

Welcome to SCORM Watch™. The intent of this product is to allow you to test your Sharable Content Objects (SCO's) by seeing each SCORM™ Runtime Environment (RTE) message as it goes by. SCORM Watch allows you to configure what values get sent to the SCO in response to its "GetValue" calls. Where these values are *Read/Write*, they can also be set or updated by the SCO itself with "SetValue" calls.

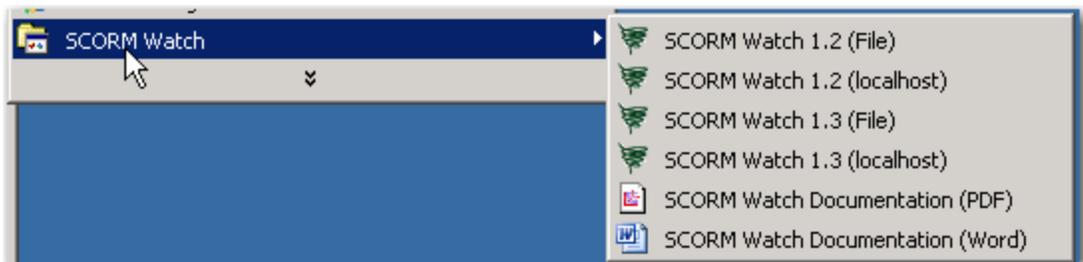


SCORM Watch works by serving as a temporary Learning Management System (LMS) for your content/SCO. While in this role, SCORM Watch reports all communications between your content and the LMS. By providing all communication information, you can analyze your SCO performance and confirm all communication matches your expectations.

Installation

Start by running *SCORM Watch Installation.exe* and choose to put the files in whatever directory you would like. By default, it is installed in *C:\Program Files\Platte Canyon Multimedia Software Corporation\SCORM Watch*. If you do not have Internet Information Services (IIS) installed on your computer, you may receive an error message related to that during the

installation. See the next paragraph for more details. In that case, the shortcuts listed as "(localhost)" as shown to the right will not work. But those listed as "(File)" will work just fine.



If your development computer is running Windows® 2000, Windows XP, or later, you have the option to run SCORM Watch via *localhost*. This means that your computer is its own web server (Internet Information Services or IIS) and that the LMS (which in this discussion is SCORM Watch itself) and your SCO's are running via "http:" rather than as a file (C:\...) reference. Running via *localhost* is required for active content¹ such as Platte Canyon's Exam Engine™ but is otherwise optional. See Attachment A for information about how to install IIS on your computer. **If you do this before running the SCORM Watch installation, then the installation will make the required virtual directory for you.**

Getting Started

The first thing you need to know is whether the SCO you want to test is using SCORM 1.2 or SCORM 1.3 (also known as SCORM 2004). The next thing to decide is whether you want to run *File* or *localhost*. For most content, you can run either way. See the Installation section above for an explanation of each method.

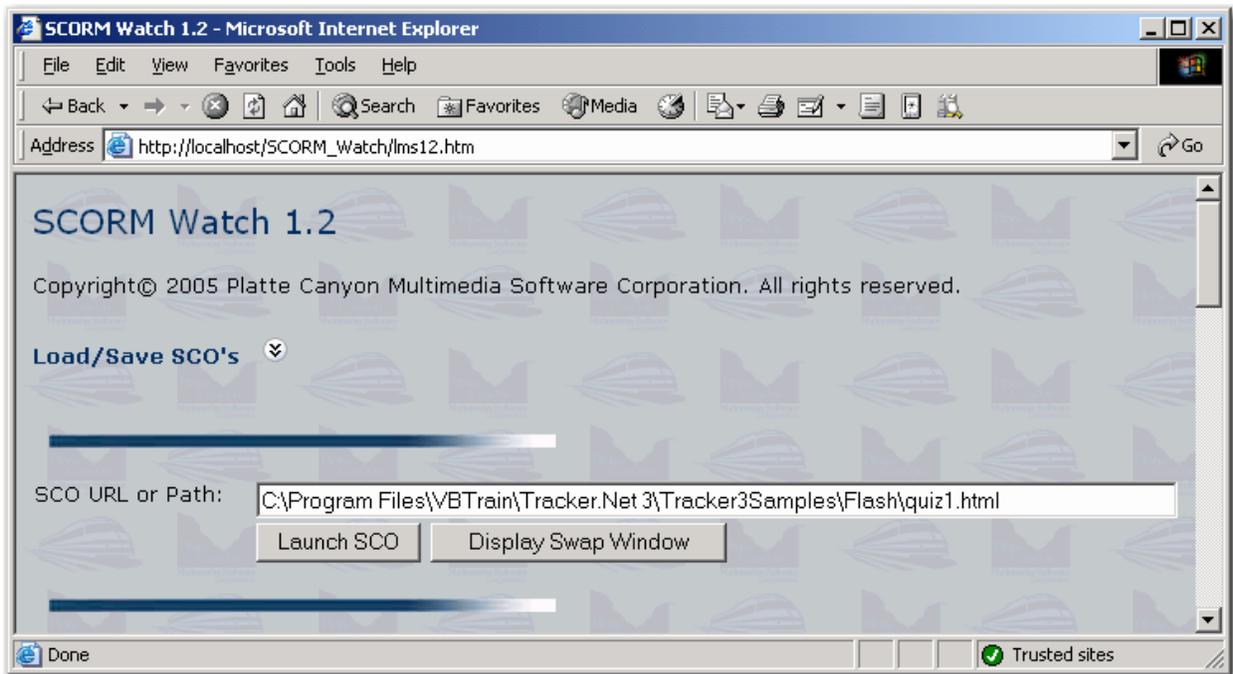
¹ Active content in this context means that it uses ASP, ASP.NET, jsp, php, or other technologies that require the pages to be generated by a web server.

After deciding on the SCORM version and whether to run *localhost* or *File*, launch SCORM Watch using the appropriate shortcut link.

