

## Performance Issues and Improvements

Release 9.1 Service Pack 2 outperforms previously released service packs from both a responsiveness and scalability perspective across all supported platform configurations. No degradation was reported during any performance tests when comparing against any previous service pack using regression performance settings. Performance improvements have been confirmed on both Windows and Unix configurations.

### **Discussion Board**

The “Expand All” capability with Discussion Board forums will now perform as expected in large Discussion Board forums.

Previously, when grading a user in a discussion forum, the request would take many seconds to load. The underlying query to perform this operation was executing an expensive full table scan on the MSG\_MAIN table. Customers with millions of rows on this table would experience unnecessary latency. This was addressed by modifying the query to force a nested loop.

### **Grade Center**

The significant performance problems experienced when grading an assessment question from within the Grade Center have been resolved by retrieving and displaying data from the database more efficiently.

### **Content System**

Queries used to get a 360 degree view of content or comments related to a content item were causing an expensive full table scan on the XYF\_COMMENTS table. This was corrected by adding an index on the table.

A query related to the CMS workflow was found to be slow when adding a workflow module to the My Institution page. This was corrected by optimizing the query.

### **Reporting and Tracking**

A query used to calculate the number of logins reported in the system tracking tables was calculating incorrect successful and failed logins as well as doing full table scans on the ACTIVITY\_ACCUMULATOR table to gather that information. This was corrected so that the data reported in the system tracking tables for logins was accurate and the query would no longer perform full table scans by using an appropriate index to force a nested loop.

## General System Performance

In some cases, Tomcat application threads would consume CPU cycles and block other threads. This was tracked down to the use of HashMap data structure in the NavigationCache used for accessing the course map and left navigation menu. The cache was re-factored to make use of a ConcurrentHashMap to eliminate resource contention.

## Modules

When loading the course module page, an inefficient query was identified that scanned all courses in the system multiple times to acquire data needed for presentation within the user's course module. This was addressed so that the query spans only those courses with which the user is associated.

## Recommended Deployment Approach

### 64-Bit Deployments

Release 9.1 is the first release to offer an entire application and database footprint using 64-bit addressable memory. To take advantage of more addressable memory, Blackboard strongly encourages clients to deploy using 64-bit operating systems (OSs) and sub-components (Java and SQL Server or Oracle). As part of the 64-bit deployment, Blackboard encourages clients to take advantage of larger Java Virtual Machines (JVMs) that range from 2GB to 16GB in size. The preferred size is 4GB, but performance testing has been conducted with acceptable performance as high as 16GB.

Customers should begin migrating from Tomcat clusters. Tomcat clustering was introduced for scalability purposes when the Blackboard Learn architecture was 32-bit and customers wanted the ability to increase their memory usage on a single server. With the option to virtualize on both 32-bit and 64-bit, Blackboard's benchmarking efforts have moved away from Tomcat cluster deployments. Customers can achieve similar performance in a virtual environment on the same physical server with multiple virtual instances as with a bare metal configuration with many Tomcat cluster instances. The difference in configurations is a smaller demand on the Apache or IIS web server fronting the Tomcat instance(s). The option to deploy a 64-bit JVM with larger heap sizes has suppressed the need for customers to run in a cluster option.

Blackboard recommends that customers consider a deployment approach consisting of larger 64-bit JVMs that are distributed across physical servers with the option to virtualize the hardware to take advantage of the CPU and Memory capacity of these systems.

### Database Availability Options

Customers should also consider database availability options such as Microsoft SQL Server Active/Passive or Oracle RAC One Node, which is a single instance of Oracle RAC running within one node in a cluster. Additional nodes can be added within Oracle RAC to address scalability. In general, both offerings are more around high-availability and will have limited or no capability to improve performance.

### For More Information

For more information about the SQL Server Failover capabilities of Blackboard Learn, contact Blackboard Consulting.

For information about running Blackboard Learn with RAC, see the *Blackboard Learn Server Administrator Guide* available on [Behind the Blackboard](#).

For more information about deploying Blackboard Learn, see the *Blackboard Learn Hardware Sizing Guides* for Dell and Sun Deployments in the Upgrade Kit available on [Behind the Blackboard](#).

