Development of a Digital Library using DSpace Open Source Platform

Project Report Submitted for Summer Internship 2008

Submitted by

Barnan Das
&
Tanmoy Pal

Under the guidance of

Dr. Pabitra Mitra
Department of Computer Science and Engineering
Indian Institute of Technology, Kharagpur

CERTIFICATE

This is to certify that the project report entitled "Development of a Digital Library using DSpace Open Source Platform" is a record of bona fide work carried out by Mr. Barnan Das & Mr. Tanmoy Pal of Bengal College of Engineering and Technology, Durgapur under my supervision and guidance, as part of their Summer Internship 2008, at the Indian Institute of Technology, Kharagpur.

Dr. Pabitra Mitra

Date: Dept. of Computer Science and Engineering

Place: Kharagpur   Indian Institute of Technology, Kharagpur

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ABSTRACT

Today as the world is becoming digitalized, it is a matter of utter necessity to store the invaluable works of research scholars and project staffs, at the various universities, research institutes and labs spread across the globe, in digital formats. It also becomes essential to add functionalities to the application that maintains a database of these works. These functionalities include customized searching techniques, ability to store almost all the digital format from texts and images to video and audio, making the application robust enough to deal with any sort of user requirements and producing the desired and relevant result at a single click of the mouse.

The DSpace open source platform for providing access and preservation of digital content was launched in the year 2003 by MIT and Hewlett Packard. The platform was adopted quickly by numerous organizations around the world, as it was easy to use and provided broad access to much of the key intellectual output produced in digital form. Currently there are over 250 organizations in 42 countries using DSpace. In the last several years, the amount of digital content produced has exploded and the Internet has become an enabling technology to share and reuse this content. The DSpace platform will need to evolve to handle the ever increasing amount and different types of content, and satisfy the needs of a broad set of users across the community.

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Chapter 1: Introduction

1.1   What is a Digital Library?

A digital library is a library in which collections are stored in digital formats (as opposed to print, microform, or other media) and accessible by computers. The digital content may be stored locally, or accessed remotely via computer networks. A digital library is a type of information retrieval system.

1.2   What is an Institutional Repository?

A university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution.

1.3   What is DSpace?

DSpace captures your data in any format – in text, video, audio, and data. It distributes it over the web. It indexes your work, so users can search and retrieve your items. It preserves your digital work over the long term.
DSpace provides a way to manage your research materials and publications in a professionally maintained repository to give them greater visibility and accessibility over time.

1.4   Benefits of Using DSpace.

- Getting your research results out quickly, to a worldwide audience
- Reaching a worldwide audience through exposure to search engines such as Google
- Storing reusable teaching materials that you can use with course management systems
- Archiving and distributing material you would currently put on your personal website
- Storing examples of students' projects (with the students' permission)
- Showcasing students' theses (again with permission)
- Keeping track of your own publications/bibliography
- Having a persistent network identifier for your work, that never changes or breaks
- No more page charges for images. You can point to your images' persistent identifiers in your published articles.

1.5   Who's Using DSpace?

• Texas Digital Library, Texas, USA
• Oxford University ,UK
• The Ohio State University, USA
• Indian Institute of Science, Bangalore, India
• Indian Institute of Technology, Bombay, India
• Indian Institute of Management, Kozhikode, India.

Currently there are over 250 organizations in 42 countries using DSpace.

Chapter 2: Functional Overview of DSpace.

2.1 Data Model.

The following sections describe the various functional aspects of the DSpace system.
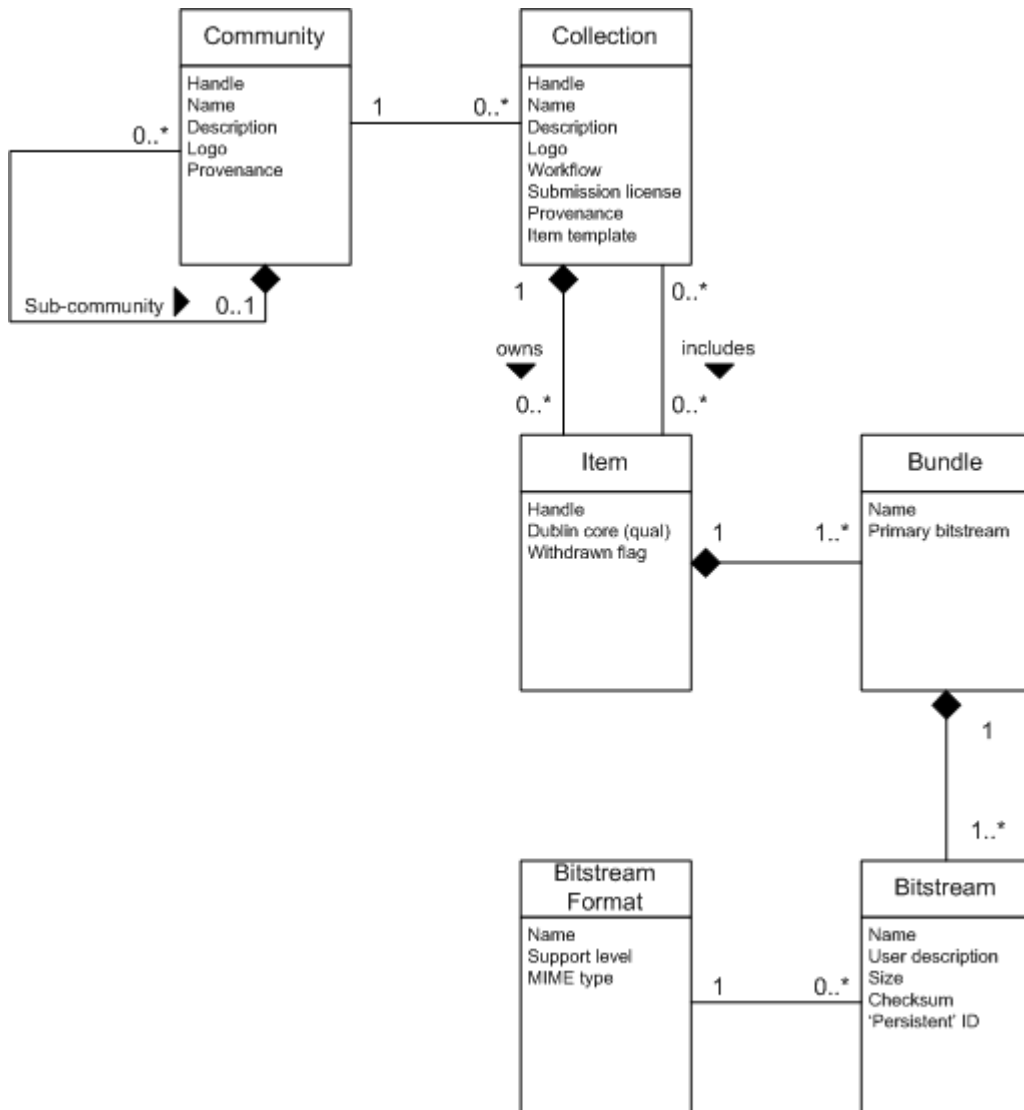
Fig: Data Model Diagram

2.2 Objects in DSpace Data Model

Object	Example
Community	Research Scholars; MS Students
Collection	Theses; Project Reports
Item	A technical report; a data set with accompanying description; a video recording of a lecture
Bundle	A group of HTML and image bitstreams making up an HTML document
Bitstream	A single HTML file; a single image file; a source code file
Bitstream Format	Microsoft Word version 6.0; JPEG encoded image format

2.3 Ingest Process and Workflow

Rather than being a single subsystem, ingesting is a process that spans several. Below is a simple illustration of the current ingesting process in DSpace.
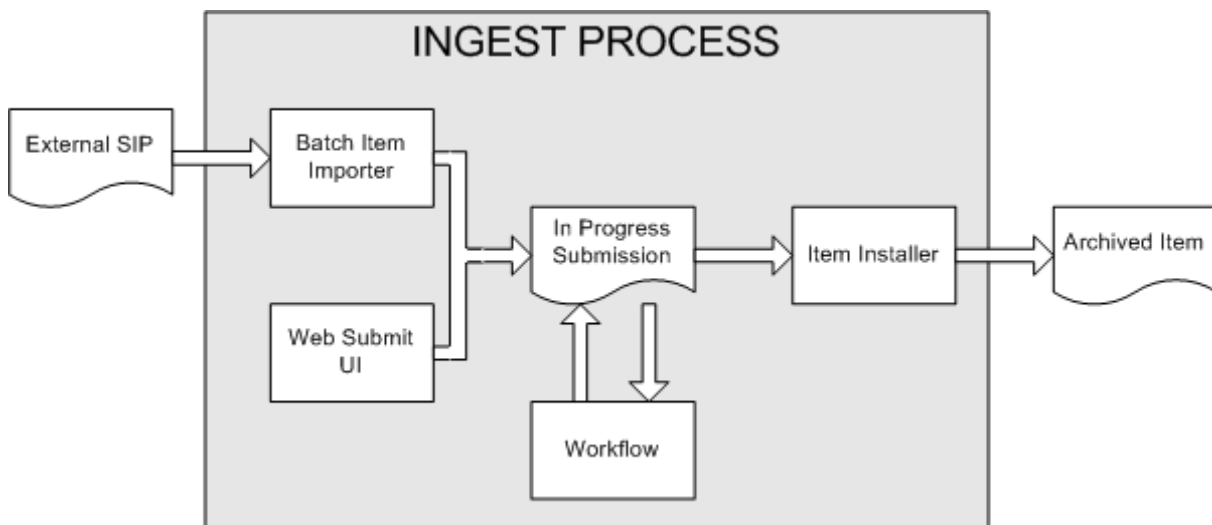
Fig : Ingest Process Diagram