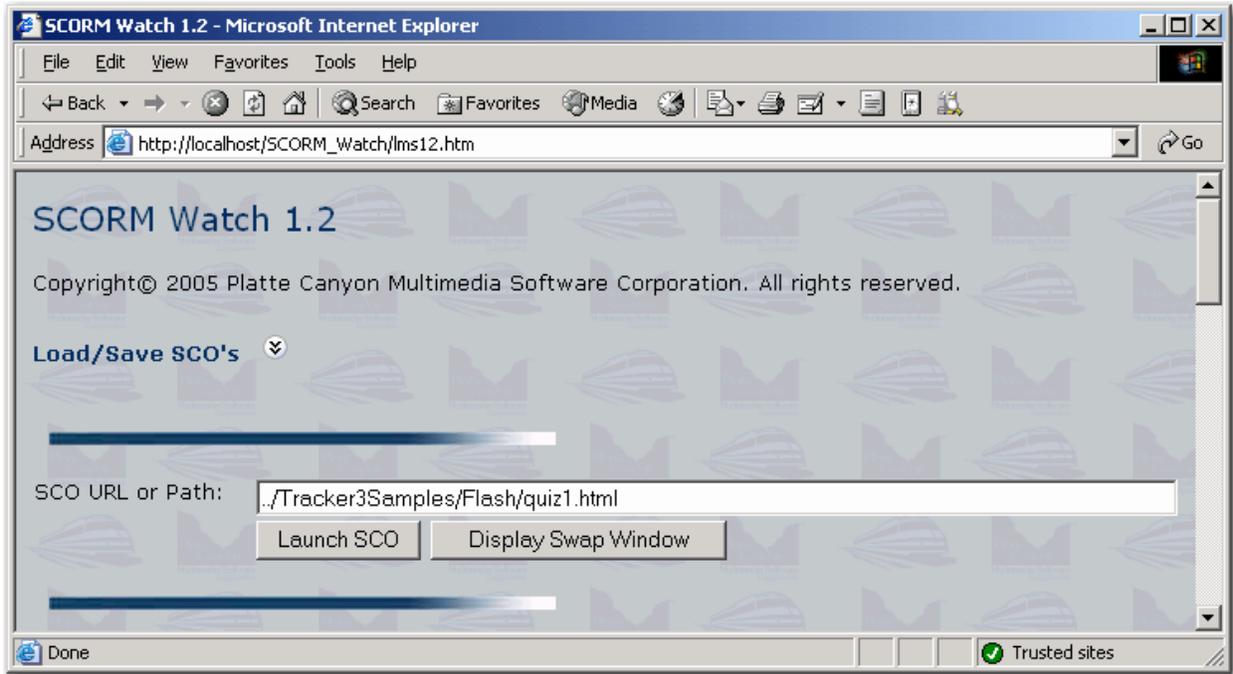
At its simplest, you can just enter the path to the SCO in the field beside the *SCO URL or Path*: label.

Note: SCORM Watch comes with two SCO's that you can use for testing or to learn more about the SCORM Runtime Environment. Type in *test12.htm* for the path to test with SCORM 1.2 and *test13.htm* for the path to test with SCORM 1.3.

For security reasons, both the LMS (SCORM Watch) and the SCO need to be running via the same domain. So if you use the *File* method to run your SCO, then the path to your SCO must also be a file reference as shown below.



If you use *localhost*, then the path to your SCO must be *localhost* (or a relative path) as well. This is shown below. Notice that *Tracker3Samples* in the screen capture has been configured in IIS to be a virtual directory. It corresponds to *C:\Program Files\VBTrain\Tracker.Net 3\Tracker3Samples*.



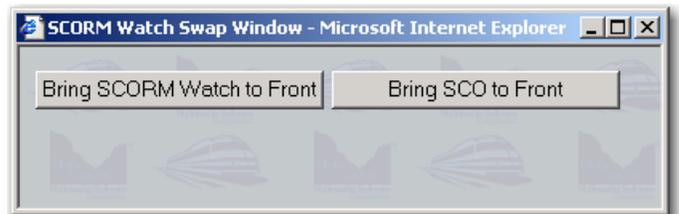
After entering the SCO path, click the “Launch SCO” button² to launch your SCO. SCORM Watch will immediately begin displaying messages and SCORM information.

Troubleshooting

1. If nothing happens when you click “Launch SCO,” first check your path. If that is correct, then you likely are blocking popups. In XP, you may see an icon like this at the bottom of the screen . You can right-click and enable popups for this site only by right-clicking on the icon. Popup blockers like Google and MSN have their own interface for enabling popups.
2. If you receive an error message about not being able to find the API or API_1484_11 object when you launch the SCO, then you are probably running the wrong SCORM Watch version.

Displaying the “SCORM Watch” or “SCO” Window

Since it can be annoying to have to “Alt-Tab” back and forth between SCORM Watch and the SCO, you can click the “Display Swap Window” button to show the window to the right. From there, clicking the left button will bring SCORM Watch to the front. Clicking the



² We know it would be nice to have a “Browse” button here but unfortunately security restrictions prevent that type of HTML control from being reloaded later from JavaScript. We decided it was more important to allow you to save this path (along with your other settings) and be able to reload it later than it was to allow you to browse to your file. But this does mean that you’ll need to type in the path or paste it from Explorer. Another option would be to use the Load/Save SCO’s Browse button and then copy the result to the Path box.

button to the right will bring the SCO to the front. You can control the location of this window under the *Window Settings* region of SCORM Watch.

Tracking Messages

Once you launch the SCO, you can see messages that have been sent by the SCO by looking at the bottom of the SCORM Watch window. The messages are broken out by System, GetValue, SetValue, Error, All, and Interaction messages. You may expand or collapse these messages as you can other areas of the window.