## Recommended JVM Tuning Set

For every Service Pack release, the Blackboard Performance Engineering team spends many hours studying the transactional and systemic performance of Blackboard Learn and whether particular tuning sets will have a positive or negative impact on performance or scalability.

This section provides the recommended Java Virtual Machine (JVM) tuning set as executed in the Blackboard Performance Engineering laboratory against Release 9.1 Service Pack 2. Customers are strongly encouraged to deploy their application environments in a 64-bit configuration using the recommended 4GB, 8GB, or larger tuning set.

Blackboard recommends using the following tuning set for 8GB JVMs (64-bit) on Windows, Linux, and Solaris systems using Java 1.6. These recommended settings can be managed within the `bb-config.properties` file or `wrapper.conf` file:

```
-Xms8192m -Xmx8192m -XX:NewSize=2048m -XX:MaxNewSize=2048m
-XX:SurvivorRatio=4 -XX:+UseConcMarkSweepGC -XX:+UseParNewGC
-XX:+UseTLAB -XX:PermSize=256m -XX:ParallelCMSThreads=2
-XX:ParallelGCThreads=4 -XX:+PrintVMOptions -XX:+PrintGCDetails
-XX:+PrintGCTimeStamps -XX:+PrintGCTaskTimeStamps
-XX:+PrintCommandLineFlags -XX:+PrintGCApplicationStoppedTime
-XX:+PrintGCApplicationConcurrentTime
-Xloggc:<blackboard_directory>/logs/tomcat/gc.log
```

When using a 4GB heap size, change the following parameter values in the recommended tuning set:

```
-Xms4096m -Xmx4096m -XX:NewSize=1024m -XX:MaxNewSize=1024m
```

Guidance for 32-bit configurations is also included below, however, to achieve the best performance and scalability, 32-bit environments are not recommended for use in production situations. 32-bit Windows and Red Hat Enterprise Linux deployments are limited to JVM sizes no greater than 1.7GB of addressable memory. This consists of the main heap area (Old and New Space) plus the permanent space. For 32-bit configurations with a 1.4GB heap size, Blackboard recommends changing the following parameter values in the recommended tuning set:

```
-Xms1400m -Xmx1400m -XX:NewSize=350m -XX:MaxNewSize=350m
```

## Understanding the Settings

Additional performance tuning may be required for certain configurations depending on how much memory is available and what other processes are running. Some of the parameters below can be changed to match your particular environment and improve overall performance.

### Concurrent Mark Sweep Collector

With the certification of Java 6, Blackboard recommends using the Concurrent Mark Sweep Collector (`-XX:+UseConcMarkSweepGC`) instead of the Parallel Collector (`-XX:+UseParallelGC`).

### Local Allocation Buffer (TLAB)

The `-XX:+UseTLAB` parameter forces the JVM to use thread-local object allocation. A Thread Local Allocation Buffer (TLAB) is a region of Eden that is used for object allocation by a single thread, which is faster than performing an atomic operation on a top pointer shared across threads. Using a TLAB improves concurrency by reducing contention on the shared heap lock. Administrators can specify TLAB initial size and disable the resizing through the `-XX:TLABSize=<size in kb>` `-XX:-ResizeTLAB` parameter. The default setting of 256KB provides adequate performance. Blackboard's tests do not show increased performance when changing the TLAB size from the default value 256KB to 128KB or to 512KB. To discover which settings have a positive, negative, or neutral effect on performance, trace all TLAB operations, using the `-XX:+PrintTLAB` parameter.

### Survivor Spaces

The `-XX:SurvivorRatio` parameter controls the size of the two survivor spaces. If survivor spaces are too small, the JVM will copy collection overflows directly into the old generation. If survivor spaces are too large, they will be empty. At each garbage collection, the JVM determines the number of times that an object can be copied before it is tenured, which is called the tenure threshold (`-XX:MaxTenuringThreshold`). After experimenting with setting `-XX:SurvivorRatio` to 4, 8, 16, and 4096 with `-XX:MaxTenuringThreshold` set to 0, Blackboard's tests have found that customers who use our heap setting recommendations can improve Eden space memory management by changing the `-XX:SurvivorRatio` parameter to 4 or lower. Configurations that use JVM heap sizes larger than 8GB require different settings.

