

# Exam Engine Web Service Documentation

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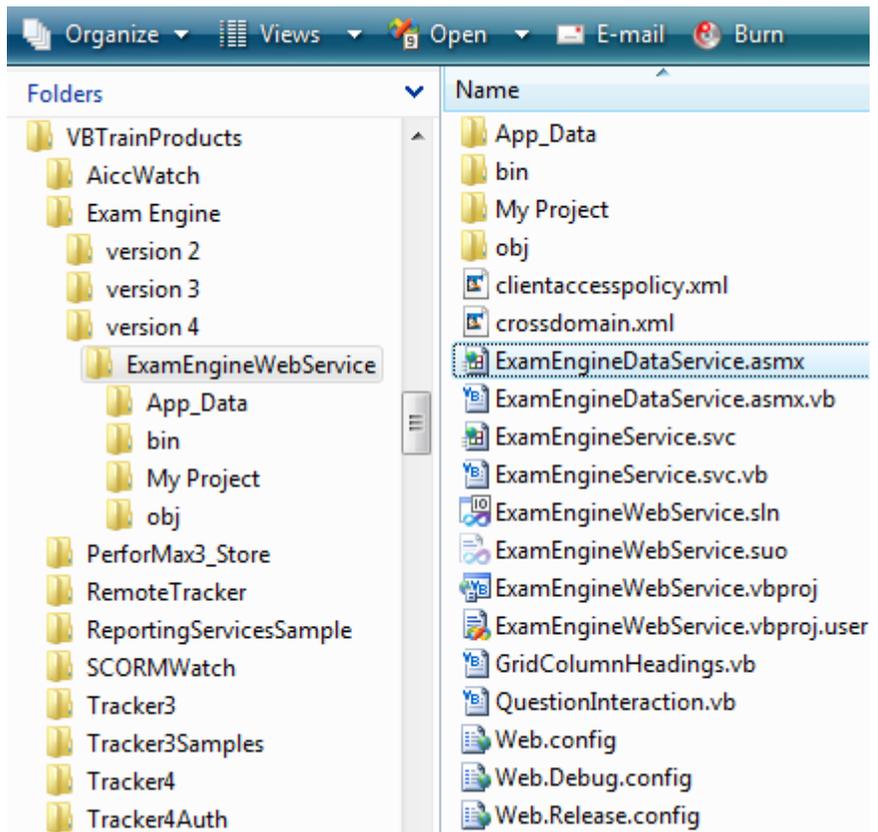
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This document describes the Exam Engine Web Service configuration and implementation. Note that the use of this web service is optional. It is used to provide these pieces of Exam Engine functionality:

- 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.

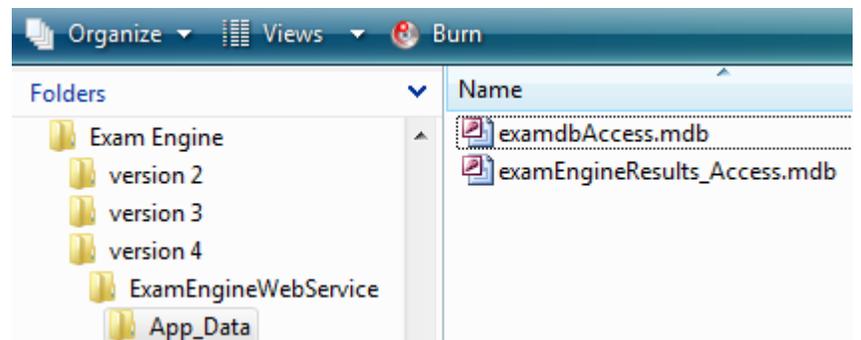
## Directory Structure

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 client-side 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.



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.