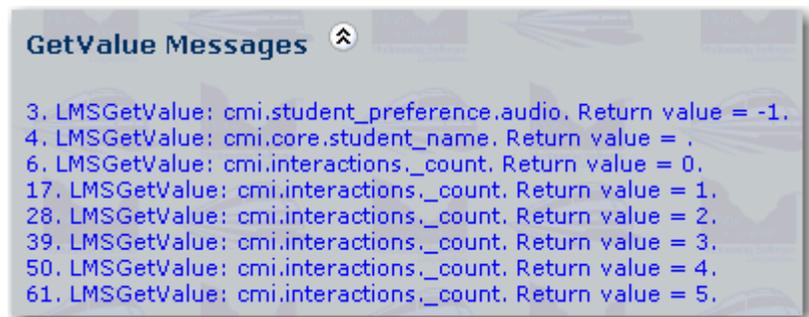
System Messages

System messages are Initialize, Commit, Finish/Terminate, GetLastError, GetErrorString, and GetDiagnostic. To the left of the name of the message is a number showing the order that the message occurred within all SCO calls. In the graphic to the right, *LMSInitialize* was the first call and *LMSFinish* was the 74th call. Since *LmsGetError* is a support message, its numbering shows the “sub-steps.” So 19.1 means that an *LMSGetErrorString* was called immediately after message 19, which if we looked under SetValue messages was an *LMSSetValue* call



GetValue Messages

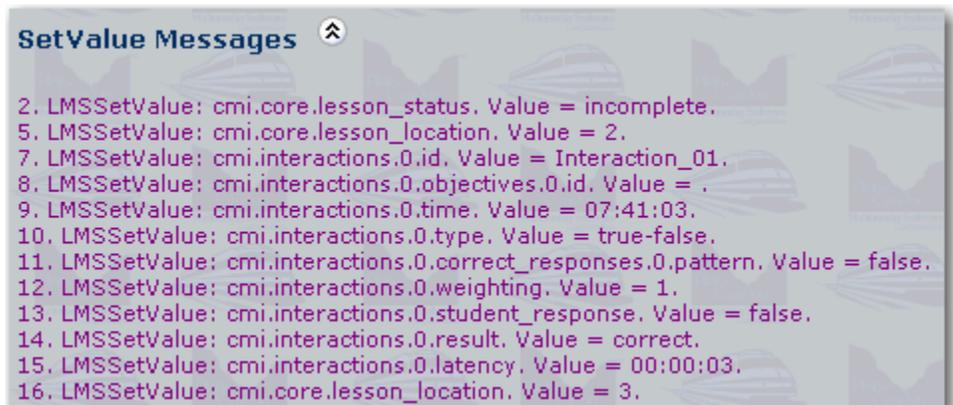
GetValue messages are *LmsGetValue* (SCORM 1.2) or *GetValue* (SCORM 1.3). SCORM Watch again lists the messages with a number showing the order that the message was sent. It also shows the element name and the return value. For example, message 3 requested the *cmi.student_preference.audio*.



The return value was -1. Notice that in the upper area of the SCORM Watch screen you can configure it to return whatever valid (or in most cases invalid if you want to test that) values you want.

SetValue Messages

SetValue messages are *LmsSetValue* (SCORM 1.2) or *SetValue* (SCORM 1.3). They show a number that reflects the order that the message was sent as well as the element name and value as sent by the SCO. For example, message 2 set the *cmi.core.lesson_status* to *incomplete*. In addition to



being displayed here, these values are also displayed in upper portion of the SCORM Watch screen.³

Error Messages

Error messages are generated when any of the System, GetValue, or SetValue messages are sent in an incorrect sequence, with an incorrect element name, or using an incorrect data format. Notice that in many cases the error would not have been noticed in a standard LMS. For example, the *cmi.interactions.n.objectives.0.id* errors shown below occur because the value is blank. In a standard LMS, this *LMSSetValue* would have been ignored but there would not have been any visible result unless the SCO had itself called a method like *LMSGetError*. Since these are also support messages, their numbering shows “sub-steps.” The 8.2 number on the first messages means that it came two support messages after the main *LmsSetValue* call.

```

Error Messages ^
8.2. Function: LMSSetValue. Element: cmi.interactions.0.objectives.0.id. Value: . Error Number: 405. Message: Incorrect Data Type.
19.2. Function: LMSSetValue. Element: cmi.interactions.1.objectives.0.id. Value: . Error Number: 405. Message: Incorrect Data Type.
30.2. Function: LMSSetValue. Element: cmi.interactions.2.objectives.0.id. Value: . Error Number: 405. Message: Incorrect Data Type.
41.2. Function: LMSSetValue. Element: cmi.interactions.3.objectives.0.id. Value: . Error Number: 405. Message: Incorrect Data Type.
52.2. Function: LMSSetValue. Element: cmi.interactions.4.objectives.0.id. Value: . Error Number: 405. Message: Incorrect Data Type.
63.2. Function: LMSSetValue. Element: cmi.interactions.5.objectives.0.id. Value: . Error Number: 405. Message: Incorrect Data Type.
    
```

All Messages

This region is for the situation where you would like to see all messages in order. Since we are looking at only message sent by the SCO, it does not include error messages.

```

All Messages ^
1. LMSInitialize
2. LMSSetValue: cmi.core.lesson_status. Value = incomplete.
3. LMSGetValue: cmi.student_preference.audio. Return value = -1.
4. LMSGetValue: cmi.core.student_name. Return value = .
5. LMSSetValue: cmi.core.lesson_location. Value = 2.
6. LMSGetValue: cmi.interactions._count. Return value = 0.
7. LMSSetValue: cmi.interactions.0.id. Value = Interaction_01.
8. LMSSetValue: cmi.interactions.0.objectives.0.id. Value = .
8.1. LMSGetErrorString
    
```

Interaction Messages

Since interaction data can be one of the more problematic parts of SCORM, this region displays only the messages related to interactions in order. The numbering matches the other regions and reflects the order that the messages were sent by the SCO.

```

Interaction Messages ^
6. LMSGetValue: cmi.interactions._count. Return value = 0.
7. LMSSetValue: cmi.interactions.0.id. Value = Interaction_01.
8. LMSSetValue: cmi.interactions.0.objectives.0.id. Value = .
9. LMSSetValue: cmi.interactions.0.time. Value = 07:41:03.
10. LMSSetValue: cmi.interactions.0.type. Value = true-false.
11. LMSSetValue: cmi.interactions.0.correct_responses.0.pattern. Value = false.
12. LMSSetValue: cmi.interactions.0.weighting. Value = 1.
13. LMSSetValue: cmi.interactions.0.student_response. Value = false.
14. LMSSetValue: cmi.interactions.0.result. Value = correct.
15. LMSSetValue: cmi.interactions.0.latency. Value = 00:00:03.
    
```

³ This is true except for elements that are “collection” elements that number more than four levels. These elements are interactions, objectives, interaction objectives, comments from learner (SCORM 1.3 only), and comments from LMS (SCORM 1.3 only). In these cases, setting the values will not generate errors but they will not be displayed in SCORM Watch nor stored along with the rest of the SCORM data.

