

How To Link Tomcat 5 with IIS 6 on Windows 2003 Server using the JK2 ajp13 connector

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History

Created: 23 December 2003

Updated: 24 December 2003 - Added details of JK2 Connector automated installer to Prerequisites

Updated: 24 December 2003 - Added discussion of IIS6 vs IIS 5 isolation mode to Introduction

Introduction

There are a few guides to integrating versions of Tomcat prior to 5.0 with IIS versions up to and including IIS 6.0 (Windows 2003 Server), but in attempting to follow them I've discovered them to be inaccurate and in some cases plain wrong.

The lack of documentation on the Apache Tomcat JK2 itself, and the errors in the published information, makes it difficult for system administrators to easily install Tomcat 5.0 (and later) as the Java Servlet and JSP container for Internet Information Services 6.0 on Microsoft Windows 2003 Server.

Note: There is some discussion among developers as to whether the JK2 isapi_redirector2.dll needs to be re-engineered to take advantage of IIS 6's new worker-process protection. It may be that in the not too distant future a new version of the JK2 ISAPI filter developed that doesn't require putting IIS 6 into IIS 5 isolation mode, but for now that is the downside to using the JK2 connector.

Microsoft Technet Article: [Evaluating Application Changes Required for Worker Process Isolation Mode](#)

Excluding the downloads, if you follow this guide you should have a working IIS/Tomcat Servlet and JSP installation inside 15 minutes.

Prerequisites



Microsoft Windows 2003 Server, with Internet Information Services (IIS) 6.0 installed and working.

Downloads of:

- Java 2 Standard Edition Software Development Kit 1.4.0 (or later)
- Jakarta Tomcat 5.0 (or later)
- Jakarta Tomcat Connector JK2 for IIS

Note: There is an automated installer for the Tomcat JK2 Connector available from <http://www.shiftomat.com/opensource/>. I was made aware of it after writing this article. I've not had the opportunity to test it but the author does discuss it in the [Tomcat Mailing List](#). If you choose to use it be prepared to deviate from this guide.

Download

I haven't given links to specific downloadable files here in case those links are changed, or superseded by newer releases.

Java 2 SDK 1.4.2 (or later)

From java.sun.com/downloads/

- Java 2 Platform, Standard Edition (J2SE)

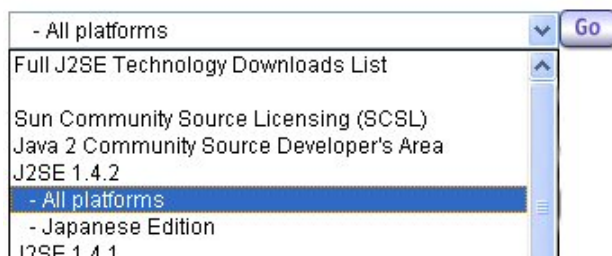
The essential Java 2 SDK, tools, runtimes, and APIs for developing applets and applications in the Java programming language. Also release 1.1 and Java Runtime Environment 1.1.



selecting the J2SE 1.4.2 (or later) All platforms

Java 2 Platform, Standard Edition (J2SE)

The essential Java 2 SDK, tools, runtimes, and APIs for developing applets and applications in the Java programming language. Also release 1.1 and Java Runtime Environment 1.1.



and then the SDK

Download J2SE v 1.4.2_03	JRE	SDK
32-bit/64-bit for Windows/Linux/Solaris SPARC	DOWNLOAD	DOWNLOAD
32-bit for Solaris x86		DOWNLOAD

Tomcat 5.0.16 KEYS

- [5.0.16 zip PGP MD5](#)
- [5.0.16 tar.gz PGP MD5](#)
- [5.0.16 exe PGP MD5](#)
- [5.0.16 Deployer zip PGP MD5](#)
- [5.0.16 Deployer tar.gz PGP MD5](#)
- [5.0.16 Embed zip PGP MD5](#)
- [5.0.16 Embed tar.gz PGP MD5](#)

Select the 5.0.16 **exe** (or later) for the self-installing archive.

Tomcat Web Server Connectors




Also from the [Apache Jakarta](#) downloads page. Tomcat Web Server Connectors is listed just after Tomcat 5.0.

Tomcat Web Server Connectors KEYS

- JK 1.2
 - [JK 1.2 Binary Releases](#)
- JK 2
 - [JK 2 Binary Releases](#)








Choose JK2 Binary Releases, which links to the connector download directory listing at [flirble.org](#)

Index of /pub/apache/dist/ connectors/jk2/binaries

<u>Name</u>	<u>Last modified</u>
 Parent Directory	30-Sep-2003 02:15
 solaris/	30-Sep-2003 02:25
 win32/	30-Sep-2003 02:42

Choose the win32 directory, and then select [jakarta-tomcat-connectors-jk2.0.2-win32-IIS.zip](#)

Index of /pub/apache/dist/jakarta/tomcat- connectors/jk2/binaries/win32

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
 Parent Directory	30-Sep-2003 02:33	-	
 jakarta-tomcat-conne...>	30-Sep-2003 02:34	85k	
 jakarta-tomcat-conne...>	30-Sep-2003 02:40	1k	
 jakarta-tomcat-conne...>	30-Sep-2003 02:35	115k	
 jakarta-tomcat-conne...>	30-Sep-2003 02:40	1k	
 jakarta-tomcat-conne...>	30-Sep-2003 02:35	64k	
 jakarta-tomcat-conne...>	30-Sep-2003 02:40	1k	

Index of /pub/apache/dist/jakarta/tomcat-connectors/jk2/binaries/win32

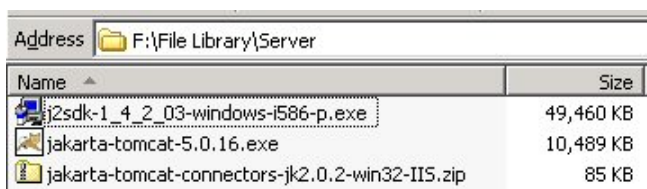
Name	Last modified	Size	Description
 Parent Directory	30-Sep-2003 02:33	-	
 jakarta-tomcat-conne...>	30-Sep-2003 02:34	85k	
 jakarta-tomcat-conne...>	30-Sep-2003 02:40	1k	
 jakarta-tomcat-conne...>	30-Sep-2003 02:35	115k	
 jakarta-tomcat-conne...>	30-Sep-2003 02:40	1k	
 jakarta-tomcat-conne...>	30-Sep-2003 02:35	64k	
 jakarta-tomcat-conne...>	30-Sep-2003 02:40	1k	

<http://ftp.plig.org/pub/apache/dist/jakarta/tomcat-connectors/jk2/binaries/win32/jakarta-tomcat-connectors-jk2.0.2-win32-IIS.zip>

Notice that the directory names listing is truncated and so you'll need to check the browser status bar as you hover the mouse over the links to make sure you have the file ending "...IIS.zip". The other files are for the Apache web server.