### New Space Region

Use the `-XX:NewSize` and `-XX:MaxNewSize` parameters instead of the previously recommended `-XX:NewRatio` parameter to determine the memory needs in the New Space region of the JVM. During performance tests, the `-XX:NewRatio` parameter did not size and resize the new generation space of the JVM correctly. Size the `-XX:NewSize` and `-XX:MaxNewSize` parameters to roughly 1/4 or 1/3 the size of the JVM.

## Supported Technologies

In every release, Blackboard devotes time and resources to make Blackboard Learn run on the latest operating systems, databases, and browsers available, with the goal of creating a system that is more manageable, more stable, and more user friendly.

This section highlights the major changes to the Supported Technologies and Browsers for this release. For the most up-to-date information, see [Blackboard Learn Release 9.1 SP2 Supported Technologies and Browsers](#) available on the [Maintenance Center](#) on [Behind the Blackboard](#)

The following sections highlight the new Platform and Client configurations tested for this release using the following support terms:

- **Certified:** Fully supported technology with highest level of testing before release.
- **Compatible:** Fully supported technology with minimal level of testing before release.
- **Unsupported:** Unsupported technology because it is either impossible or not tested.

### Platform Technologies

#### 32-bit Server Configurations

	Application Server/JDK 1.6	SQL Server 2005 (32-bit)	SQL Server 2008 (32-bit)	Oracle 10gR2 (32-bit)
<b>Windows Server 2003 SP1 (32-bit)</b>	Compatible (32-bit JDK)	Compatible	Compatible	Unsupported
<b>Red Hat Enterprise Linux Server 4 (32-bit)</b>	Compatible (32-bit JDK)	Unsupported	Unsupported	Compatible
<b>Red Hat Enterprise Linux Server 5 (32-bit)</b>	Compatible (32-bit JDK)	Unsupported	Unsupported	Compatible

## 64-bit Server Configurations

	Application Server/JDK 1.6	SQL Server 2005 (64-bit)	SQL Server 2008 (64-bit)	Oracle 10gR2 (64-bit)	Oracle 11gR1 (64-bit)
<b>Windows Server 2003 SP2 (64-bit)</b>	DATABASE ONLY	Compatible	Compatible	Unsupported	Unsupported
<b>Windows Server 2008 (64-bit)</b>	<b>Certified</b> (64-bit JDK)	Unsupported	<b>Certified</b>	Unsupported	Unsupported
<b>Windows Server 2008 R2 (64-bit)</b>	Compatible (64-bit JDK)	Unsupported	Compatible	Unsupported	Unsupported
<b>Red Hat Enterprise Linux Server 4 (64-bit)</b>	Compatible (64-bit JDK)	Unsupported	Unsupported	Compatible	Unsupported
<b>Red Hat Enterprise Linux Server 5 (64-bit)</b>	<b>Certified</b> (64-bit JDK)	Unsupported	Unsupported	<b>Certified</b>	Compatible**
<b>Sun Solaris 10 (64-bit SPARC)</b>	<b>Certified</b> (64-bit JDK)	Unsupported	Unsupported	<b>Certified</b>	Compatible**

\*\* Blackboard supports only build 11.1.0.7 of Oracle 11gR1.

### Configuration Notes:

- Microsoft® SQL Server 2005 must be installed with SP3 or above.
- Microsoft SQL Server 2008 must be installed with SP1 or above.
- Windows Server 2003 should be installed with SP2 or above.

### Windows Server 2008 R2

Blackboard introduced Compatible support for Windows Server 2008 R2 in Release 9.1 SP1. Compatible support continues in 9.1 SP2. Certification is planned for a future Service Pack.

### The Xythos Common Core has been updated to version 7.2 SP1

With Release 9.1, we integrated the latest version of Xythos Core version 7.2 into the product. Our goal is to stay current with maintenance releases on the Xythos Core to ensure the best experience of our product.

### Non-English Operating Systems and Databases

Non-English operating systems and databases (such as a Chinese-language version of Oracle), are considered compatible with Blackboard Learn.

