CNT 4714: Enterprise Computing
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Connecting Apache And Tomcat

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Connecting Apache To Tomcat

- Although it is possible for Tomcat to run standalone and serve HTTP requests directly (we did this for servlets and jsps), the Apache server does a much better job of handling tasks such as static content and SSL connections.

- For this reason, Tomcat is typically used alongside an Apache server. Unlike PHP which runs as a module inside the Apache process, a JVM is external and requires a mechanism to connect it to the web server.

- Tomcat inherited the Apache JServ protocol (AJP) from the JServ project. AJP is a protocol for connecting an external process to a servlet container. It is the responsibility of an Apache module, in this case `mod_jk`, to speak this protocol to the servlet container (Tomcat).

Connecting Apache To Tomcat (cont.)

- In this last section of notes, I'll show you how to integrate Apache and Tomcat into a single package.

- The ultimate set-up will resemble the figure shown below. Note that if you also would like Tomcat to run standalone HTTP requests, it will need to run on a different HTTP port than Apache. That's why I set-up Apache on port 8081 and Tomcat on port 8080.
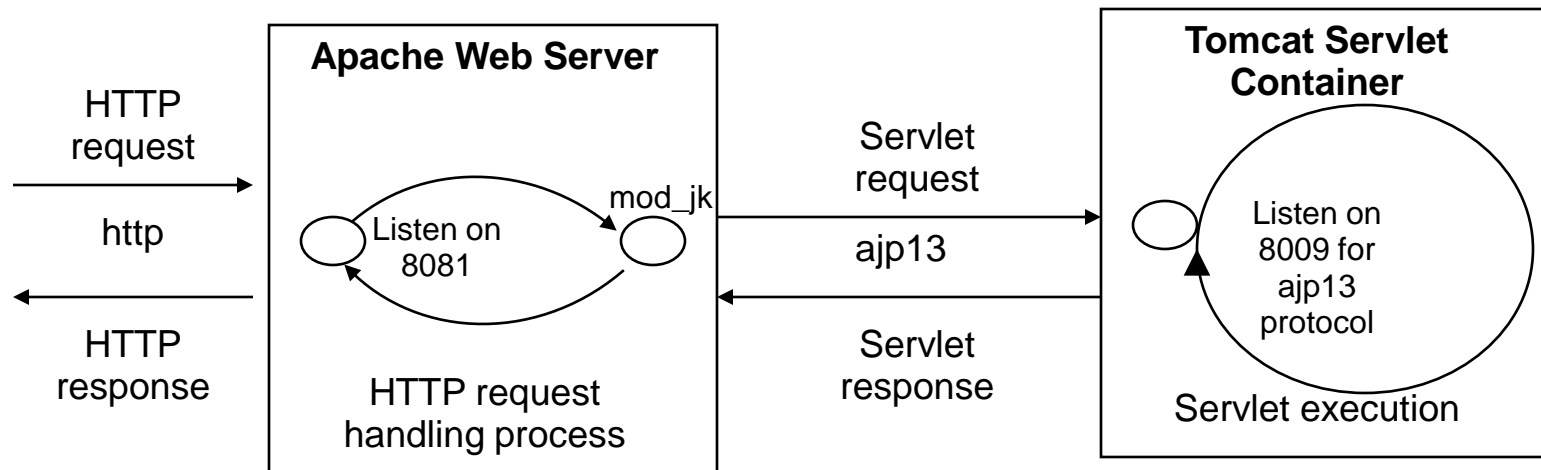
Getting The Tomcat Connector

- The first step in Apache-Tomcat integration is to obtain the Tomcat connector from Apache.

- Follow the screen shots on the next few pages to obtain the `mod_jk` connector.

- The Windows based connector binary files has the name `mod_jk-apache-2.2.4.so`.

http://tomcat.apache.org/

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Apache Tomcat

Apache Tomcat

Apache Tomcat

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Pages specifications ar[...]

- Home

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- Tomcat 5.x
- Tomcat 4.1
- Tomcat 3.3
- Tomcat Connectors
- Archives

Apache Tomcat is developed in an open and participatory environment and released under the Apache Software License. Apache Tomcat is intended to be a collaboration of the best-of-breed developers from around the world. We invite you to participate in this open development project. To learn more about getting involved, click here.

