## **Exam Engine Web Service Documentation**

### **Table of Contents**

Directory Structure	2
Deploying the Web Service	
Setting the baseAddressPrefixFilters	
Editing the Web.config File	
Linking to the Web Service in the <i>Exam Engine Configuration Editor</i>	
Configuring the Exam Engine Reporter Application	

This document describes the Exam Engine Web Service configuration and implementation. Note that the use of this web service is optional. It is used to provide these pieces of Exam Engine functionality:

- Validate Logins versus Passwords and/or Exams
- Read questions and objectives from the web service rather than from a local XML file.
- Store student data in a web-based database.
- The ability to run the *Exam Engine Reporter* against the web-based student data.
- Email technical support.
- Email student results to an administrator, with optional Word, Excel, HTML, and/or plain text attachments.

#### **Directory Structure**

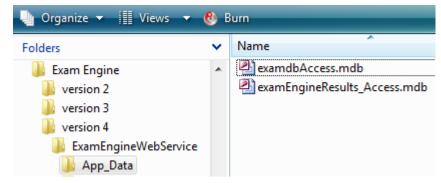
The layout of the web service directory structure is shown to the right. You would normally copy the entire *ExamEngineWebService* directory structure to your web server and then configure it as described in the next section. The ExamEngineDataService.asmx file is the actual web service referenced by the Exam Engine exam. The ExamEngineService.svc file is referenced by the Exam Engine Reporter application. The crossdomain.xml and clientaccesspolicy.xml files are special XML file that allows clientside applications access the service. They are not needed by this version of Exam Engine, but it is a good idea to keep them around just in case. You can give more restrictions if desired. The Web.config file has a number of user-configurable settings as discussed later in this document.

👣 Open 🔻 🔛 E-mail 🔞 Burn Organize 🔻 III Views ▼ Folders Name **VBTrainProducts** App\_Data li bin AiccWatch My Project Exam Engine obi version 2 clientaccesspolicy.xml version 3 crossdomain.xml version 4 🛍 ExamEngineDataService.asmx ExamEngineWebService ExamEngineDataService.asmx.vb App\_Data ExamEngineService.svc ll bin ExamEngineService.svc.vb My Project ExamEngineWebService.sIn 📗 obj ExamEngineWebService.suo PerforMax3 Store ExamEngineWebService.vbproj RemoteTracker ExamEngineWebService.vbproj.user ReportingServicesSample GridColumnHeadings.vb SCORMWatch QuestionInteraction.vb Tracker3 Web.config Tracker3Samples Web.Debug.config Tracker4 Web.Release.config Tracker4Auth

The .vb files contain the programming of the web service. They should not be edited directly but rather

should be maintained by opening ExamEngineWebService.sln with Visual Studio .NET 2010 or later.

The *App\_Data* directory contains the Access and/or XML database files for both the questions (if loading questions via the web service) and results/logins (if storing results and/or



validating logins). If you are using SQL Server for either of these tasks, then there will not be a corresponding file in this directory. The format, directory, and file name are set in the *Web.config* file as explained below.

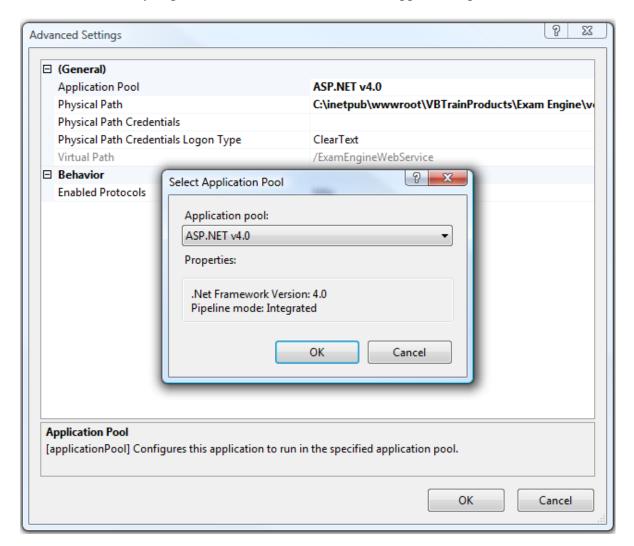
#### **Deploying the Web Service**

To begin working with the web service, you must put its directory structure on the web server and make it into an ASP.NET 4.0 virtual directory/application. If your local computer has Internet Information Services (IIS) and ASP.NET installed, you can do this locally for testing as well. If you are running IIS 6, you select the ASP.NET version via the ASP.NET tab.

