CNT 4714: Enterprise Computing Fall 2013

Integrating Apache And Tomcat

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Connecting Apache To Tomcat

- Although it is possible for Tomcat to run standalone and handle 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 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.
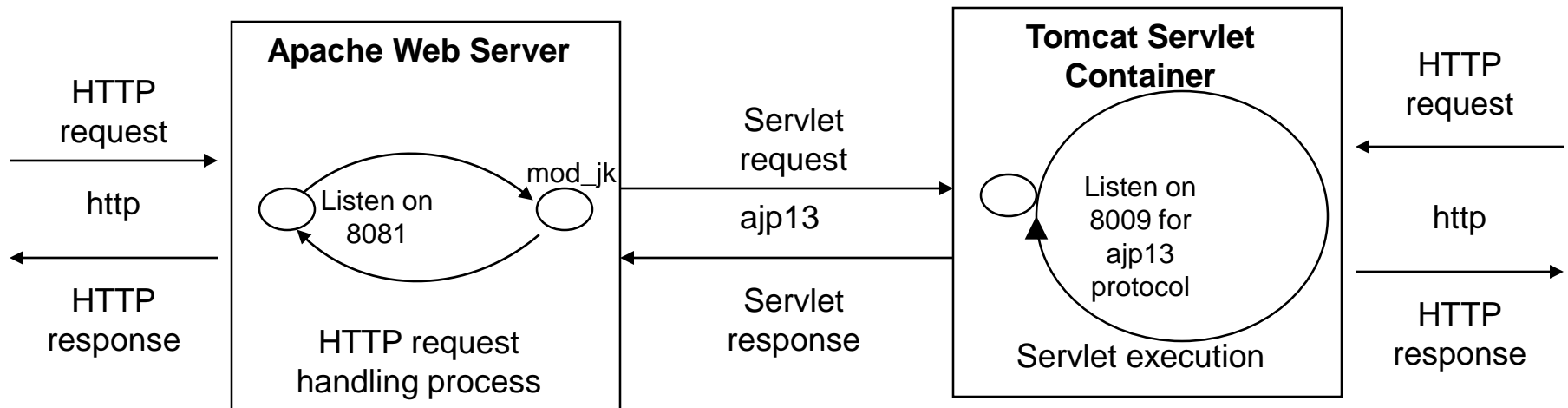
WARNING

The task you are about to undertake can have serious repercussions on your Apache Server. <u>DO NOT</u> attempt this procedure until your final project is done. It is strongly advised that you create a backup copy of your current `httpd.conf` file before embarking on this modification.
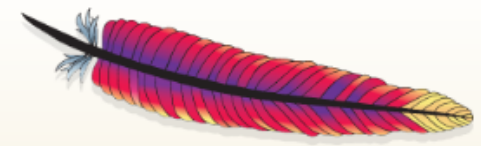
Getting The Tomcat Connector

- 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.

- Windows based connector binary files will typically have the name of `mod_jk.so`. (Files with `.so` extensions are typically shared library files compiled under either C or C++ environments.)

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Apache Tomcat

Apache Tomcat is an open source software implementation of the Java Servlet and JavaServer Pages technologies. The Java Servlet and JavaServer Pages specifications are developed under the Java Community Process.

Apache Tomcat is developed in an open and participatory environment and released under the Apache License version 2. Apache Tomcat is intended ... world. We invite you to participate in this open dev...

Apache Tomcat powers nur... ... nge of industries and organizations. Some of the...

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

Apache Tomcat, Tomcat, Apache, the Apache feather, and the Apache Tomcat project logo are trademarks of the Apache Software Foundation.

Tomcat Maven Plugin 2.2 Released   2013-11-11

The Apache Tomcat team is pleased to announce the release of Tomcat Maven Plugin 2.2. Changelog available here.

The Apache Tomcat Maven Plugin provides goals to manipulate WAR projects within the Apache Tomcat servlet container.