Apache Tomcat powers numerous large-scale, mission-critical web applications across a diverse range of industries and organizations. Some of these users and their stories are listed on the PoweredBy wiki page.

Documentation

From the main Tomcat webpage, select Tomcat connectors from the download section. The current documentation is also available from this page.

http://www.apache.org/

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http://tomcat.apache.org/download-connectors.cgi

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Apache Tomcat - Tomcat Connectors (mod_jk) Downl...

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mod_jk download page.

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Tomcat Connectors (mod_jk) Downloads

We recommend you use a mirror to download our release builds, but you **must** verify the integrity of the downloaded files using signatures downloaded from our main distribution directories. Recent releases (48 hours) may not yet be available from the mirrors.

You are currently using **http://www.axint.net/apache**. If you encounter a problem with this mirror, please select another mirror. If all mirrors are failing, there are *backup* mirrors (at the end of the mirrors list) that should be available.

- Which version?
- Tomcat 6.x
- Tomcat 5.x
- Tomcat 4.1
- Tomcat 3.3
- Tomcat Connectors
- Archives

Other mirrors: http://www.axint.net/apache   Change

The KEYS link links to the code signing keys used to sign the product. The PGP link downloads the OpenPGP compatible signature from our main site.

Documentation

For more information concerning Tomcat Connectors (mod_jk), see the Tomcat

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Documentation

For more information concerning Tomcat Co...
Connectors (mod_jk) site.

- Tomcat 6.0
- Tomcat 5.5   KEYS
- Tomcat 5.0
- Tomcat 4.1
- Tomcat 3.3   • JK 1.2 (**WARNING: Critical vulnerabilities in previous versions**)
- Tomcat Connectors   ○ Source
- Migration Guide   ▪ JK 1.2.21 Source Release tar.gz
                                      ▪ [pgp]
Problems?   ▪ JK 1.2.21 Source Release zip
                                      ▪ [pgp]
- Security Reports   ○ JK 1.2 Binary Releases
- Find help   • browse download area
- FAQ   • archives...
- Mailing Lists   • The historical mod_jk2 could be found in the archives
- Bug Database
- IRC

Get Involved

- Overview
- SVN Repositories
- Mailing Lists

Done

Scroll down the page until you see the JK 1.1.21 binary releases

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http://www.axint.net/apache/tomcat/tomcat-connectors/jk/binaries/

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Index of /apache/tomcat/tomcat-connectors/jk/binaries

Name	Last modified	Size	Description
Parent Directory	24-Dec-2004 05:50	–	
aix/	02-Mar-2007 17:06	–	
freebsd/	02-Mar-2007 17:06	–	
iseries/	02-Mar-2007 17:06	–	
linux/	05-Mar-2007 04:03	–	
macosx/	02-Mar-2007 17:06	–	
netware/	05-Mar-2007 01:12	–	
solaris/	05-Mar-2007 04:02	–	
win32/	12-Apr-2007 23:48	–	
win64/	12-Apr-2007 23:49	–	

Pick the directory of your choice for your machine. I'm using win32.

The Apache Jakarta Tomcat Connector

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http://www.axint.net/apache/tomcat/tomcat-connectors/jk/binaries/win32/

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Index of /apache/tomcat/tomcat-connectors/jk/binaries/win32

Name	Last modified	Size	Description
Parent Directory	04-Mar-2007 22:41	-	
📁 jk-1.2.21/	04-Mar-2007 22:38	-	
📁 jk-1.2.22/	13-Apr-2007 00:02	-	

Make your choice here and select the version you want.

The Apache Jakarta Tomcat Connector

- Current stable version is jk-1.2.21

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Index of /apache/tomcat/tomcat-connectors/jk/binaries/win32/jk-1.2.22

Name	Last modified	Size	Description
Parent Directory	12-Apr-2007 23:48	-	
isapi_redirect.dll	12-Apr-2007 22:14	228k	
isapi_redirect.dll.asc	12-Apr-2007 22:37	1k	
jk-symbols.zip	12-Apr-2007 22:32	692k	
jk-symbols.zip.asc	12-Apr-2007 22:37	1k	
mod_jk-apache-1.3.37.so	12-Apr-2007 22:12	180k	
mod_jk-apache-1.3.37.so.asc	12-Apr-2007 22:37	1k	
mod_jk-apache-2.0.59.so	12-Apr-2007 22:11	188k	
mod_jk-apache-2.0.59.so.asc	12-Apr-2007 22:37	1k	
mod_jk-apache-2.2.4.so	12-Apr-2007 22:11	188k	
mod_jk-apache-2.2.4.so.asc	12-Apr-2007 22:37	1k	
nsapi_redirect.dll	12-Apr-2007 22:32	176k	

Download this file and place it in the Wamp/Apache2/modules directory.

