DSpace 1.5:
Moving Towards the DSpace of the Future

Tim Donohue
Research Programmer
IDEALS
University of Illinois
Morning Schedule

- DSpace 1.5 Overview
  - What’s changed?
  - Introducing new features...

- Upgrading/Moving to 1.5
  - Strategies, Planning, What to expect

- Questions / Discussion throughout
  - Trouble-shooting, time-permitting
DSpace 1.5 Feature Overview

- Maven Build Architecture
  - DSpace “modules”
  - Application “Overlays”
- XMLUI (aka. Manakin)
- Configurable Submission
- Streamlined Browse System
- SWORD Interface
- LNI (Lightweight Network Interface)
Introducing Maven…

So, why did we change this?
Introducing Maven…

- Apache Software Foundation
- Java Project Build / Management Tool

**Advantages:**
- Manages dependencies
- Easier to manage/build many “modules”
- Allows for basic application customizations via “overlays”

**Disadvantages:**
- Yet Another XML config (many actually…)
- Somewhat complex, if doing more than basic overlays
Maven v. Ant

- DSpace 1.x-1.4 used Ant to build & install DSpace
- DSpace 1.5 uses both Maven & Ant
  - Maven – Builds / Assembles DSpace “package”
    - Includes applying “overlays” and pulling down all the necessary 3rd party dependencies
  - Ant – Installs or Updates your DSpace Installation
Ok, so what really is Maven?
Maven Concepts: An Overview

- pom.xml (Project Object Model)
- Standard directory layout

```
src
  main
    java (Java Source Code)
    resources (Application Resources)
    webapp (Web Application Source)

target (Build / Package Output)
```
DSpace 1.5 Release

(Module Overlays)

(Maven Build Settings – no Java here...)

(Maven Project Object Model settings)
DSpace 1.5 “Modules”

Where’s the actual source code?

`src/main/java`?
Building DSpace 1.5 (Maven)
Installing DSpace 1.5 (Ant)

Install or Update DSpace

- ant fresh_install
- install / update
- ant update

Specified in dspace.cfg
DSpace 1.5 Source (SVN)

(dsparse-1.5)

- dspace
- dspace-api
- dspace-jspui
- dspace-lui
- dspace-oai
- dspace-sword
- dspace-xmlui

(Same as 1.5 release – see previous slides)

Source code for DSpace “modules”

In Release Version:
Maven pulls down pre-compiled versions of these modules
So, why’d we change this?

- Why the Maven Build Architecture?
  - More flexibility for future releases...
  - DSpace now consists of many “modules”…you can choose which ones you want to use!
  - Easier to extend / customize DSpace
    - Especially through “overlays”…(more on that later)
XML-UI Overview

• Intro to Manakin / XMLUI

• Tiered interface development

Credit: Scott Phillips, Texas Digital Library + Texas A&M
(Most of this content is borrowed heavily from Scott’s numerous Manakin tutorials)
Why XMLUI?

- Module design – easier to extend
- Multiple interfaces / views, per community, collection or item
- Metadata in its native formats
- No knowledge of Java/JSPs necessary

Picture borrowed from: http://www.flickr.com/photos/lambdageek/
XMLUI Tiers

- **Style Tier**
  - Simple Themes: XHTML + CSS

- **Theme Tier**
  - Complex Themes: XSL + XHTML + CSS

- **Aspect Tier**
  - Add new features (aspects)
  - Java (or XSL) + Cocoon
XMLUI Architecture

- Built on Apache Cocoon
  - Modular, web-development framework
  - *Pipeline based architecture*

- DRI (Digital Repository Interface) Schema
  - XML schema specific to XMLUI

- Aspects and Themes
  - Aspects = functionality in system
  - Themes = style / look & feel
Cocoon’s Pipeline Model
XMLUI Architecture Overview

Notice the similarities to Cocoon pipeline model!
Digital Repository Interface (DRI)

- DRI is XML
- Abstract representation of page in a repository
- View from any page by appending `?XML` or `&XML` onto URL
Aspects

- Implement set of features across entire repository
  - Java or XSL
- “Aspect Chain” (see below)
  - Each requires valid DRI document as input/output
- Core Aspects in DSpace 1.5
  - Artifact Browser (browse / search)
  - E-Person (login / logout)
  - Submission (submit new items)
  - Administrative (admin and management tools)
Themes