The binaries are available from Maven repositories. You should specify the version in your project's plugin configuration:

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

Apache Tomcat

mod_jk download page.
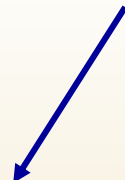
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Migration Guide

Tomcat Connectors (mod_jk) Downloads

Use the links below to download Tomcat Connectors from one of our mirrors. You **must** verify the integrity of the downloaded files using signatures downloaded from our main distribution directory.

Only current recommended releases are available on the main distribution site and its mirrors. Older releases and the historical mod_jk2 are available from the archive download site.

Recent releases (48 hours) may not yet be available from the mirrors.

Choose a Mirror

You are currently using **http://www.eng.lsu.edu/mirrors/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.

Other mirrors: http://www.eng.lsu.edu/mirrors/apache/   Change

You may also consult the complete list of mirrors.

Tomcat Connectors JK 1.2

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

Tomcat Connectors
Tomcat Native
Archives

Documentation

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You may also consult the <u>complete list of mirrors</u>.

Tomcat Connectors JK 1.2

For more information concerning Tomcat Connectors (mod_jk), see the <u>Tomcat Connectors (mod_jk)</u> site.

- Source (please choose the correct format for your platform)
  - ○ <u>JK 1.2.37 Source Release tar.gz</u> (e.g. Unix, Linux, Mac OS)
    - ▪ [<u>PGP</u>]
    - ▪ [<u>MD5</u>]
  - ○ <u>JK 1.2.37 Source Release zip</u> (e.g. Windows)
    - ▪ [<u>PGP</u>]
    - ▪ [<u>MD5</u>]
- <u>Binary Releases</u>
- <u>Browse Download Area</u>
- <u>Browse Archive</u>

Go here

tomcat-connectors-1.2.37-src.* is signed by Mladen Turk (564C17A3).

Verify the Integrity of the Files

You **must** verify the integrity of the downloaded files. We provide OpenPGP signatures for every release file. This signature should be matched against the <u>KEYS</u> file which contains the OpenPGP keys of Tomcat's Release Managers. We also provide an MD5 checksum for every release file. After you download the file, you should calculate a checksum for

Index of /dist/tomcat/tomcat-connectors/jk/binaries/windows

Important Notices

- Windows Users, Read These First...
- Obtain the Current Stable Release
- Debugging and Source Code

Download from your **nearest mirror site!**

Select correct version and download

Name	Last modifie		
Parent Directory		–	
symbols/	23-Aug-2012 22:11	–	
HEADER.html	31-May-2012 06:46	453	
README.html	31-May-2012 06:46	2.7K	
tomcat-connectors-1.2.37-windows-i386-httpd-2.0.x.zip	31-May-2012 06:46	124K	ZIP compressed archive
tomcat-connectors-1.2.37-windows-i386-httpd-2.2.x.zip	31-May-2012 06:46	124K	ZIP compressed archive
tomcat-connectors-1.2.37-windows-i386-httpd-2.4.x.zip	31-May-2012 06:46	125K	ZIP compressed archive
tomcat-connectors-1.2.37-windows-i386-iis.zip	31-May-2012 06:46	173K	ZIP compressed archive
tomcat-connectors-1.2.37-windows-i386-iplanet.zip	31-May-2012 06:46	138K	ZIP compressed archive
tomcat-connectors-1.2.37-windows-x86_64-httpd-2.4.x.zip	31-May-2012 06:46	149K	ZIP compressed archive
tomcat-connectors-1.2.37-windows-x86_64-iis.zip	31-May-2012 06:46	211K	ZIP compressed archive

Download from your **nearest mirror site!**

Please do not download from www.apache.org. Use a mirror site to help us save apache.org bandwidth and to speed up your download. Click here to find your nearest mirror.

Windows Users, Read These First...