### Oracle RAC

Blackboard offers support for RAC with all versions of Oracle supported by Blackboard. For information about running Blackboard Learn with RAC, see the *Blackboard Learn Server Administrator Guide* available on [Behind the Blackboard](#).

### Oracle 11gR1 Query Error

Oracle 11gR1 contains a bug that displays the following error when attempting a complex query:



```
ORA-00600: internal error code, arguments: [kkocxj : pjpCtx], [], [],
[], [], []
```

To prevent this error, before installation or afterward log on as a system user and run the command:

```
alter system set "_optimizer_push_pred_cost_based"=false scope = both;
```

## Hybrid Configurations

Red Hat/Solaris hybrid configurations have not been tested and are not supported.

## SSL Configuration

Blackboard strongly recommends running the Secure Sockets Layer (SSL) protocol to secure communication between a Blackboard Learn Web/App server and a client machine. If SSL is not used, authentication may be compromised. For more information, see the *Blackboard Learn Server Administration Guide*.

# Client Technologies

## Windows Client Configurations

	Internet Explorer 8	Internet Explorer 7	Firefox 3.6	Firefox 3.5
<b>Windows XP (32-bit)</b>	Compatible	Compatible	Compatible	Compatible
<b>Windows Vista (32-bit)</b>	<b>Certified</b>	Compatible	<b>Certified</b>	Compatible
<b>Windows Vista (64-bit)</b>	Compatible	Compatible	Compatible	Compatible
<b>Windows 7 (32-bit)</b>	<b>Certified</b>	Unsupported	<b>Certified</b>	Compatible
<b>Windows 7 (64-bit)</b>	Compatible	Unsupported	Compatible	Compatible

## Mac OSX Client Configurations

	Safari 5.0	Safari 4.0	Safari 3.2	Firefox 3.6	Firefox 3.5.x
<b>Mac OSX 10.5 "Leopard"</b>	Compatible	Compatible	Unsupported	Compatible	Compatible
<b>Mac OSX 10.6 "Snow Leopard"</b>	<b>Certified</b>	Compatible	Unsupported	<b>Certified</b>	Compatible

## Accessibility and JAWS

Blackboard strives to make all its products as accessible as possible. JAWS for Windows 9 and 10 were used during accessibility testing.

## JRE Support

Blackboard Learn requires the latest version of Sun JRE 6. The JRE can be downloaded from <http://java.sun.com/javase/downloads/index.jsp>. Windows System Administrators who want to

provide auto-download for users can find the .cab file link for the appropriate JRE at <http://java.sun.com/javase/6/webnotes/install/jre/autodownload.html>.

### **No Longer Supported**

Safari 3.2 was not tested with Service Pack 2 in accordance with our technology policy. Blackboard recommends that clients upgrade to the latest version of Safari.

The following technologies are not supported:

- Internet Explorer 6
- Firefox 1.x, 2.0, and 3.0
- Safari 2.0 and 3.2
- Mac OSX 10.4 “Tiger”
- Java 5

## **Virtualization**

VMware® ESX Server 4 (Linux® and Windows®) is the only configuration Certified by Blackboard for Release 9.1.

Blackboard supports other virtualization solutions as long as Blackboard and the hypervisor support the guest operating system.

In addition to VMware, Blackboard has experience with Citrix XenServer 5.5, Solaris 10 Zones and Red Hat® Enterprise Linux® 4 & 5 Xen™.

# Installation and Upgrade Information

For information about fresh installations of Blackboard Learn 9.1 SP2, see the [Blackboard Learn Installation Guide](#) for Release 9.1.

For information about upgrading to Blackboard Learn Release 9.1 SP2, see the [Upgrade Center](#) or find the *Upgrade Kit* for your current version in the [Document Library](#).

## Direct Upgrade Paths

The following releases can be upgraded directly to Blackboard Learn 9.1 SP2.