- Look and feel of repository
- May apply to any of following:
  - item, collection, community, whole repository
- Theme folders can include
  - XSL (restructure site)
  - CSS (add style)
  - Images
  - Other static resources?
Putting it all together: DRI doc

```
<document>
  <body/>
  <options/>
  <meta/>
</document>
```
Putting it all together: Aspect 1

Content Generation

Artifact Browser → Eperson → Submission

Style Application

Theme B

XML code:

```xml
<document>
  <body>
    <div>
      <head>Viewing an item</head>
      <includeSet>
        <objectInclude source="hdl:12345/23"/>
      </includeSet>
    </div>
    <options/>
    <meta>
      ...
      <objectMeta>
        <object identifier="hdl:12345/23"/>
        .... METS document for item ....
      </object>
    </objectMeta>
  </meta>
</body>
</document>
```
Putting it all together: Aspect 2

```
<document>
  <body>
    ...
  </body>
  <options> ...
    <list n="account">
      <item xref="/logout"> logout </item>
      <item xref="/profile"> Profile </item>
    </list>
  </options>
  <meta> ...
    <userMeta> ...
    <objectMeta>
      <object identifier="hdl:12345/23"/>
        .... METS document for item ...
      </object>
    </objectMeta>
  </meta>
</document>
```
Putting it all together: Aspect 3

```xml
<document>
  <body> ... </body>
  <options> ...
    <list n="account">
      <item xref="/logout"> logout </item>
      <item xref="/profile"> Profile </item>
      <item xref="/submissions"> Submissions </item>
    </list>
  </options>
  <meta> ...
    <userMeta> ... </userMeta>
    <objectMeta>
      <object identifier="hdl:12345/23"/>
        .... METS document for item ...
      </object>
      <objectMeta>
    </meta>
  </document>
```
Putting it all together: Theme
Review: customization on any tier!

- **Style Tier**
  - Simple Themes: XHTML + CSS

- **Theme Tier**
  - Complex Themes: XSL + XHTML + CSS

- **Aspect Tier**
  - Add new features (aspects)
  - Java (or XSL) + Cocoon
What is a repository?

The Texas A&M Repository is an digital service that collects, preserves, and distributes the scholarly output of the university. The repository is an important tool to facilitate scholarly communication and preserve the scholarly legacy of Texas A&M faculty. Based on the principles of Open Access, the Texas A&M Repository contains many types of content, from electronic theses and dissertations to digitized maps from the Library's holdings.

Communities in the repository

Select a community to browse its collections.

- Colleges & Schools
- Programs, Centers, and Institutes
- Special Collections
- State Agencies
- Texas A&M University Libraries
- Texas A&M University Press Consortium

http://txspace.tamu.edu/
Welcome to the Texas Digital Library Repository

The TDL Repository is composed of digital collections submitted from TDL member institutions across the state of Texas. The TDL Repository serves to preserve and promote the research output of Texas, including electronic theses and dissertations, faculty datasets, departmental databases, digital archives, course management and learning materials, digital media, and other special collections.

Submission Guidelines and Login

If you are a faculty member at a participating TDL institution and are interested in contributing material to the repository, please contact your local institutional representative for more information; your representative will be able to facilitate your use of TDL services. The login link at the right under My Account allows the owners of collections in the repository to manage their materials.

Communities in the Repository

Select a community to browse its collections.

- Conference Proceedings
- Periodicals
- Research
- Theses and Dissertations

http://repositories.tdl.org/tdl/
TDS is the Institutional Repository of the Medical Faculty, University of Helsinki.

Search DSpace

Enter some text in the box below to search DSpace.

Communities in DSpace

Select a community to browse its collections.