Warning: TCP/IP networking must be installed
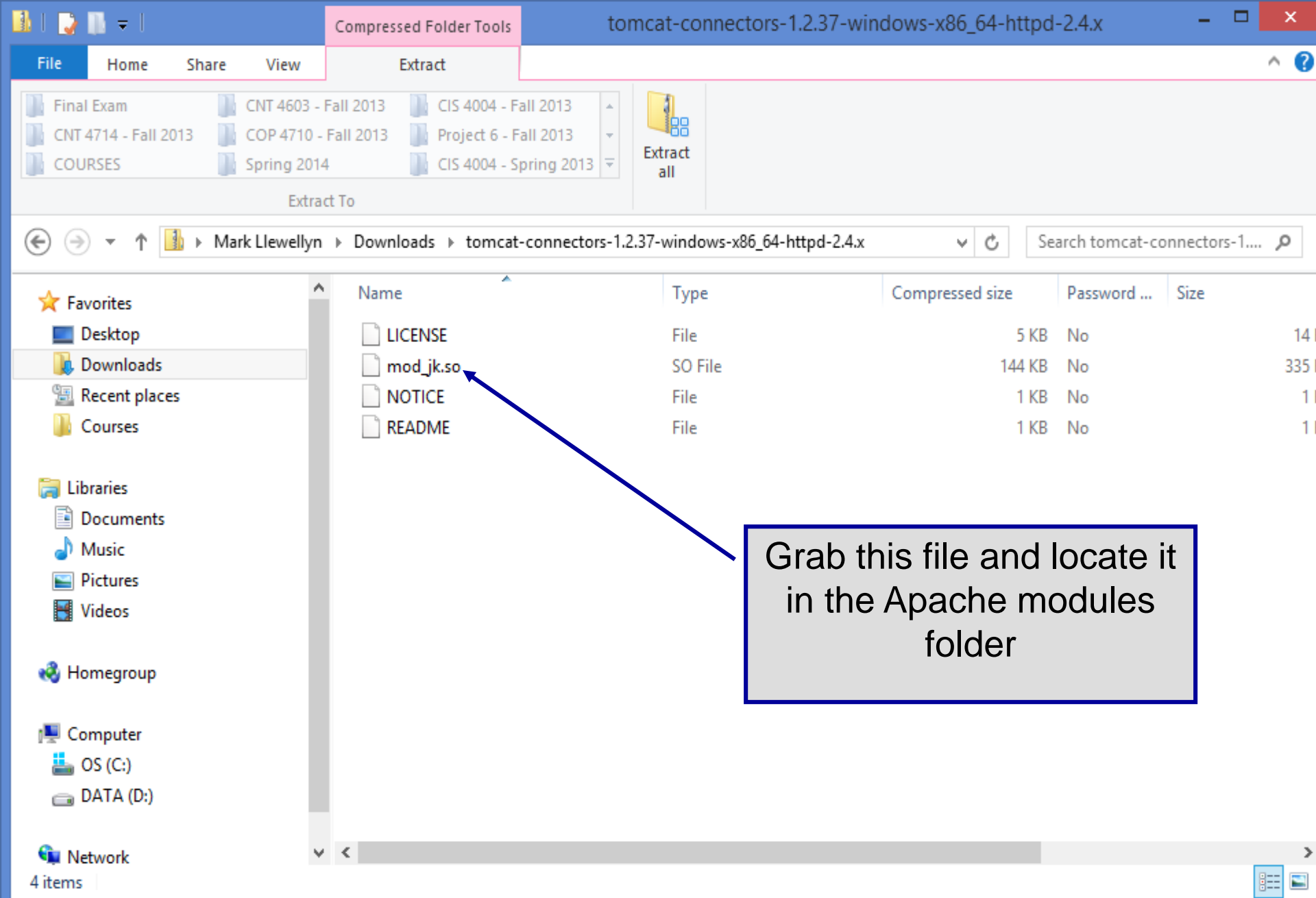