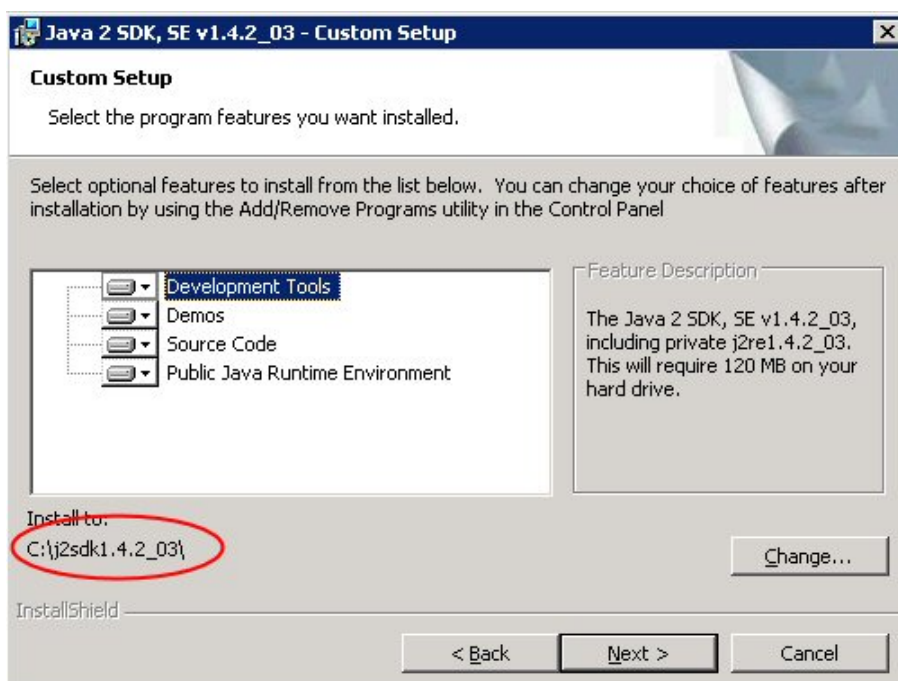
Installation

I'll assume that you've downloaded the installation files to the same folder. On our server that is F:\File Library\Server



Java 2 SDK

Run the self-executing installer **j2sdk-1_4_2_03-windows-i586-p.exe** and work through the wizard settings. In our installation we change the default directory

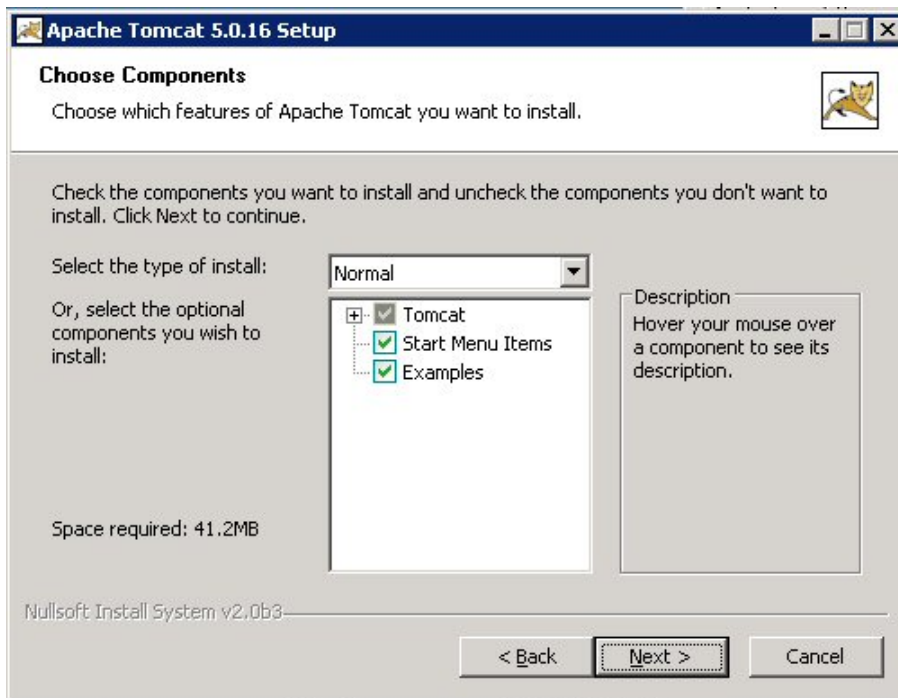


to D:\Server\Java\SDK\1.4.2_03, but you can select your own installation directory or accept the default.

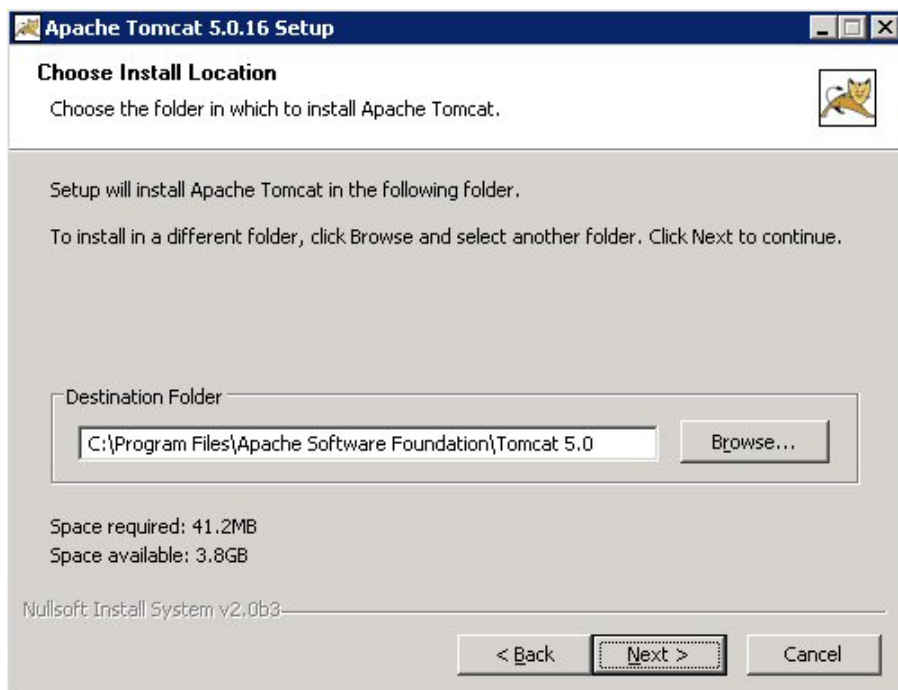
Install to:
D:\Server\Java\JDK\1.4.2_03\

Tomcat 5

Run the self-executing installer **jakarta-tomcat-5.0.16.exe** and work through the wizard settings. Ensure that you install the example if you want to use the instructions in this guide to test your installation. You can manually remove them later.



If like us you need to change the default installation location, do it now.



Destination Folder

D:\Server\Apache\Tomcat\5.0

Accept the default basic configuration, and set a password for the Administrator. Don't forget it!

Apache Tomcat 5.0.16 Setup: Configuration Options

Configuration

Tomcat basic configuration.

HTTP/1.1 Connector Port: 8080

Administrator Login

User Name: admin

Password:

Nullsoft Install System v2.0b3

< Back Next > Cancel

Point to the location of your Java 2 SDK installation

Apache Tomcat 5.0.16 Setup: Java Virtual Machine path selection

Java Virtual Machine

Java Virtual Machine path selection.

Please select the path of the JVM installed on your system:

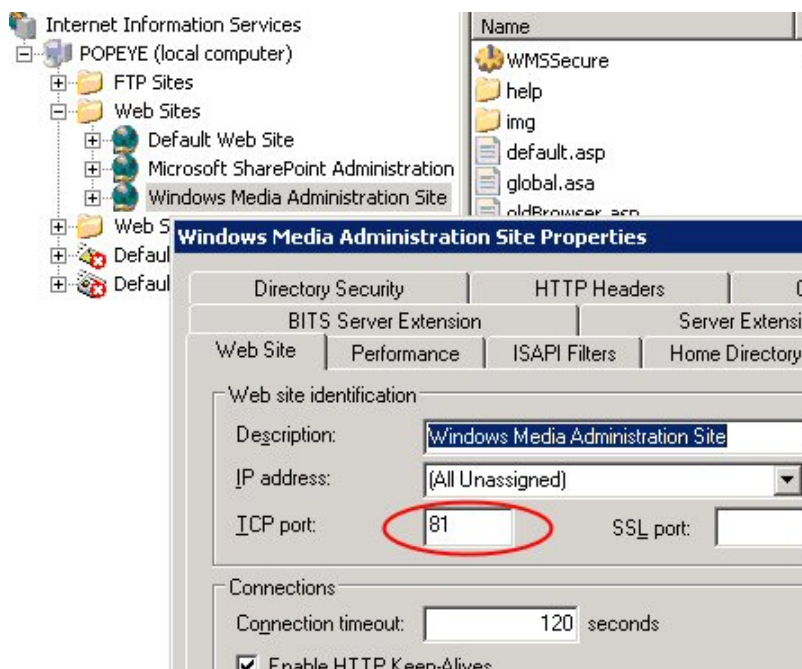
D:\Server\Java\JDK\1.4.2_03

Nullsoft Install System v2.0b3

< Back Install Cancel

Once the wizard has completed you'll have the option to start Tomcat, and to view the readme notes.