Installing The Tomcat Connector

- Once you've downloaded the Tomcat connector, put it in the `modules` sub-directory of your Apache installation's root directory.

Here's the new module file.
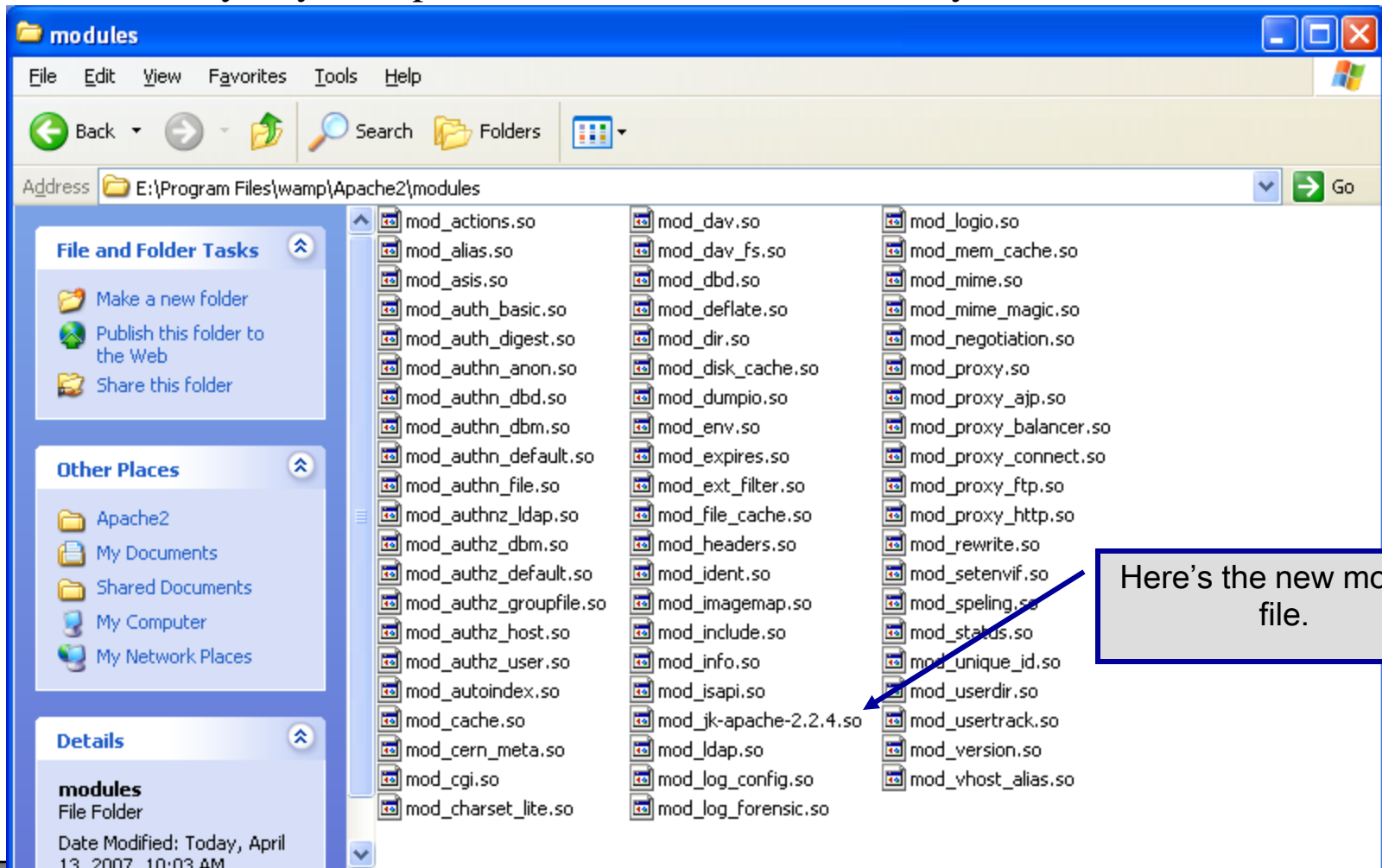
Enabling The Tomcat Connector