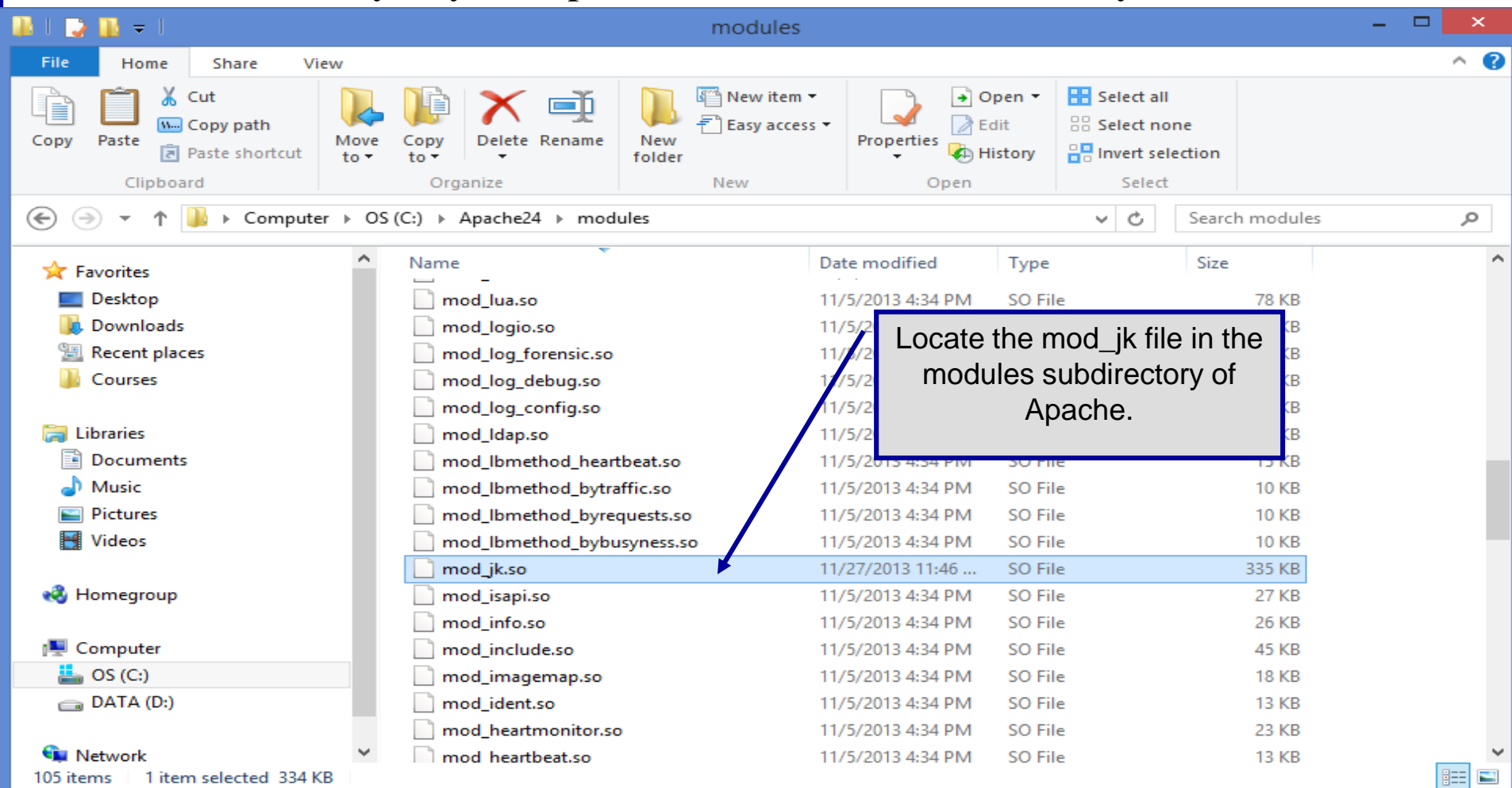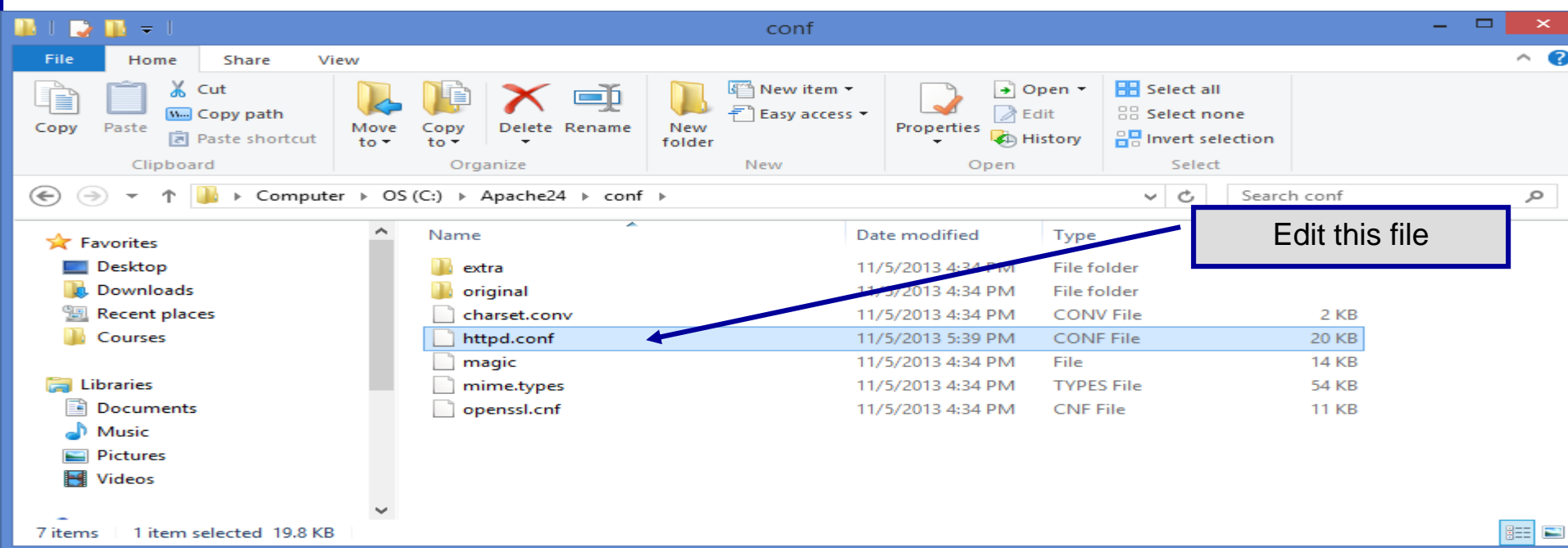
Installing The Tomcat Connector

