Learn Integration Overview: 9.1, SaaS, and Ultra

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Statements regarding our product development initiatives, including new products and future product upgrades, updates or enhancements represent our current intentions, but may be modified, delayed or abandoned without prior notice and there is no assurance that such offering, upgrades, updates or functionality will become available unless and until they have been made generally available to our customers.
# Today’s Discussion

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<th>Teaching &amp; Learning Portfolio, SaaS, &amp; Ultra</th>
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<td>Current Integration Frameworks</td>
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Teaching & Learning Portfolio, SaaS, and Ultra
The Blackboard Teaching & Learning Portfolio

Ultra experience

(new) Blackboard Collaborate

Bb Student, Mobile Learn, Bb Grader, *Bb Instructor*  
(*In Design*)

Blackboard Learn  
Self Hosted  
(9.1)

Blackboard Learn  
Managed Hosted  
(9.1)

Blackboard Learn SaaS  
(Standard, Plus, Advantage)

Original Course View  
Original Course View  
Ultra Course View
One System, Two Interfaces, Multiple Integration Types
<table>
<thead>
<tr>
<th>Why SaaS (Software as a Service)</th>
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<tbody>
<tr>
<td><strong>Enhanced quality</strong></td>
</tr>
<tr>
<td><em>Fixes &amp; maintenance more quickly</em></td>
</tr>
<tr>
<td><strong>Improved experience</strong></td>
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<tr>
<td><em>Zero downtime updates</em></td>
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<tr>
<td><strong>Easier change management</strong></td>
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<tr>
<td><em>Smaller, continuous delivery updates</em></td>
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<tr>
<td><strong>Rapid innovation</strong></td>
</tr>
<tr>
<td><em>Enhancements &amp; features more quickly</em></td>
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<tr>
<td><strong>Better support</strong></td>
</tr>
<tr>
<td><em>Less variety of versions being supported</em></td>
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<tr>
<td><strong>Peace of mind</strong></td>
</tr>
<tr>
<td><em>Experienced Bb staff managing operations</em></td>
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*With SaaS deployment, the vast majority of updates are applied without service interruption. In the event that an update may require a service interruption, this will be communicated in advance.*
Why Ultra?

- Modern
- Easy to use
- Responsive
- Innovative
Philosophy of Our Integration Evolution

We have a long history of supporting the development community that dates back to 2003.

With our commitment to deliver Learn on SaaS with the Ultra experience, we're significantly improving the user experience.

To support that experience, we're delivering a new integration model – REpresentational State Transfer (REST).

While this represents significant change, we're committed to improving the developer experience as well.

To do that, we're launching a new Bb Developer Platform, an API Gateway, and a developer forum on Bb Community.
Current Integration Frameworks
Building Blocks

- Built around Blackboard’s proprietary Java API – requires Java
- Apps installed into the Tomcat application via a customer GUI in the Admin panel
- Run *in-process* as part of Blackboard Learn
- Deployment points and tag libraries allow Building Blocks to create pages that render in Learn
## Tiers of Blackboard Learn (SaaS)

<table>
<thead>
<tr>
<th>Standard</th>
<th>Plus</th>
<th>Advantage</th>
</tr>
</thead>
</table>
| • Both the Original & Ultra experiences  
• Continuous delivery of features and functionality  
• **Curated, certified set of pre-installed B2s only**  
• Full LTI, web services, and new REST API  
• Test instance included  
• Supports Learning Core and Learning Essentials solutions only | • Both the Original & Ultra experiences  
• Continuous delivery of features and functionality  
• Flexible Deployment Option available  
• **Full B2 support**  
• Full LTI, web services, and new REST API  
• Test instance included  
• Supports all Learning Solutions | • Both the Original & Ultra experiences  
• Continuous delivery of features and functionality  
• Flexible Deployment Option  
• **Full B2 support**  
• Full LTI, web services, and new REST API  
• Test and Staging instances included  
• Supports all Learning Solutions  
• Service Delivery Mngmt  
• Direct Data Access (OpenDB / ASR)  
* Update Support Package recommended |
Blackboard Learn & the Building Block Story Today

Blackboard Learn
Self Hosted (9.1)

Blackboard Learn
Managed Hosted (9.1)

Blackboard Learn SaaS
(Standard, Plus, Advantage)

Original Course View

Building Block (SaaS)

Building Block (9.1 Q2 2016)

Building Block (9.1 Q4 2015)

Building Block (9.1 Oct 2014)
Blackboard Learn & the Building Block Story Tomorrow

**Blackboard Learn**
- Self Hosted (9.1)
- Managed Hosted (9.1)

**Blackboard Learn SaaS**
(Standard, Plus, Advantage)

Original Course View

Building Block (SaaS and 9.1 Q2 2016)

Building Block (9.1 Q2 2016)

Building Block (9.1 Q4 2015)

Building Block (9.1 Oct 2014)
Java 8 is supported with the Learn 9.1 Q2 2016 Release; self-hosted, managed hosted, and SaaS.