- Articles [Metadata and Full Text]
- Conferences, Seminars and Posters
- Kansaneläkelaitos (Rela)
- Kansanterveyslaitos (KTL)
- Kotimaisia Open Access-lehtiä [Finnish OA Journals]
- Opinionstext [Theses and Dissertations]
- Principal Investigator Profiles [University of Helsinki]
- Suomalaisia lääketieteellisiä historioita
- Työterveyslaitos (TTL)
- Virtuaaliset tietokokoelmat [Departments and Institutes]

http://tds.terkko.helsinki.fi/dspace/
XMLUI Resources

- DSpace Wiki

- “Learning to Use Manakin” – Scott Phillips
  - [www.dspace.org > Resources > Training Materials](http://www.dspace.org)

- DSpace 1.5 Documentation
DSpace 1.5 Overlays

• A different customization model…
• So, why did we change this?
What are Overlays?

- Overlay is Maven term ("Maven WAR Overlays")
- Simple way to override defaults with your own basic customizations and code
- Allow you to more easily manage your customizations separately

- What can you “overlay”?
  - User interface look-and-feel (JSPUI, XMLUI Themes)
  - Language / terminology
  - Java code to add functionality (basic XMLUI Aspect)
    - Although, this may be better built into a custom “module”
Modules + Maven = Overlays

Build DSpace

- dspace
  - modules
    - jspui
      - messages.properties
      - jsp

Overlay

pom.xml
<dependencies/>
<build/>

Maven Repository

Can you give me the JSPUI Web application?

Here you go...

My JSPUI

JSPUI WAR
Creating a Basic Overlay - JSPUI

Notice our Maven "standard directory layout"

(dsparse)

modules

jspui

src

main

resources

webapp

 messages.properties

jsp

(Replacement for "jsp/local")
Building/Installing an Overlay

- Add your files to appropriate "/dspace/modules/" directory (see previous slides)
- Rebuild DSpace: **mvn package**
  - Builds to `[dspace-src]/dspace/target/
- Update DSpace installation: **ant update**
  - Installs to `[dspace.dir]` (as specified in dspace.cfg)
Why Overlays?

- Essentially, they came along with move to Maven
- You can manage your own customizations separate from DSpace source code
  - “dspace/modules” is empty by default...
- Replacement for “jsp/local” from pre-1.5 DSpace
Configurable Submission

- Intro to Configurable Submission
Why Configurable Submission?

- **DSpace 1.0 to 1.4**
  - Submission steps are “hardcoded”
  - Only major option is to change metadata entry page(s)

- **Goals:**
  - Allow easier changes to entire submission process
  - Make it easier to share changes between institutions
Configurable Submission Features

- Reorder, remove or add “steps” to Submission
- Different submission processes for different collections
Configurable Submission Features

- Can also create “invisible” (to your users), processing-only steps
  - (e.g.) A virus scanning step?
- Steps are as ‘standalone’ as possible, to promote sharing

- Add New Steps — requires Java knowledge
- Remove / Reorder Steps — an XML config change
Configurable Submission “Flow”

Step Definition
- JSPUI: JSPs
- XMLUI: Transformer

Step UI Class

Step Processing Class

Step Definition
- JSPUI: JSPs
- XMLUI: Transformer

Step UI Class

Step Processing Class

Submission “Controller”

Start Submission

JSPUI: Servlet
XMLUI: Flowscript

Next Step, etc..

<submission-process>
<step/>
<step/>
....

item-submission.xml
Configurable Submission in 1.5

- Feature of both JSPUI and XMLUI
- “Invisible” feature - looks the same out-of-the-box
- No new “steps” come out-of-the-box, yet
Example Custom Step

- PubMed Prefill – Graham Triggs, BioMedCentral
  - User is given option to enter in a PubMed ID
  - With PubMed ID, metadata is pulled down directly from PubMed and pre-populated in DSpace forms
  - “How To” on Dspace Wiki:
Configurable Browse

- Intro to Configurable Browse
- Features...
Improved Browse Configuration

- Feature of both JSPUI and XMLUI
- Configured from dspace.cfg
- Define your own Browse Indices
  - Defaults: Date (Issued), Author, Title, Subject
- Define your own Sort Options (all Browse UI)
  - Defaults: Title, Date (Issued), Date (Accessioned)
- Define Browse “Links” (JSPUI Only)
  - Default: Author names link directly to Browse by Author
  - XMLUI – Can create via Themes…See HowTo’s on Wiki!
Browsing by Title