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

Locate the mod_jk file in the modules subdirectory of Apache.

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`.

- **NOTE: Before modifying the configuration file, I would strongly suggest making a duplicate backup copy so that you can reinitialize a working version of Apache if necessary.**

Edit this file

©

C:\Apache24\conf\httpd.conf - Notepad++

File Edit Search View Encoding Language Settings Macro Run Plugins Window ?

RSSFeed.html   notes.html   httpd.conf   workers.properties   tremp-workers.properties

```
64   PHPIniDir "C:/php"
65
66   # Load mod_jk module
67   # Update this path to match your modules location
68   LoadModule    jk_module  c:/apache24/modules/mod_jk.so
69   # Declare the module for <IfModule directive> (remove this line on Apache 2.x)
70   #AddModule      mod_jk.c
71   # Where to find workers.properties
72   # Update this path to match your conf directory location (put workers.properties next to httpd.conf)
73   JkWorkersFile c:/apache24/conf/workers.properties
74   # Where to put jk shared memory
75   # Update this path to match your local state directory or logs directory
76   JkShmFile       c:/apache24/conf/mod_jk.shm
77   # Where to put jk logs
78   # Update this path to match your logs directory location (put mod_jk.log next to access_log)
79   JkLogFile       c:/apache24/logs/mod_jk.log
80   # Set the jk log level [debug/error/info]
81   JkLogLevel    info
82   # Select the timestamp log format
83   JkLogStampFormat "[%a %b %d %H:%M:%S %Y] "
84   # Send everything for context /examples to worker named worker1 (ajp13)
85   #JkMount  /examples/* worker1
86   JkMount /first-example/* worker1
87   JkMount /CNT4714/* worker2
```

Add all of the mater
from this point dow
on the page into yo
httpd.conf file.