Java 8 brings changes to the Java language and binaries; this required us to refactor our Building Block APIs.

Builds using Java 8 can be accomplished using compatibility settings enabling the war files to be installed on previous versions of the JVM e.g.: 1.6/1.7. This allows you to build once for deployment on Java 8 enabled versions of Learn.
Bringing the Building Block Story Together

- **Single code base**
  Q2 2016 and SaaS release will share the same code base forward

- **Building block certification**
  Ongoing changes for updates are minimized

- **Support for Java 8**
  Take advantage of current Java programming models

- **Continue to support older versions of Learn**
  Existing Building Blocks will continue to work on legacy systems
SOAP Services

- XML-encoded method calls sent over HTTP
- UDDI for service discovery, WSDL for service description
- Consumer/Provider model – Blackboard Learn can be either
- Provide a limited set of APIs compared to Building Blocks
IMS Learning Tool Interoperability (LTI)

- IMS Global Consortium standard
- Vendor agnostic remote, out-of-process tool communication
- Consumer/Provider model – Blackboard Learn is a consumer only
- Tool links can be registered system-wide or at the course level
Partner Cloud

- Blackboard proprietary cloud-based integration broker for Partner applications
- Provides a single target for integrations – no need to deal with multiple versions
- Partner connects their service to the Partner Cloud service
- Blackboard maintains the Partner Cloud Building Block that connects Learn to the Partner cloud
Where We’re Headed
REpresentation State Transfer (REST) APIs

An architectural style of building web services

REST APIs are integration interfaces built using REST principles

Blackboard REST APIs are not just for Learn – other cloud products

Runs out-of-process – nothing is installed in the Learn instance

Programming language agnostic
Why REST?

- Preferred HTTP-based model for building Internet solutions
  - Supports a greater breadth of integration potential than LTI

- Leverage in-house programming expertise
  - Does not require Java knowledge

- Lower development costs
  - Provides a standardized interface

- Near zero Learn performance impact
  - Highly scalable, simple, and easy to code – reduces time to solution
The New Blackboard Developer Platform

- Register as a developer and access REST API documentation
- Manage your developer information and REST integrations
- Includes a new API gateway to manage REST API Access
- Provides access to a developer VM to assist with development
- Supported by the new Bb Community site
- No cost for licensed customers
The Integration Landscape
The Full Range of Options

- **Building Blocks**
- **SOAP Web Services**
- **IMS LTI**
- **Partner Cloud**

**REST APIs**
## What Will Work Where

<table>
<thead>
<tr>
<th>Integration Type</th>
<th>Learn 9.1</th>
<th>Learn SaaS Original Experience</th>
<th>Learn SaaS Ultra Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Blocks</td>
<td>Yes</td>
<td>Yes¹</td>
<td>Yes²</td>
</tr>
<tr>
<td>SOAP Web Services</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>IMS LTI</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Partner Cloud</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>REST API</td>
<td>Yes³</td>
<td>Yes³</td>
<td>Yes³</td>
</tr>
</tbody>
</table>

¹ Some Building Blocks may need to be updated to work in Learn SaaS.
² Building Blocks will work in the Ultra experience for Original Course Views. Building Blocks that don’t expose any interfaces outside of the Admin Panel will also continue to work when Ultra is enabled. All other Building Blocks must be placed in an LTI wrapper to work in the Ultra Course View.
³ Initial REST APIs are now available via an Integrations Technical Preview.
For Integrations to Work in SaaS + Original Experience