2.4 Workflow Steps

Workflow Steps	Possible Actions
1	Can accept submission for inclusion, or reject submission.
2	Can edit metadata provided by the user with the submission, but cannot change the submitted files. Can accept submission for inclusion, or reject submission.
3	Can edit metadata provided by the user with the submission, but cannot change the submitted files. Must then commit to archive; may not reject submission.
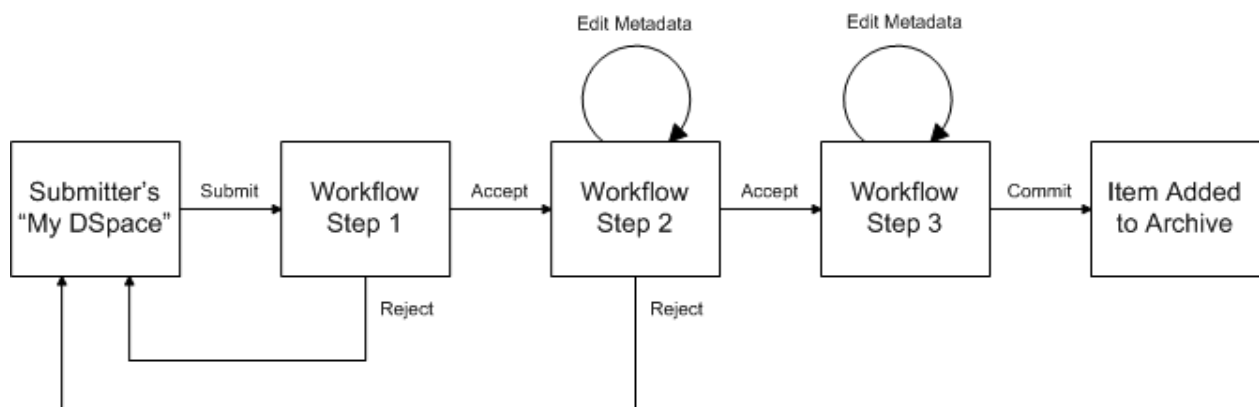
Fig : Work Flow Diagram

2.5 Overview of DSpace Directories

Before beginning an installation, it is important to get a general understanding of the DSpace directories and the names by which they are generally referred. (Please attempt to use these below directory names when asking for help on the DSpace Mailing Lists, as it will help everyone better understand what directory you may be referring to.) DSpace uses three separate directory trees. Although you don't need to know all the details of them in order to install DSpace, you do need to know they exist and also know how they're referred to in
this document:

1. **The installation directory**, referred to as `[dspace]`.

   This is the location where DSpace is installed and running off of it is the location that gets defined in the dspace.cfg as "dspace.dir". It is where all the DSpace configuration files, command line scripts, documentation and webapps will be installed to.

2. **The source directory**, referred to as `[dspace-source]`.

   This is the location where the DSpace release distribution has been unzipped into. It usually has the name of the archive that you expanded such as `dspace-<version>-release` or `dspace-<version>-src-release`. It is the directory where all of your "build" commands will be run.

3. **The web deployment directory**, directory that contains DSpace web application(s).

   In DSpace 1.5.x and above, this corresponds to `[dspace]/webapps` by default. However, if you are using Tomcat, you may decide to copy your DSpace web applications from `[dspace]/webapps/` to `[tomcat]/webapps/` (with `[tomcat]` being wherever you installed Tomcat--also known as `$CATALINA_HOME`).

Chapter 3 : Installing DSpace

3.1 Pre-requisites

Before Developing the Digital Library using Dspace we need the following Software & Hardware configuration:

Software Configuration

- o Unix like Operating System (Linux of any flavor, Mac OS etc)
- o Java 1.4 or later(Sun java is preferred)
- o Apache Ant 1.6.2 or later(Java Build Tool)
- o PostgreSQL 7.3 or later(An open source Database) or Oracle 9 or later.
- o Java Servlet Container (like Tomcat, Resin or Jetty)- Tomcat 5 or later is fine.

Hardware Configuration

- o Any computer that can run UNIX type OS (Server Configuration is preferred)

- o RAM memory about 2GB

- o The repository size will decide the storage capacity (hard disk size)

3.1.1 UNIX like OS

Any flavor of UNIX like
- o Linux, any flavor
    - Redhat
    - Suse
    - Mandrake
    - Fedora
    - Debian, etc.

- o Solaris (Sun system)
- o HP-UX (Hewlett Packard)
- o AIX (IBM)
- o Mac OS X

3.1.2 Java Compiler
- o Sun Java (preferred)
- o IBM Java
- o GNU Java

NOTE:
- ✓ Some linux versions might have already been loaded with GNU Java.
- ✓ Make sure of the PATH variable points to Sun Java.

3.1.3 Ant

- o Java based build tool, similar to make in the world of 'C'
- o Compiles java programs of dspace source code, generates war files

War files -A Web application is a group of HTML pages, JSP pages, servlets, resources and source file, which can be managed as a single unit. A Web archive (WAR) file is a packaged Web application. WAR files can be used to import a Web application into a Web server.

3.1.4 DBMS

- o PostgreSQL(open source)
- o Oracle (commercial)

Database backend on DSpace stores information on

- ✓ Communities
- ✓ Collection
- ✓ Members -passwords
- ✓ E-groups

3.1.5 Servelet Containers

- o Tomcat (most popular with DSpace)
- o Jetty
- o Resin
- o JBoss(more professional)
- o J2EE
- o Can be integrated with Apache, you have to build connectors

Servletsare server-side Java™ programs. These Java programs extend the functionality of a Web server by generating dynamic content and responding to Web client requests. When a browser sends a request to the server, the server can send the request information to a servlet, so that the servlet can construct the response that is sent back to the browser.

3.2 Software Configuration Used

- Operating System – Linux (Fedora 8.0)

- Java – jdk-7-i586.rpm

- Apache Ant – apache-ant-1.7.0-bin.tar.gz

- PostgreSQL

  - ➤ Postgresql-8.2.5-2PGDG.f7.i586.rpm

  - ➤ Postgresql-server-8.2.5-2PGDG.f7.i686.rpm

  - ➤ Postgresql-8.2.507.jdbc4.jar

- Tomcat – apache-tomcat-5.5.23-compat.tar.gz

- Dspace– dspace-1.4.2-source.tar

3.3 Steps to Install DSpace

3.3.1 Installing JAVA

a. Check whether java is installed or not
```
#java -version
```

If java is already installed then it will give the version otherwise go to next step .

b. Copy the java rpm given
```
#cp jdk-6-linux-i586  [desired dir]
```

Go to that directory using #cd [dir name]

c. Install the package
```
#rpm -ivh  jdk-7-linux-i586.rpm
```

It will take some time .After installation check it with first command to see the version.

d. Set environment variable by editing the profile dir
```
#vi /etc/profile
```

Here add the following line

```
JAVA_HOME=/usr/java/jdk1.7.0
export JAVA_HOME
```
Save it by pressing `<ESC>:wq` then press `<Enter key>`

You can do it by creating to new startup file `/etc/profile.d/java.sh` & write the same.

3.3.2 Installing Apache Ant

a. Check if ant is installed
```
#which ant
```

(It will show the ant version if not installed go to next step)

b. Copy Apache Ant
```
#cp apache-ant-1.7.0-bin.tar.gz    /usr/local
```

c. Install as follows

Go to the [dir]
```
#cd   /usr/local
```

Unzip the Zip file
```
#gunzip apache-ant-1.7.0-bin.tar.gz
```

Untar the tar file
```
#tar -xvf apache-ant-1.7.0-bin.tar
```

d. Set Environment Variable
```
#vi /etc/profile
```

Add the line
```
PATH=$PATH:/usr/local/ant/bin
```

Save it by pressing `<ESC>:wq` then press `<Enter key>`

You can do it by creating to new startup file `/etc/profile.d/java.sh` & write the same.

3.3.3 Installing PostgreSQL

a. Copy the desired rpm into your [desired dir].

b. Install as follows

```
#rpm -ivh postgresql-8.2.5-2PGDG.f7.i586.rpm
#rpm -ivh  postgresql-server-8.2.5-2PGDG.f7.i686.rpm
```

c. Log into postgresql
```
#su  -l postgres
```

d. Initialize the Database
```
$initdb
```

e. Changes the following configuration
```
$vi /data/postgresql.conf
```

Remove comment for listen_addresses = 'localhost'
Save it by pressing <ESC>:wq then press <Enter key>

```
$ vi /data/pg_hba.conf
```

Go to the section #IPV4 Style local connection. Add the following parameter

```
host dspace dspace 127.0.0.1 255.255.255.255 md5
```

Save it by pressing <ESC>:wq then press <Enter key>

3.3.4 Installing Apache Tomcat

a. Copy apache-tomcat to /usr/local
```
#cp apache-tomcat-5.5.23.tar.gz /usr/local
#cd/usr/local
```

b. Uncompress & extract zip file
```
#gunzip apache-tomcat-5.5.23.tar.gz
```

c.Untar the unzipped file
```
#tar -xvf apache-tomcat-5.5.23.tar
```

d.Configuration changes
```
#vi /etc/profile
```

Add the following line
```
JAVA_OPTS= "-Xmx512M -Xms64M -Dfile.encoding=UTF-8"
export JAVA_OPTS
```

Save it by pressing <ESC>:wq then press <Enter key>

Locate the following section in file `/usr/local/tomcat/config/server.xml`

```
#vi /usr/local/tomcat/config/server.xml
```

You need to add a configuration option to the `<Connector port="8080">` element. Add this `URIEncoding="UTF-8"`

```
<!-- Define a non-SSL HTTP/1.1 Connector on port 8080 -->

<Connector port="8080"maxThreads="150" minSpareThreads="25"
maxSpareThreads="75"enableLookups="false"
redirectPort="8443"
acceptCount="100"connectionTimeout="20000"
disableUploadTimeout="true"
URIEncoding="UTF-8" />
```