Add JKMount directives for
any webapps in Tomcat.

Normal text file   length : 21354 lines : 561   Ln : 86 Col : 23 Sel : 0 | 0   Dos\Windows   ANSI as UTF-8

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- 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.

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| RSSFeed.html | notes.html | httpd.conf | workers.properties | tremp-workers.properties |

```
15
16   # workers.properties.minimal -
17   #
18   # This file provides minimal jk configuration properties needed to
19   # connect to Tomcat.
20   #
21   # The workers that jk should create and work with
22   #
23   worker.list=lb,jk-status,worker1,worker2
24   #
25   # Defining a worker named node1 and of type ajp13
26   # Note that the name and the type do not have to match.
27   #
28   worker.node1.type=ajp13
29   worker.node1.host=localhost
30   worker.node1.port=8009
31
32   worker.worker1.type=ajp13
33   worker.worker1.host=localhost
34   worker.worker1.port=8009
35
36   worker.worker2.type=ajp13
37   worker.worker2.host=localhost
38   worker.worker2.port=8009
39   #
40   # Defining a load balancer
41   #
42   worker.lb.type=lb
43   worker.lb.balance_workers=node1
44   #
45   # Define status worker
46   #
47   worker.jk-status.type=status
```

This is a minimal Tomcat `worker.properties` file showing the definition for the default AJP 1.3 workers. NOTE: the port number listed here must match the port number listed in the Tomcat `server.xml` file as shown on the next page. I've set up two different worker threads to handle the two different webapps we developed in Tomcat.

Properties file   length : 1532   lines : 48   Ln : 47   Col : 1   Sel : 0 | 0   Dos\Windows   ANSI as UTF-8   INS