Note: Before starting Tomcat ensure that no other services are listening on ports 8080 (Tomcat's default HTTP port) or 8009 (Tomcat's AJP13 connector port). If you've installed Windows Media Services for IIS on Windows 2003 Server, the Administration web site will be listening on port 8080. On our server we have **changed the listening port to 81** for the **Windows Media Administration Site**.



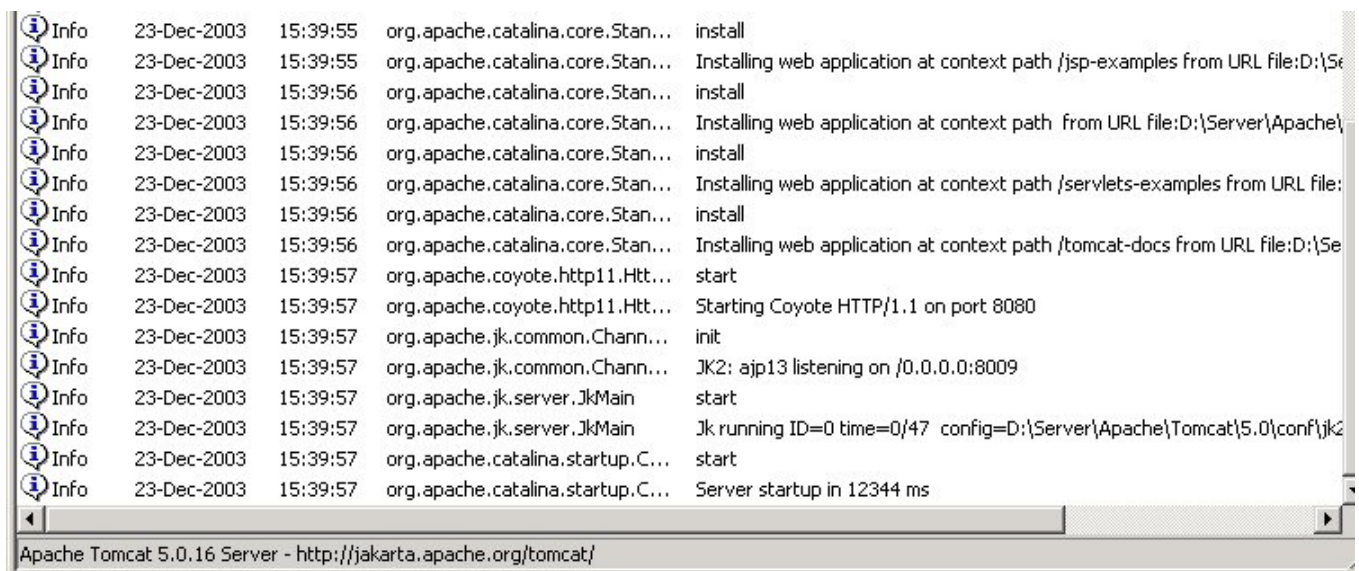
Allow Tomcat to start and check it is loaded and running by inspecting its task-tray icon.



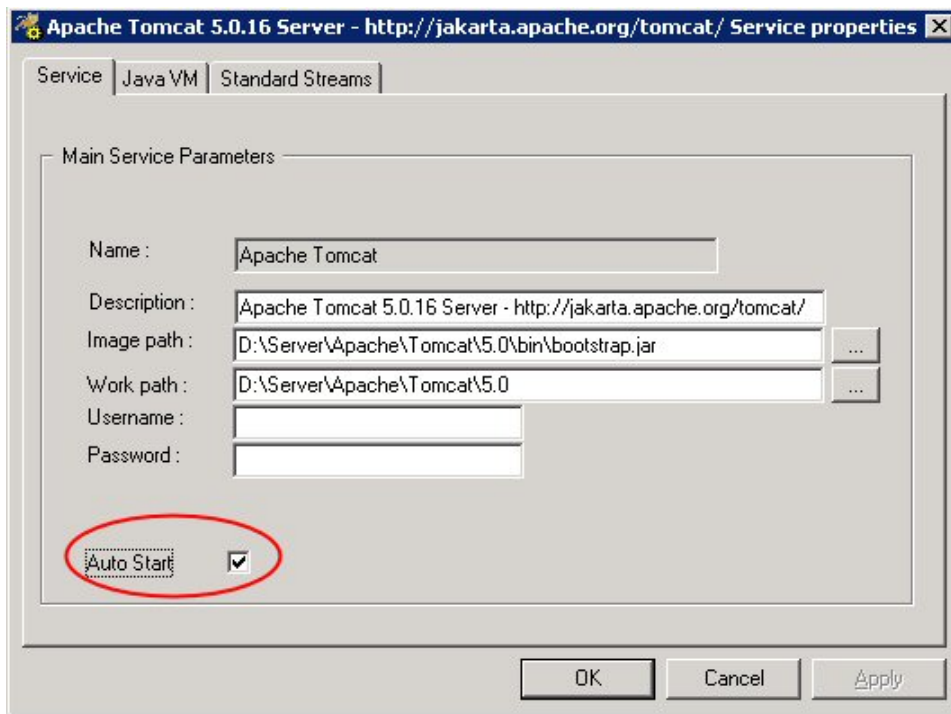
Right-click the icon and choose Open Console Monitor



to check that Tomcat's startup went smoothly.



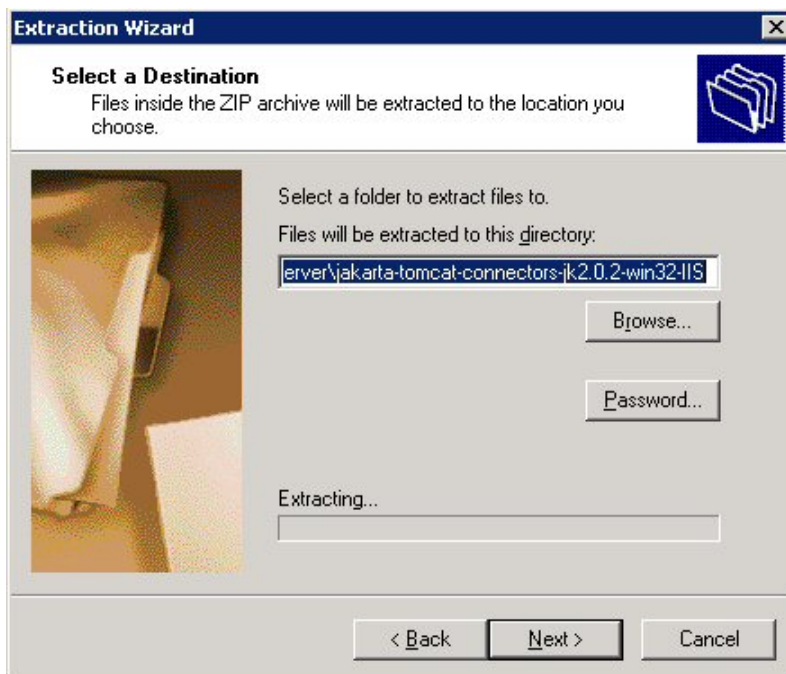
Close the console, right-click the task-tray icon once again, and choose **Properties**. Check that the NT Service is set to **Auto Start**.