Save it by pressing `<ESC>:wq` then press `<Enter key>`

3.3.5 Installing DSpace

a. Create the DSpace user.(This needs to be the same user that Tomcat as root run)

```
#useradd –m  dspace
#passwd dspace
```

Set password for dspace user

b. Copy dspace source file to your home dir

```
#cp dspace-1.4.2-source.tar /home/dspace
```

c. Change the dir
```
#cd /home/dspace
```

d. Unzip & extract the source file
```
#gunzip  dspace-1.4.2-source.tar.gz
#tar –xvf dspace-1.4.2-source.tar
```

e. Database Set Up

- Copy postgresql .jar file.
```
#cp postgresql-8.2.507.jdbc4.jar /home/dspace/lib
```

- Log in as dspace & do the following

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```
#createuser -U postgres -d -A -P dspace
#createdb -U dspace -E UNICODE dspace
```

Give the password & remember it

- Start postgres database

```
#service postgresql restart.
```

f. Dspace file configuration

Edit *[dspace-source]*/dspace/config/dspace.cfg, in particular you'll need to set these properties:

```
#cd /home/dspace/dspace-1.4.2-source/config
#vi dspace.cfg
```

Edit the following aspect –

dspace.dir -- /home/dspace/dspace (must be set to dspace installation dir).

dspace.url -- http://dspace-test.cse.iitkgp.ernet.in:8080/dspace (complete URL of
                this server's DSpace home page.)

dspace.hostname -- dspace-test.cse.iitkgp.ernet.in(fully-qualified domain name of
                      web server)

dspace.name -- DSpace at IIT KGP ("Proper" name of your server)

db.password -- dspace123 (the database password you entered in the previous step)

mail.server -- cse.iitkgp.ernet.in(fully-qualified domain name of your
outgoing mail server.

mail.from.address -- dspace-noreply@cse.iitkgp.ernet.in(the "From:" address to
                      put on email sent by DSpace.

feedback.recipient -- dspace-help@cse.iitkgp.ernet.in(mailbox for
                        feedback mail)

mail.admin -- dspace-help@cse.iitkgp.ernet.in(mailbox for DSpace site
                administrator.

alert.recipient -- mailbox for server errors/alerts (not essential but very useful!)

registration.notify -- mailbox for emails when new users register (optional)

Save the file by pressing `<ESC>:wq` then press `<Enter key>`

g. Create the directory for the DSpace installation.

```
#cd /home/dspace
#mkdir  dspace
#chown  dspace  /home/dspace/dspace
```

(We need to log in as root)

h. Ant Fresh Installtion

```
#cd /home/dspace/dspace-1.4.2-source
#ant fresh_install
```

(it wil take some time,if BUILD SUCCESSFUL is shown go to next step otherwise check database connection)

i. Copy the DSpace Web application archives (.war files) to the appropriate directory in your Tomcat:

```
#cp /home/dspace/dspace-1.4.2-source/build/*.war
/usr/share/tomcat/webapps
```

j. Create an initial administrator account:

```
#cd /home/dspace/dspace/bin
#create-administrator
```

 Enter details as promted and remember it.

k. Change ownership to user dspacefor tomcat

```
#chown  -R dspace:dspace /usr/shere/tomcat
```

l. Restart tomcat service

```
#service tomcat restart
```

m. Open browser

Give address in mozila address bar http://10.183.xx.xx:8080/dspace
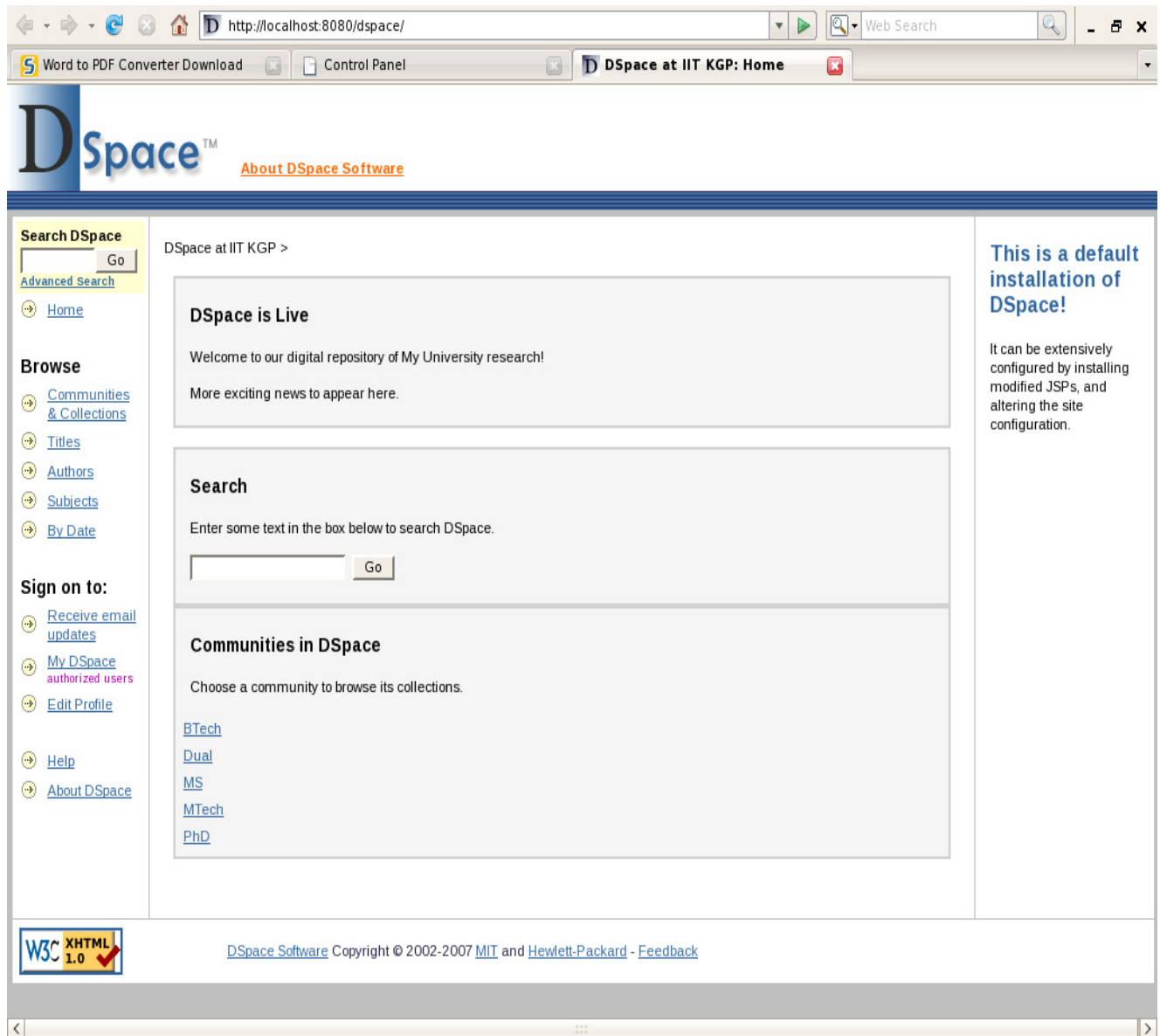In our case it is http://localhost:8080/dspace

Fig: Screenshot of the default DSpace Home Page

Chapter 4 : Manakin

4.1 Introduction to Manakin

Manakin is the second release of the XML UI project's customizable DSpace interface and is currently under development by Texas A&M University in order to provide major improvements to the user interface of DSpace; the fundamental feature this project adds is the ability for each community and collection within DSpace to establish a unique look-and-feel, one that might extend outside of DSpace into an existing web presence.

DSpace XML UI / Manakin is an add-on to the standard DSpace software. This means that before Manakin can be installed you must first install DSpace

4.2 Installation of Manakin

Step 1: Configure DSpace

Your dspace.cfg file needs to be updated to include specific Manakin configuration parameters. First you must supply information about your repository. There are also several optional configuration parameters you may wish to use.

Required: Provide some basic information to be included in every Manakin page about your repository. Add the following parameters to your dspace.cfg:

```
#
# Repository metadata
#

xmlui.repository.identifier = DSpace Manakin
xmlui.repository.description = This is the default repository description
xmlui.repository.publisher = Default DSpace publisher
xmlui.repository.subject = Default repository subject
xmlui.repository.title = DSpace XMLUI :: Manakin
```

Step 2: Configure Manakin

First, copy the theme and aspect configuration file `config/xmlui.xconf` from Manakin's source to your DSpace configuration directory. This file is used to configure which aspects and themes are installed on your Manakin / DSpace. By default the following Aspects are turned ON, to turn off any of them off just comment out the corresponding <aspect> element in xmlui.xconf.

Artifact Browser:

Responsible for browsing communities, collections, items, and bitstreams, viewing an individual item, and searching the repository.

1. E-Person & Authentication:

   Responsible for logging in, logging out, new user registration, forgotten passwords, editing profiles, and changing passwords.

2. Submission & Workflow:

   Responsible for submitting new items to DSpace, the workflow process, and finally ingesting the new items into the DSpace repository.

3. Administration:

   Responsible for administrating DSpace, such as creating, modifying, and removing all communities, collections, e-persons, groups, registries, and authorizations.

4. XML Test:

   Provides a set of test pages that exercise various features of Manakin.

   Next, copy the front page news file, config/news.xml from Manakin's source, to your DSpace configuration directory. This file is used to place news items on Manakin's homepage. Edit this file to include any announcements that you would like displayed on the front page of your new Manakin installation.

   The commands required are —

   ```
   #cd /home/dspace/Manakin1.1.a/config
   ```

   ```
   #cp xmlui.xconf /home/dspace/dspace/config
   ```

   ```
   #cp news.xml /home/dspace/dspace/config
   ```

Step 3: Configure Tomcat

Update Tomcat's conf/context.xml to include a parameter that tells Manakin where your dspace.cfg configuration is located. Modify the context.xml file to add the following element inside the <Context> element:

```
<Parameter name="dspace-config"
 value="home/dspace/dspace-1.4.2-source/config/dspace.cfg"
 description ="Path to the DSpace configuration file." />
```

Modify the parameter's value to your particular environment; the value should be the absolute path to your dspace.cfg file.

Remember, Manakin requires Tomcat version 5.5.

Step 4: Compile & Deploy

Compile Manakin using an existing DSpace source tree to link against. Use the "dspace" ant parameter to tell Manakin where your DSpace source directory is, as follows:

```
#ant -Ddspace=/home/dspace/dspace-1.4.2-source  build_wars
```

This will create a manakin.war file in the build/ directory, to deploy Manakin simply copy this war file into Tomcat's webapps/ directory. Alternatively you may deploy using the deploy or tomcat-delopy tasks, see the ant build file for more information on these deployment methods.