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RSSFeed.html ☒ | notes.html ☒ | httpd.conf ☒ | workers.properties ☒ | tremp-workers.properties ☒ | server.xml ☒
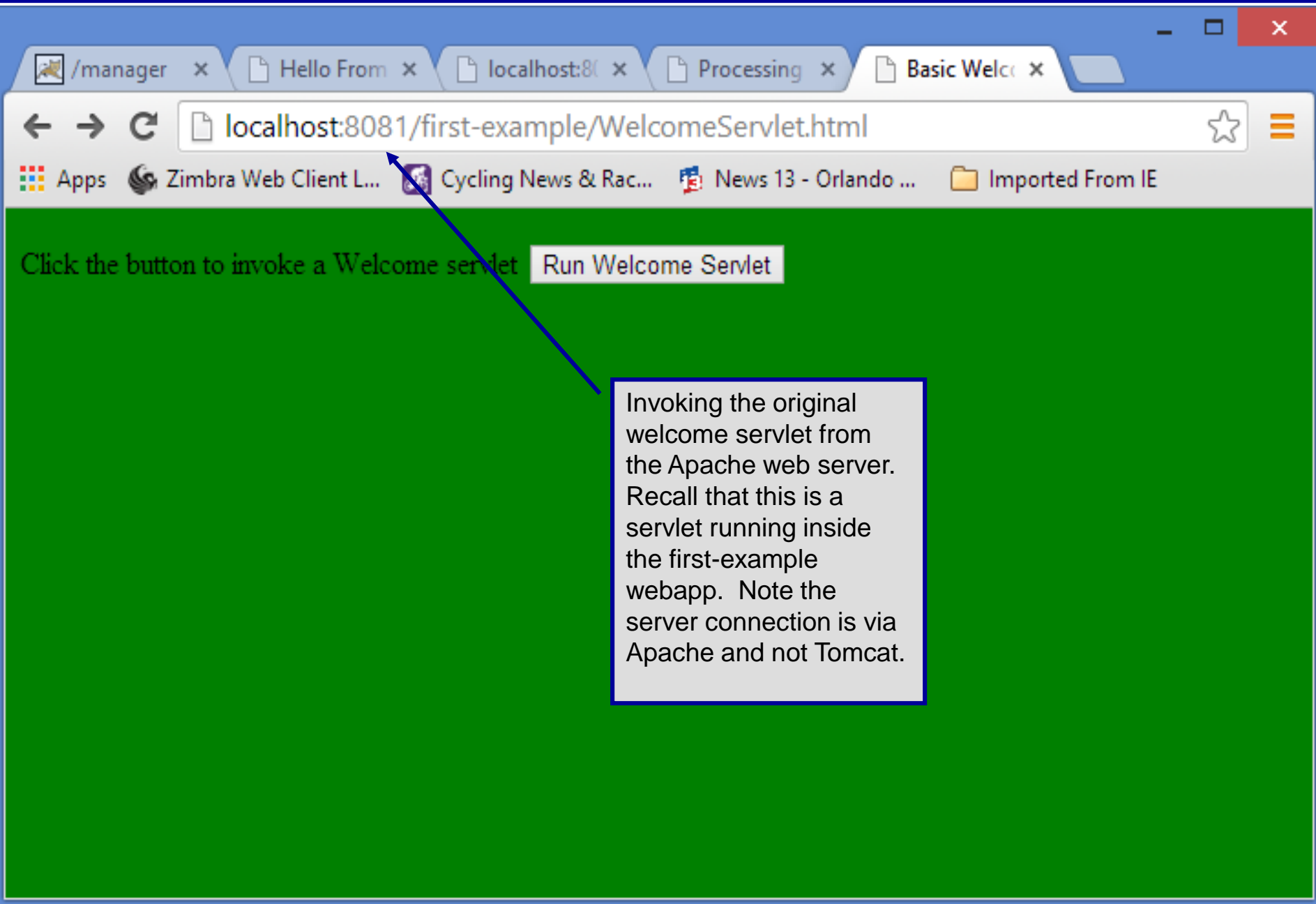
```
82              connector should be using the OpenSSL style configuration
83              described in the APR documentation -->
84      <!--
85      <Connector port="8443" protocol="HTTP/1.1" SSLEnabled="true"
86                  maxThreads="150" scheme="https" secure="true"
87                  clientAuth="false" sslProtocol="TLS" />
88      -->
89
90      <!-- Define an AJP 1.3 Connector on port 8009 -->
91      <Connector port="8009" protocol="AJP/1.3" redirectPort="8443" />
92
93
94      <!-- An Engine represents the entry point (within Catalina) that process
95          every request.  The Engine implementation for Tomcat stand alone
96          analyzes the HTTP headers included with the request, and passes the
97          on to the appropriate Host (virtual host).
98          Documentation at /docs/config/engine.html -->
99
100     <!-- You should set jvmRoute to support load-balancing via AJP ie :
101     <Engine name="Catalina" defaultHost="localhost" jvmRoute="jvm1">
102     -->
103     <Engine name="Catalina" defaultHost="localhost">
104
```

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.

eXtensible Markup Language file   length : 6577   lines : 143   Ln : 1   Col : 1   Sel : 0 | 0   Dos\Windows   ANSI as UTF-8   INS