Browse Sort Options

Browsing by Title

Browse Indices

Search DSpace

Advanced Search

Browse

- All of DSpace
- Communities & Collections
  - By Issue Date
  - Authors
  - Titles
  - Subjects

My Account

- Login
- Register

False starts, dead ends, and new opportunities in public opinion research

Ontogenesis of morphine-induced behavior in the cat.
Burgess JW; Villablanca JR; Burgess, J Wesley; Villablanca, Jaime R (2007)

Priming effects in complex information environments: Reassessing the impact of news discourse on presidential approval

Using news abstracts to represent news agendas
<table>
<thead>
<tr>
<th>Issue Date</th>
<th>Title</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>False starts, dead ends, and new opportunities in public opinion research</td>
<td>Althaus, S.L.</td>
</tr>
<tr>
<td>2007</td>
<td>Ontogenesis of morphine-induced behavior in the cat.</td>
<td>Villablanca, Jaime R; Burgess, J Wesley; Villablanca JR; Burgess JW</td>
</tr>
<tr>
<td></td>
<td>Priming effects in complex information environments: Reassessing the impact of news discourse on presidential approval</td>
<td>Kim, Y.M.; Althaus, S.L.</td>
</tr>
<tr>
<td>2005</td>
<td>Using news abstracts to represent news agendas</td>
<td>Phalen, P.F.; Althaus, S.L.; Edy, J.A.</td>
</tr>
</tbody>
</table>
SWORD Interface

- New web-service interface to DSpace
- What is it, why is it important?
SWORD is...

- Simple Web-service Offering Repository Deposit
- a Protocol:
  - Allows external system / program to deposit items directly into DSpace
  - A Profile of the Atom Publishing Protocol

- a Common “Standard”:
  - DSpace, Fedora, EPrints are all adopting SWORD

SWORD Wiki: [http://www.ukoln.ac.uk/repositories/digirep/index/SWORD](http://www.ukoln.ac.uk/repositories/digirep/index/SWORD)
How SWORD works...

Step 1: Request Service Document

External System

Can I make a deposit? Here's my login info...

Repository

SWORD Interface

<collection/>
<collection/>
<collection/>

Here are the collections you may deposit to...

service document
How SWORD works...

Step 2: Make a Deposit

External System

files + metadata

SWORD Client

Ok, I'd like deposit to ____ collection

Repository

SWORD Interface

Atom response

Thanks! Here's a reference to your deposit for later
SWORD...a real life scenario

- BibApp (U of Wisconsin & U of Illinois)
  - A Campus Research Gateway
    - Helps gather information (metadata) about published research on campus
    - Helps promote campus by promoting research
    - Provides import/export of research data (metadata)
  - An “Expert Finder”
    - Help locate potential collaborators on campus

http://bibapp.googlecode.com/
At the library, we ♥ our researchers.
NOW, CAN WE GET IT INTO THE REPOSITORY?

Upload Content File

Attaching to Journal article:

Political Communication 20 (4), 381-414.

(1) Metadata from within BibApp

(2) Deposit License & Repository Name pulled in via SWORD

(3) Uploaded files & metadata are sent to Repository via SWORD
Lightweight Network Interface

- Another new web-service interface to DSpace
- What is it, why is it important?
LNI is...

- Lightweight Network Interface (DSpace-specific)
- WebDAV server implementation ([www.webdav.org](http://www.webdav.org))
  - Web-based Distributed Authoring and Versioning
  - Extensions to HTTP protocol for editing/management
- Features:
  - Retrieve, Update, or Add Items in DSpace
  - Language-neutral (non-Java applications can use)
- Meant for developers to build applications against
Before Moving to 1.5

- Strategies, planning...
- What to expect along the way...
Updating Now versus Waiting...

- Lots of new Features!
- More abilities to share customizations in 1.5
- Support, support, support
- Many others in your same shoes...

Picture borrowed from: http://www.flickr.com/photos/amerinocasino/
Choosing your upgrade path...

- Which User Interface (JSPUI v. XMLUI)?
- How much customizing have we done / are we planning?
- One-fell-swoop, or staged upgrade?

Picture borrowed from: http://www.flickr.com/photos/mukluk/
Which User Interface?