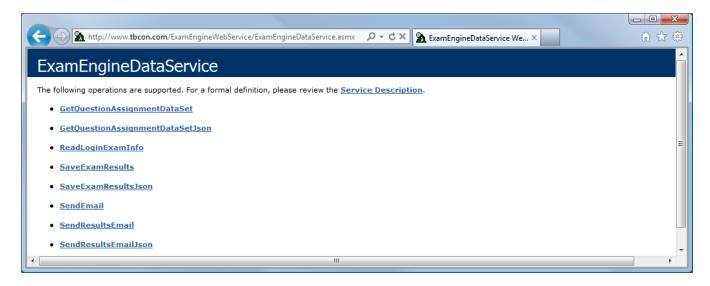
Note: If you are running IIS 6 or later, it is critical that you select an application pool that <u>only</u> has ASP.NET 2.0 applications in it.

Mixing applications with different .NET versions within the same pool can cause both the web service and the other applications to fail.

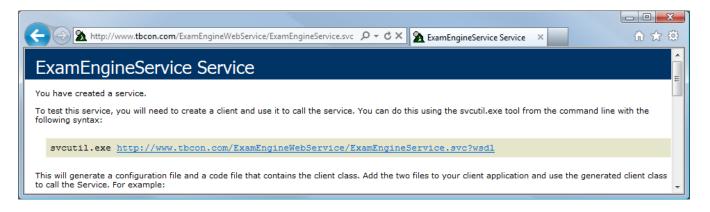
For IIS 7 and later, you pick the ASP.NET version via the application pool. This is shown below.



You can tell if the web service is set up correctly if you can navigate to the *ExamEngineWebService.asmx* file and see a screen like the one below.



Note that this URL is what is required in the *Exam Engine Configuration Editor* as described later in this document. A slightly different URL (to ExamEngineService.svc) is needed by the users of the *Exam Engine Reporter* application, also described below.



If you are prompted for any type of logon before reaching these screens, then neither of these applications will work.

Due to security restrictions for JavaScript, you normally want to locate the web service in the same domain as your content. For example, if your content is on <a href="www.tbcon.com">www.tbcon.com</a>, you want the web service on that URL as well, such as <a href="www.tbcon.com/ExamEngineWebService">www.tbcon.com/ExamEngineWebService</a>. Exam Engine attempts to make a cross-domain call if needed, but this tends to work only with Internet Explorer. If you need to go cross-domain, we recommend that you place the provided <a href="mailto:crossdomain.xml">crossdomain.xml</a> file on the web server containing the web service. Although primarily designed for Silverlight content, you might also include <a href="mailto:clientaccesspolicy.xml">clientaccesspolicy.xml</a> file in the same location. It normally needs to be set on the <a href="mailto:root">root</a> of the web site.

For example, we place it at <a href="http://www.plattecanyon.com">http://www.plattecanyon.com</a> rather than at <a href="http://www.plattecanyon.com/ExamEngineWebService">http://www.plattecanyon.com/ExamEngineWebService</a>. Here are the contents of these files:

#### crossdomain.xml

```
<?xml version="1.0"?>
<!DOCTYPE cross-domain-policy SYSTEM</pre>
"http://www.macromedia.com/xml/dtds/cross-domain-policy.dtd">
<cross-domain-policy>
     <site-control permitted-cross-domain-policies="all"/>
     <allow-access-from domain="*" />
     <allow-http-request-headers-from domain="*" headers="SOAPAction"</pre>
/>
</cross-domain-policy>
clientaccesspolicy.xml
<?xml version="1.0" encoding="utf-8" ?>
<access-policy>
     <cross-domain-access>
          <policy>
               <allow-from http-request-headers="*">
                     <domain uri="*"/>
               </allow-from>
               <grant-to>
                     <resource include-subpaths="true" path="/"/>
          </policy>
     </cross-domain-access>
</access-policy>
```

These files allow communications from any domain. They are designed for use by Flash and Silverlight, but there may be support for them in the future with JavaScript. You can make these files more restrictive if desired. See <a href="http://www.adobe.com/devnet/articles/crossdomain\_policy\_file\_spec.html">http://www.adobe.com/devnet/articles/crossdomain\_policy\_file\_spec.html</a> for information on *crossdomain.xml* and <a href="http://msdn.microsoft.com/en-us/library/cc197955(VS.95).aspx">http://msdn.microsoft.com/en-us/library/cc197955(VS.95).aspx</a> for information on *clientaccesspolicy.xml*.