Displaying Screen Regions

To simplify the SCORM Watch interface, most areas of the screen can be collapsed or expanded. An area is collapsed if it displays the ☹ symbol. It is expanded if it has the ☺ symbol. Click the symbol to switch the region's state. The state of each region is stored in cookies (if allowed by your browser settings) and these states are restored the next time you open SCORM Watch.

Setting and Viewing Data

SCORM Watch allows you to configure the launch window as well as any data that is either *Read Only* or *Read/Write*. Data that is *Write Only* will be displayed but cannot be edited. The data in each of these categories will vary between SCORM 1.2 and 1.3.

Data that has been written by the SCO (e.g., via a SetValue call) during the current session is green as shown below. The *cmi.core._lesson_status* and the *cmi.core.score.raw* were set by the SCO.

| | | | |
|-------------------------|--|---------------------|----------------------------------|
| cmi.core.lesson_status: | <input type="text" value="completed"/> | cmi.core.score.max: | <input type="text" value="100"/> |
| cmi.core.score.min: | <input type="text" value="0"/> | cmi.core.score.raw: | <input type="text" value="100"/> |

The major screen regions are explained below. We will cover “Load/Save SCO’s” in the next section.

Window Settings

This region allows you to set the width and height as well as other characteristics (menubar, toolbar, etc.) of the window in which the SCO is launched.

Read/Write Settings

This region allows you to set items that the LMS would normally store and return on request, such as the completion status, minimum score, and suspend data. As shown in the (SCORM 1.3) screen capture below, items with a defined set of values have a drop-down list from which you can choose. Other items have a normal text box. For those, you are responsible for putting in a valid value (unless you are testing what your SCO does in response to an invalid value).

Read/Write Settings ☺

| | | | |
|------------------------------------|--|------------------------------------|--------------------------------------|
| cmi.location: | <input type="text"/> | cmi.progress_measure: | <input type="text" value="0"/> |
| cmi.completion_status: | <input type="text" value="incomplete"/> | cmi.score.max: | <input type="text" value="100"/> |
| cmi.score.min: | <input type="text" value="completed"/> | cmi.score.raw: | <input type="text"/> |
| cmi.score.scaled: | <input type="text" value="incomplete"/> | success_status: | <input type="text" value="unknown"/> |
| learner_preference.audio_level: | <input type="text" value="not attempted"/> | learner_preference.language: | <input type="text"/> |
| learner_preference.delivery_speed: | <input type="text" value="unknown"/> | learner_preference.audio_captions: | <input type="text" value="0"/> |
| cmi.suspend_data: | <input type="text"/> | | |

Objective Settings

Due to the various settings for each objective (id, score, status, etc.), they each have their own region. In order to simplify the interface, SCORM Watch only displays and allows you to set values for the first four objectives. Reading or writing additional objectives will not cause an error but the data will not be persisted.

Comment Settings (SCORM 1.3)

Due to the various settings for “Comments from Learner” and “Comments from LMS” (comment, location, and timestamp), they each have their own region. SCORM Watch only displays and allows you to set values for the first four comments in order to simplify the interface. Reading or writing additional comments will not cause an error but the data will not be persisted.

Read Only Settings

This region allows you to set read-only items that the LMS would normally send to the SCO on request, such as launch data, student/learner name, and maximum time allowed. The values for these items often come from the SCORM manifest.

Write Only Settings

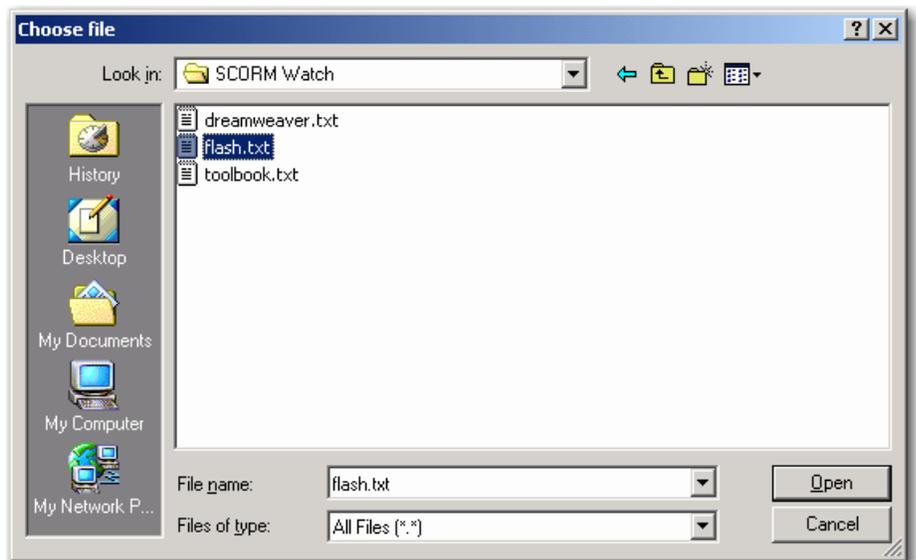
The exit and session time data can be viewed but not edited in this region.

Interaction Settings

Due to the various settings for each interaction (id, latency, weighting, etc.), each interaction has its own section. SCORM Watch only displays and allows you to set values for the first four interactions (as well as four interaction objectives for each interaction) in order to simplify the interface. Reading or writing additional interactions will not cause an error but the data will not be persisted. Note that interactions are *Write Only* in SCORM 1.2 but *Read/Write* in SCORM 1.3.