<table>
<thead>
<tr>
<th>Integration Type</th>
<th>Required Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Blocks</td>
<td>Test Building Block integration in Learn SaaS and update if necessary</td>
</tr>
<tr>
<td>SOAP Web Services</td>
<td>No action needed</td>
</tr>
<tr>
<td>IMS LTI</td>
<td>No action needed</td>
</tr>
<tr>
<td>Partner Cloud</td>
<td>No action needed</td>
</tr>
<tr>
<td>REST API</td>
<td>Redevelop integration against REST API</td>
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For Integrations To Work In SaaS + Ultra Experience

<table>
<thead>
<tr>
<th>Integration Type</th>
<th>Action Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Blocks</td>
<td>LTI wrapper required</td>
</tr>
<tr>
<td>SOAP Web Services</td>
<td>N/A</td>
</tr>
<tr>
<td>IMS LTI</td>
<td>No action needed</td>
</tr>
<tr>
<td>Partner Cloud</td>
<td>No action needed</td>
</tr>
<tr>
<td>REST API</td>
<td>Re-develop integration against REST API</td>
</tr>
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</table>
Today’s Discussion

• You have a full range of options for how you integrate with Learn – some older, some newer

• Each option has pros and cons that will impact your decision as to which to use

• The approach to take depends on three major factors

Target Platform: 9.1 or SaaS

User Experience: Original or Ultra

Architectural Goals: In or Out of Process
Choosing the Right Path: Target Platform

<table>
<thead>
<tr>
<th>Integration</th>
<th>Learn 9.1</th>
<th>SaaS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Blocks</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>SOAP</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>LTI</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>REST</td>
<td>9</td>
<td>4</td>
</tr>
</tbody>
</table>
### Choosing the Right Path: User Experience

<table>
<thead>
<tr>
<th>Integration</th>
<th>Original</th>
<th>Ultra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Blocks</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>SOAP</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>LTI</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>REST</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
# Choosing the Right Path: Architecture

<table>
<thead>
<tr>
<th>Integration</th>
<th>In-process</th>
<th>Out-of-process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Blocks</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>SOAP</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>LTI</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>REST</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>
## Requirements

<table>
<thead>
<tr>
<th></th>
<th>9.1</th>
<th>SaaS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java 8</td>
<td>4</td>
<td>4|4</td>
</tr>
<tr>
<td>Refactoring</td>
<td>4</td>
<td>4|4</td>
</tr>
<tr>
<td>Building Block as LTI</td>
<td>0</td>
<td>0|4</td>
</tr>
<tr>
<td>REST</td>
<td>9</td>
<td>4|4</td>
</tr>
</tbody>
</table>
REST API Roadmap

Available in Technical Preview
- Developer Platform
- API Gateway
- Learn APIs
  - Content
  - Courses
  - Data Sources
  - Gradebook
  - Memberships
  - Terms
  - Group Assignments

In Research
- Learn APIs
  - Accessibility
  - Announcements
  - Assessments
  - Assignments
  - Attempts
  - Calendar
  - Discussions
  - Events
  - Hierarchy
  - Localization
- Collaborate APIs
- Transact APIs
Resources
https://blackboard.jiveon.com/community/developers/learn
API Dev Portal

Browse our REST APIs, check out our Developer Community site, and register your REST application for use by the Blackboard Community.

Questions? Contact developers@blackboard.com

Browse APIs

API Documentation is the cornerstone to successful development.
Explore Blackboard REST APIs that can be used in your applications!

Register and Manage Your Applications

Ready to test and release your Application?
Sign Up for a Blackboard Developer Account, register your application and gain access to the tools necessary for testing and release of your application to the Blackboard Community.

https://developer.blackboard.com/
Training

- Online Training
  - Self-paced Building Blocks, LTI and REST services training
  - [https://training.blackboard.com](https://training.blackboard.com)

- Onsite, hands-on training with Subject Matter Experts
  - Building Blocks, LTI and REST services training
  - Analysis and Design
  - Contact your sales rep for more information
Developer Portal: https://developer.blackboard.com
Latest APIs: https://developer.blackboard.com/portal/displayApi
Sample Code: https://github.com/search?q=blackboard+REST+BBDN-
&type=Repositories&ref=searchresults
REST Community Site: https://community.blackboard.com/community/developers/rest
The REST API Architecture: https://community.blackboard.com/docs/DOC-1733
Setting up Learn to use your REST Integration:
https://community.blackboard.com/docs/DOC-1580
DVM Object Gen: https://github.com/blackboard/BBDN-LearnObjectGen_Python

Contact Us: developers@blackboard.com
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