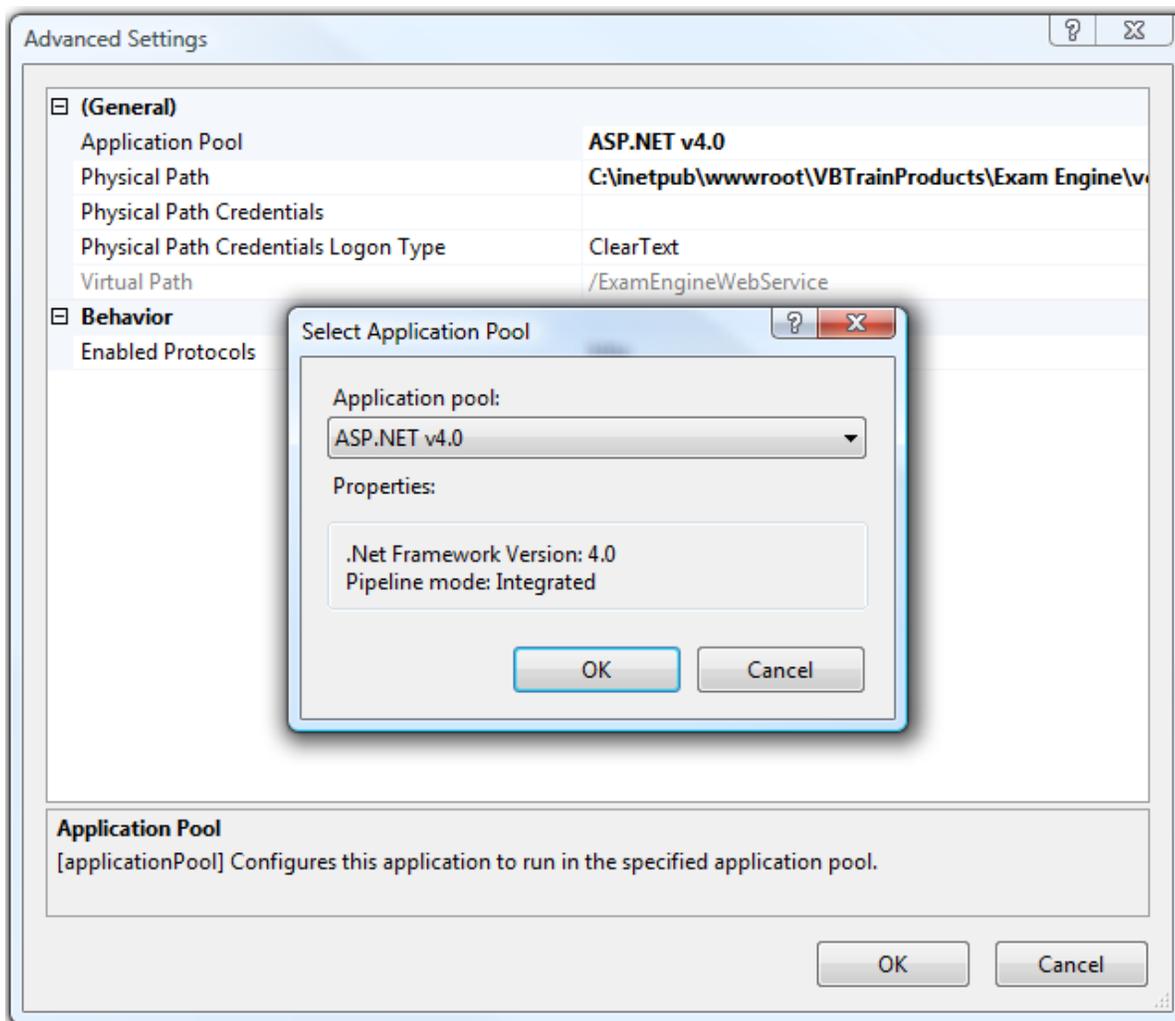
## Deploying the Web Service

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.

