CS520 Web Programming
Bits and Pieces of Web Programming

Chengyu Sun
California State University, Los Angeles

Overview

- Logging
- File upload
- Email
- Controller Exception Handling in Spring
- JSP Pre-compilation
- Deployment

Logging

- Use print statements to assist debugging
  - Why do we want to do that when we have GUI debugger??

```
public void foo()
{
    System.out.println( "loop started" );
    // some code that might get into infinite loop
    …
    System.out.println( "loop finished" );
}
```

Requirements of Good Logging Tools

- Minimize performance penalty
- Support different log output
  - Console, file, database, …
- Support different message levels
  - Fatal, error, warn, info, debug, trace
- Easy configuration

Java Logging Libraries

- Logging implementations
  - Log4j - http://logging.apache.org/log4j/docs
  - java.util.logging in JDK
- Logging API
  - Apache Commons Logging (JCL) - http://commons.apache.org/logging/
  - Simply Logging Façade for Java (SLF4J) - http://www.slf4j.org/

Choose Your Logging Libraries

- Log4j
  - Widely used
  - Good performance
  - Easy configuration
- java.util.logging
  - Part of JDK, i.e. not extra library dependency
- Commons Logging
  - Widely used
  - Determines logging implementation at runtime
- SLF4j
  - Static binding
  - Gaining popularity

Log4j Example

- Library dependency
- Logger creation
- Configuration
  - Message levels
  - Output format

Log4j Configuration File

- `log4j.xml` or `log4j.properties`
- Appender
  - Output type
  - Output format
- Logger
  - Class
  - Message level

Log4j PatternLayout

- http://logging.apache.org/log4j/docs/api/org/apache/log4j/PatternLayout.html

File Upload – The Form

```
<form action="FileUploadHandler"
        method="post"
        enctype="multipart/form-data">

   First file: <input type="file" name="file1" /> <br />
   Second file: <input type="file" name="file2" /> <br />

   <input type="submit" name="upload" value="Upload" />

</form>
```

File Upload – The Request

```
POST / HTTP/1.1
Host: cs.calstatela.edu:4040
[...]
Cookie: SITESERVER=ID=289f7e73912343a2d7d1e6e44f931195
Content-Type: multipart/form-data; boundary=-----------------------------146043902153
Content-Length: 509

-----------------------------146043902153
Content-Disposition: form-data; name="file1"; filename="test.txt"
Content-Type: text/plain

this is a test file.

-----------------------------146043902153
Content-Disposition: form-data; name="file2"; filename="test2.txt.gz"
Content-Type: application/x-gzip

???□??????UC
```

Apache commons-fileupload

- http://jakarta.apache.org/commons/fileupload/using.html

```
FileItemFactory fileItemFactory = DiskFileItemFactory();
ServletFileUpload fileUpload = new ServletFileUpload( fileItemFactory );

List items = fileUpload.parseRequest( request );
for( Object o : items )
{
   FileItem item = (FileItem) items;
   if( ! item.isFormFiled() ) {...}
}
```

Spring File Upload Support

- `multipartResolver` bean
  - Support multiple request parser libraries
- Handle uploaded files
  - Treat a uploaded file as a `String` or `byte[]` field
    - Spring Reference Documentation, Chapter 13.8 - http://static.springframework.org/spring/docs/2.0.x/reference/mvc.html
  - Use `MultipartHttpServletRequest` and `MultipartFile`
    - http://static.springframework.org/spring/docs/2.0.x/api/org/springframework/web/multipart/MultipartHttpServletRequest.html

File Upload Examples in CSNS

- UploadFilesController
- AbstractMessageController

Store Uploaded Files

- In database
  - BLOB, CLOB
  - BINARY VARCAR, VARCHAR
- On disk

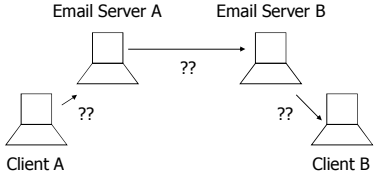
- *Pros and Cons??*

Store Uploaded Files

- In database
  - ACID
  - BLOB/CLOB types are not very portable
  - Bad performance
- On disk
  - Not ACID
  - Do not need BLOB/CLOB types
  - Good performance

How Email Works

- SMTP, IMAP, POP



JavaMail

- http://java.sun.com/products/javamail/

```
Properties props = System.getProperties();
props.put("mail.smtp.host", mailhost);
Session session = Session.getInstance( props );

Message msg = new MimeMessage(session);
...
Transport.send( msg );
```

Spring Email Support

- Declare a `mailSender` bean
- Mail message classes
  - `SimpleMailMessage`
    - http://static.springframework.org/spring/docs/2.0.x/api/org/springframework/mail/SimpleMailMessage.html
    - No attachment, no special character encoding
  - `MimeMailMessage`

Configure Mail Sender

```
<bean id="mailSender"
  class="org.springframework.mail.javamail.JavaMailSenderImpl">
       <property name="host" value="localhost">
</bean>
```

- Additional properties
  - `port`
  - `username`, `password`

Email Examples in CSNS

- ResetPasswordController
- EmailToListController

Controller Exception Handling in Spring

- An exception resolver catches all exceptions thrown by controllers and chooses the a view to display based on the exception type
  - `SimpleMappingExceptionResolver`
    - http://static.springframework.org/spring/docs/2.0.x/api/org/springframework/web/servlet/handler/SimpleMappingExceptionResolver.html

ExceptionResolver in CSNS

```
<bean id="exceptionResolver"
      class="csns.spring.handler.ExceptionResolver">

   <property name="exceptionMappings">
      <props>
         <prop key="AccessDeniedException">exception/access</prop>
      </props>
   </property>

   <property name="defaultErrorView" value="exception/default" />

   <property name="exceptionAttribute" value="exception" />
   <property name="defaultStatusCode" value="500" />

</bean>
```

JSP Pre-compilation

- Usually a JSP is converted to a servlet and then compiled into byte code *when the JSP is request for the first time*.
- JSP pre-compilation
  - Eliminate the "first request overhead"
  - Speed up development
- Tomcat provides a JSP pre-compiler which can be used as an ANT task
  - CSNS Example: `jspc` target in `build.xml`

Application Deployment

WAR Files

- Web application ARchive
- A JAR file for packaging, distributing, and deploying Java web applications
- Create WAR files
  - The command line tool `jar`
  - Eclipse `Export` -> `Web` -> `WAR file`
  - Ant task `<war>`
    - CSNS Example: `war` target in `build.xml`

Deploy WAR Files to a Tomcat Server

- The Manager interface
- The `deploy` Ant task
  - CSNS Example: `deploy` target in `build.xml`