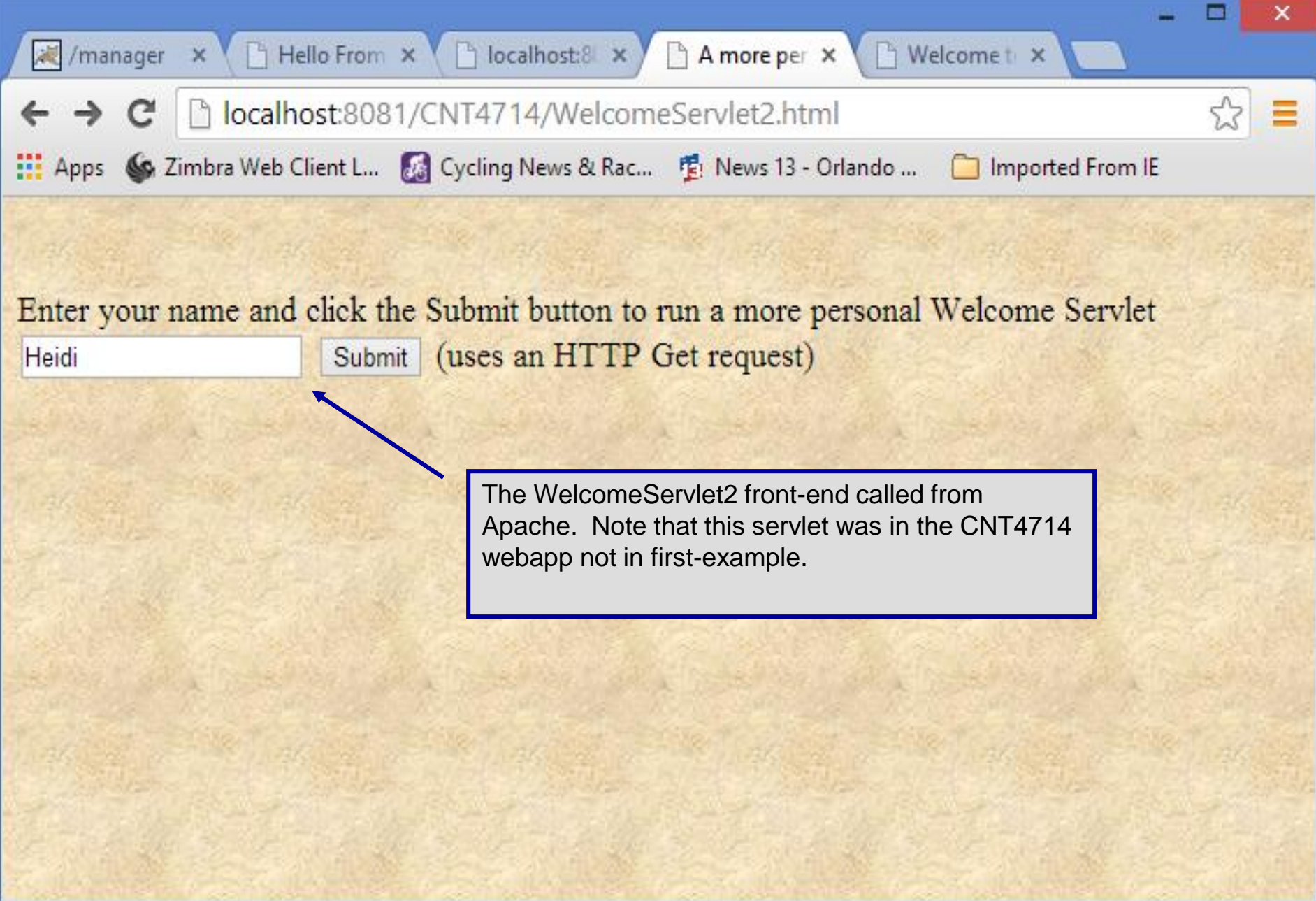Click the button to invoke a Welcome servlet   Run Welcome Servlet

Invoking the original welcome servlet from the Apache web server. Recall that this is a servlet running inside the first-example webapp. Note the server connection is via Apache and not Tomcat.

The output from the first-examples/WelcomeServlet servlet from Tomcat via Apache

Enter your name and click the Submit button to run a more personal Welcome Servlet

Heidi   [Submit]   (uses an HTTP Get request)

The WelcomeServlet2 front-end called from Apache. Note that this servlet was in the CNT4714 webapp not in first-example.

©

Hello Heidi,
Welcome to the Exciting World of Servlet Technology!

The output from Tomcat via Apache.