- Blackboard Learn Release 9.1 Service Pack 1 (Build 9.1.452.0) and Hotfix 1 (Build 9.1.452.8)
- Blackboard Learn Release 9.0 Service Pack 4 (Build 9.0.572.0)
- Blackboard Academic Suite 8.0 Service Pack 7 (Build 8.0.494.0) and Hotfix 1 (Build 8.0.494.5)

## Indirect Upgrade Paths

Previous Version	Suggested Path
9.0 GA, SP1, SP2, SP3	<ol style="list-style-type: none"> <li>1. Increment through the service packs to 9.0 SP4.</li> <li>2. Upgrade to 9.1 SP2.</li> </ol>
8.0 GA, SP1, SP2, SP3, SP4, SP5, and SP6	<ol style="list-style-type: none"> <li>3. Increment through the service packs to 8.0 SP7.</li> <li>4. Upgrade to 9.1 SP2.</li> </ol>
7.3 SP2	<ol style="list-style-type: none"> <li>1. Upgrade to 8.0 SP7.</li> <li>2. Upgrade to 9.1 SP2.</li> </ol>
7.3 SP1	<ol style="list-style-type: none"> <li>1. Upgrade to 7.3 SP2.</li> <li>2. Upgrade to 8.0 SP7.</li> <li>3. Upgrade to 9.1 SP2.</li> </ol>
7.3 GA	<ol style="list-style-type: none"> <li>1. Upgrade to 7.3 SP1.</li> <li>2. Upgrade to 7.3 SP2.</li> <li>3. Upgrade to 8.0 SP7.</li> <li>4. Upgrade to 9.1 SP2.</li> </ol>
7.2 SP1	<ol style="list-style-type: none"> <li>1. Upgrade to 7.3 SP2.</li> <li>2. Upgrade to 8.0 SP7.</li> <li>3. Upgrade to 9.1 SP2.</li> </ol>
7.2 GA	<ol style="list-style-type: none"> <li>1. Upgrade to 7.2 SP1.</li> <li>2. Upgrade to 7.3 SP2.</li> <li>3. Upgrade to 8.0 SP7.</li> <li>4. Upgrade to 9.1 SP2.</li> </ol>

Previous Version	Suggested Path
7.1 SP2 or later	<ol style="list-style-type: none"> <li>1. Upgrade to 7.3 GA.</li> <li>2. Upgrade to 7.3 SP1.</li> <li>3. Upgrade to 7.3 SP2.</li> <li>4. Upgrade to 8.0 SP7.</li> <li>5. Upgrade to 9.1 SP2.</li> </ol>
7.1 GA and SP1	<ol style="list-style-type: none"> <li>1. Upgrade to 7.1 SP2.</li> <li>2. Upgrade to 7.3 GA.</li> <li>3. Upgrade to 7.3 SP1.</li> <li>4. Upgrade to 7.3 SP2.</li> <li>5. Upgrade to 8.0 SP7.</li> <li>6. Upgrade to 9.1 SP2.</li> </ol>
7.0.x	<ol style="list-style-type: none"> <li>1. Upgrade to 7.0 SP1.</li> <li>2. Upgrade to 7.1 SP2.</li> <li>3. Upgrade to 7.3 GA.</li> <li>4. Upgrade to 7.3 SP1.</li> <li>5. Upgrade to 7.3 SP2.</li> <li>6. Upgrade to 8.0 SP7.</li> <li>7. Upgrade to 9.1 SP2.</li> </ol>
6.3.x	<ol style="list-style-type: none"> <li>1. Upgrade to 6.3 SP2.</li> <li>2. Upgrade to 7.0 SP1.</li> <li>3. Upgrade to 7.1 SP2.</li> <li>4. Upgrade to 7.3 GA.</li> <li>5. Upgrade to 7.3 SP1.</li> <li>6. Upgrade to 7.3 SP2.</li> <li>7. Upgrade to 8.0 SP7.</li> <li>8. Upgrade to 9.1 SP2.</li> </ol>

## **Paths for Importing and Restoring Courses**

The following table identifies the supported paths for importing or restoring a Course that was exported or archived from Blackboard Academic Suite. Certified paths are fully tested and supported by Blackboard. Compatible paths are not fully tested but should function correctly based on past performance.

**Note** Paths for importing and restoring Courses are not backward compatible. Courses may be imported or restored to a newer version, but Courses from a newer version may not be imported or restored to an earlier version.