```
#cp /home/dspace/Manakin-1.1a/build/*.war   /usr/shere/tomcat/webapps
```

Step 5 : See the Manakin Webpage

Now give the address http://localhost:8080/manakin in your browser address bar

The following page will be displayed --
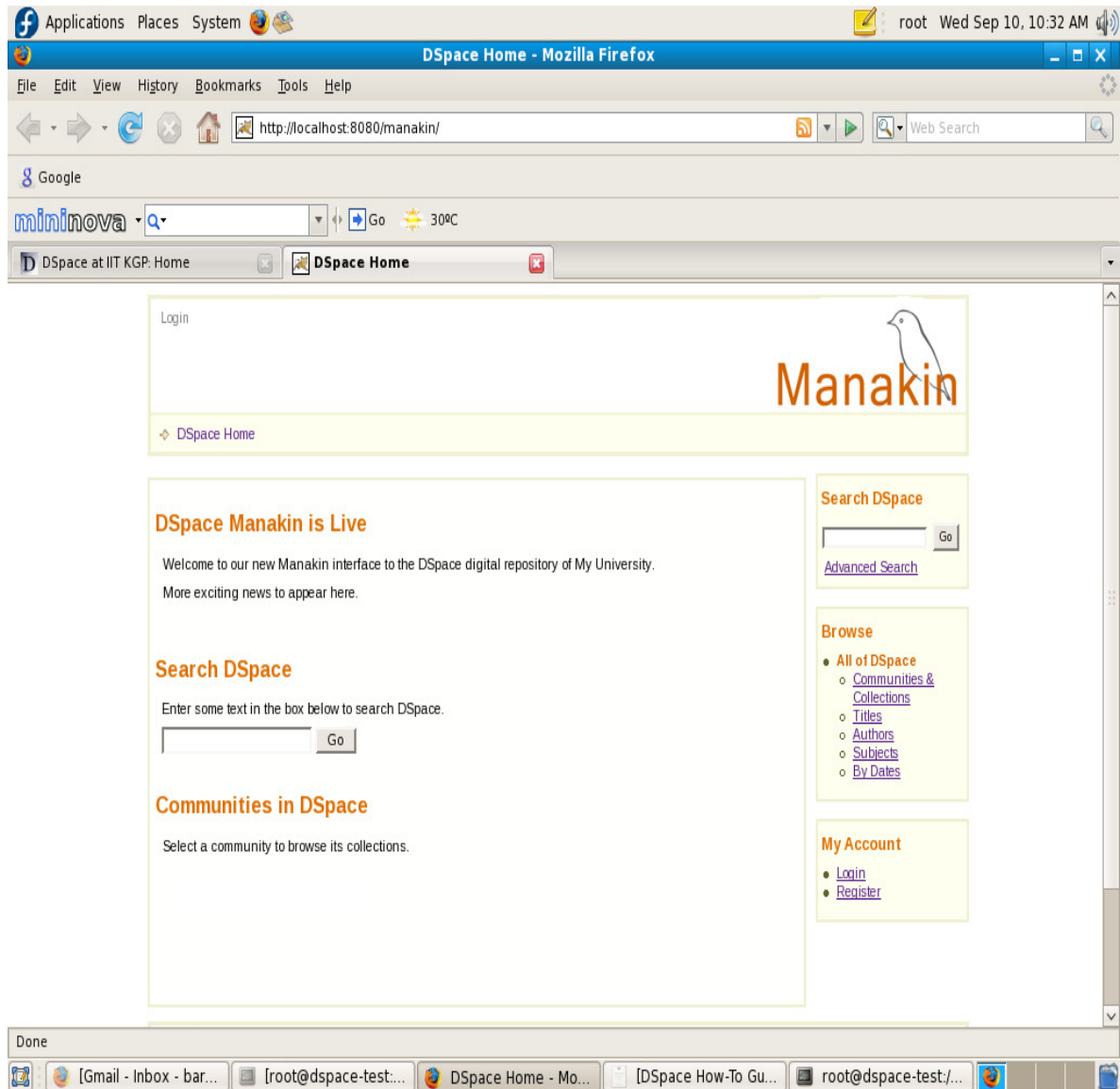
Fig: Screenshot of default Manakin Home Page

Chapter 5 : Configuring DSpace

5.1 Rebuild DSpace

Full Refresh/Rebuild: *(Completely refresh all of DSpace)*

1. Logon to the server DSpace is running on (e.g. ssh). Make sure to login as the user who initially installed DSpace!

2. Open a command prompt (if you don't have one already), and `cd` *`[dspace-source]`*

3. `ant clean` (removes old compiled code)

4. `ant update` (recompiles all DSpace code and reinstalls third-party JAR files)

5. Stop Tomcat *(WARNING: this will bring down the website)*
      [Tomcat]/bin/shutdown.sh

6. `cp build/*.war` *`[Tomcat]/webapps/`*

7. (*Optional, but recommended*) Completely remove any dspace or dspace-oai directories created in *[Tomcat]*/webapps - *BE CAREFUL…you don't want to remove the wrong directory!*
 To *force* Tomcat to recompile everything, you may also wish to remove any dspace or dspace-oai directories created in
      [Tomcat]/work/Catalina/localhost

8. Start Tomcat
      [Tomcat]/bin/startup.sh

9. Test your changes in DSpace

5.2 Add a Custom Metadata Schema

Files:
● http://*web-address-to-my-dspace*/dspace-admin (*Requires Administrator Login*)

Instructions:

1. Login as a DSpace Administrator and visit the DSpace Administration user interface (http://*web-address-to-my-dspace*/dspace-admin)

2. Click on the "Metadata Registry" in order to see all current metadata schemas within DSpace. By default, you should only see the Dublin Core (dc) schema

3. At the bottom of the page, enter in a new metadata schema "namespace" and give it a "name". (There is no requirement that the namespace be resolvable.
Also, you may wish the "name" to be only a few characters, since it serves dual purpose as a prefix for this schema). Click "Save"

4. The new metadata schema is now added to the underlying database. You will then want to add new metadata fields by following the instructions in Add a new metadata field. It is also possible to move metadata fields from one schema to another, by following the instructions in Move a metadata field.

Notes:
● DSpace currently only supports "flat" (non-hierarchical) metadata schemas.

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5.3 Add a New Metadata Field

Add Metadata Field

To create a new field you must provide a unique element and qualifier pair. The qualifier may be left blank if desired and the element and qualifier cannot contain spaces, underscores or periods.

Element: [   ]

Qualifier: [   ]

Scope Note: [   ]

[Add New]

Files:
● http://*web-address-to-my-dspace*/dspace-admin (*Requires Administrator Login*)

Instructions:

1. Login as a DSpace Administrator and visit the DSpace Administration user interface (http://*web-address-to-my-dspace*/dspace-admin)

2. Click on the "Metadata Registry" in order to see all current metadata schemas within DSpace. Then, click on the namespace of the schema to add a field to that particular schema.

3. At the bottom of the page, you will find the *Add Metadata Field* form, where you can specify an "element", "qualifier", and "scope note" for the new metadata field. Only the "element" is required. Click "Add New" to add the new field.

4. The new metadata field is now added to the underlying database as a member of the current metadata schema. If you wish, you can now make this field searchable, add this field to the submission forms, and/or display this field in the item display .

5.4 Move a Metadata Field

Move Field

To move one or more field, select the desired fields (use control-key to select multiple) and the target schema. If the target schema already has fields with identical names the fields will not be moved.

Element:
```
contributor.advisor
contributor.author
contributor.editor
contributor.illustrator
contributor.other
```

Schema: http://myschema.org

[Move]

Files:
● http://*web-address-to-my-dspace*/dspace-admin (*Requires Administrator Login*)

Instructions:

1. Login as a DSpace Administrator and visit the DSpace Administration user interface (http://*web-address-to-my-dspace*/dspace-admin)

2. Click on the "Metadata Registry" in order to see all current metadata schemas within DSpace. Then, click on the namespace of the schema you wish to move a metadata field *from*.

3. At the bottom of the page, you will find the *Move Field* form. Using this form you can select one or more fields (in the current schema), and select the schema you wish to move those fields to. Once you have selected the field(s) and the schema to move them to, click "Move".

4. The selected metadata fields are now moved to the selected schema. Since you moved these fields, you may need to update how they are being used in DSpace.

For example, you can now make these fields searchable, add these fields to the submission forms , and/or display these fields in the item display .

Notes:
● Moving a metadata field will also *remove* it from its existing metadata schema. However, any items which previously used this metadata field will be updated automatically (i.e. no existing metadata should be lost).

5.5 Re-index DSpace

Files:
● *[dspace]*/bin/index-all

Instructions:

1. Log on to the machine running DSpace.

2. Change directory to *[dspace]*/bin.

3. Run the re-indexing script
```
./index-all
```

4. Stop and restart Tomcat.

Notes:

● This process re-creates DSpace's search and browse indices. Run it after anything you do to the install that could change the content of these indices (e.g. manually changing metadata, withdrawing items). In addition, run it if you decide to change your searchable metadata fields (see Modify search fields).

● You may wish to have a scheduled process (e.g. cron) to re-index DSpace daily. Lots of little changes that add up over time without a re-indexing can cause DSpace's search function to become erratic.

5.6 Configure Media Filters

Files:
● *[dspace]*/bin/filter-media
● *[dspace]*/config/dspace.cfg
● A scheduling program (e.g. Unix cron or Windows Scheduled Tasks)

Instructions:

1. In DSpace, "media filters" are what control both *full-text indexing* and *automated creation of thumbnail images*. Both can be scheduled by calling the filter-media script (which in turn calls the org.dspace.app.mediafilter.MediaFilterManager class).

2. The list of all currently enabled "media filters" is available in your dspace.cfg configuration file under the section labeled:
```
#### Media Filter plugins (through PluginManager) ####
```

3. If you wish to disable or enable a specific "media filter", you can remove or add them from the sequence list in that section:

```
plugin.sequence.org.dspace.app.mediafilter.MediaFilter = \
org.dspace.app.mediafilter.PDFFilter, \
org.dspace.app.mediafilter.HTMLFilter, \
org.dspace.app.mediafilter.WordFilter, \
org.dspace.app.mediafilter.JPEGFilter
```

(Make sure that each separate line ends with a backslash \ character! A list of what each "media filter" does is available in the *Notes* section on the next page)

4. For Linux or Mac OSX, you can schedule the filter-media shell script to run by adding a cron entry similar to the following to the crontab for the user who installed DSpace:

```
0 2 * * * [dspace]/bin/filter-media
```

(The above entry would schedule filter-media to run nightly at 2am. You would need to change *[dspace]* to the full path of your DSpace installation directory.)

5. For Windows, you will be unable to use the filter-media shell script. Instead, you should use Windows Scheduled Tasks to schedule the following command to run at the appropriate time of day:

```
[dspace]/bin/dsrun.bat
org.dspace.app.mediafilter.MediaFilterManager
```

(*The above command should appear on a single line.*)

Notes:

● Below is a listing of all currently available Media Filters, and what they actually do:

    ○ HTMLFilter – extracts the full text of HTML documents for full text indexing.
    ○ JPEGFilter – creates thumbnail images of GIF, JPEG and PNG files
    ○ BrandedPreviewJPEGFilter – creates a branded preview image for GIF, JPEG and PNG files (*disabled by default*)
    ○ PDFFilter – extracts the full text of Adobe PDF documents (only if textbased or OCRed) for full text indexing
    ○ WordFilter – extracts the full text of Microsoft Word or Plain Text documents for full text indexing

● Please note that the filter-media or MediaFilterManager will automatically update the DSpace search index by default (see Re-index DSpace). This is the recommended way to run these scripts. But, should you wish to disable it, you can pass the -n flag to either script to do so.

● The following additional options are also available for either the filter-media or MediaFilterManager scripts:

  ○ -v = verbose mode (prints out all extracted text and additional messages)
  ○ -f = forces reprocessing of all bitstreams (by default only unprocessed bitstreams are processed by this script)
  ○ -n = do not update the search index after completion
  ○ -i <handle> = only process bitstreams within a particular community/collection/item represented by the <handle>
  ○ -m <#> = only process a maximum number of bitstreams (specified by <#>) .

This is useful if you want to process bitstreams little-by-little in order to avoid taxing your server too much.

5.7 Configure Full-Text Indexing

Files:
● *[dspace]*/bin/filter-media
● *[dspace]*/config/dspace.cfg

Instructions:

1. First, follow the instructions in Configure media filters, since full text indexing is performed by those media filters (specifically the `HTMLFilter`, `PDFFilter`, and `WordFilter`)

2. You may wish to modify the `search.maxfieldlength` field in your dspace.cfg configuration file. This field specifies the maximum number words to index for each document, and by default is set to the first 10,000 words. (Set it to the value -1, if you want to index an unlimited number of words)

        search.maxfieldlength = 10000

If you choose to modify the `search.maxfieldlength` field you must Re-index DSpace before the change will take affect.

Notes:
● Full text indexing is only available for the following formats at this time:
  ○ Adobe PDF (only if text-based or OCRed)
  ○ Microsoft Word
  ○ Plain Text
  ○ HTML

 Full text searching in DSpace occurs when a user searches via the default search box (see below), or when a user selects the "Keyword" option from the Advanced Search screen.

Chapter 6: Configuring Manakin

6.1 Rebuild Manakin

Directories:

- *[dspace-source]*
- *[manakin-source]*
- *[Tomcat]*/webapps/

Quick Restart *(Just restarts the web server after configuration changes)*
1. Stop Tomcat *(WARNING: this will bring down the website)*
    [Tomcat]/bin/shutdown.sh
2. Start Tomcat
    [Tomcat]/bin/startup.sh

Quick Build: *(Quick build after smaller changes)*
1. Logon to the server DSpace / Manakin is running on (e.g. ssh). Make sure to login as the user whi initially installed DSpace/Manakin!
2. Open a command prompt (if you don't have one already), and
    `cd [manakin-source]`
3. `ant -Ddspace=[manakin-source] build_wars` (recompiles all Manakin code and builds a new .war file)
4. `cp build/*.war [Tomcat]/webapps/`
5. Test changes in DSpace / Manakin

Full Refresh/Rebuild: *(Completely refresh all of Manakin)*
1. Logon to the server DSpace / Manakin is running on (e.g. ssh). Make sure to login asthe user who initially installed DSpace / Manakin!
2. Open a command prompt (if you don't have one already), and
    `cd [manakin-source]`
3. `ant clean` (removes old compiled code)
4. `ant -Ddspace=[dspace-source]` build_wars (recompiles all Manakin and builds a new fresh .war file)
5. Stop Tomcat *(WARNING: this will bring down the website)*
    `[Tomcat]/bin/shutdown.sh`
6. `cp build/*.war [Tomcat]/webapps/`
7. (*Optional, but recommended*) Completely remove any manakin or dspace directories created in *[Tomcat]*/webapps
 To *force* Tomcat to recompile everything, you may also wish to remove any manakin or dspace directories created in
[Tomcat]/work/Catalina/localhost
8. Start Tomcat
    `Tomcat]/bin/startup.sh`
9. Test your changes in DSpace / Manakin

6.2 Install a Theme

Files:
- *[new-theme-source]* (This where the new theme's source code is)
- *[manakin-source]*/themes/*[theme-dir]* (This will be the new location for the theme's source)
- *[dspace]*/config/xmlui.xconf

Instructions:
1. If you are installing a brand new theme that is not distributed with Manakin then perform the following operations, otherwise skip to the next step.

```
cp [new-theme-source] [manakin-source]/themes/[theme-dir]
```

2. Open Manakin's configuration file, `[dspace]/config/xmlui.xconf`, scroll to the bottom and locate the `<themes>` element.

3. Add a new tag `<theme>` element inside the `<themes>` element as below:

```
<theme name="My new theme" path="[theme-dir]"/>
```

4. If you wish to install this theme onto a particular community or collection then modify the new `<theme>` tag as:

```
<theme name="My new theme" handle="123/1" path="[themedir]"/>
```

5. If you wish to install this theme as the *default* theme then modify your new <theme> tag (*make sure this tag is the last theme defined*):

```
<theme name="My new theme" regex=".*" path="[theme-dir]"/>
```

6. Restart Tomcat (See *Quick Restart* in Rebuild Manakin)

Notes:
Themes are evaluated in the order they appear in the xmlui.xconf file. Thus, if the default theme is defined before any other themes then no other themes will be used.

6.3 Creating a New Theme

Files:
- *[manakin-source]* /themes/*[theme-dir]*/sitemap.xmap (The theme's configuration)
- *[manakin-source]* /themes/*[theme-dir]*/style.css (CSS stylesheet)
- *[manakin-source]* /themes/*[theme-dir]*/style-ie.css (CSS stylesheet for IE)

Instructions:
1. First determine a directory name for your new theme inside the [manakin-source]/themes/ directory; this name will be referenced as [theme-dir] in these instructions.

2. Instead of starting your new theme completely from scratch, make a new copy of the *standard theme template* in a new directory, [theme-dir] .
```
cd [manakin-source]/themes
 cp -R template [theme-dir]
```

3. Next customize the theme's sitemap by specifying the theme's directory and name. Open, [manakin-source]/themes/[theme-dir]/sitemap.xmap, and edit the global variables shown below:
```
<map:component-configurations>
<global-variables>
<theme-path>[theme-dir]</theme-path>
<theme-name>[the name of your theme]</theme-name>
</global-variables>
</map:component-configurations>
```

4. Next customize the theme's CSS stylesheets, by default there are two style sheets used – a base version for all browsers and then a supplemental version just for Internet explorer.
```
[manakin-source]/themes/[theme-dir]/style.css
[manakin-source]/themes/[theme-dir]/style-ie.css
```

5. Perform the steps in Install a theme

6. Perform the steps in Rebuild Manakin

6.4 Customize Header or Footer

Files:
● [manakin-source]/themes/[theme-dir]/template.xsl (The theme's stylesheet)
● [manakin-source]/themes/dri2xhtml/structural.xsl

Instructions:

1. If you haven't already, you need to Create a new theme

2. To modify the header, locate the template named "buildHeader" inside the structural.xsl. Copy this template into your theme's local template.xsl and modify the XSLT as needed.

```
<xsl:template name="buildHeader">
....
</xsl:template>
```

3. To modify the footer, locate the template named "buildFooter" inside the structural.xsl. Copy this template into your theme's local template.xsl and modify the XSLT as needed.