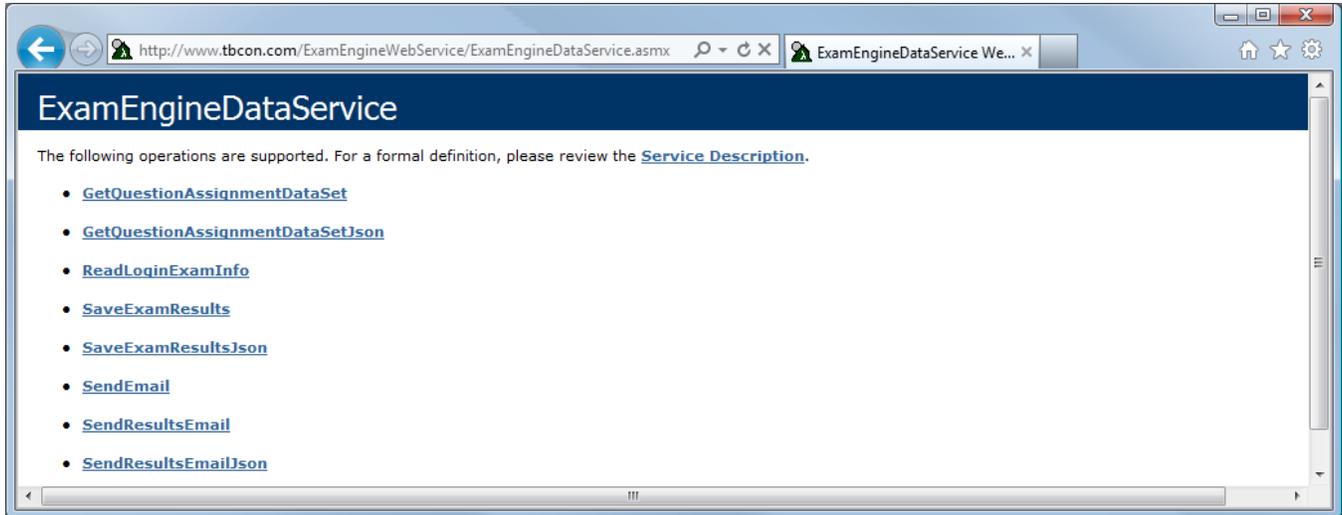
**Note: If you are running IIS 6 or later, it is critical that you select an application pool that only has ASP.NET 2.0 applications in it.**

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

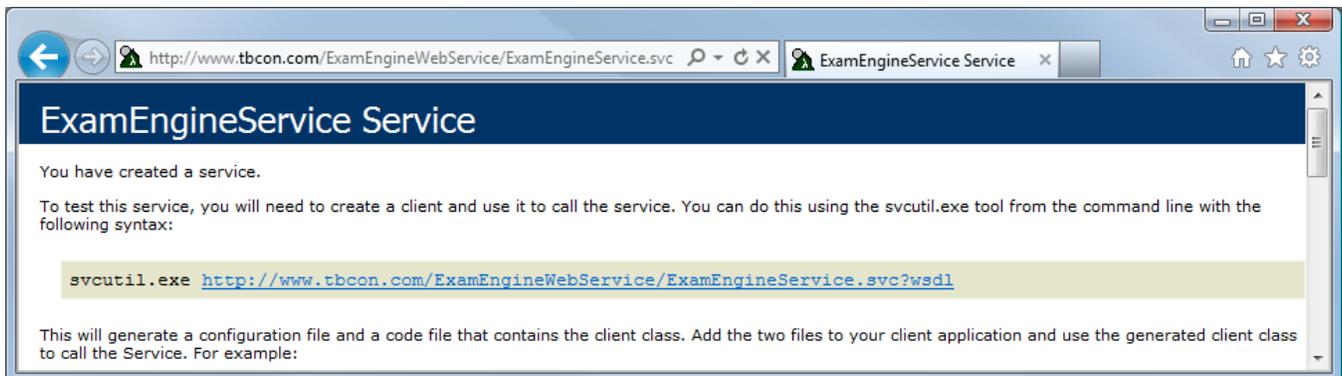
For IIS 7 and later, you pick the ASP.NET version via the application pool. This is shown below.