Load/Save SCO's

SCORM Watch allows you to save and restore your SCO settings in a file. To do this, you first expand the “Load/Save SCO's” region as described in the “Displaying Screen Regions” section above. To save settings the first time, enter a path and file name (you can use any extension you would like) or browse to an existing file and then change the name. Then click the “Save” button. If you do not enter a path, the

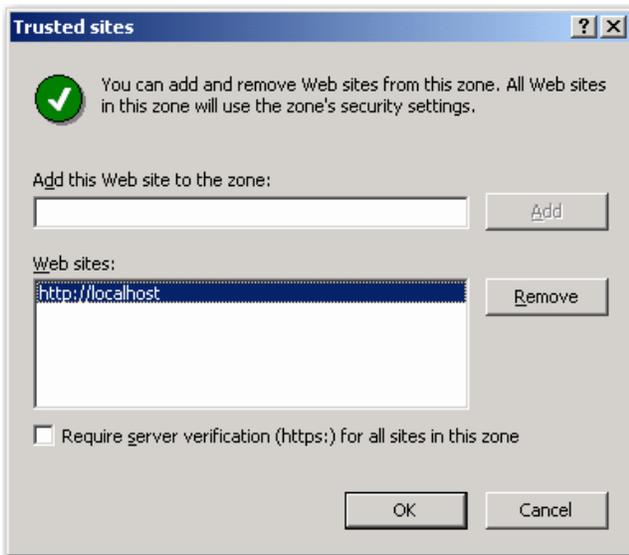
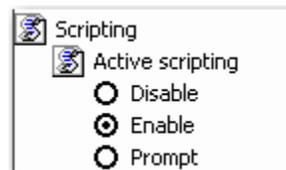
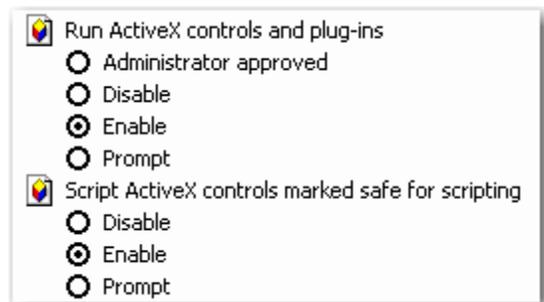
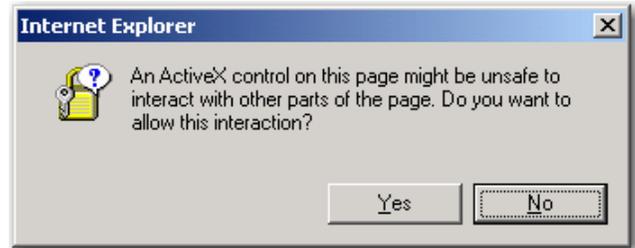


file will be saved to your desktop. Note that the file will contain the path to the SCO plus all *Read Only* and *Read/Write* settings. Due to security restrictions on JavaScript, you will receive security warnings and will need to authorize functionality. As these warnings vary by browser type, they are explained separately below.

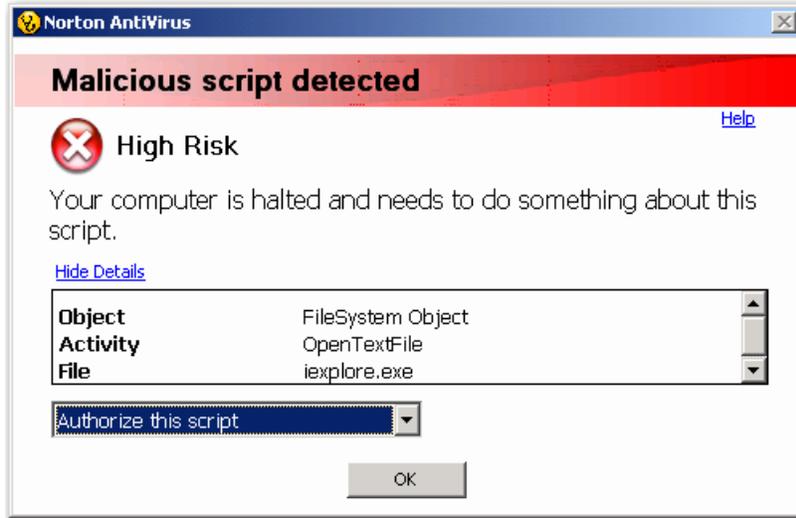
To retrieve a saved setting, browse to the desired file (or enter the complete path). SCORM Watch will automatically load the contents of the file. If you want to revert to the saved settings at any time, click the “Load” button.

Internet Explorer Security Settings

SCORM Watch uses the FileSystem ActiveX control to read and write its external files. Depending on your security settings, you will likely need to authorize the use of this control by responding to a message like the one shown to the right. If you do not see this dialog box but nothing happens, be sure that you are allowing Active Scripting and ActiveX controls (Tools menu – Internet Options – Security tab) in your security settings as shown to the right. If you are having trouble when running *localhost*, you can make *localhost* a Trusted Site as shown below.

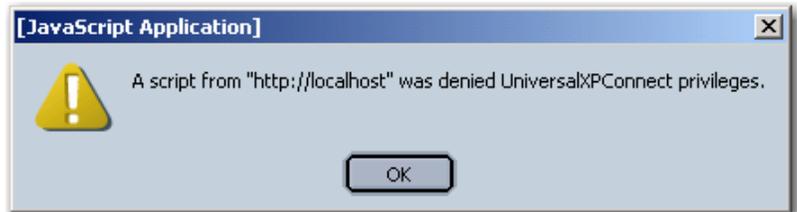


Once you allow the ActiveX control, you may also be prompted by your antivirus program. For example, if you have Norton Antivirus and have enabled Script Blocking, you will see a dialog box like the one below. We recommend that you authorize the script.