Tomcat JK2 IIS Connector

Windows Server 2003/XP file explorer has a built-in zip extractor, so you don't need to install WinZip or any other Zip file manager

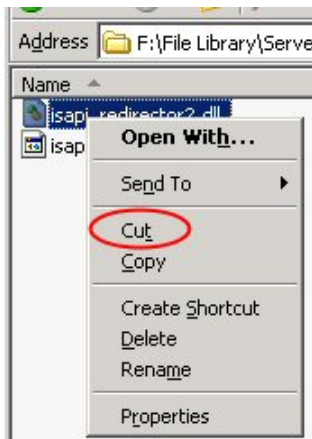
Right-click the **jakarta-tomcat-connectors-jk2.0.2-win32-IIS.zip** and choose **Extract All...**, and follow through the wizard steps. Accept the default location for the extracted files. You can delete the folder that is created later, once you've moved the **isapi_redirector2.dll** file.



Accept the option to Show extracted files

Address F:\File Library\Server\jakarta-tomcat-connectors-jk2.0.2-win32-IIS\jakarta-tomcat-connectors-jk2.0.2-win32-IIS					
Name	Size	Type	Date Modified	Attributes	
isapi_redirector2.dll	188 KB	Application Extension	27/11/2002 06:39	A	
isapi_redirector2.dll.asc	1 KB	ASC File	27/11/2002 06:39	A	

Right-click the **.dll** file and choose Cut to place it onto the clipboard.



In an explorer window navigate to the location where you installed Tomcat 5, and select the bin\ folder.

Address D:\Server\Apache\Tomcat\5.0\bin		
Name	Size	Type
bootstrap.jar	24 KB	Executable Jar File
catalina.bat	8 KB	Windows Batch File
catalina.sh	10 KB	SH File
catalina.xml	9 KB	XML Document
commons-daemon.jar	10 KB	Executable Jar File
commons-launcher.jar	41 KB	Executable Jar File

Purely for the sake of naming convention, create two new sub-folders **win32\i386** and Paste the .dll into the **i386** folder.

Address D:\Server\Apache\Tomcat\5.0\bin\win32\i386		
Name	Size	Type
isapi_redirector2.dll	188 KB	Application Extension

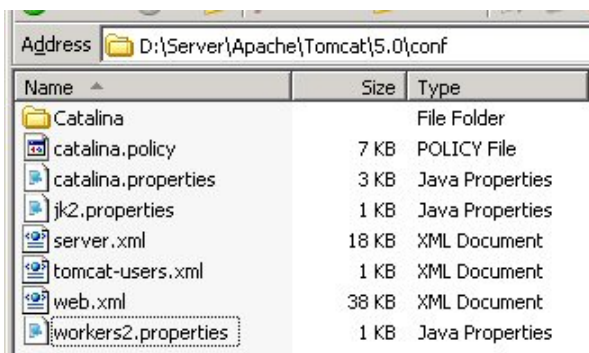
You could put the **isapi_redirector2.dll** file anywhere, but previous versions of Tomcat have shipped with the redirector in this location so it makes sense to retain the convention. Remember this location, you'll need it later to configure IIS.

Now you can delete the folder where the connector was extracted; it's no longer required.

Configuration

Tomcat

Navigate to Tomcat's **conf** folder.



To support the JK2 Connector, you might need to edit the **jk2.properties** file. In most cases though, the default settings adopted by Tomcat are correct and the contents of **jk2.properties** can remain commented out.

```
## THIS FILE MAY BE OVERRIDEN AT RUNTIME. MAKE SURE TOMCAT IS STOPED
## WHEN YOU EDIT THE FILE.
```

```
## COMMENTS WILL BE _LOST_
```

```
## DOCUMENTATION OF THE FORMAT IN JkMain javadoc.
```

```
# Set the desired handler list
# handler.list=apr,request,channelJni
#
# Override the default port for the socketChannel
# channelSocket.port=8019
# Default:
# channelUnix.file=${jkHome}/work/jk2.socket
# Just to check if the the config is working
# shm.file=${jkHome}/work/jk2.shm
```

```
# In order to enable jni use any channelJni directive
# channelJni.disabled = 0
# And one of the following directives:
```

```
# apr.jniModeSo=/opt/apache2/modules/mod_jk2.so
```

```
# If set to inprocess the mod_jk2 will Register natives itself
# This will enable the starting of the Tomcat from mod_jk2
# apr.jniModeSo=inprocess
```

If there isn't already an example **workers2.properties** file in the Tomcat conf\ directory, create one or [download a copy of ours](#) and edit it to suit your server. This file is used by the ISAPI connector to configure itself to talk to Tomcat, and to know what Uniform Resource Indicators (URIs) to intercept and pass to Tomcat.

In most cases the basic settings shouldn't need altering, apart from the Shared Memory File [**shm:**]. Set this to a location on your server. The shm file doesn't need to exist, it will be created.

```
[shm:]
info=Shared memory file. Required for multiprocess servers
file=D:\Server\Apache\Tomcat\5.0\work\jk2.shm
size=1000000

[channel.socket:localhost:8009]
info=Ajp13 worker, connects to tomcat instance using AJP 1.3 protocol
tomcatId=localhost:8009

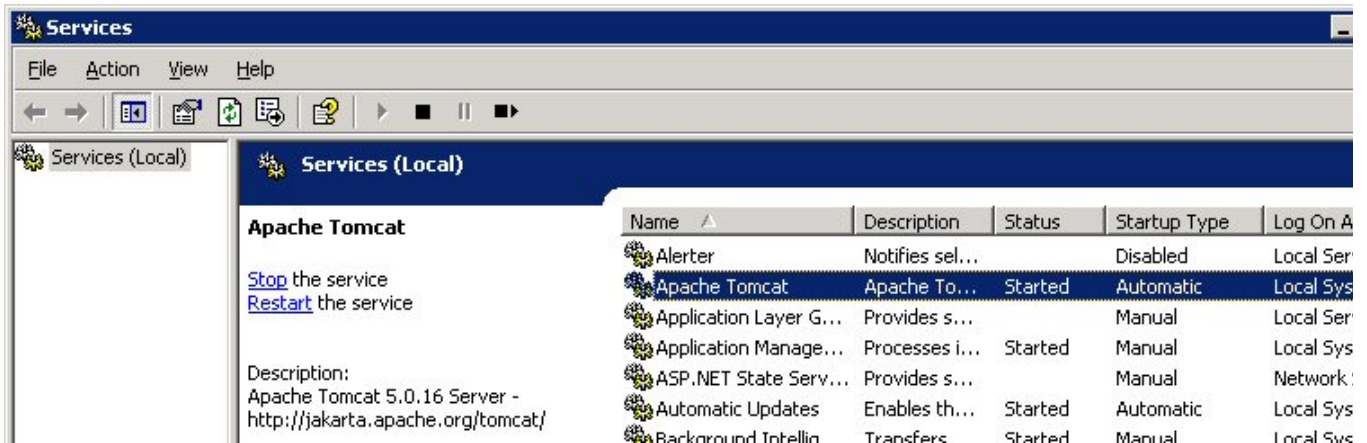
[uri:/jsp-examples/*]
info=JSP examples, map requests for all JSP pages to Tomcat.
context=/jsp-examples
```

You should read the [worker2.properties reference guide](#) to learn more.

Shutdown the Tomcat server from the task-tray by right-clicking the icon and choosing Shutdown.

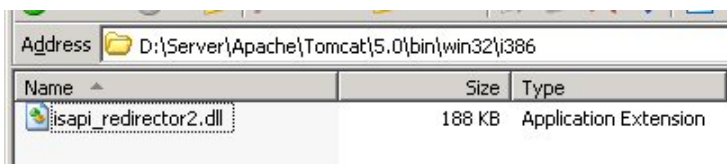


Start the Tomcat service from the **Services** console in **Administrative Tools**



Tomcat IIS Connector

You've already put **isapi_redirector2.dll** in a folder in the Tomcat installation. For us this is `D:\Server\Apache\Tomcat\5.0\bin\win32\i386\`.