```
<xsl:template name="buildFooter">
....
</xsl:template>
```

6.5   Adding Text to a Page (i18n)

Files:
● *[manakin-source]*/config/i18n/messages.xml (English i18n catalogue)
● *[manakin-source]*/config/i18n/messages*[language & locale]*.xml (non-English i18n catalogues)

Instructions:
1. Open the theme's XSL template and modify the relevant templates (i.e. the header or footer templates) adding an <i18n:text> element where you would like the new text to appear. Make sure the value of the key is unique, for example:
```
<i18n:text> xmlui.yourtheme.mynewkey </i18n:text>
```

2. Open the messages catalogue, config/i18n/messages.xml, and for neatness find the key values for that begin with the common prefix of your new key. Add a new line corresponding to your new key:
```
<message key="xmlui.yourtheme.mynewkey">
Text of my new key!
</message>
```

3. Perform the steps in Rebuild Manakin.
Notes:
● i18n = internationalization
● We can, of course, simply add the text directly into the XSL, but you will find it easier to translate the text into other languages if you use the i18n catalogue.
● Remember, when adding or modifying text in the messages.xml catalogues be very careful to use XML escaping rules, such as:

&	becomes	&
"	becomes	&quote;
'	becomes	'
<	becomes	<
>	becomes	>

6.6 Installing an Aspect

Files:
- *[new-aspect-source]* (This where the new Aspect's source code is)
- *[manakin-source]*/aspects/*[aspect-dir]*

(This will be the new location for the Aspect's source)
- *[dspace]*/config/xmlui.xconf

Instructions:
1. If you are installing a brand new Aspect that is not distributed with Manakin
then preform the following operations, otherwise skip to the next step.

```
cp [new-aspect-source] [manakin-source]/aspects/[aspectdir]
```
(the above copy command should be on a single line)

2. Open Manakin's configuration file, *[dspace]*/config/xmlui.xconf, scroll to the
bottom and locate the <aspects> element.

3. Add a new <aspect> element inside the <aspects> element as below:
```
<aspect name="My new Aspect" path="[aspect-dir]/"/>
```

4. Restart Tomcat (See *Quick Restart* in Rebuild Manakin)

Chapter 7: Codes

7.1 color.css

```css
/*    color.css    */
body {color: #05192C;}
div#ds-main {color: inherit;background-color: white;}
#contact_us {color: #0C3F71;}
#contact_us a {color: #0C3F71;}
#mainmenu {background-color: #97A9C0;border: 1px solid white;}
#mainmenu ul li {color: white;}
#mainmenu ul li.current {background-color: #97A9C0;}
#mainmenu ul li a {color: white;background-color: #0C3F71;border-right:
1px solid white;}
#mainmenu ul li.search {background-color: #97A9C0;}
#mainmenu ul li a:hover {background-color: #2B5C8C;}
.main_nav_text {color: #FFFFFF;}
.sub_nav_text {color: #05192C;}
ul#ds-trail-top {background-color:#084B8A ;border-top: 0px solid
white;border-bottom: 1px solid white;}
ul#ds-trail-bottom {background-color:#084B8A ;}
li.ds-trail-link {color: white;}
li.ds-trail-link a {color: white;}
div#ds-user-box p {color: rgb(43, 92, 140);background-color: inherit;}
div#ds-user-box a {color: rgb(43, 92, 140);background-color: inherit;}
div#ds-body h1 {color: #041A55;border-bottom: 1px solid #BE1621;}
div#ds-body h2 {color: #243A75;}
div#ds-body h3 {color: #BE1621;}
.alphabet a {color: #243A75;}
.alphabet a:hover {color: #BE1621;}
div#ds-options h3 {color: #243A75;}
div#ds-options h4 {color: #BE1621;}
div#ds-options li {color: rgb(25, 25, 75);}
div#ds-search-option input.ds-text-field {border-bottom: 2px solid
rgb(200, 200, 200);
    border-right: 2px solid rgb(200, 200, 200);border-left: 2px solid
rgb(75, 75, 75);
    border-top: 2px solid rgb(75, 75, 75);color: #0C3F71;}
div#ds-search-option input.ds-button-field {border-bottom: 2px solid
rgb(50, 50, 50);
    border-right: 2px solid rgb(50, 50, 50);border-left: 2px solid
rgb(210, 210, 210);
    border-top: 2px solid rgb(210, 210, 210);background-color:
rgb(150, 150, 150);
    color: rgb(60, 60, 60);}
div#ds-search-option a {color: #436B92;}
div.ds-option-set {border-left: 1px solid #546AA5;}
.collection .search,.community .search {background-color: rgb(229, 240,
251);
    border: 1px solid rgb(206, 220, 234);}
div.filter-search-results .filter-search {background-color: rgb(229,
240, 251);
    border: 1px solid rgb(206, 220, 234);}
.result-query {color: rgb(150, 150, 200);}
```

```
div#ds-footer {background-color: #D8E6F4;}
div#ds-footer p {color:#0174DF;}
div.pagination {background-color: rgb(229, 240, 251);border: 1px solid
rgb(206, 220, 234);}
div.pagination-masked {background-color: rgb(229, 240, 251);border: 1px
solid rgb(206, 220, 234);}
a.previous-page-link {color: rgb(25, 25, 100);}
a.next-page-link {position: absolute;right: 10px;top: 20px;color:
rgb(25, 25, 100);}
li.page-link a,li.first-page-link a,li.last-page-link a {color: rgb(25,
25, 100);}
li.current-page-link a {color: #BE1621;}
.artifact-title a {color: #243A75;}
.citation {background-color: rgb(247, 252, 255);border: 1px solid
rgb(206, 220, 234);}
ul.ds-artifact-list {clear: both;border: 1px solid rgb(229, 240,
251);margin-left: 0px;padding-left: 0px;}
ul.ds-artifact-list li.ds-artifact-item.odd {background-color: rgb(231,
242, 251);}
ul.ds-artifact-list li.ds-artifact-item.even {background-color:
rgb(247, 252, 255);}
table {border: 2px solid rgb(206, 220, 234);}
tr.ds-table-header-row {background-color: rgb(206, 220, 234);}
tr.ds-table-header-row.subheader {background-color: rgb(206, 220,
234);}
tr.ds-table-row.odd {background-color: rgb(231, 242, 251);}
tr.ds-table-row.even {background-color: rgb(247, 252, 255);}
td {background-color: inherit;color: inherit;}
fieldset.ds-form-list {background-color: rgb(229, 240, 251);border: 1px
solid rgb(206, 220, 234);}
fieldset.ds-form-list.thick { border-top: 22px solid rgb(206, 220,
234);}
fieldset.ds-form-list legend {color: rgb(190, 22, 33);}
fieldset.ds-form-list li.odd {background-color: rgb(195, 208, 223);}
fieldset.ds-form-list li.even {background-color: rgb(229, 240, 251);}
fieldset.ds-form-list li.last {border-top: 2px solid rgb(206, 220,
234);background-color: rgb(84, 123, 162);}
fieldset.ds-form-list li.sublist {background-color: transparent;}
fieldset.thick legend {background-color: rgb(229, 240, 251);border-top:
6px solid rgb(206, 220, 234);}
fieldset.ds-form-sublist {border-top: 1px solid rgb(240, 240,
210);border: 1px solid rgb(206, 220, 234);}
fieldset.ds-form-sublist legend {color: rgb(190, 22, 33);background-
color: transparent;}
fieldset.ds-form-sublist.thick legend {color: rgb(190, 22, 33);}
label.ds-composite-component {color: blue;}
span.error {color: red;}
span.field-help {color: gray;background-color: inherit;}
input.error,textarea.error,select.error {background-color: rgb(255,
239, 242);border-color: red;}
span.composite-help {color: gray;}
div.notice.failure, div#ds-system-wide-alert{border: 1px solid
black;background-color: rgb(239, 209, 209);}
div.notice.success{border: 1px solid black;background-color: rgb(228,
255, 223);}
div.notice.neutral{border: 1px solid black;background-color: rgb(209,
231, 239);}
```

```
div#NoticeTransformer_div_general-message p {color: black;}
div#NoticeTransformer_div_general-message h1.ds-div-head {color:
black;}
ul.horizontal{border-bottom: 1px solid rgb(206, 220, 234);}
ul.horizontal li{background-color: rgb(229, 240, 251);border: 1px solid
rgb(206, 220, 234);}
ul.horizontal li span.bold a{border-bottom: 1px solid white;background-
color: white;}
ul.horizontal li span.bold a { color: black; }
ul.horizontal a:hover { background: rgb(195, 208, 223); }
```

7.2 font.css

```
/*    fonts.css   */
body {font-family: Verdana, sans-serif;font-size: 13px;}
#contact_us {font-size: 10px;font-weight: bold;text-transform:
uppercase;text-align: right;}
#contact_us a {text-decoration: none;}
#contact_us a:hover {text-decoration: underline;}
a#tdl_logo{text-decoration: none;}
#mainmenu ul li {text-transform: uppercase;}
#mainmenu ul li a {text-decoration: none;}
#mainmenu ul li a:hover {font-weight: normal;}
.main_nav_text { text-transform: uppercase;text-decoration: none;font-
weight: normal; }
.sub_nav_text { font-weight: bold;text-decoration: none; }

li.ds-trail-link {font-family: Verdana, sans-serif;font-size: 10px;}
li.ds-trail-link a{text-decoration: none;}
li.ds-trail-link a:hover{text-decoration: underline;}
li.last-link {font-weight: bolder;}
div#ds-user-box p {font-size: 95%;}
div#ds-user-box a {text-decoration: none;font-weight: bold;}
div#ds-user-box a:hover {text-decoration: underline;}
div#ds-body h1 {font-size: 20px;font-weight: normal;}
div#ds-body h2 {font-size: 14px;font-weight: bold;}
div#ds-body h3 {font-size: 11px;font-weight: bold;}
.alphabet li {font-weight: 200;}
.alphabet a{font-weight: 600;}
.alphabet a:hover{font-weight: 600;}
div#ds-search-option input.ds-text-field {font-size: 12px;font-weight:
bold;}
div#ds-search-option input.ds-button-field {font-family: Verdana, sans-
serif;font-weight: bold;font-size: 12px;}
div#ds-search-option a {font-weight: bold;}
.collection .search, .community .search {font-size: 10px;}
.collection input {font-size: 10px;}
.collection input.ds-text-field {width: 136px;}
.collection select {font-size: 10px;}
.community input {font-size: 10px;}
.community select {font-size: 10px;}
div.filter-search-results.filter-search {font-size: 10px;}
div.filter-search-results input {font-size: 10px;}
div.filter-search-results select {font-size: 10px;}
```