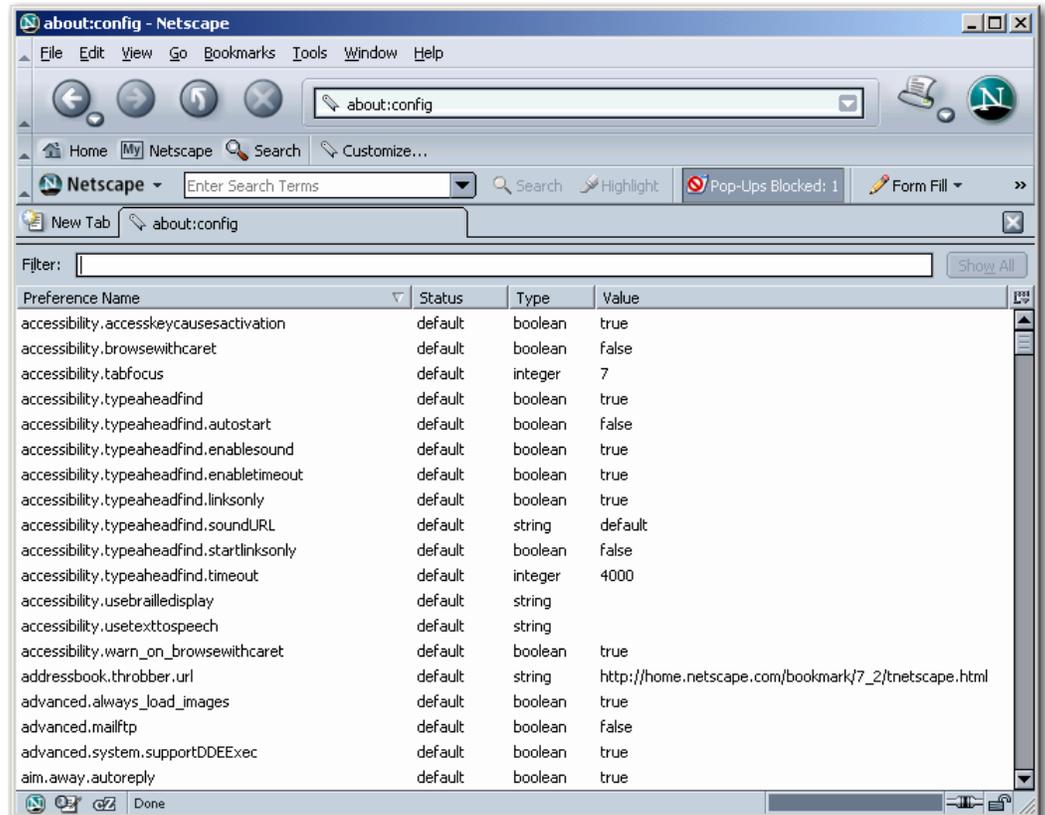


Netscape®⁴ Security Settings

In Netscape, local file access has more privileges by default than when running *localhost*. For *localhost*, you will likely see the dialog to the right.

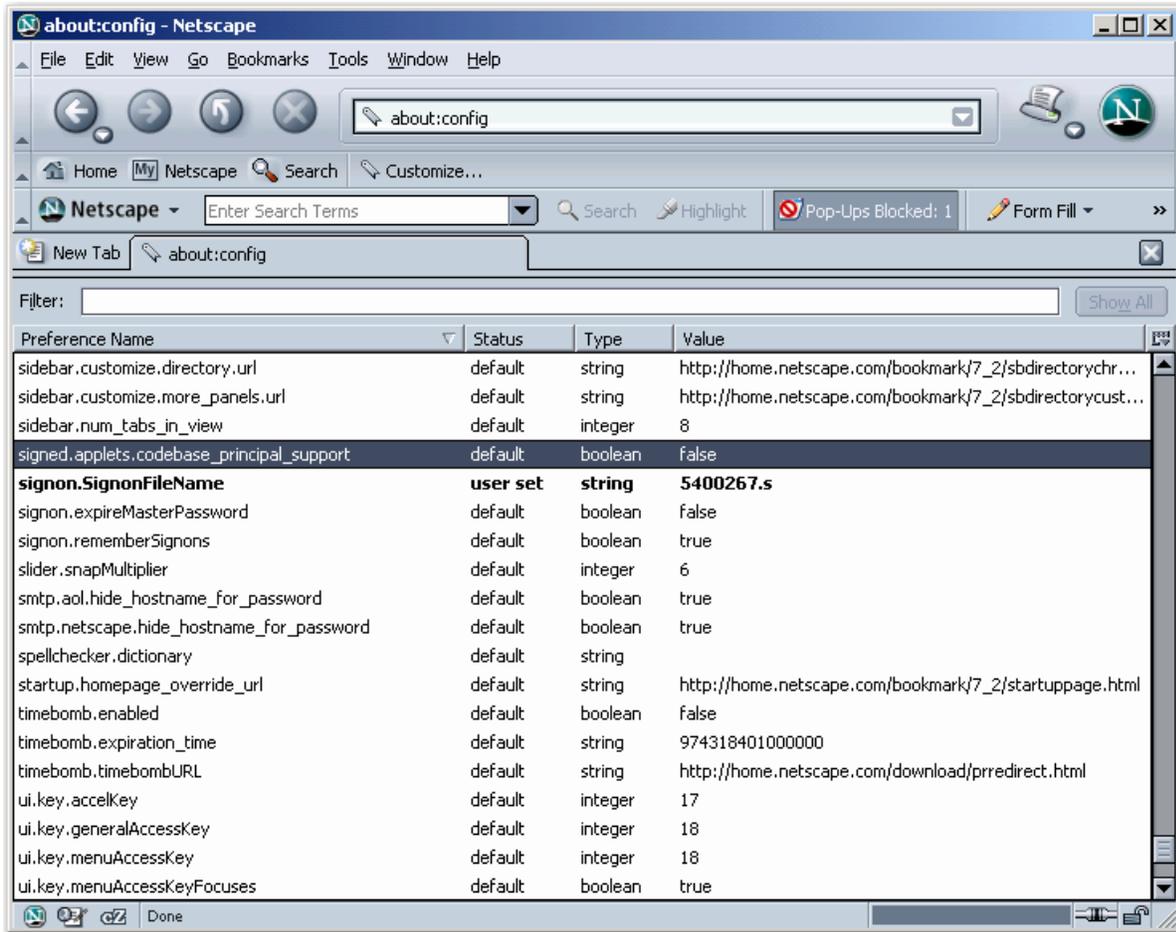


To enable the reading and writing of files, enter *about:config* into the address bar and press the Enter key. You will see a list of items like the one to the right.