Source	Support
Blackboard Learn Release 9.1	Certified
Blackboard Learn Release 9.0	Certified
Blackboard Academic Suite Release 8	Certified
Blackboard Academic Suite Release 7	Certified
Blackboard Academic Suite Release 6	Certified
Blackboard ML	Certified
Blackboard 5.5*	Certified
Blackboard 5.0*	Compatible
CourseInfo 4	Not Supported
Blackboard Vista and CE 8.0	Certified
Blackboard Campus Edition 4.1	Certified

\*Blackboard 5 and Blackboard 5.5 did not include an Archive and Restore function. Courses from these releases may be imported but Courses cannot be restored with user data and interactions intact.

## **Upgrading Server Software**

Server software must meet certain requirements before installing Blackboard Learn. The following items are important to keep in mind when setting up the server software:

- The database is run on a separate server when using two or more servers. Thus, appropriate client tools for the database must be installed on the Application server or servers when using a configuration with two or more servers.
- If running on Windows, when installing the Java SE Development Kit (JDK), make sure that both the JDK and the JRE components are installed to different locations. Also, ensure that there are no spaces in the path name to either the JDK or the JRE.
- If running on Windows, support for .NET APIs and .NET Building Blocks has been removed from Blackboard Learn in Release 9.1. If you are using .NET APIs and Building Blocks, they will not work in Release 9.1. Replace them with comparable Web Services and Java Building Block APIs. For more information about the available APIs, see the API documentation available on [Behind the Blackboard](#).
- If running on Solaris, ensure that the Swap space for the operating system is 0.5 – 1.5 times the amount of physical RAM on the server. For more information, see [http://www.sun.com/bigadmin/content/submitted/swap\\_space\\_impact.jsp](http://www.sun.com/bigadmin/content/submitted/swap_space_impact.jsp).

## **Before Running the Updater**

### **Windows Server 2008 IIS 7 Roles and Features Configuration**

Windows Server 2008 uses IIS 7. Before installation of Blackboard Learn 9.1, IIS 7 needs to be configured with specific Role Services and other settings.

1. Install the IIS 7 Role in Windows Server 2008 Server Manager and configure Role Services:
  - A. Click **Start** and select **Administrative Tools** then select **Server Manager**.
  - B. Click **Roles**, and under the **Roles Summary** heading, click **Add Roles**.
  - C. From the list of displayed roles, select **Web Server (IIS)**.
  - D. Click **Next**.

At a minimum, the following five (5) role services must be installed in addition to the default role services:

- Role Services > Web Server > Application Development > ISAPI Extensions
- Role Services > Web Server > Application Development > ISAPI Filters
- Role Services > Management Tools > IIS 6 Management Compatibility > IIS 6 Metabase Compatibility
- Role Services > Management Tools > IIS 6 Management Compatibility > IIS 6 WMI Compatibility
- Role Services > Management Tools > IIS 6 Management Compatibility > IIS 6 Scripting Tools

To enhance performance, troubleshooting, and offer additional web server configuration options, Blackboard recommends that the following role services also be installed:

- Role Services > Web Server > Common HTTP Features > all five (5) role services enabled
- Role Services > Web Server > Application Development > all seven (7) role services enabled
- Role Services > Web Server > Security > all eight (8) role services enabled
- Role Services > Management Tools > all three (3) role services enabled
- Management Tools > IIS 6 Management Capabilities > all four (4) role services enabled.

Of the role services listed in this step, the following are will be of the most interest:

- Role Services > Common HTTP Features > HTTP Redirection (to allow for HTTP redirection, in the event that the site is renamed)
- Role Services > Security > Windows Authentication (to allow for Active Directory integrated authentication)
- Role Services > Security > IP and Domain Restrictions (to allow for greater control of web server access)
- Role Services > Performance > Dynamic Content Compression (to allow for enhanced performance)

- E. Select **Windows Process Activation Service (.NET Environment)**, and then click **Add Required Role services**.

2. Disable the Default Web Site:
  - A. Click **Start** select **Administrative Tools** then select **Server Manager**.
  - B. From the left menu, click the plus sign next to **Roles** to expand the tree.
  - C. Click the plus sign next to **Web Server IIS**, and then click **Internet Information Services (IIS) Manager**.