```
.navigation input,.navigation select {font-size: 10px;}
div#ds-footer p { font-family: Arial, Sans-serif;font-size: 10px;}
.pagination-links li {font-weight: bolder;font-size: 90%;}
div.artifact-title {font-size: 12px;}
.artifact-title a {text-decoration: none;font-weight: bolder;font-size:
90%;}
.artifact-title a:hover {text-decoration: underline;}
ul.ds-artifact-list li span.publisher {font-style: italic;}
.citation {font-size: 11px;}
span.title {font-style: italic;}
p.copyright-text {font-style: italic;}
td {font-size: inherit;}
.subheader th {font-weight: 100;}
fieldset.ds-form-list legend {font-size: 115%;font-weight: bolder;}
fieldset.ds-form-sublist legend {font-size: 100%;font-weight: bolder;}
ol li.ds-form-item a {font-size: 90%;}
span.ds-form-label,label.ds-form-label {font-weight: bold;}
label.ds-composite-component {display: block;float: left;padding: 0px
5px 0 0px;
                                        font-size: 95%;color: blue;    text-align:
left;}
span.error {font-size: 95%;}
span.field-help {font-size: 95%;}
span.composite-help {font-size: 95%;}
span.bold {font-weight: bold;}
span.italics,span.italic {font-style: italic;}
span.underline {text-decoration: underline;}
*.ds-gloss-list-label {font-weight: bolder;}
div.notice.failure, div#ds-system-wide-alert{text-align: center;}
div.notice.success{text-align: center;}
div.notice.neutral{text-align: center;}
div#NoticeTransformer_div_general-message h1.ds-div-head {font-size:
110%;}
ul.horizontal{font-weight: bold;}
ul.horizontal a{text-decoration: none;}
```

7.3 image.css

```
/*    images.css   */
div#ds-header{background-image: url("../images/header.jpg");background-
repeat:repeat-x;}
a#tdl_logo {background-image: url("../images/logo1.gif");}
#dropdown1 {background-image:
url("../images/sub_nav_bkgd.png");background-repeat: repeat;}
#dropdown2 {background-image: url("../images/sub_nav_bkgd.png");}
#dropdown3 {background-image: url("../images/sub_nav_bkgd.png");}
#dropdown4 {background-image: url("../images/sub_nav_bkgd.png");}
#dropdown5 {background-image: url("../images/sub_nav_bkgd.png");}
li.ds-trail-link {background-image:
url("../images/trail.gif");background-repeat: no-repeat;
                     background-position: 0% 60%;}
li.first-link {background-image: none;}
/* Branding of ETDs  */
ul.ds-artifact-list li.ds-artifact-item div.artifact-grantor {
```

```
                     background-repeat: no-repeat;background-position: 0px 5px;}
ul.ds-artifact-list li.ds-artifact-item div.artifact-grantor.TDL {
            background-image: url("../images/search.jpg");}
div#ds-system-wide-alert p{background-image:
url("../images/alert.gif");
                background-repeat: no-repeat;}
```

7.4 style.css

```
/*    style.css    */
@import url("color.css");
@import url("fonts.css");
@import url("images.css");
body {margin: 0px;padding: 0px;}
div#ds-header {height: 208px;padding: 0px;margin: 0px;margin-bottom:
20px;width: 100%;}
a#tdl_logo {position: relative;left: 19px;top: 23px;width:
190px;height: 41px;z-index: 5;border:  0px;}
#contact_us {position: absolute;width: 400px;height:100px;top:
50px;right: 10px;z-index: 4;}
#hidedropdown {position: absolute;width: 777px;height: 350px;z-index:
3;left: 0px;top: 0px;visibility: hidden;}
#mainmenu {position: absolute;top: 100px;height: 29px;left: 0px;width:
100%;line-height: normal;
            border-width: 1px 0px 0px 0px;z-index: 4;}
#mainmenu ul {margin: 0px;padding: 0px;padding-top: 3px;list-style:
none;}
#mainmenu ul li {float: left;margin: 0px; display: inline;}
#mainmenu ul li a {position: relative;top: 5px;margin: 0px;padding: 8px
26px 8px 26px;}
#mainmenu ul li a:hover {margin: 0px;}
#dropdown1 {position: absolute;width: 200px;height: auto;z-index:
5;left: 9px;top: 130px; visibility: hidden;}
#dropdown2 {position: absolute;width: 200px;height: 115px;z-index:
5;left: 91px;top: 130px;visibility: hidden;}
#dropdown3 {position: absolute;width: 200px;height: 115px;z-index:
5;left: 194px;top: 130px;visibility: hidden;}
#dropdown4 {position: absolute;width: 200px;height: 115px;z-index:
5;left: 398px;top: 130px;visibility: hidden;}
#dropdown5 {position: absolute;width: 200px;height: 115px;z-index:
5;left: 375px;top: 130px;visibility: hidden;}
.main_nav_text {cursor: pointer;}
ul.subnav {list-style: none;padding: .5em 0 0.5em 1em;margin: 0;}
ul.subnav li {display: list-item;padding: 0 0 10px 0;margin: 0}
div#ds-header h1,div#ds-header h2 {display: none;}
form.navSearch p {padding: 0px;margin: 0px;}
ul#ds-trail-top {position: relative;top: 160px;height: 26px;margin:
0px;padding: 4px 0 0 24px;}
ul#ds-trail-bottom {margin: 0px;padding-left: 25px;line-height:
30px;clear: both;}
li.ds-trail-link {display: inline;padding-left: 15px;margin-top:
2px;margin-left: 0px;
                  line-height: 20px;max-width: 400px;overflow: hidden;}
li.first-link {list-style: none;padding-left: 0;}
```

```
div#ds-user-box {width: 100%;position: absolute;top: 10px;right:
15px;text-align: left;}
div#ds-user-box p {height: 12px;padding: 0px;margin: 0px;}
div#ds-user-box a {height: 12px;padding: 0px;margin: 0px;}
div#ds-body {float: left;clear: left;padding: 0px 30px 20px 5px;margin-
left: 20px;
              margin-top: -40px;width: 65%;min-height: 350px;}
div#ds-body h1 {margin-top:35px;clear: both;padding-bottom: 3px;}
div#ds-body h2 {clear: both;padding: 10px 0;margin-top: 20px;margin-
bottom: 0px;}
div#ds-body h3 {clear: both;padding: 10px 0;margin-bottom: 0px;}
ul.alphabet {padding-left: 10px;padding-top: 0px;margin: 0px;margin-
top: 5px;text-align: center;}
.alphabet li {list-style: none;display: inline;margin-right: 3px;}
div#ds-options {float: right;padding: 0px 10px 0px 10px;margin:
0px;width: 22%;}
div#ds-options h3 {position: relative;top: 12px;margin: 0px;margin-
left: 5px;}
div#ds-options h4 {margin-top: 5px;margin-bottom: 5px;}
div#ds-options ul{margin-bottom: 10px;margin-left: 0px;padding-left:
5px;}
div#ds-options ul ul{margin-bottom: 10px; margin-left: 0px;padding-
left: 10px;}
div#ds-options li{list-style-position: inside;}
div#ds-options li li{list-style-position: inside;}
div#ds-options li.listHead{list-style-type: none;}
div#ds-search-option {position: absolute;text-align: right;border:
none;padding: 0px;top: 100px;z-index: 30;}
div#ds-search-option input.ds-text-field {margin-top: 80px;padding-
left: 5px;margin-right: 5px;width: 130px;}
div#ds-search-option a {position: relative;top: 8px;}
div.ds-option-set {margin-bottom: 20px;padding-left: 10px;padding-top:
10px;}
.collection .search {padding: 5px 5px 5px 10px;margin: 5px 0px 5px
0px;}
.collection input {margin: 0px;}
.collection input.ds-text-field {width: 136px;}
.collection select {margin: 0px;width: 140px;}
.collection p.button-list {margin: 0px;}
.community .search {padding: 5px 5px 5px 10px;margin: 5px 0px 5px 0px;}
.community input {margin: 0px;}
.community input.ds-text-field {width: 200px;}
.community select {margin: 0px;width: 200px;}
.community p.button-list {margin: 0px;}
div.search-browse {float: left;padding: 0px;width: 50%;margin-right:
3%;margin-bottom: 2%;}
div.filter-search-results .filter-search {padding: 5px 5px 5px
10px;margin: 5px 0px 5px 0px;width: 260px;}
div.filter-search-results input {margin: 0px;}
div.filter-search-results input.ds-text-field {width: 200px;}
div.filter-search-results select {margin: 0px;width: 200px;}
.result-query {text-align: center;}
.filter-search h2,.filter-search h2 {display: none;}
input.ds-password-field {margin-right: 5px;}
.navigation input,.navigation select {margin-left: 5px;}
.navigation p {margin: 5px;text-align: center;}
div.browse {display: none;}
```

