SINGLE-SOURCE INTERACTIVE AND PRINTED CONTENT PUBLISHING USING THE DOCBOOK XML STANDARD

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Introduction – Presentation of Course Content

- On-Line Format (HTML)
  - Allows interactive components
  - Allows personalized content
    - Through server-side applications (Servlet, EJB etc.)
  - Difficult to copyright protect content
  - Can be difficult to format for correct printing
- Print-Ready Format (PDF, Word, PowerPoint)
  - Can have large file size (Word/PowerPoint)
  - No interactive components
  - PDF content can be copyright protected

Introduction – Context of this implementation

- Module in object-oriented programming at DCU
  - With 80 full-time post-graduate students
  - With 40 part-time/on-line post-graduate students
- Full Course content must be available on-line
- Need content that is suitable:
  - for high-quality printing
  - for on-line viewing, to allow interactive components
  - for electronic lecture presentation
- Need a single document source
  - 3 versions too difficult to maintain as content is dynamic

Introduction – Introduction to DocBook

- DocBook XML Standard (OASIS Project)
  - Collection of standards & tools for publishing
  - Useful for highly structured content
  - Single source XML file can be transformed:
    - HTML – suitable for on-line presentation
    - PDF – suitable for printing
    - Rich Text – for possible later editing
  - Style is maintained independent of content