#### Setting the baseAddressPrefixFilters

If you deploy your service and get an error like this, "This collection already contains an address with scheme http," you need to uncomment the baseAddressPrefixFilters area of the *Web.config* file and set the prefix to the domain of your web site. For example, on our version deployed on plattecanyon.com, the entry looks like this:

#### **Editing the Web.config File**

The web.config file located in the main directory of the web service has a number of user-configurable settings. These are all located in the *<appSettings>* area of the file. Each setting is described below. After editing the web.config (and keeping a backup copy of the original), you can replace the one on your web server.

Key Name	Description	Example
CacheTimeInMinutes	This is the number of minutes that	<add< th=""></add<>
	certain items like these settings will	<pre>key="CacheTimeInMinutes"</pre>
	remain in memory rather than being	value="60" />
	read from the Web.config file.	
DataSourceAccessName	This is the file name for the	<add< th=""></add<>
	questions database if the	key="DataSourceAccessName"
	DataSourceType is set to Access. It	<pre>value="examdbAccess.mdb"/&gt;</pre>
	is located at the relative or absolute	file name for</th
	path set by the	Access. Can be overridden by
	DataSourceAccessPath setting.	dbName query string>
	Note that this name can be sent to	
	the exam via the dbName query	
	string parameter. In that case, that	
	name will override this <i>Web.config</i> value.	
Data Carray Array Dansay I	1 00-070	<add< th=""></add<>
DataSourceAccessPassword	This is the optional password for	key="DataSourceAccessPasswor
	the questions database if the	d" value=""/> Optional</th
	DataSourceType is set to Access.	for Access>
DataSourceAccessPath	This is the relative or absolute path	<add< th=""></add<>
DuidSourcericeessi um	for the questions database if the	key="DataSourceAccessPath"
	DataSourceType is set to Access.	<pre>value="App_Data"/&gt; <!--</pre--></pre>
	You would normally want to leave	relative or absolute path
	this as App_Data as ASP.NET	for Access>
	prevents files in that directory from	
	being downloaded via the browser.	
	However, you can set an absolute	
	path outside the web site directory	
	if desired.	
DataSourceAccessUserName	This is the optional username for	<add< th=""></add<>
	the questions database if the	key="DataSourceAccessUserNam
	DataSourceType is set to Access.	e" value=""/> Optional</th