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 [www.tbcon.com](http://www.tbcon.com), you want the web service on that URL as well, such as [www.tbcon.com/ExamEngineWebService](http://www.tbcon.com/ExamEngineWebService). 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 *crossdomain.xml* file on the web server containing the web service. Although primarily designed for Silverlight content, you might also include *clientaccesspolicy.xml* file in the same location. It normally needs to be set on the *root* of the web site.

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

#### **crossdomain.xml**

```
<?xml version="1.0"?>
<!DOCTYPE cross-domain-policy SYSTEM
"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"
/>
</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="/" />
            </grant-to>
        </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 [http://www.adobe.com/devnet/articles/crossdomain\\_policy\\_file\\_spec.html](http://www.adobe.com/devnet/articles/crossdomain_policy_file_spec.html) for information on *crossdomain.xml* and [http://msdn.microsoft.com/en-us/library/cc197955\(VS.95\).aspx](http://msdn.microsoft.com/en-us/library/cc197955(VS.95).aspx) 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](http://plattecanyon.com), the entry looks like this:

```
<serviceHostingEnvironment aspNetCompatibilityEnabled="true">
    <!-- Following needed to avoid "This collection already contains an address
with scheme http" error. Need to comment out to run localhost -->
    <baseAddressPrefixFilters>
```