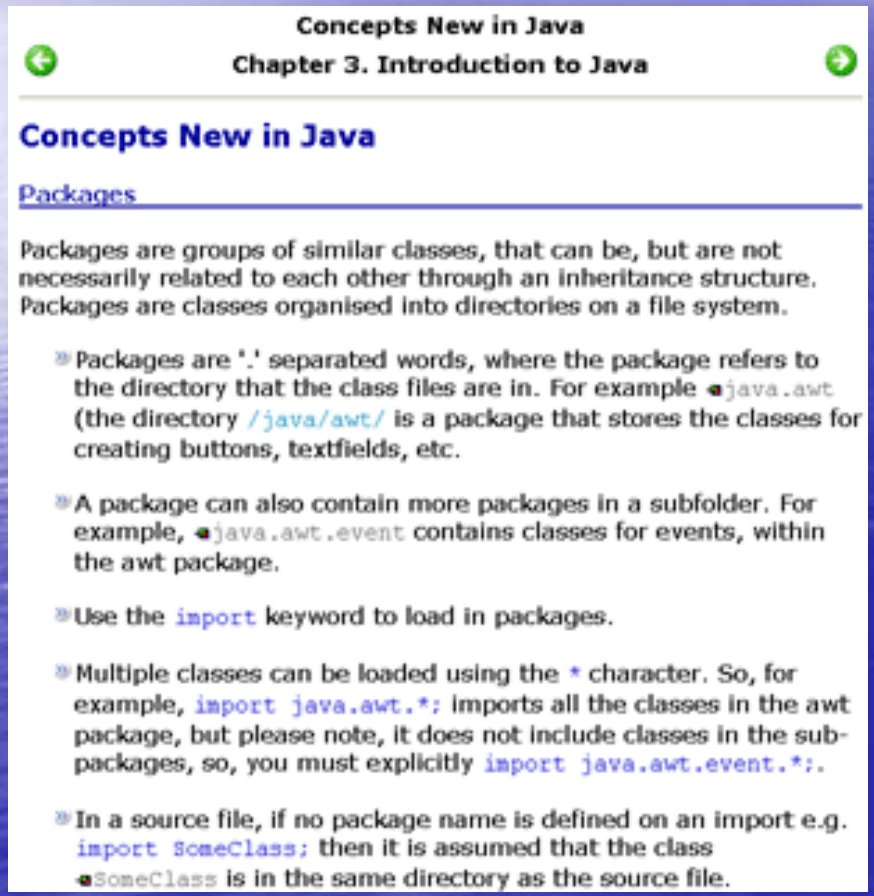
Implementation – DocBook Example Source

- Source Example:
  - Tags define content (e.g. <filename> <classname>)
  - and document structure (e.g. <para><sect2>)

```
<sect1><title>Concepts New in Java</title>
<sect2><title>Packages</title>
<para>
Packages are groups of similar classes, that can be, but are not necessarily related to each other
through an inheritance structure. Packages are classes organised into directories on a file system.
<itemizedlist>
    <listitem><para>Packages are '.' separated words, where the package refers to the directory
      that the class files are in. For example <classname>java.awt</classname> (the directory
      <filename>/java/awt/</filename> is a package that stores the classes for creating buttons,
      textfields, etc.</para></listitem>
    <listitem><para>A package can also contain more packages in a subfolder. For example,
      <classname>java.awt.event</classname> contains classes for events, within the awt package.
      </para></listitem>
    <listitem><para>Use the <literal>import</literal> keyword to load in packages.</para></listitem>
    <listitem><para>Multiple classes can be loaded using the <literal>*</literal> character. So,
      for example,<literal>import java.awt.*;</literal> imports all the classes in the awt package,
      but please note, it does not include classes in the sub-packages, so, you must explicitly
      <literal>import java.awt.event.*;</literal>.</para></listitem>
    <listitem><para>In a source file, if no package name is defined on an import e.g.
      <literal>import SomeClass;</literal> then it is assumed that the class
      <classname>SomeClass</classname> is in the same directory as the source file.</para></listitem>
</itemizedlist>
</para>
</sect2>
```

Implementation – DocBook Example Output

- Segment of HTML and PDF output



Concepts New in Java

Chapter 3. Introduction to Java

Concepts New in Java

Packages

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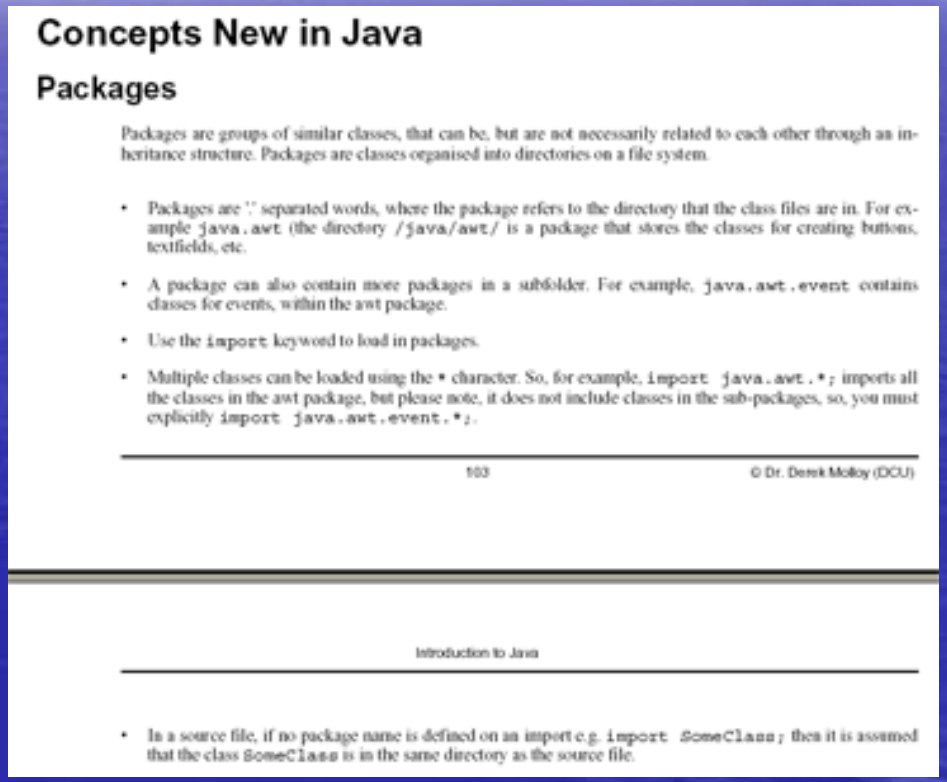
- A package can also contain more packages in a subfolder. For example, `java.awt.event` contains classes for events, within the awt package.
- Use the `import` keyword to load in packages.
- Multiple classes can be loaded using the `*` character. So, for example, `import java.awt.*;` imports all the classes in the awt package, but please note, it does not include classes in the sub-packages, so, you must explicitly `import java.awt.event.*;`.
- In a source file, if no package name is defined on an import e.g. `import SomeClass;` then it is assumed that the class `SomeClass` is in the same directory as the source file.



Concepts New in Java

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- Multiple classes can be loaded using the `*` character. So, for example, `import java.awt.*;` imports all the classes in the awt package, but please note, it does not include classes in the sub-packages, so, you must explicitly `import java.awt.event.*;`.