Key Name	Description	Example
		for Access>
DataSourceSaveDataName	This is the <i>name</i> of the Access or	<add< th=""></add<>
Buiusoureesuve Buiur vame	XML file used to save student	key="DataSourceSaveDataName"
	results and/or validating logins. For	value="examEngineResults_Acc
	SQL Server, this is the <i>database</i>	ess.mdb"/> filename for</th
	name. We recommend using Access	XML and Access, database
	or SQL Server for performance	name for SQL>
	reasons. The type of database is set	Tidille Tot bgi
	via the ResultsDataSourceType	Or
	21	
	setting.	<add< th=""></add<>
		key="DataSourceSaveDataName"
		<pre>value="ExamEngineResults3"/&gt;</pre>
DataSourceSaveDataPassword	This is the programmed to the detabase	<add< th=""></add<>
DaiaSourceSaveDaiaPasswora	This is the password to the database	
	used to save student results and/or	<pre>key="DataSourceSaveDataPassw ord" value=""/&gt; <!-- not</pre--></pre>
	validating logins. It is not needed	
	for XML, optional for Access, and	needed or XML, optional for
	required for SQL Server. The type	Access, required for SQL>
	of database is set via the	
	ResultsDataSourceType setting.	
DataSourceSaveDataPath	This is the relative or absolute path	<add< th=""></add<>
	for the student results/login	key="DataSourceSaveDataPath"
	database if the	<pre>value="App_Data"/&gt; <!-- subdirectory for XML or Access</pre--></pre>
	ResultsDataSourceType is Access	(App_Data usually), server name
	or XML. For these types, you	for SQL>
	would normally want to leave this	Or
	as App_Data as ASP.NET prevents	
	files in that directory from being	<add< th=""></add<>
	downloaded via the browser.	key="DataSourceSaveDataPath"
	However, you can set an absolute	<pre>value="(local)"/&gt;</pre>
	path outside the web site directory	
	if desired. For SQL Server, this is	
	the name or IP address of the SQL	
	Server instance.	
DataSourceSaveDataUserNam	This is the username for the	<add< th=""></add<>
e	database used to save student	key="DataSourceSaveDataUserName
	results and/or validating logins. It is	" value=""/> not needed or</th
	not needed for XML, optional for	XML, optional for Access,
	Access, and required for SQL	required for SQL>
	Server. The type of database is set	
	via the ResultsDataSourceType	
	setting.	
DataSourceSqlName	This is the name of the database if	<add <="" key="DataSourceSqlName" th=""></add>
-	the <i>DataSourceType</i> is set to SQL.	<pre>value="ExamEngineQuestions3"/&gt;&lt;</pre>
	JI	! database name for SQL
		Server>
DataSourceSqlPassword	This is the password of the database	<add< th=""></add<>
	if the <i>DataSourceType</i> is set to	key="DataSourceSqlPassword"
	SQL.	value="happy"/> Mandatory</th
		for SQL Server>

Key Name	Description	Example
DataSourceSqlPath	This is the server name or IP	<add <="" key="DataSourceSqlPath" th=""></add>
	address of the server if the	<pre>value="local"/&gt; <!-- Server</pre--></pre>
	DataSourceType is set to SQL.	name or IP address for SQL
	ButtisourceType is set to SQL.	Server>
DataSourceSqlUserName	This is the username of the database	<add< th=""></add<>
	if the <i>DataSourceType</i> is set to	key="DataSourceSqlPassword"
	SQL.	<pre>value="happy"/&gt; <!-- Mandatory</pre--></pre>
		for SQL Server>
DataSourceType	This is the type of database to be	<add <="" key="DataSourceType" th=""></add>
	used if you are loading questions	<pre>value="Access"/&gt; <!-- Access, XML, or SQL--></pre>
	from the web server. Valid values	MIL, OI SQL>
	are Access, XML, or SQL.	
DataSourceXmlName	This is the file name for the	<add <="" key="DataSourceXmlName" th=""></add>
	questions database if the	<pre>value="examdb.xml"/&gt; <!-- file</pre--></pre>
	DataSourceType is set to XML. It is	name for XML. Can be overridden
	located at the relative or absolute	by dbName query string>
	path set by the	
	DataSourceAccessPath setting.	
	Note that this name can be sent to	
	the exam via the <i>dbName</i> query	
	string parameter. In that case, that	
	name will override this Web.config	
	value.	
DataSourceXmlPath	This is the relative or absolute path	<add <="" key="DataSourceXmlPath" th=""></add>
	for the questions database if the	<pre>value="App_Data"/&gt; <!--</pre--></pre>
	DataSourceType is set to XML.	relative or absolute path for
	You would normally want to leave	XML>
	this as App_Data as ASP.NET	
	prevents files in that directory from	
	being downloaded via the browser.	
	However, you can set an absolute	
	path outside the web site directory	
	if desired.	
EmailCredentialsDomain	This is the optional domain for	<add< th=""></add<>
	computer name that verifies the	key="EmailCredentialsDomain"
	other email credentials. It is often	value=""/>
	left blank. See	
	http://msdn.microsoft.com/en-	
	us/library/system.net.networkcreden	
	tial.domain.aspx for more details.	
EmailCredentialsPassword	This is the optional password for	<add< th=""></add<>
	your email credentials. On some	key="EmailCredentialsPassword"
	systems, credentials are required in	<pre>value="aaabbbb"/&gt;</pre>
	, , , , , , , , , , , , , , , , , , , ,	
	order for the mail server listed in	
	order for the mail server listed in	
	order for the mail server listed in SmtpServer to allow emails from	
EmailCredentialsUsername	order for the mail server listed in <i>SmtpServer</i> to allow emails from your application.	<add< th=""></add<>
EmailCredentialsUsername	order for the mail server listed in <i>SmtpServer</i> to allow emails from your application.  This is the optional username for	<add <="" key="EmailCredentialsUsername" th=""></add>
EmailCredentialsUsername	order for the mail server listed in <i>SmtpServer</i> to allow emails from your application.	