**JSPUI**
- Familiar
- Customize via JSP or CSS
- Changes are Site-level only
- Slightly better performance

**XMLUI**
- Newer
- Customize via XHTML, CSS, or XSL
- Changes at Site, Community, Collection, or Item level
- Some scalability issues? (being fixed)
Interface Features Differ, Slightly

<table>
<thead>
<tr>
<th>JSPUI-Only</th>
<th>XMLUI-Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Very basic Statistics</td>
<td>□ No Statistics (1.5.1)</td>
</tr>
<tr>
<td>□ Customize some pages (esp. Item) via configs</td>
<td>□ Customize all pages via Themes!</td>
</tr>
<tr>
<td>□ Controlled-Vocab</td>
<td>□ Community List caching</td>
</tr>
<tr>
<td>□ Item Recommendations</td>
<td>□ Understands metadata files (e.g. METS, MODS)</td>
</tr>
</tbody>
</table>
Many potential upgrade paths

- 1.4 JSPUI to 1.5 JSPUI
- 1.4 & Manakin 1.1 to 1.5 XMLUI
- 1.4 JSPUI to 1.5 XMLUI
How “easy” is my upgrade?

- Depends on:
  - Path chosen
  - # of local customizations
  - Dedicated staff

- Is a Staged Upgrade more plausible?
  - 1.4 JSPUI to 1.5 JSPUI
  - 1.5 JSPUI to 1.5 XMLUI

Picture borrowed from: http://www.flickr.com/photos/drachmann/
General Upgrade Tips

• That’s just what they are, tips!
• Not a “one size fits all” solution...
HOW do I upgrade?

- Plan the Upgrade process...
  - Test your plan somewhere other than Production
  - Do not upgrade on Production until you’ve done a successful upgrade elsewhere!

- Follow Upgrade Instructions in '/dspace/docs/docs/update.html'
  - Database upgrade
  - Config file changes, new configs
    - May wish to start with a fresh dspace.cfg
Basics: 1.4 JSPUI to 1.5 JSPUI

Use new JSPUI “overlay” for your customizations
Basics: 1.4 + Manakin to 1.5 XMLUI

Move Theme(s) to new XMLUI “overlay”
Basics: 1.4 JSPUI to 1.5 XMLUI

- **Recommended**: Install a “fresh” 1.5 XMLUI
  - Get familiar with it and its settings…

- Re-do any interface customizations for XMLUI
  - Create your custom Theme(s)
  - Place Theme(s) in XMLUI overlay directory

- Upgrade 1.4 to 1.5
  - Follow instructions in DSpace docs
  - Don’t forget to install the `/config/xmlui.xconf`
DSpace Community

- Where to go for more help…
- How you can help
- On the horizon
DSpace Resources

- DSpace System Docs (/dspace/docs/)
- DSpace Wiki: http://wiki.dspace.org
- Dspace Training Materials
  - www.dspace.org > Resources > Training Materials
- Mailing Lists
  - dspace-general: general announcements, q & a
  - dspace-tech: weird errors? upgrade issues?
  - dspace-devel: where hardcore developers are...
How you can help…

- **Help test**: DSpace Testathon

- **Report bugs**: Add to bug list on SourceForge or email dspace-tech list
  - [http://sourceforge.net/projects/dspace/](http://sourceforge.net/projects/dspace/)

- **Help others, just like you**: Answer questions on dspace-general or dspace-tech lists

- **Tech-savvy? Fix bugs or add functionality**:  
  - Announce your work on dspace-tech
On the Horizon – 2.0

- **DSpace 2.0** – Planning stage right now...early release by OR ’09 (mid-May)

  - Potential Features:
    - New data model – Versioning of files
    - Support for more metadata formats (MODS, etc.)
    - Add your request(s)!
      - [http://wiki.dspace.org/index.php/Frequently_Asked_For](http://wiki.dspace.org/index.php/Frequently_Asked_For)
  - Federation has 75% time from 4 developers
Contact Info

Tim Donohue
University of Illinois
tdonohue@uiuc.edu
http://ideals.uiuc.edu/

DSpace Mailing Lists
Technical Questions:
dspace-tech@lists.sourceforge.net
Development Questions / Suggestions:
dspace-devel@lists.sourceforge.net