- Once you've put the connector file in the `modules` sub-directory of your Apache installation's root directory, you are now ready to configure Apache to recognize and enable the module.

- To do this you'll need to edit your Apache configuration file. This is the same file you edited to enable PHP.

- This file is located in the `conf` subdirectory and is named `httpd`.

Edit this file
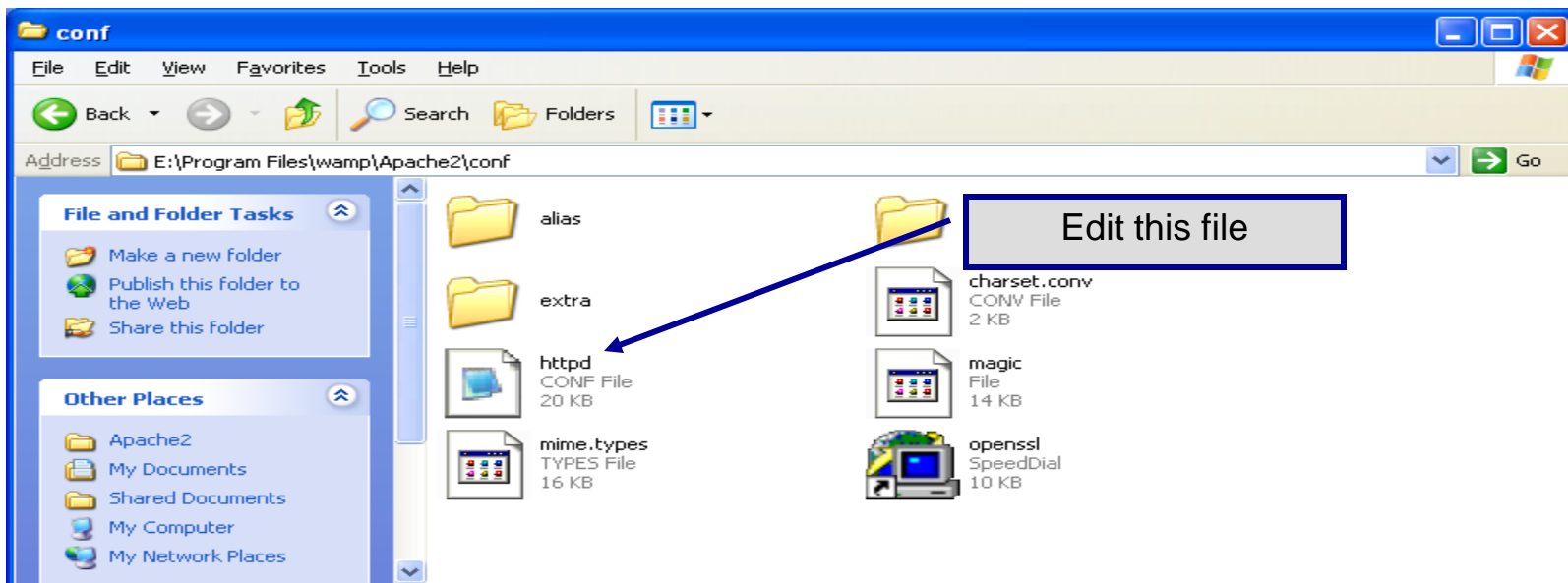
httpd - Notepad

```
### begin material for mod_jk connector

# Load mod_jk module
# Update this path to match your modules location
LoadModule jk_module "E:/Program Files/wamp/Apache2/modules/mod_jk-apache-2.2.4.so"

# Declare the module for <IfModule directive> (remove this line on Apache 2.x)
#AddModule mod_jk.c

# Where to find workers.properties
# Update this path to match your conf directory location (put workers.properties next to httpd.conf)
#JkWorkersFile "E:/Program Files/Apache Software Foundation/Tomcat 5.5.20/conf/workers.properties"

# Where to put jk logs
# Update this path to match your logs directory location (put mod_jk.log next to access_log)
#JkLogFile  "E:/Program Files/wamp/Apache2/logs/mod_jk.log"

# Set the jk log level [debug/error/info]
#JkLoglevel  info

# Select the log format
#JkLogStampFormat "[%a %b %d %H:%M:%S %Y] "

# JkOptions indicate to send SSL KEY SIZE,
#JkOptions    +ForwardKeySize  +ForwardURICompat  -ForwardDirectories

# JkRequestLogFormat set the request format
#JkRequestLogFormat   "%w %V %T"

# Send everything for context /examples to worker named worker1 (ajp13)
#JkMount  /examples/* worker1
JkMount /cop4610/* ajp13
JkMount /first-examples/* ajp13

### end material for mod_jk connector
```