Key Name	Description	Example
	order for the mail server listed in	
	SmtpServer to allow emails from	
	your application.	
ExamEngineReporterKey	This key must match the key being	<add< th=""></add<>
	sent by the <i>Exam Engine Reporter</i>	key="ExamEngineReporterKey"
	application as described later in this	<pre>value="AABBCC11223344"/&gt;</pre>
	document. This key gives the	
	Reporter the ability to view various	
	Exam and Question reports.	
ExamEngineTrackingKey	This key must match the <i>Access</i>	<add< th=""></add<>
	Key set in the Exam Engine	<pre>key="ExamEngineTrackingKey"</pre>
	Configuration program and read by	<pre>value="11223344AABBCC"/&gt;</pre>
	the individual exam.	
IndividualFileName	This value is used as part of the	<add <="" key="IndividualFileName" th=""></add>
	name of the optional XML database	<pre>value="individualresults"/&gt; <!---</pre--></pre>
	of the user results that can be sent to	- used as part of emailed
	an administrator. This value is used	attachments>
	if there is no "User Id" value to use	
	as the basis for the file name.	
Label_ExamName	This is the label used to denote the	<add <="" key="Label_ExamName" th=""></add>
	"Exam Name" in emails to	<pre>value="Exam Name:" /&gt;</pre>
	administrators with student results.	
	It is editable here for localization	
	purposes.	
Label_UserName	This is the label used to denote the	<add <="" key="Label_UserName" th=""></add>
	"User" in emails to administrators	<pre>value="User:" /&gt;</pre>
	with student results. It is editable	
	here for localization purposes.	
ReportAlternatingItemBackgro	This is the alternating row color	<add< th=""></add<>
undColor	used in the HTML format emails	<pre>key="ReportAlternatingItemBackg roundColor" value="#EFE7E7"/&gt;</pre>
	and attachments to administrators.	roundcolor value = "#EFE/E/"/>
	Every other row will have this	
	color. It needs to be in the same	
	format as for a CSS style, typically	
	RGB in hexadecimal format with	
	the # symbol in front. Standard	
	named colors are acceptable as	
Description I and I and I	well.	<add< th=""></add<>
ReportHeaderBackgroundColo	This is the header color used in the	key="ReportHeaderBackgroundColo
r	HTML format emails and attachments to administrators. It	r" value="#E7E7EF"/>
	needs to be in the same format as	
	for a CSS style, typically RGB in	
	hexadecimal format with the #	
	symbol in front. Standard named	
	colors are acceptable as well.	
ReportItemBackgroundColor	This is the alternating row color	<add< th=""></add<>
Neporitiembackgrounacowr	used in the HTML format emails	key="ReportItemBackgroundColor"
	used in the 111 ML Ioiniat emails	value="#d6ccc2"/>