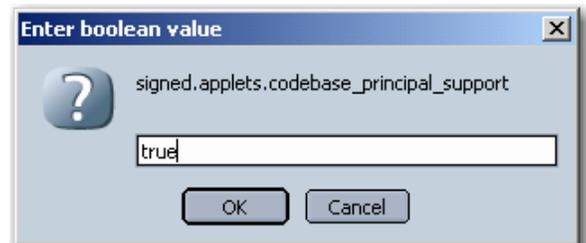
⁴ All screen captures and descriptions are for Netscape but the settings should be very similar in Mozilla™ and Firefox™.

Scroll down and select *signed.applets.codebase_principal_support*.

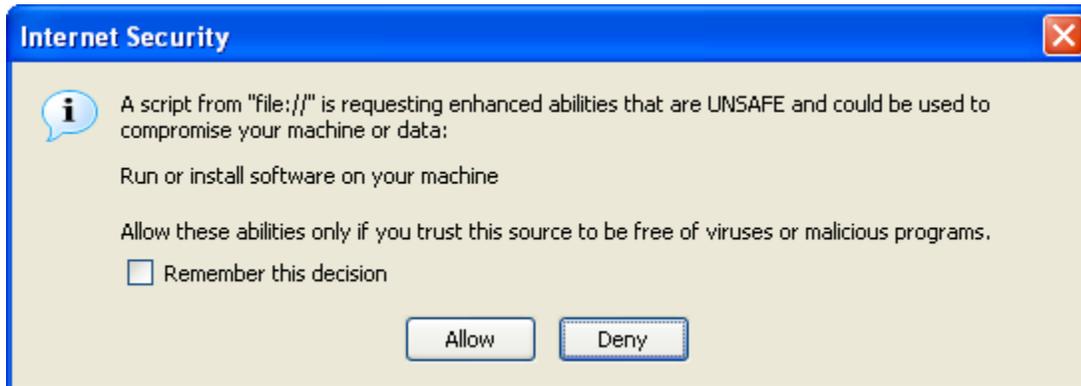


Double-click the selection and change the *false* value to *true*. Note that in Firefox the value just toggles between *true* and *false* without bringing up a dialog box.

At this point, you will be in the same state as running via a file reference. When you try to open or save a file, you may see the dialog below asking if you want to grant *UniversalXPConnect* privileges. We recommend that you check to “Remember this decision” and click on “Yes.”



Firefox users may see this kind of dialog box instead. You would again want to check “Remember this decision” and then click “Allow.”



Attachment A. Installing IIS.

Taken from *VBTrain.Net™: Creating Computer and Web Based Training with Visual Basic® .NET* by Jeffrey M. Rhodes.

Configuring a Local Web Server

We end this chapter with a brief explanation about how to configure *Internet Information Server (IIS)* on your Windows 2000 machine. Many of you likely already have this running, but since it is absolutely crucial to running your ASP.NET applications, we'll run through the steps⁵. You'll also need to use IIS to configure ASP.NET projects that you receive from other developers (like the sample projects that go with this book).

Installing IIS

The first task is to ensure that IIS is installed on your computer. To do that, go to Control Panel → Add/Remove Programs → Add/Remove Windows Components. See Figure A-1. If Internet Information Services (IIS) is not checked, then check it and click the “Next>” button.

You may then be prompted for your Windows CD.

Either way, then click the “Details” button. Make sure all the choices are checked as shown in Figure A-1.