> Add all of this material to enable mod_jk

> Add JKMount directives for any servlets and jsps to go through Tomcat.

- The `JWorkerFile` directive (see previous page) refers to a separate file that configures the `ajp13` protocol communications parameters. An example called `workers.properties` is included with `mod_jk`. For a basic set-up, this default file will work fine.

- There are a couple of things you should verify however: (1) `workers.tomcat_home` should agree with the value you've already set for Tomcat called `CATALINA_HOME`, and (2) `worker.ajp13.port` must be the same as the one listed in the Tomcat `server.xml` file as shown on the next page.

- In more robust applications, additional editing of the `JWorkerFile` will be required. For example, if you have more than one installation of Tomcat on your machine, you'll need to adjust the `worker.ajp.port` parameter in `workers.properties` to make sure that `mod_jk` is connecting to the correct Tomcat installation as Tomcat installations will not be able to start up sharing port numbers.

workers - WordPad

File Edit View Insert Format Help
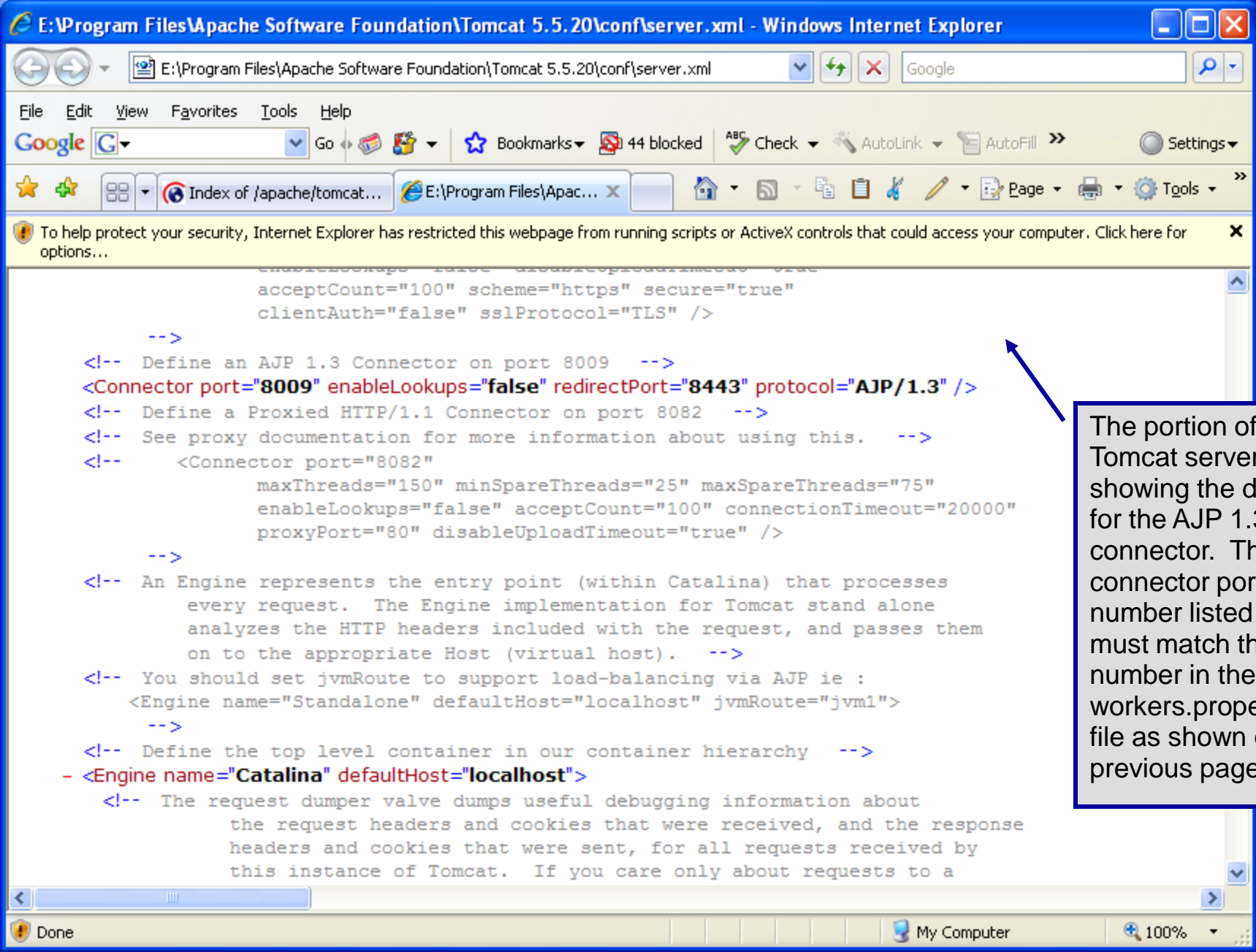
```
worker.ajp12.lbfactor=1


#
#------- DEFAULT ajp13 WORKER DEFINITION --------------------------------
#----------------------------------------------------------------------
#


#
# Defining a worker named ajp13 and of type ajp13
# Note that the name and the type do not have to match.
#
worker.ajp13.port=8009
worker.ajp13.host=localhost
worker.ajp13.type=ajp13
#
# Specifies the load balance factor when used with
# a load balancing worker.
# Note:
#   ----> lbfactor must be > 0
#   ----> Low lbfactor means less work done by the worker.
worker.ajp13.lbfactor=1


#
# Specify the size of the open connection cache.
#worker.ajp13.cachesize


#
#------- DEFAULT LOAD BALANCER WORKER DEFINITION -----------------------
#----------------------------------------------------------------------
#
```

For Help, press F1   NUM

The portion of the Tomcat worker.properties file showing the definition for the default AJP 1.3 worker. NOTE: the port number listed here must match the port number listed in the Tomcat server.xml file as shown on the next page.