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Introduction to Java

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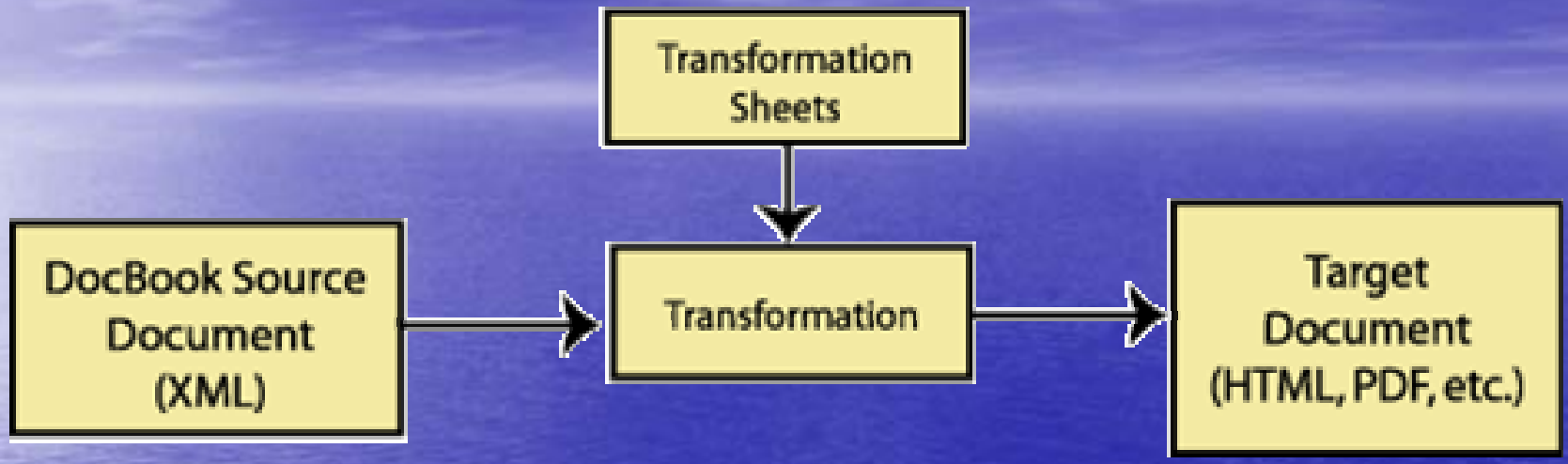
Implementation – DocBook Output Generation



- Transformation
  - Validation against DTD for document structure
  - Use of Xalan and FO for PDF conversion
  - Use of Xalan and XSL for HTML conversion
    - HTML is then combined with CSS for Presentation

Implementation – Advanced Conversion Features

- Profiling
  - Tag paragraphs with user-level details
    - E.g. <para userlevel="advanced"> text </para>
  - Allows generation of several parallel versions of document
    - Generate user-level “beginner” document for first pass
    - Generate user-level “advanced” document for second pass

Implementation – Advanced Conversion Features

- Interactive Content
  - Can add interactive content to HTML version
    - On-line self assessment questions (Servlet checked)
    - Interactive applet/flash movie
  - Provide suitable replacement for PDF version
    - Printed version of questions
    - Image instead of applet
  - Use rules in XML
    - E.g. <?dbhtml command1 ?><?dbfo command2 ?> where command1 is executed for html and command2 is executed for PDF version.

Implementation – Advanced Conversion Features

- Accessible Content (for disabled users)
  - Since content independent of Style
    - Can use high contrast conversion/CSS
    - Alternative image information presented
    - HTML contains content clues
    - Can provide XML source to VoxML in future?