```
<add prefix="http://www.plattecanyon.com" />
</baseAddressPrefixFilters>
</serviceHostingEnvironment>
```

This mainly happens on shared hosting servers. See <http://msdn.microsoft.com/en-us/library/bb924481.aspx> and <http://stackoverflow.com/questions/506634/wcf-config-element-baseaddressprefixfilters> for more information. You only need to worry about this if you are using the *Exam Engine Reporter* as this error only happens with WCF services (Exam Engine itself calls the ASMX service).

## 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
<i>CacheTimeInMinutes</i>	This is the number of minutes that certain items like these settings will remain in memory rather than being read from the <i>Web.config</i> file.	<pre>&lt;add key="CacheTimeInMinutes" value="60" /&gt;</pre>
<i>DataSourceAccessName</i>	This is the file name for the questions database if the <i>DataSourceType</i> is set to Access. It is located at the relative or absolute path set by the <i>DataSourceAccessPath</i> 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 <i>Web.config</i> value.	<pre>&lt;add key="DataSourceAccessName" value="examdbAccess.mdb" /&gt; &lt;!-- file name for Access. Can be overridden by dbName query string --&gt;</pre>
<i>DataSourceAccessPassword</i>	This is the optional password for the questions database if the <i>DataSourceType</i> is set to Access.	<pre>&lt;add key="DataSourceAccessPasswor d" value="" /&gt; &lt;!-- Optional for Access --&gt;</pre>
<i>DataSourceAccessPath</i>	This is the relative or absolute path for the questions database if the <i>DataSourceType</i> is set to Access. You would normally want to leave this as <i>App_Data</i> 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.	<pre>&lt;add key="DataSourceAccessPath" value="App_Data" /&gt; &lt;!-- relative or absolute path for Access --&gt;</pre>
<i>DataSourceAccessUserName</i>	This is the optional username for the questions database if the <i>DataSourceType</i> is set to Access.	<pre>&lt;add key="DataSourceAccessUserNam e" value="" /&gt; &lt;!-- Optional</pre>

<i>Key Name</i>	<i>Description</i>	<i>Example</i>
		for Access -->
<b><i>DataSourceSaveDataName</i></b>	This is the <i>name</i> of the Access or XML file used to save student results and/or validating logins. For SQL Server, this is the <i>database name</i> . We recommend using Access or SQL Server for performance reasons. The type of database is set via the <i>ResultsDataSourceType</i> setting.	<pre>&lt;add key="DataSourceSaveDataName" value="examEngineResults_Access.mdb"/&gt; &lt;!-- filename for XML and Access, database name for SQL --&gt;</pre> <p>Or</p> <pre>&lt;add key="DataSourceSaveDataName" value="ExamEngineResults3"/&gt;</pre>
<b><i>DataSourceSaveDataPassword</i></b>	This is the password to the database used to save student results and/or validating logins. It is not needed for XML, optional for Access, and required for SQL Server. The type of database is set via the <i>ResultsDataSourceType</i> setting.	<pre>&lt;add key="DataSourceSaveDataPassword" value=""/&gt; &lt;!-- not needed or XML, optional for Access, required for SQL --&gt;</pre>
<b><i>DataSourceSaveDataPath</i></b>	This is the relative or absolute path for the student results/login database if the <i>ResultsDataSourceType</i> is Access or XML. For these types, you would normally want to leave 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. For SQL Server, this is the name or IP address of the SQL Server instance.	<pre>&lt;add key="DataSourceSaveDataPath" value="App_Data"/&gt; &lt;!-- subdirectory for XML or Access (App_Data usually), server name for SQL --&gt;</pre> <p>Or</p> <pre>&lt;add key="DataSourceSaveDataPath" value="(local)"/&gt;</pre>
<b><i>DataSourceSaveDataUsername</i></b>	This is the username for the database used to save student results and/or validating logins. It is not needed for XML, optional for Access, and required for SQL Server. The type of database is set via the <i>ResultsDataSourceType</i> setting.	<pre>&lt;add key="DataSourceSaveDataUsername" value=""/&gt; &lt;!-- not needed or XML, optional for Access, required for SQL --&gt;</pre>
<b><i>DataSourceSqlName</i></b>	This is the name of the database if the <i>DataSourceType</i> is set to SQL.	<pre>&lt;add key="DataSourceSqlName" value="ExamEngineQuestions3"/&gt;&lt;!-- database name for SQL Server. --&gt;</pre>
<b><i>DataSourceSqlPassword</i></b>	This is the password of the database if the <i>DataSourceType</i> is set to SQL.	<pre>&lt;add key="DataSourceSqlPassword" value="happy"/&gt; &lt;!-- Mandatory for SQL Server --&gt;</pre>

<b>Key Name</b>	<b>Description</b>	<b>Example</b>
<b><i>DataSourceSqlPath</i></b>	This is the server name or IP address of the server if the <i>DataSourceType</i> is set to SQL.	<pre>&lt;add key="DataSourceSqlPath" value="local" /&gt; &lt;!-- Server name or IP address for SQL Server --&gt;</pre>
<b><i>DataSourceSqlUserName</i></b>	This is the username of the database if the <i>DataSourceType</i> is set to SQL.	<pre>&lt;add key="DataSourceSqlPassword" value="happy" /&gt; &lt;!-- Mandatory for SQL Server --&gt;</pre>
<b><i>DataSourceType</i></b>	This is the type of database to be used if you are loading questions from the web server. Valid values are Access, XML, or SQL.	<pre>&lt;add key="DataSourceType" value="Access" /&gt; &lt;!-- Access, XML, or SQL --&gt;</pre>