E:\Program Files\Apache Software Foundation\Tomcat 5.5.20\conf\server.xml

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options...

```
                          acceptCount="100" scheme="https" secure="true"
                          clientAuth="false" sslProtocol="TLS" />
        -->
    <!--  Define an AJP 1.3 Connector on port 8009  -->
    <Connector port="8009" enableLookups="false" redirectPort="8443" protocol="AJP/1.3" />
    <!--  Define a Proxied HTTP/1.1 Connector on port 8082  -->
    <!--  See proxy documentation for more information about using this.  -->
    <!--     <Connector port="8082"
                          maxThreads="150" minSpareThreads="25" maxSpareThreads="75"
                          enableLookups="false" acceptCount="100" connectionTimeout="20000"
                          proxyPort="80" disableUploadTimeout="true" />
        -->
    <!--  An Engine represents the entry point (within Catalina) that processes
          every request.  The Engine implementation for Tomcat stand alone
          analyzes the HTTP headers included with the request, and passes them
          on to the appropriate Host (virtual host).  -->
    <!--  You should set jvmRoute to support load-balancing via AJP ie :
        <Engine name="Standalone" defaultHost="localhost" jvmRoute="jvm1">
        -->
    <!--  Define the top level container in our container hierarchy  -->
  - <Engine name="Catalina" defaultHost="localhost">
      <!--  The request dumper valve dumps useful debugging information about
                the request headers and cookies that were received, and the response
                headers and cookies that were sent, for all requests received by
                this instance of Tomcat.  If you care only about requests to a
```
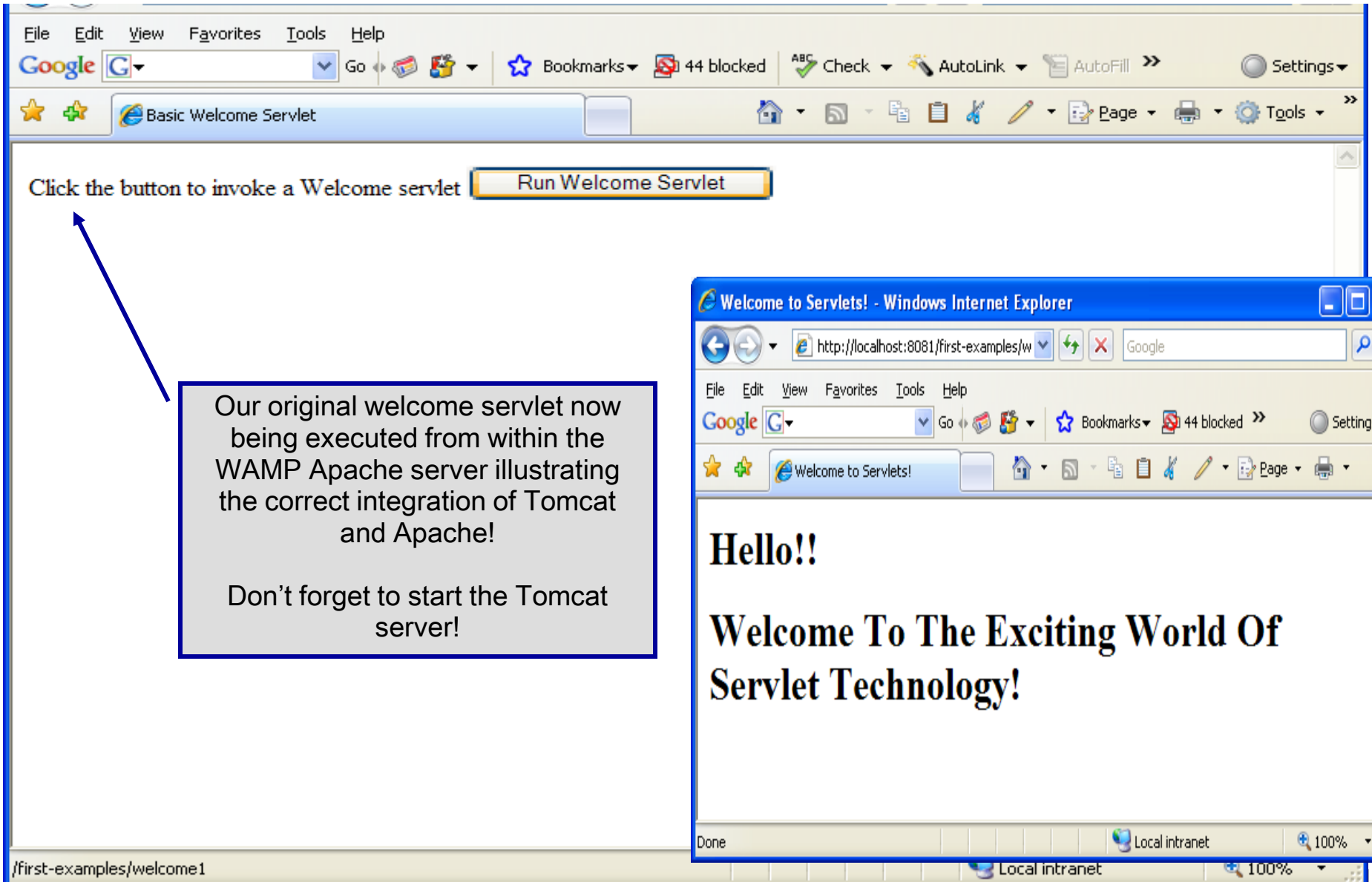
The portion of the Tomcat server.xml file showing the definition for the AJP 1.3 connector. This connector port number listed here must match the port number in the workers.properties file as shown on the previous page.