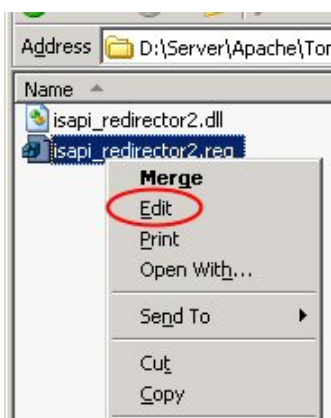
Now we need to add some settings to the Windows Registry that the redirector will read when it is loaded by IIS.

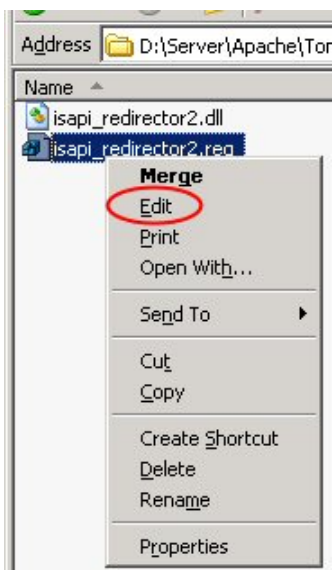
Windows Registry Editor Version 5.00

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Apache Software Foundation\Jakarta Isapi Redirector\2.0]
"workersFile"="D:\\Server\\Apache\\Tomcat\\5.0\\conf\\workers2.properties"
"extensionUri"="/jakarta/isapi_redirector2.dll"
"logLevel"="debug"
"serverRoot"="D:\\Server\\Apache\\Tomcat\\5.0\\"
```

Copy this text into notepad then save it as `isapi_redirector2.reg` or [download our copy](#)

Edit the file using Notepad (right-click it and select **Edit**)



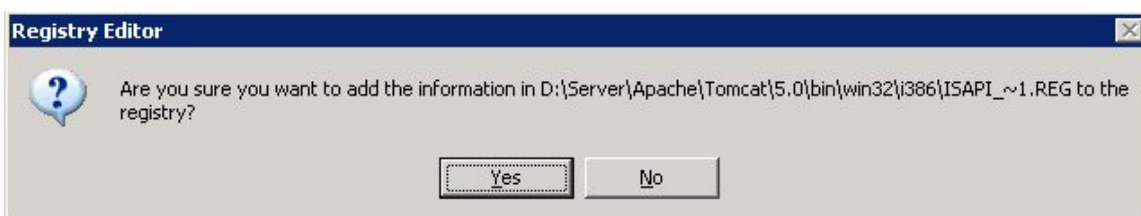


Ensure that **workersFile** points to the location of your **workers2.properties** file. I cannot be sure where **serverRoot** should point to, I selected the base Tomcat folder. (Without it I found that the connector wouldn't operate correctly. I hope the JK2 Connector author might document it sooner rather than later, and that documentation might be easily found).

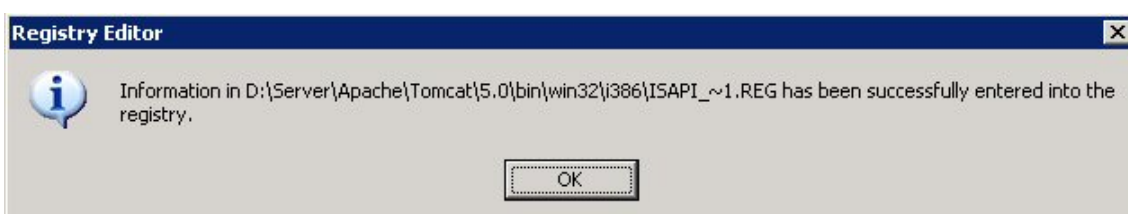
Right-click the file again, choose **Merge** to incorporate it into your Server's registry.



Give Registry Editor permission to merge the new settings.



If all goes well, you should see:



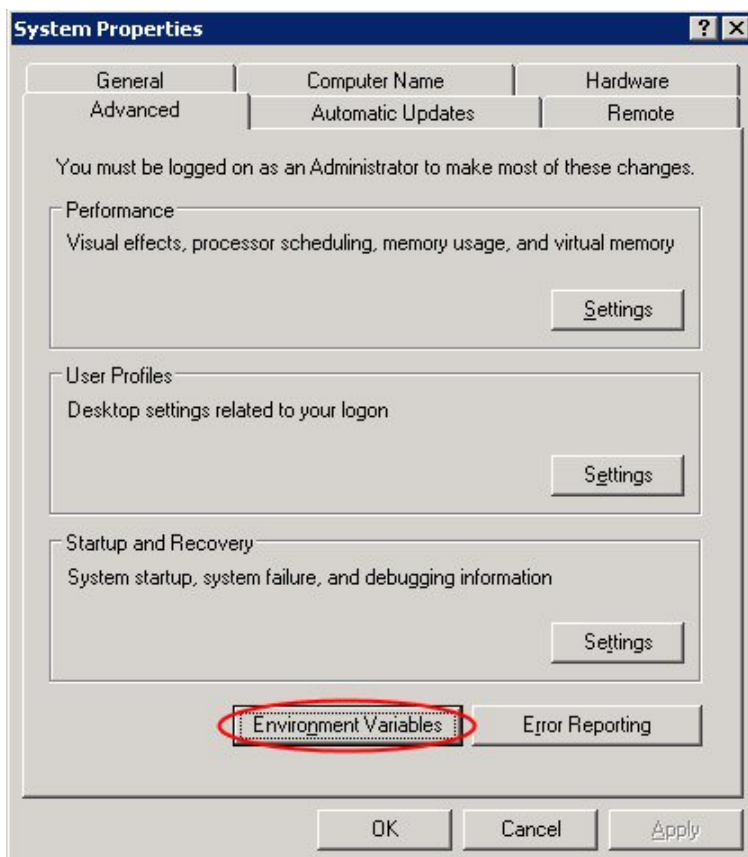


You can now delete the **.reg** file.

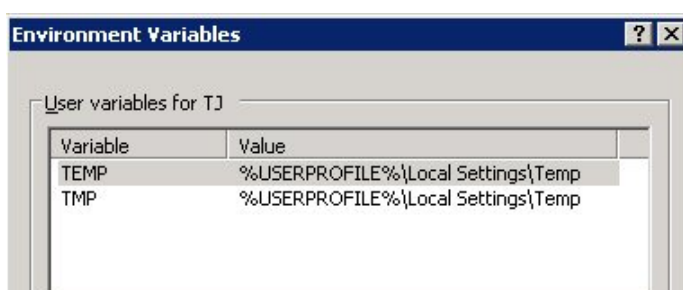
Windows

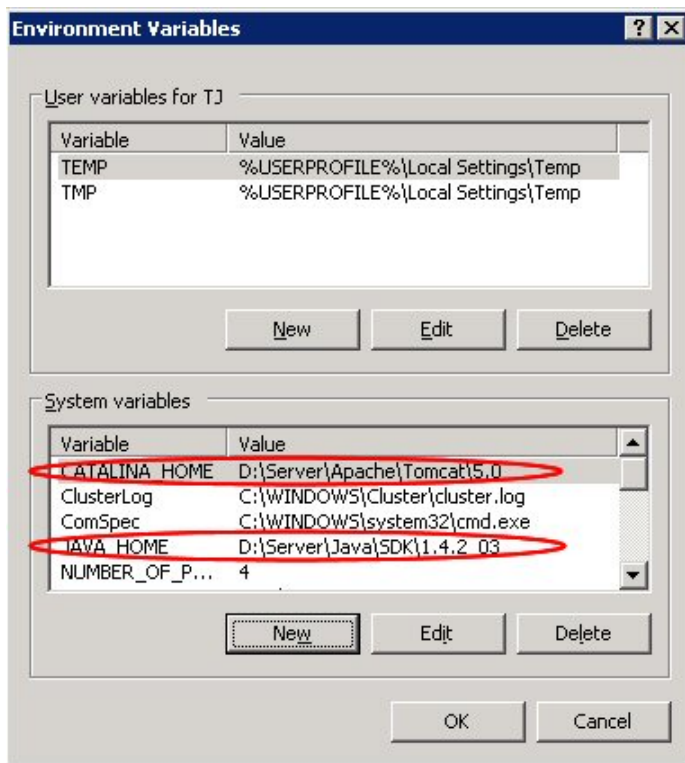
Add two environment variables to the Server. These are **CATALINA_HOME** and **JAVA_HOME**.