- D. Under the **Connections** heading, click plus sign next to the **%HOSTNAME%**, and then click the plus sign next to **Sites**.
  - E. Right-click **Default Web Site** and from the drop-down menu select **Manage Web Site**, then select **Stop**.
3. Back up the current IIS 7 configuration and verify.
  - A. `%windir%\system32\inetsrv\appcmd.exe add backup "Blackboard Pre-Change"`
  - B. `%windir%\system32\inetsrv\appcmd.exe list backup`
4. Modify the IIS 7 configuration to permit double escaping within URLs (applies to all sites).
  - A. `%windir%\system32\inetsrv\appcmd set config /section:system.webServer/Security/requestFiltering - allowDoubleEscaping:True`
5. Modify the IIS 7 configuration to allow upload files greater than 20MB in size, specified in bytes (applies to all sites).
  - A. `%windir%\system32\inetsrv\appcmd set config - section:requestFiltering - requestLimits.maxAllowedContentLength:104857600`
6. Back up the current IIS 7 configuration and verify.
  - A. `%windir%\system32\inetsrv\appcmd.exe add backup "Blackboard Post-Change Backup"`
  - B. `%windir%\system32\inetsrv\appcmd.exe list backup`
7. Restart the IIS service.
  - A. Click **Start** and select **Administrative Tools** then select **Server Manager**.
  - B. From the left menu, click the plus sign next to **Configuration** and then click **Services**.
  - C. From the list of services, right-click **World Wide Web Publishing Service** and select **Restart**.

### IIS Configuration Editing Notes

Blackboard recommends that you do not manually edit the

`%windir%\system32\inetsrv\config\applicationHost.config` file to configure these options. This will result in errors that require a backup and restore of the last known good backup of the IIS 7 configuration that was managed by the IIS.

If you manually backed up the `applicationHost.config` file, restoring this manual backup and restarting IIS 7 will not fix errors generated by manually editing this file to configure IIS 7.

By default, IIS 7 will check every two minutes for changes to the configuration files and will automatically create backups of them, maintaining a history of ten backups. Use the oldest of these backups to restore IIS 7 to a working state.

```
%windir%\system32\inetsrv\appcmd.exe list
backup%windir%\system32\inetsrv\appcmd.exe restore backup
"CFGHISTORY_0000000021"
```

Once the configuration has been restored and verified through web browser access, then use the `appcmd` utility to configure the necessary features of IIS 7 as described in the section above.

If this approach does not solve the problem with IIS 7 generating errors, remove and then reinstall the IIS 7 Role.

If you need to reinstall the IIS 7 Role, you can use the `%BLACKBOARD%\tools\admin\WebsiteReinstall.bat` command to re-establish the Blackboard Web site within IIS. Then install the IIS 7 Role in Windows Server 2008 Server Manager and configure Role Services.

## **Upgrading to Blackboard Learn 9.1 SP2**

### **Upgrade Guides**

Blackboard provides separate Upgrade Guides for each of the following products:

- Blackboard Learn Release 9.0
- Blackboard Academic Suite 8.0
- CE 4
- CE 8
- Vista 8

Each Upgrade Guide is available in the appropriate product's Upgrade Kit available on the [Blackboard Upgrade Center](#) or [Behind the Blackboard](#).

### **Provide New License**

Contact Blackboard Client Operations to [request a new license key](#) file (`bb-license.xml`) for Blackboard Learn Release 9.1. Make sure to do so well in advance of the upgrade. It is important to obtain a new license file to ensure the upgrade includes new features and functions.

Save the new license file in the same directory as the updater. Be sure not to confuse the new license with the old license file.

During the upgrade, when the installation prompt presents the following options: Update, Provide new License file, Uninstall Blackboard Learn, and Uninstall appserver, select **Provide new License file**.

### **Customizations Warning**

Running the Updater on an existing system will reset many back-end and user interface customizations. Examples of affected back-end settings include:

- `JAVA_HOME` system environment variable
- SSL and custom authentication settings
- Settings in the `bb-config.properties`, `authentication.properties`, and `wrapper.conf` files

Examples of affected user interface settings include:

- Course Settings (which control the Course menu)
- Building Block availability
- Module and Tab availability, role settings, and custom layouts

Customizations will need to be reapplied after the upgrade. To make this process easier, create a detailed document outlining all existing customizations.