⚠ Done   💻 My Computer   🔍 100% ▾

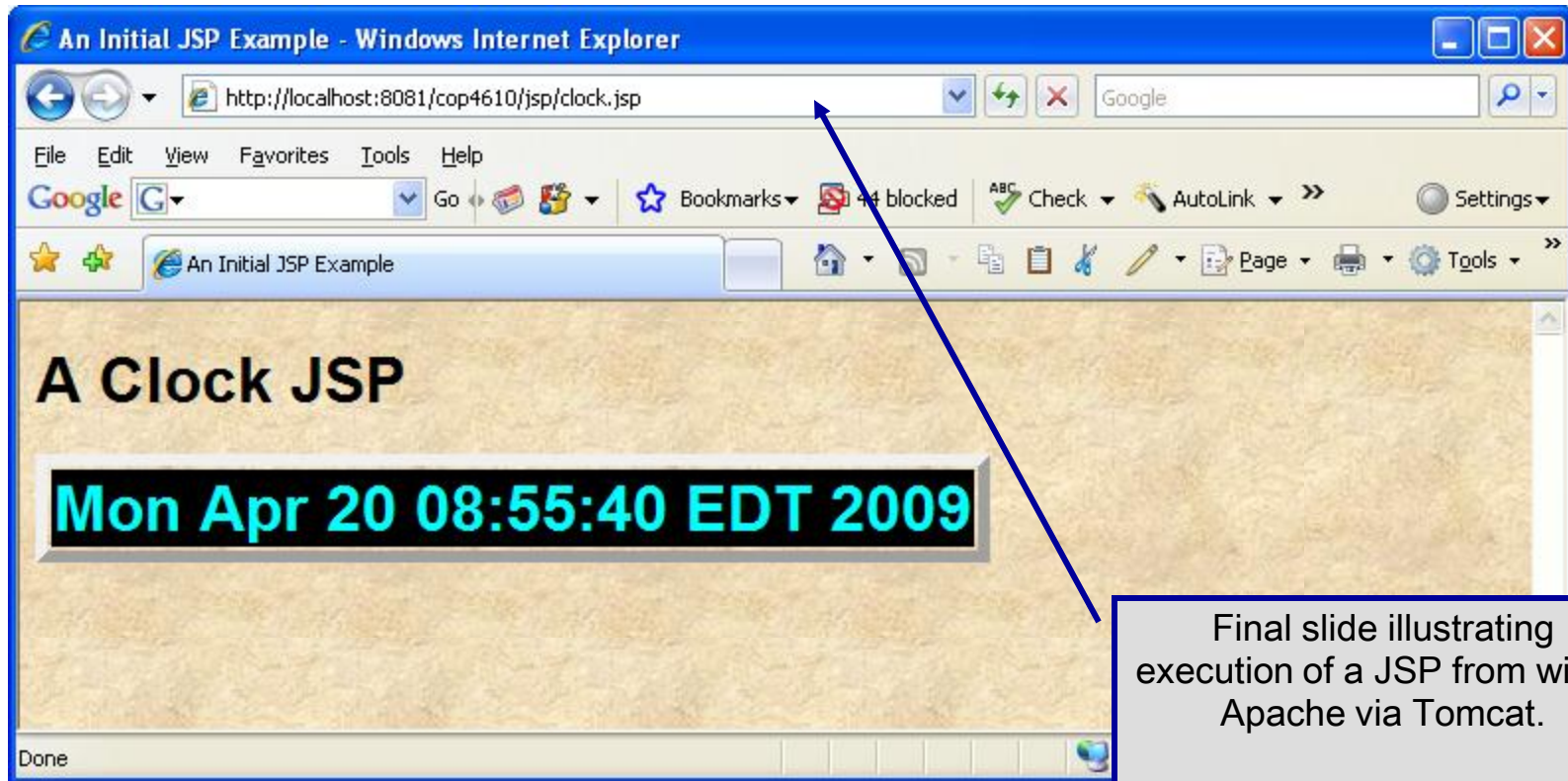Click the button to invoke a Welcome servlet [Run Welcome Servlet]

Our original welcome servlet now being executed from within the WAMP Apache server illustrating the correct integration of Tomcat and Apache!

Don't forget to start the Tomcat server!

Hello!!

Welcome To The Exciting World Of Servlet Technology!

/first-examples/welcome1

Final slide illustrating execution of a JSP from within Apache via Tomcat.