From Control Panel select **System Properties** (or right-click My Computer and choose Properties)



Press the **Environment Variables** button, and then add the 2 new System variables





CATALINA_HOME points to the base installation directory of Tomcat, in our case D:\Server\Apache\Tomcat\5.0

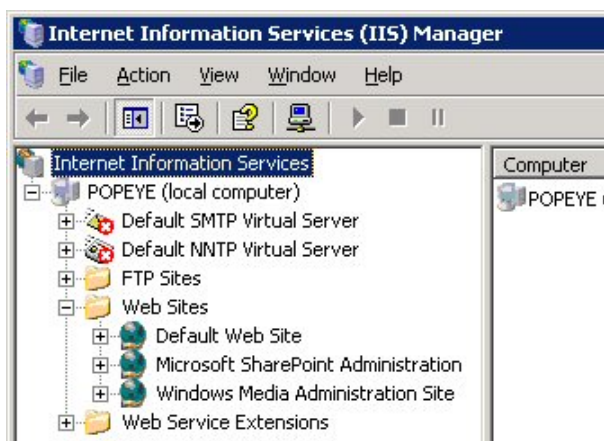
JAVA_HOME points to the base installation directory of the Java SDK, in our case D:\Server\Java\SDK\1.4.2_03

IIS

There are several steps to preparing IIS to run the Tomcat connector successfully, but they only take a minute or so to complete.

1. Switch IIS 6 into IIS 5 isolation mode.
2. Install the ISAPI filter DLL.
3. Create a virtual directory for the ISAPI filter DLL.
4. Authorise the DLL as a web application.
5. Restart IIS services.

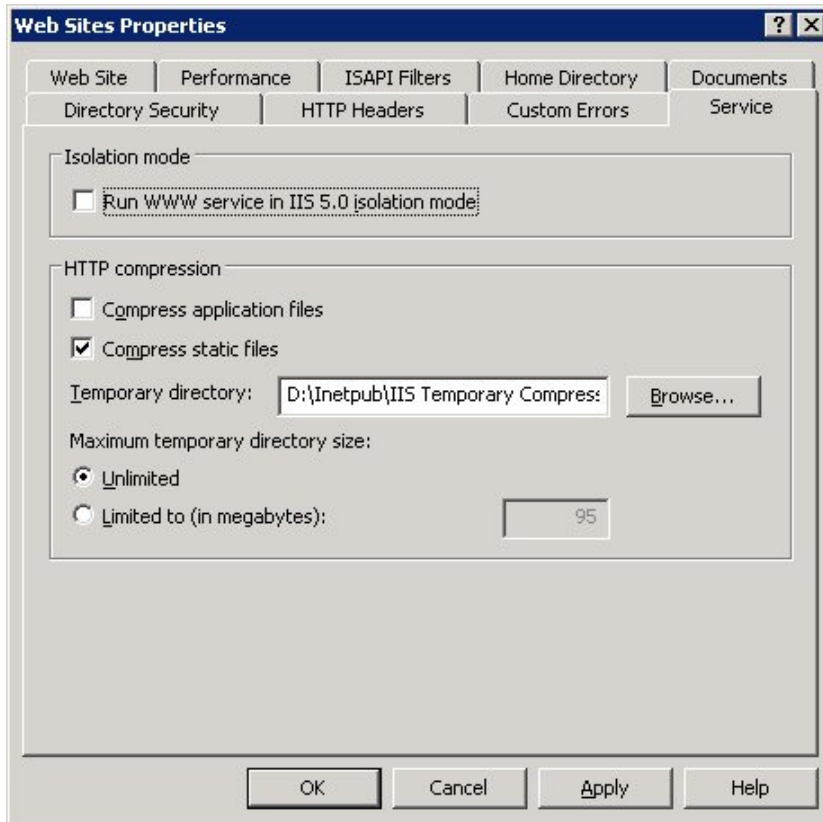
Open the IIS Manager, you will need it for all these steps.



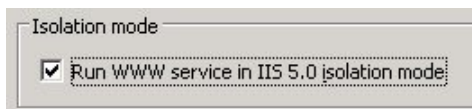
Choose the **Web Sites** container



right-click and choose **Properties**, then select the **Service** tab



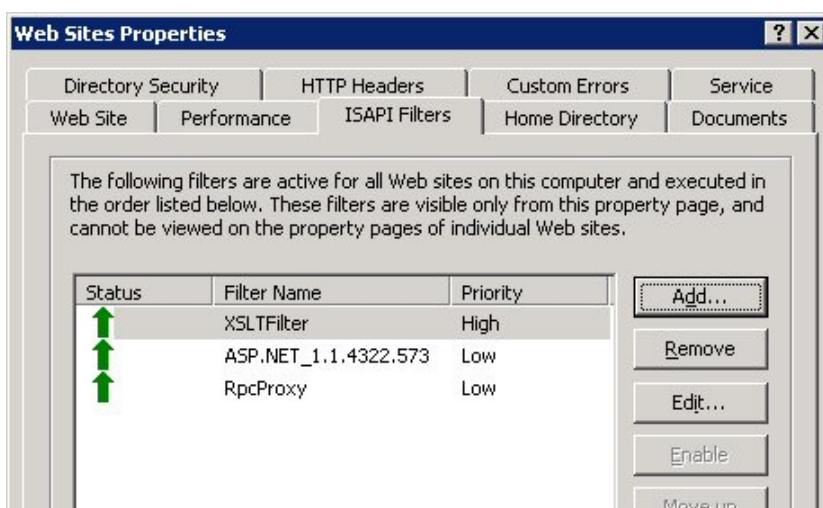
Tick the **Run WWW service in IIS 5.0 isolation mode** option

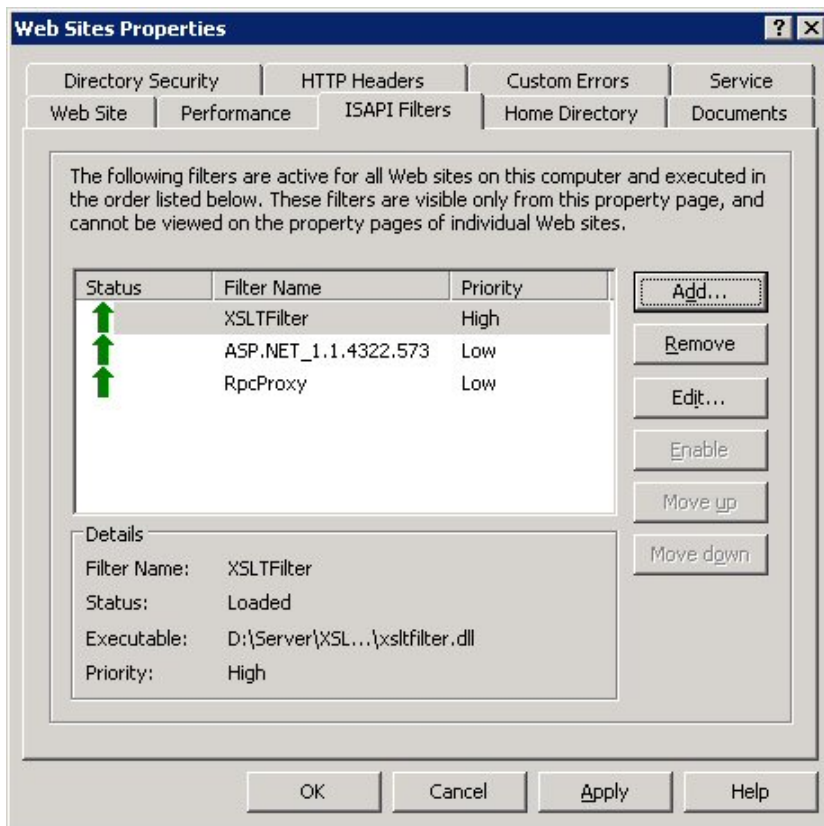


Press the **Apply** button. Don't leave this dialog box, you'll need it for the next step.

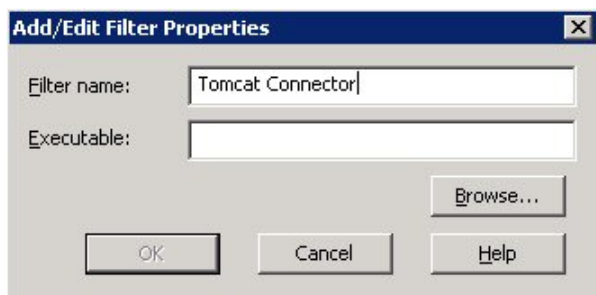
Install the ISAPI filter DLL

Select the **ISAPI Filters** tab

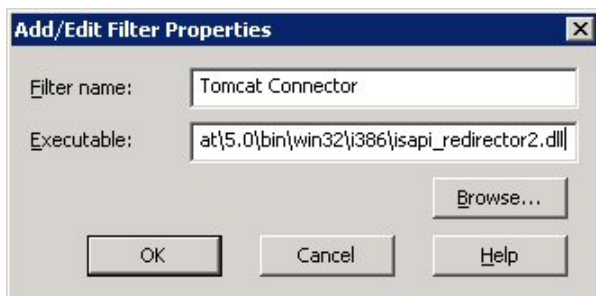




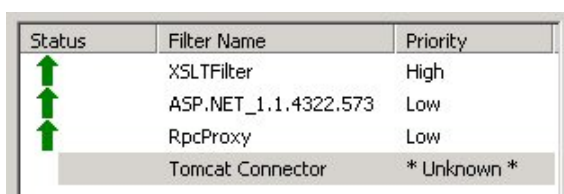
Press the **Add...** button and type a name for the new Filter (it can be anything)