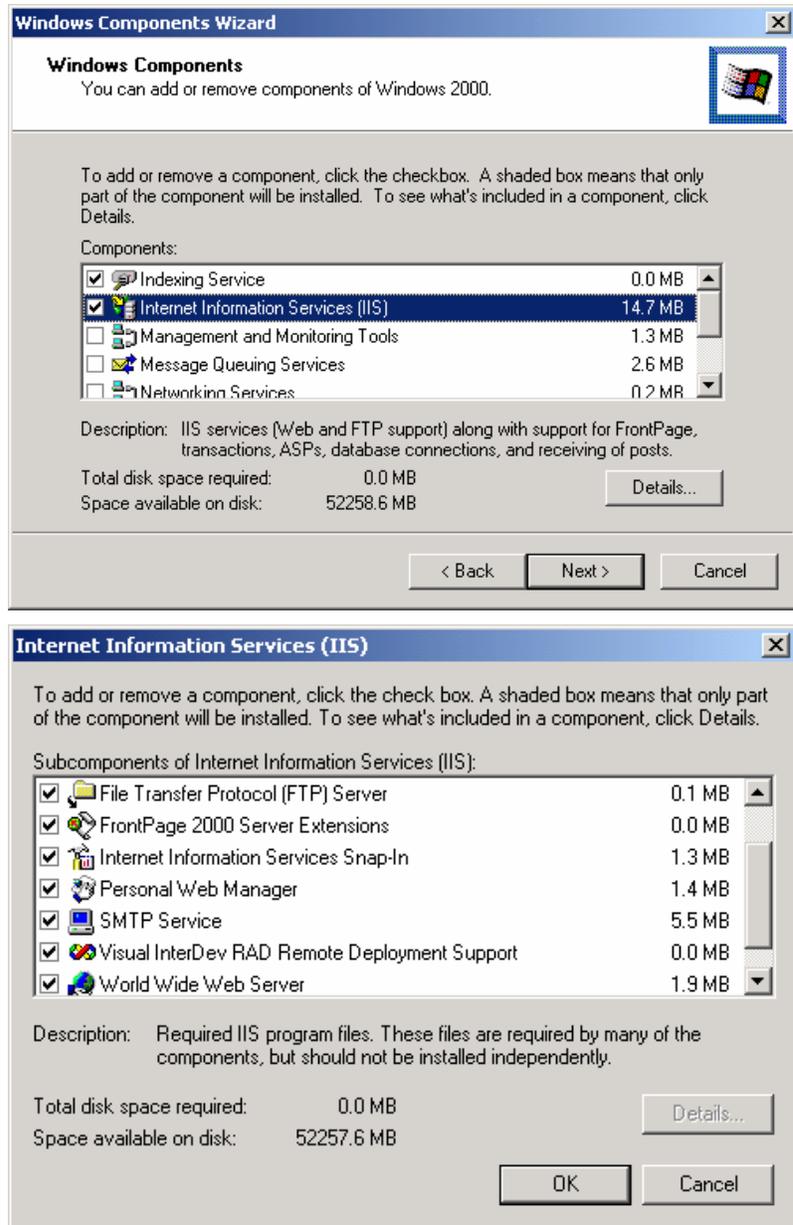


Figure A-1. Installing Internet Information Services

⁵ The best description of these steps that I have seen is in *Beginning Active Server Pages 3.0*; David Buser, John Kauffman, Juan T. Llibre, Brian Francis, David Sussman, Chris Ullman, and Jon Duckett; Wrox Press Ltd.; 1999; ISBN 1-861003-38-2.

The Microsoft Management Console)



I like to set up a shortcut to IIS on my desktop using the Microsoft Management Console (MMC). The path to the shortcut should look something like this:

`C:\WINNT\system32\mmc.exe C:\WINNT\system32\inetsrv\iis.msc`

You can then use this to perform all your web management tasks.

Creating a Virtual Directory

The task that I find myself doing most often inside IIS is creating a virtual directory. Let's go through the steps for this as an example of working with IIS. You will also need to do this to run the ASP.NET sample applications for this book. Let's assume that you want to get the "Sample Web Training" application running. You downloaded it to

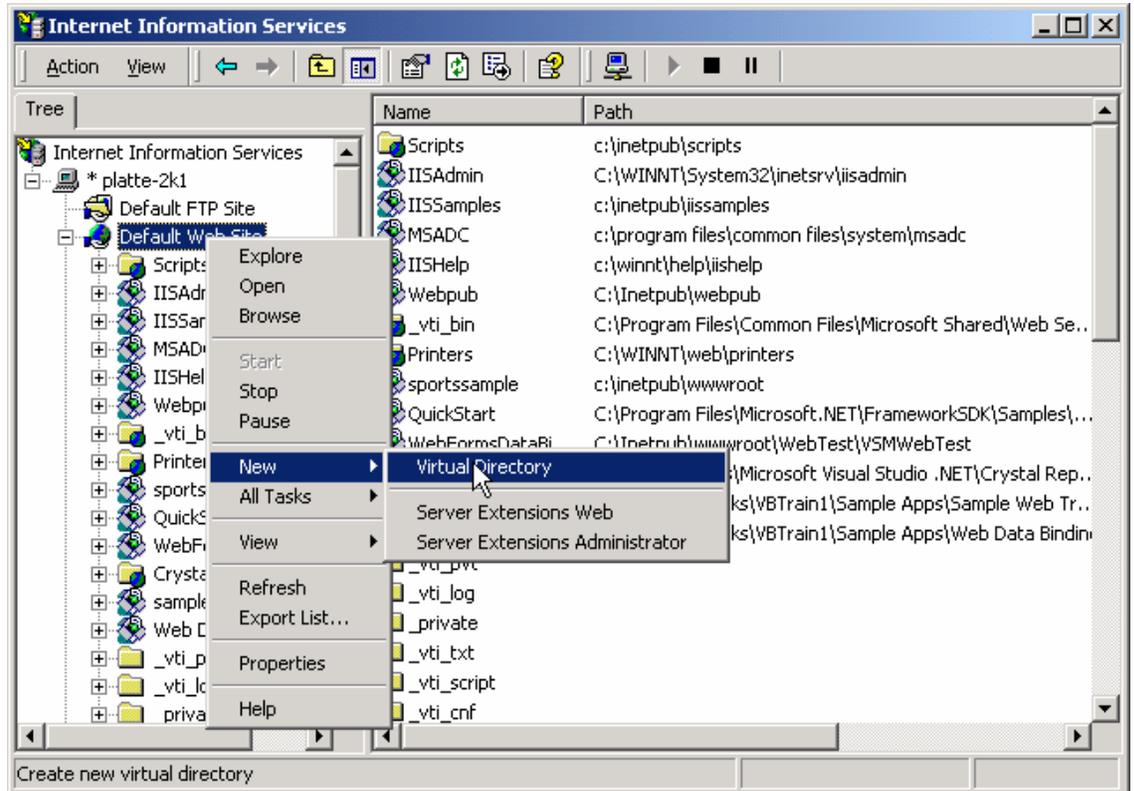


Figure A-2. Creating a Virtual IIS Directory

`c:\vbtrain\Sample Web Training`. Now you need to tell IIS where the project's files are located. You do this by creating a *virtual* directory corresponding to the project's defined directory: `samplewebtraining`⁶. As shown in Figure A-2, you open IIS, navigate to "Default Web Site", right click it, and then select New → Virtual Directory. In the wizard that follows, you enter `samplewebtraining` for the Alias and `c:\vbtrain\Sample Web Training` for the directory. Accept the default permissions. You are now ready to go. Note: you can use this same process to create a SCORM_Watch virtual directory if you install IIS after running the installation.

⁶ So your URL address line when you start this project will be `http://localhost/samplewebtraining/TableOfContents.aspx`. Localhost is the term for your local web server, though you could also use your computer name here. You can figure out that the virtual directory is `samplewebtraining` by opening the `.sln` file in Notepad. Near the top of this file there will be a string that shows the project location, for example `http://localhost/samplewebtraining/SampleWebTraining.vbproj`. The virtual directory name is the directory information after the localhost and before the project name.

⁷ This is normally located on `c:\inetpub\wwwroot`.