Key Name	Description	Example
	and attachments to administrators.	•
	Every other row will have this	
	color. It needs to be in the same	
	format as for a CSS style, typically	
	RGB in hexadecimal format with	
	the # symbol in front. Standard	
	named colors are acceptable as	
	well.	
Don outltom DataColon	This style is not currently used but	<add <="" key="ReportItemDateColor" th=""></add>
ReportItemDateColor	is defined in case users want to	value="Black"/>
		varac Brasil / -
	incorporate it into their HTML	
	format emails or attachments. It	
	needs to be in the same format as	
	for a CSS style, typically RGB in	
	hexadecimal format with the #	
	symbol in front. Standard named	
	colors are acceptable as well.	
ReportItemTitleColor	This is the text color of the title at	<add <="" key="ReportItemTitleColor" th=""></add>
	the top of the HTML format emails	value="Black"/>
	and attachments to administrators.	
	It typically has the exam name and	
	the date in it. It needs to be in the	
	same format as for a CSS style,	
	typically RGB in hexadecimal	
	format with the # symbol in front.	
	Standard named colors are	
	acceptable as well.	
ReportTitleColor	This is the text color of the title of	<add <="" key="ReportItemTitleColor" th=""></add>
	the exam used in the HTML format	<pre>value="Black"/&gt;</pre>
	emails and attachments to	
	administrators. It needs to be in the	
	same format as for a CSS style,	
	typically RGB in hexadecimal	
	format with the # symbol in front.	
	Standard named colors are	
	acceptable as well.	
ResultsDataSourceType	This is the type of database to be	<add< th=""></add<>
	used if you are saving student data	<pre>key="ResultsDataSourceType"</pre>
	and/or validating logins on the web	<pre>value="Access"/&gt; <!-- Access,</pre--></pre>
	server. Valid values are Access,	XML, or SQL>
	XML, or SQL. We recommend	
	Access or SQL for performance	
	reasons.	
SmtpServer	This is the Simple Mail Transfer	<add <="" key="SmtpServer" th=""></add>
Shupberver	Protocol (SMTP) server for the	<pre>value="smtp.plattecanyon.com"/&gt;</pre>
	notification email. This will be	1 1 1111 1 1111
	specific to your web server. If you	
	are running the web service on your	
	local computer for testing, you	

Key Name	Description	Example
	would put the machine name in for	
	this setting. You can get the	
	machine name via My Computer –	
	Properties. Using the machine	
	name, "(local)," or "localhost"	
	works for some web servers as well.	

# Linking to the Web Service in the *Exam Engine Configuration Editor*

The URL to the web service as well as the *ExamEngineTrackingKey* is needed by users of the *Exam Engine Configuration Editor*. You set these values on the General Properties – General Tab as shown below:

Web Service If you are using a web service	e, enter or edit the settings for the Exam Engine web service.	
URL:	http://www.tbcon.com/ExamEngineWebService/ExamEngineDataService.asmx	
Access Key:	111111111111111111111111111111111111111	

Put the correct URL in place of

http://www.tbcon.com/ExamEngineWebService/ExamEngineWebService.asmx

Put in the value of your *ExamEngineTrackingKey* into the *Access Key* field.

Again, you will want this to match the *ExamEngineTrackingKey* defined in *Web.config*.

You can edit the base configuration file (examengineconfig3.xml) located in the \config subdirectory underneath the ExamEngineConfiguration3.exe file if you want all new exams to be pre-populated with this information. The elements to be edited are <WebServiceUrl> and <ExamEngineTrackingKey>

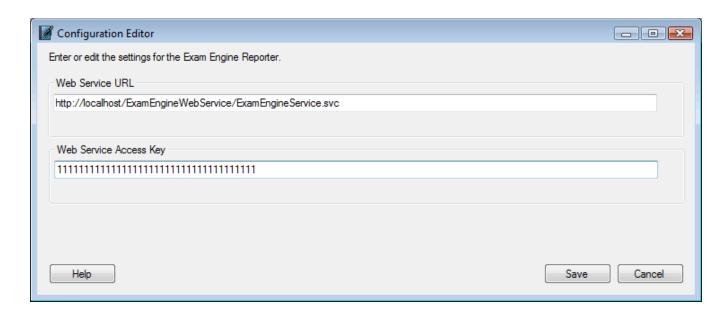
#### Configuring the Exam Engine Reporter Application

The URL to the web service is slightly different since it uses a *WCF* service rather than the *ASMX* service that we use for Flex. For the Reporter, you point to the ExamEngineService.svc file. For example, on the Platte Canyon site, this would be:

http://www.plattecanyon.com/ExamEngineWebService/ExamEngineService.svc

The *ExamEngineReporterKey* is also needed by users of the *Exam Engine Reporter* application in order for it to communicate with the web service and display reports. The *Exam Engine Reporter* Configuration screen is shown below:

#### Exam Engine Web Service Documentation



The user enters the Web Service URL and Web Service Access Key (which must match the *ExamEngineReporterKey* defined in the *Web.config* file). Once the user saves this information, it is restored each time he or she opens the *Exam Engine Reporter* application.