Type in or Browse to the location of the **isapi_redirector2.dll** file. In our case this is D:\Server\Apache\Tomcat\5.0\bin\win32\i386\isapi_redirector2.dll



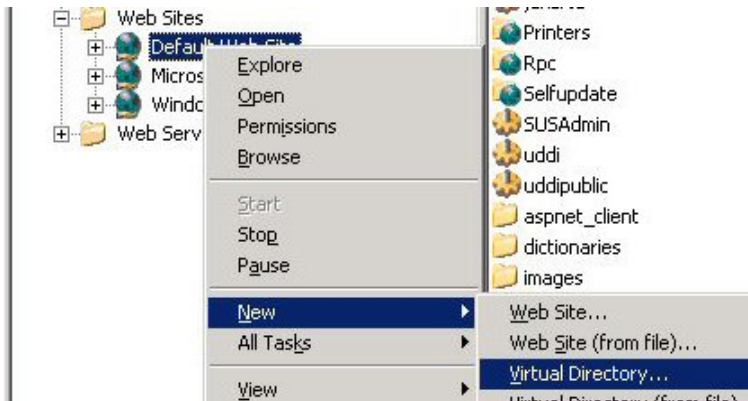
Press **OK** to add the new Tomcat filter. IIS will need to be restarted before the filter will be loaded, we'll do that later.



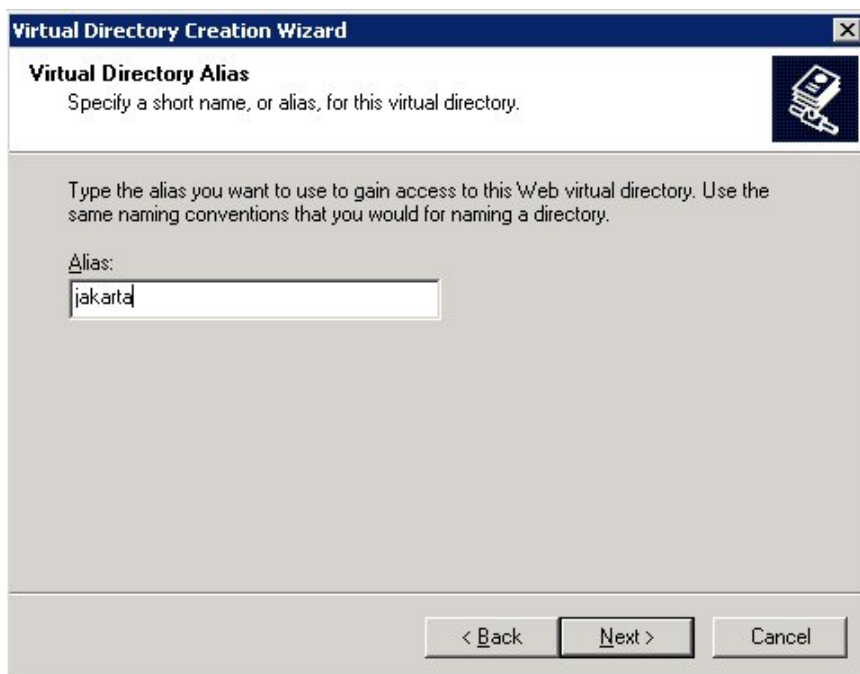
others, instead of adding it to the ISAPI Filters of the global Web Sites properties, add it to the ISAPI Filters of the individual web site (e.g: Default Web Site) using the same procedure.

Create a virtual directory for the ISAPI filter DLL

Select the web site you want to add Tomcat services to, right-click and choose **New**, then choose **Virtual Directory...**

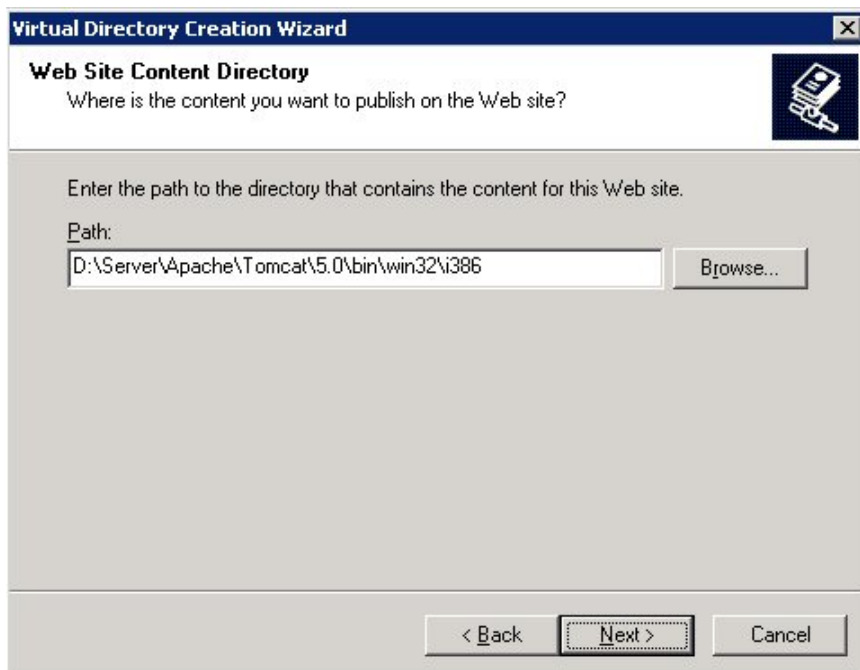


Create a new Virtual Directory named **jakarta**. It is important to use this exact case and spelling.



Enter the path to the directory where **isapi_redirector2.dll** is stored. In our case this is D:\Server\Apache\Tomcat\5.0\bin\win32\i386





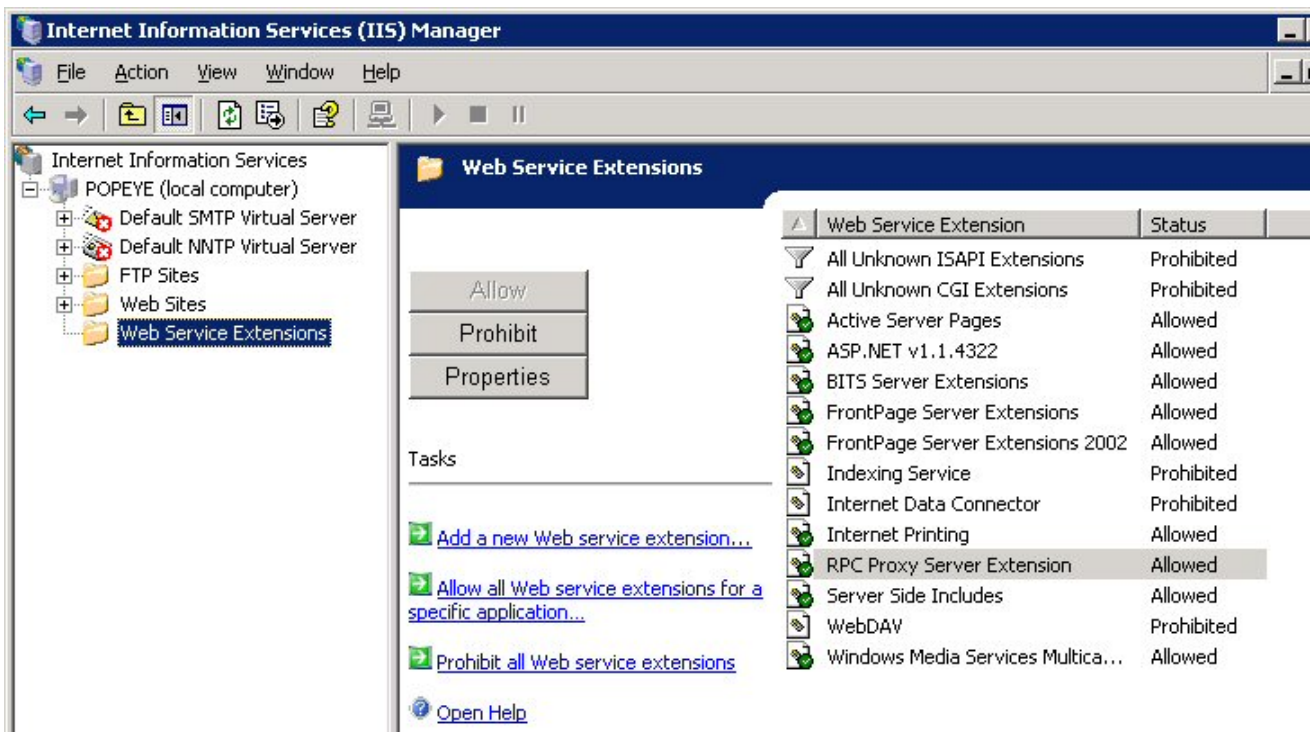
Enable Execute permissions



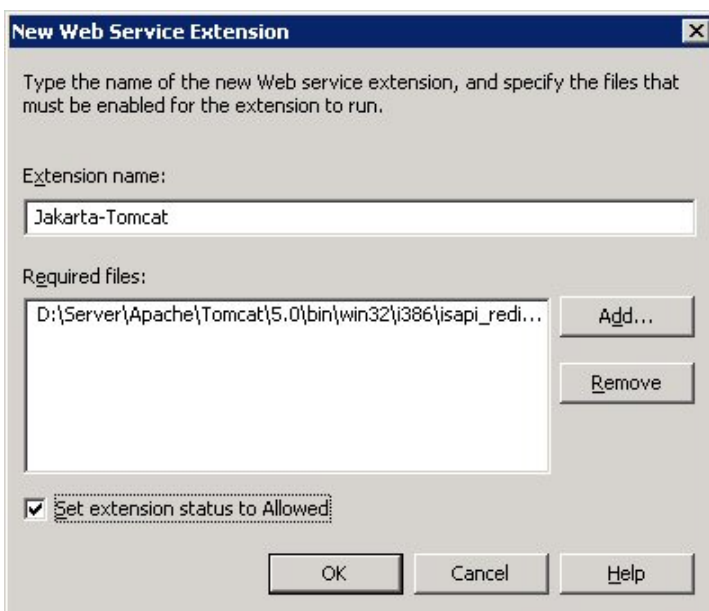
After completing the Virtual Directory wizard you should see something like this in the console.



Authorise the DLL as a web application

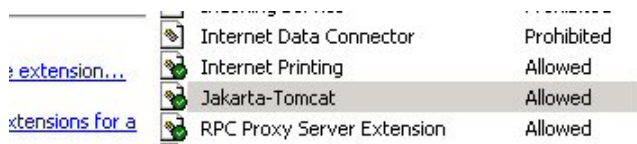


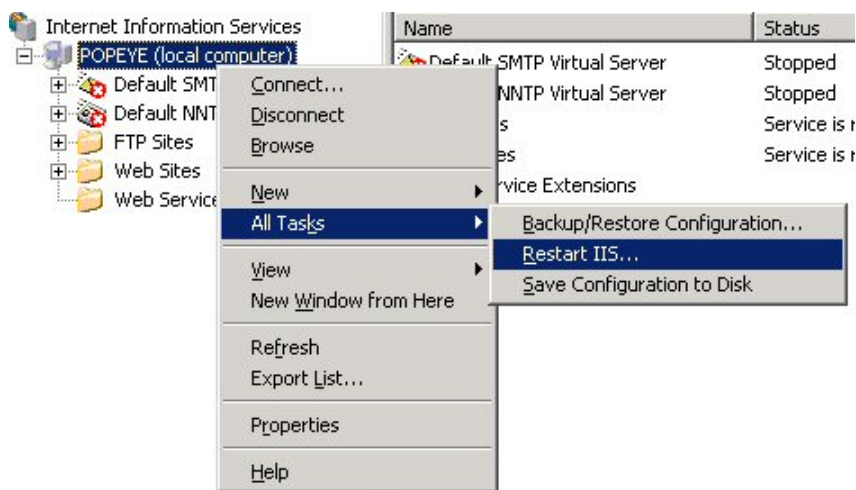
Add a new extension called **Jakarta-Tomcat** (this can be anything), add **isapi_redirector2.dll** to the list of required files, and select **Set extension status to Allowed**



Press the **OK** button.

You should see something like this in the Extension list