**Note** Any configuration files removed by the upgrade will be placed in the `<blackboard_directory>/backups/<upgrade_timestamp>` directory. Use these files as a guide when updating the new configuration files to reapply your previous customizations.

### Custom Themes Warning

Significant changes were made to the application markup and CSS in Release 9.1 to support new features and accessibility standards. These changes can cause customized themes and color palette changes created in earlier releases to malfunction as well as fail to apply styles to new features.

Comments have been added to the CSS files to make them easier to read and understand. These comments identify new elements and elements that are no longer used. Extraneous sectors have been removed.

### Previous Content Management Clients

If your institution is planning to upgrade directly from Blackboard Learn 9.0 or earlier please be aware of possible complications with Content Management. Clients who have previously licensed the Content Management module, but no longer have such a license, may encounter problems when upgrading to Release 9.1. This occurs because of lingering schemas in the database that require a Content Management license. Because of these lingering schemas, the installer is unable to upgrade the database properly and will fail.

If your institution's database has lingering schemas from a previous Content Management license you must obtain the appropriate uninstaller script from Blackboard Client Support to remove these schemas before upgrading to 9.1.

### Load-Balanced Systems

The Updater must be run on each Application server and the Collaboration server on a load-balanced system. After running the Updater the first time, choose the Update an App Server for all other Application servers and the Collaboration server. This option will upgrade the application files without making any of the database changes.

### Language Pack Changes

To ensure consistency across releases, the Blackboard Learn Updater will compare the existing en\_US language pack against the version that is being installed. The differences are noted and output in a file called `bundle_diff.txt`. This file is added to the `blackboard/backups/<updater_time_stamp>` directory. Use this file to review the text differences between releases and make upgrades to any custom Language Packs.

### Running the Updater on Windows

Follow these steps to run the Updater on Windows:

1. Make sure that the Java environment variable is properly set.
2. Click on the Updater file to launch it.
3. A welcome message will appear with a reminder to read the release notes and the installations instructions completely before updating. Click **Next** to continue.
4. The first updater page confirms the auto-detected install and content directories. Click **Next** to accept the defaults or enter new values and then click **Next**. Load-Balanced users should use the mapped UNC path.

5. The next prompt presents several options. The options are **Update**, **Provide new License file**, **Uninstall Blackboard Learn**, and **Uninstall Application Server**. Select the appropriate option and click **Next**. The **Update** option will use the license file already configured and **Provide new license file** will upgrade the system and apply the new license.
6. If the server does not already have a Server Type value, the Server Type screen will display. Properly categorize the server and click **Next**.
7. A message will appear that displays the changes that will be made when the Updater is run. Click **Next** to start the upgrade. If the Updater was launched from the command line, do not close the command line window or any of the other windows that pop-up during the upgrade.

### Running the Updater on UNIX (Red Hat and Solaris)

Follow these steps to run the Updater on UNIX.

1. Open a command-line prompt as the root user and navigate to the directory that holds the Updater.
2. Run the following command to launch the Updater:

```
$JAVA_HOME/bin/java -jar <updater_file>
```

If Xwindows or a similar GUI is running and the DISPLAY variable is properly configured, the Updater will launch in GUI mode. The following steps assume that the command-line Updater is used.

A welcome message will appear with a reminder to read the release notes and the installations instructions completely before updating. Hit ENTER to continue.

3. Instructions will appear for navigating through the Updater prompts. The Updater, in most cases, will provide a default value in brackets. Hit ENTER to accept the default and continue or enter a different value. Hit ENTER to continue after entering a new value.
4. The first Updater prompt asks for the directory where Blackboard will be found. Hit ENTER to accept the default or enter a new value and then hit ENTER. If The Blackboard Learn is not found in the directory provided, the Updater will attempt to install at the given location.
5. The next prompt presents several options. The options are “**1 – Upgrade and Convert**” and “**2 – Upgrade App Server Only.**” Type **1** and hit ENTER.
6. If the server does not already have a Server Type value, the Server Type screen will display. Properly categorize the server and hit ENTER.
7. A message will appear that displays the changes that will be made when the Updater is run. Hit ENTER to start the upgrade.