<b><i>DataSourceXmlName</i></b>	This is the file name for the questions database if the <i>DataSourceType</i> is set to XML. It is located at the relative or absolute path set by the <i>DataSourceAccessPath</i> 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 <i>Web.config</i> value.	<pre>&lt;add key="DataSourceXmlName" value="examdb.xml" /&gt; &lt;!-- file name for XML. Can be overridden by dbName query string --&gt;</pre>
<b><i>DataSourceXmlPath</i></b>	This is the relative or absolute path for the questions database if the <i>DataSourceType</i> is set to XML. You would normally want to leave this as <i>App_Data</i> 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.	<pre>&lt;add key="DataSourceXmlPath" value="App_Data" /&gt; &lt;!-- relative or absolute path for XML --&gt;</pre>
<b><i>EmailCredentialsDomain</i></b>	This is the optional domain for computer name that verifies the other email credentials. It is often left blank. See <a href="http://msdn.microsoft.com/en-us/library/system.net.networkcredential.domain.aspx">http://msdn.microsoft.com/en-us/library/system.net.networkcredential.domain.aspx</a> for more details.	<pre>&lt;add key="EmailCredentialsDomain" value=" " /&gt;</pre>
<b><i>EmailCredentialsPassword</i></b>	This is the optional password for your email credentials. On some systems, credentials are required in order for the mail server listed in <i>SmtServer</i> to allow emails from your application.	<pre>&lt;add key="EmailCredentialsPassword" value="aaabbbb" /&gt;</pre>
<b><i>EmailCredentialsUsername</i></b>	This is the optional username for your email credentials. On some systems, credentials are required in	<pre>&lt;add key="EmailCredentialsUsername" value="happy@plattecanyon.com" /&gt;</pre>

<i>Key Name</i>	<i>Description</i>	<i>Example</i>
	order for the mail server listed in <i>SmtServer</i> to allow emails from your application.	
<b><i>ExamEngineReporterKey</i></b>	This key must match the key being sent by the <i>Exam Engine Reporter</i> application as described later in this document. This key gives the Reporter the ability to view various Exam and Question reports.	<pre>&lt;add key="ExamEngineReporterKey" value="AABBCC11223344" /&gt;</pre>
<b><i>ExamEngineTrackingKey</i></b>	This key must match the <i>Access Key</i> set in the <i>Exam Engine Configuration</i> program and read by the individual exam.	<pre>&lt;add key="ExamEngineTrackingKey" value="11223344AABBCC" /&gt;</pre>
<b><i>IndividualFileName</i></b>	This value is used as part of the name of the optional XML database of the user results that can be sent to an administrator. This value is used if there is no "User Id" value to use as the basis for the file name.	<pre>&lt;add key="IndividualFileName" value="individualresults" /&gt; &lt;!-- - used as part of emailed attachments --&gt;</pre>
<b><i>Label_ExamName</i></b>	This is the label used to denote the "Exam Name" in emails to administrators with student results. It is editable here for localization purposes.	<pre>&lt;add key="Label_ExamName" value="Exam Name:" /&gt;</pre>
<b><i>Label_UserName</i></b>	This is the label used to denote the "User" in emails to administrators with student results. It is editable here for localization purposes.	<pre>&lt;add key="Label_UserName" value="User:" /&gt;</pre>
<b><i>ReportAlternatingItemBackgroundColor</i></b>	This is the alternating row color used in the HTML format emails 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.	<pre>&lt;add key="ReportAlternatingItemBackgroundColor" value="#EFE7E7" /&gt;</pre>
<b><i>ReportHeaderBackgroundColor</i></b>	This is the header color used in the HTML format 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.	<pre>&lt;add key="ReportHeaderBackgroundColor" value="#E7E7EF" /&gt;</pre>
<b><i>ReportItemBackgroundColor</i></b>	This is the alternating row color used in the HTML format emails	<pre>&lt;add key="ReportItemBackgroundColor" value="#d6ccc2" /&gt;</pre>

<i>Key Name</i>	<i>Description</i>	<i>Example</i>
	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.	
<b><i>ReportItemDateColor</i></b>	This style is not currently used but is defined in case users want to 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.	<pre>&lt;add key="ReportItemDateColor" value="Black" /&gt;</pre>
<b><i>ReportItemTitleColor</i></b>	This is the text color of the title at the top of the HTML format emails 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.	<pre>&lt;add key="ReportItemTitleColor" value="Black" /&gt;</pre>
<b><i>ReportTitleColor</i></b>	This is the text color of the title of the exam used in the HTML format 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.	<pre>&lt;add key="ReportItemTitleColor" value="Black" /&gt;</pre>
<b><i>ResultsDataSourceType</i></b>	This is the type of database to be used if you are saving student data and/or validating logins on the web server. Valid values are Access, XML, or SQL. We recommend Access or SQL for performance reasons.	<pre>&lt;add key="ResultsDataSourceType" value="Access" /&gt; &lt;!-- Access, XML, or SQL --&gt;</pre>
<b><i>SmtServer</i></b>	This is the Simple Mail Transfer Protocol (SMTP) server for the notification email. This will be specific to your web server. If you are running the web service on your local computer for testing, you	<pre>&lt;add key="SmtServer" value="smtp.plattecanyon.com" /&gt;</pre>