Choose **Restart Internet Services on SERVERNAME** and press **OK**



Check that services have restarted, and inspect the Event Viewer logs. The isapi_redirector2.dll writes its errors to the Application event log, not to a file as it did in previous versions.

In the IIS Console, check the status of the Tomcat Connector on the **ISAPI Filters** tab of the web site **Properties** dialog

Status	Filter Name	Priority
↑	XSLTFilter	High
↑	Tomcat Connector	High
↑	ASP.NET_1.1.4322.573	Low
↑	RpcProxy	Low

Testing

Tomcat

First try browsing to the examples installed with Tomcat, using it's own HTTP server on port 8080.

Test servlets from the browser on the server: <http://localhost:8080/servlets-examples/>
(change localhost to SERVERNAME if you're testing from another PC).

is listening on port 80, and is bound to 127.0.0.1 (localhost). If this isn't the case for you, alter the URL accordingly.

<http://localhost/servlets-examples/>

and

<http://localhost/jsp-examples/>

If everything went well, you should have a working Servlet and JSP container in IIS 6. Please email me your [experiences or feedback](#) on this guide.

Credits

In developing this guide I worked from several sources that each gave some, but not all, of the steps required.

[Resources for Getting Tomcat and IIS 6.0 To Work Together](#) by Adam Krouskop

[Setting Up IIS 6.0 To Work with Tomcat](#) by Adam Krouskop

[Tomcat And Microsoft Internet Information Services \(IIS\)](#)

[How to setup bajie server for Apache and IIS](#)

[Apache Tomcat JK2 Installation Instructions \(pre Tomcat 5, pre IIS 6\)](#)

[Apache Tomcat JK2 documentation](#)