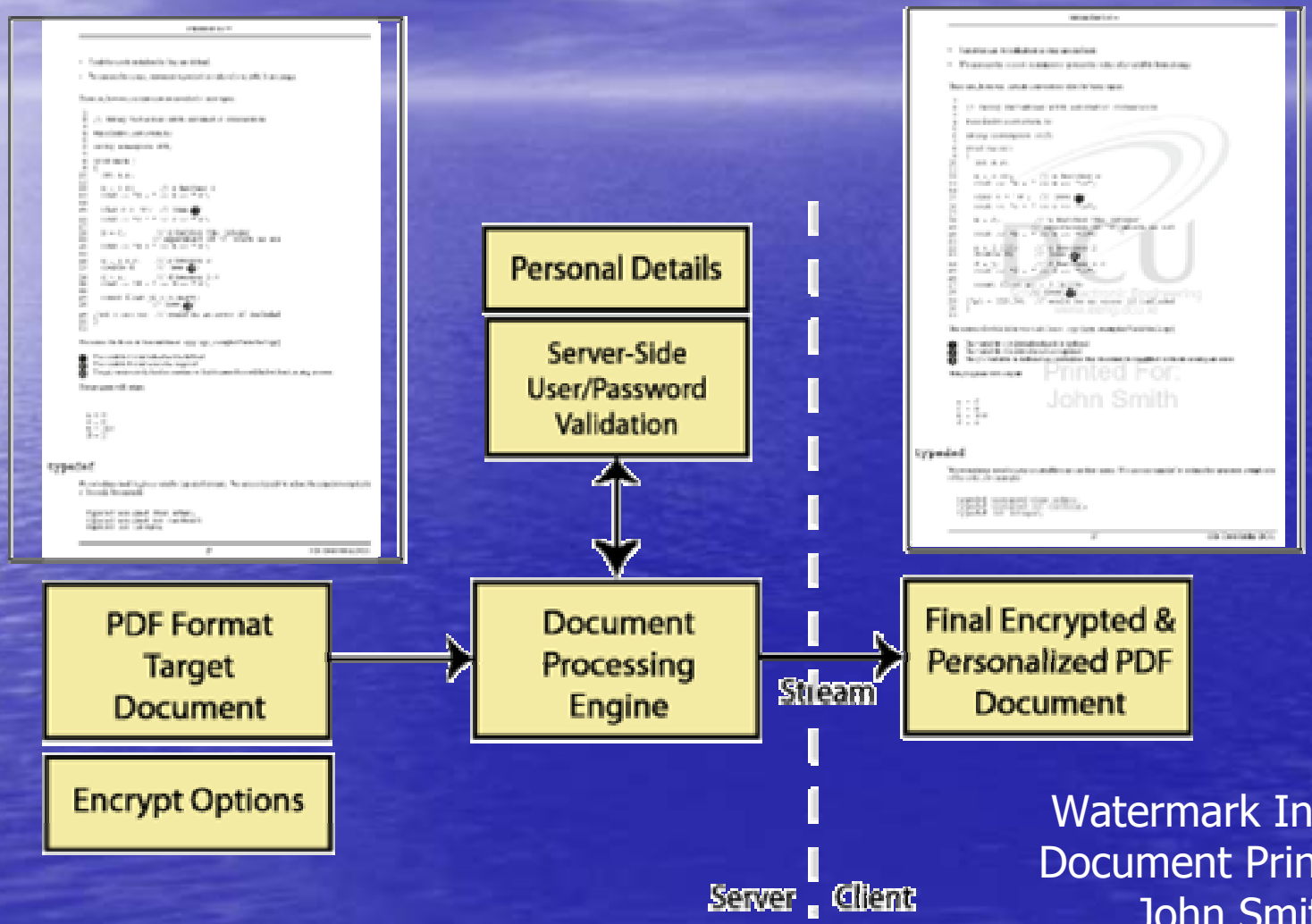
Implementation – Advanced Conversion Features

- Customization
  - Can modify and add own tags to suit content
  - E.g. <classname> tag can be modified to link to on-line Java API documentation
  - Modify using XSL conversion rules.
  - Can build in advanced conversion functionality

Implementation – Content Protection

- In this implementation
  - Additional Document Processing Engine Built
    - Using Java Servlets and iText (Java-PDF Library)
  - Generation of PDF takes 3-4mins
  - DPE takes generated PDF and customizes for user
    - Adds user information as Watermark
    - Creates personalized front cover
    - Encrypts document to maintain copyright (128bit)
    - Can prevent editing/cut-and-paste etc.

Implementation – Content Protection



Implementation – Content Protection

- PDF Version Protected
  - With personalized user details in watermark and on front cover
  - Encrypted with User password to open
    - Must consciously pass on information
  - Document properties can be altered
- HTML Version Protected
  - Difficult to download as Chunked
  - User personal details on each page
  - All links are static, not relative.

Conclusions – Problems with DocBook

- Problems with DocBook for On-Line Content
  - Difficult to set-up process, choice of tools
  - Suitable for Engineering/Computing content
    - May need many additions for other subject matter
  - No high-quality WYSIWYG Tools freely available
  - Set-Up time is significant

Conclusions – Final Conclusions

- Once in place changes to content easy to apply, Content easy to maintain
- Deployment of content can be scripted
- Once user-management is in place, access and control self-maintaining
- Further advanced features can be developed and easily integrated

Thank you for your patience