```
div#ds-footer {float: left;clear: both;width: 100%;padding: 0px;height:
85px;}
div#ds-footer p {float: left;clear: both;padding-left: 25px;margin-top:
10px;}
div.pagination {position: relative;height: 45px;padding: 0px;margin-
top: 20px;
                    margin-bottom: 10px;float: left;clear: both;width:
100%;}
div.pagination-masked {position: relative;height: 45px;padding: 0px;
                        margin-top: 10px;margin-bottom: 10px;float:
left;clear: both;width: 100%;}
p.pagination-info {position: relative;left: 10px;top: -5px;width:
100%;text-align: center;padding: 1px;
                    height: 20px;margin-left: auto;margin-right:
auto;padding-top: 7px;padding-bottom: 0px;float: none;}
ul.pagination-links {position: relative;text-align: center;top: -
24px;right: 7px;width: 100%;}
.pagination-links li {list-style: none;display: inline;margin-right:
0px;}
a.previous-page-link {position: absolute;left: 10px;top: 20px;}
a.next-page-link {position: absolute;right: 10px;top: 20px;}
.item-view-toggle {margin-top: 30px;}
.citation {padding: 5px 5px 5px 10px;overflow: hidden;}
div.ds-logo-wrapper {float: right;padding: 10px;font-size: 1px;width:
45%;margin-bottom: 2%;text-align: center; }
img.logo {max-width: 00px;max-height: 200px;margin-left: auto;margin-
right: auto;vertical-align: middle;}
p.copyright-text {margin-top: 30px;font-style: italic;text-align:
center;}
ul.ds-artifact-list {padding: 0px;list-style-type: none;margin:
0px;float: left;width: 100%;}
ul.ds-artifact-list li {float: left;clear: both;width: 100%;padding-
bottom: 8px;padding-top: 8px;}
ul.ds-artifact-list li img {border: 0px;}
ul.ds-artifact-list li  div {float: left;}
ul.ds-artifact-list li div.artifact-description {float: left;clear:
right;margin-top: 0px;padding: 0 5px;width: 77%;}
ul.ds-artifact-list li div.artifact-title {float: left;clear: both;}
ul.ds-artifact-list li div.artifact-info {float: left;clear:
both;width: 100%;}
ul.ds-artifact-list li div.artifact-links {display: block;float:
left;clear: both;width: 50%;}
ul.ds-artifact-list li.branded {padding-left: 50px;}
ul.ds-artifact-list li div.artifact-preview {float: right;}
ul.ds-artifact-list li div.artifact-grantor {float: left;margin-left:
7px;margin-top: 5px;width: 40px;height: 40px;}
.artifact-links {margin: 0px; margin-top: 7px;}
.artifact-links a {margin-right: 20px;}
table {width: 100%;border-spacing: 0px;border-collapse: collapse;}
td {padding: 3px 10px 5px 10px;border: none;font-size: inherit;}
* .first-cell {vertical-align: middle;text-align: center;}
th {padding: 4px 10px;}
.subheader th {padding-left: 5px;font-weight: 100;}
.indent {padding-left: 35px;padding-right: 0;}
.doubleIndent {padding-left: 55px;padding-right: 0;}
th.indent {padding-left: 30px;padding-right: 0;}
th.doubleIndent {padding-left: 50px;padding-right: 0;}
```

```css
fieldset {border: 0px;}
.file-list td {text-align: center;}
a.image-link img {border: none;}
fieldset.ds-checkbox-field,fieldset.ds-radio-field {border: none;
      margin: 0;padding: 0;}
fieldset.ds-checkbox-field legend,fieldset.ds-radio-field legend
{display: none;}
fieldset.ds-checkbox-field label,fieldset.ds-radio-field label
{display: block;}
fieldset.ds-form-list {padding: 0;margin-left: 0;margin-right: 0;width:
100%;}
fieldset.ds-form-list ol {padding: 0;margin: 0;width: 100%;}
li.ds-form-item {float: left;clear: both;}
fieldset.ds-form-list legend {margin-left: 10px;}
fieldset.thick legend {padding-left: 10px;padding-right: 30px;}
fieldset.ds-form-sublist {padding: 0;margin: 5px;}
fieldset.ds-form-list ol {list-style-type: none;}
form.ds-interactive-div fieldset.ds-form-sublist ol { padding: 0;
      margin: 0;  width: 100%;}
form.ds-interactive-div fieldset.ds-form-sublist legend {margin-left:
10px;padding: 0;border: 0;}
/* Row-level hierarchy */
form.ds-interactive-div li.ds-form-item {display: block;padding: 5px
0;width: 100%;}
div.ds-form-content {float: left;clear: right;display: block;padding:
7px;width: 400px;}
span.ds-form-label,label.ds-form-label {display: block;float:
left;clear: left;
                  padding: 5px 20px 5px 10px;width: 115px;  vertical-
align: middle;overflow: hidden;}
label.ds-composite-component {display: block;float: left;padding: 0px
5px 0 0px;}
span.error {display: block;margin: 0px;margin-top: 2px;}
span.field-help {display: block;margin-top: 2px;}
span.composite-help {display: block;text-align: left;}
div.spacer {margin: 0;padding: 0;line-height: 0;clear: both;}
*.hidden {display: none;visibility: none;}
h1.ds-div-head,h2.ds-div-head,h3.ds-div-head {clear: both;}
ul.ds-progress-list {margin: 0 0 10px 0;padding: 2px 0px;text-align:
center;}
ul.ds-progress-list li {overflow: hidden;display: inline;padding: 4px
3px;margin-top: 2px;
                        margin-left: 3px;max-width: 400px;line-height:
20px;}
ul.ds-progress-list li.button {border: none;padding: 1px
!important;margin-top: 2px;margin-left: 0px !important;}
ul.ds-progress-list li.arrow {border: none;background: none;margin-
left: 0px;margin-right: 0px;}
form.search li {margin: 0;padding: 0px !important;}
div.detail-view {padding: 5px 5px 5px 6px;}
p.button-list {margin-top: 3px;padding-bottom: 0;}
ul.collection-browse,ul.community-browse {display: none;}
*.collection-search-browse td,*.community-search-browse td {white-
space: nowrap;}
*.collection-search-browse h4,*.community-search-browse h4 {display:
none;}
```

```
*.collection-search-browse select,*.community-search-browse select
{width: auto;max-width: 200px;}
*.collection-search-browse input,*.community-search-browse input
{width: auto;max-width: 195px;}
*.button-list input {width: auto;}
div.ds-logo-wrapper {float: right;padding: 5px 0px 5px 10px;}
table.ds-gloss-list {border: none;width: auto;font-size: inherit;}
*.ds-gloss-list td {padding: 5px;}
table.ds-gloss-list td ul {list-style-type: none;padding: 0px;margin:
0px;}
div.ds-static-div {border: 0px solid white;clear: both;}
div.ds-static-div.secondary{clear: none;}
span.ds-composite-field {display: table-row;padding: 2px;}
*.ds-composite-field .ds-composite-component {display: table-cell;text-
align: left;        width: auto;padding-right: 10px;}
*.ds-composite-field input,*.ds-composite-field textarea,*.ds-
composite-field select {margin-right: 5px;margin-bottom: -2px;}
form.ds-interactive-div {padding: 0px;margin-bottom: 10px;width: 100%;}
p {padding: 0;margin: 6px;}
div.license-text {padding: 20px;margin: 20px;margin-top: 5px;}
div.notice, div#ds-system-wide-alert {padding: 0px;margin: 0px;width:
100%;}
div#ds-system-wide-alert p{height: 35px;vertical-align: middle;padding-
top: 15px;padding-left: 55px;margin: 0px;text-align: left;}
div#NoticeTransformer_div_general-message h1.ds-div-head {display:
none;position: absolute;left: -10000px;}
p.hidden {display: none;}
ul.horizontal{list-style-type: none;padding: 0px;padding-left:
5px;padding-bottom: 24px;margin: 0px;}
ul.horizontal li{float: left;height: 21px;margin: 2px 2px 0px 2px;}
ul.horizontal a{float: left;display: block;padding: 4px;}
```

7.5 jscript.js

```
/*    jscript.js  */
function MM_reloadPage(init) {  //reloads the window if Nav4 resized
  if (init==true) with (navigator) {if
((appName=="Netscape")&&(parseInt(appVersion)==4)) {
    document.MM_pgW=innerWidth; document.MM_pgH=innerHeight;
onresize=MM_reloadPage; }}
  else if (innerWidth!=document.MM_pgW || innerHeight!=document.MM_pgH)
location.reload();
}
MM_reloadPage(true);

function MM_swapImgRestore() { //v3.0
  var i,x,a=document.MM_sr;
for(i=0;a&&i<a.length&&(x=a[i])&&x.oSrc;i++) x.src=x.oSrc;
}

function MM_preloadImages() { //v3.0
  var d=document; if(d.images){ if(!d.MM_p) d.MM_p=new Array();
    var i,j=d.MM_p.length,a=MM_preloadImages.arguments; for(i=0;
i<a.length; i++)
```

```
    if (a[i].indexOf("#")!=0){ d.MM_p[j]=new Image;
d.MM_p[j++].src=a[i];}}
}

function MM_findObj(n, d) { //v4.01
  var p,i,x;  if(!d) d=document;
if((p=n.indexOf("?"))>0&&parent.frames.length) {
    d=parent.frames[n.substring(p+1)].document; n=n.substring(0,p);}
  if(!(x=d[n])&&d.all) x=d.all[n]; for (i=0;!x&&i<d.forms.length;i++)
x=d.forms[i][n];
  for(i=0;!x&&d.layers&&i<d.layers.length;i++)
x=MM_findObj(n,d.layers[i].document);
  if(!x && d.getElementById) x=d.getElementById(n); return x;
}

function MM_swapImage() { //v3.0
  var i,j=0,x,a=MM_swapImage.arguments; document.MM_sr=new Array;
for(i=0;i<(a.length-2);i+=3)
   if ((x=MM_findObj(a[i]))!=null){document.MM_sr[j++]=x; if(!x.oSrc)
x.oSrc=x.src; x.src=a[i+2];}
}

function MM_showHideLayers() { //v6.0
  var i,p,v,obj,args=MM_showHideLayers.arguments;
  for (i=0; i<(args.length-2); i+=3) if
((obj=MM_findObj(args[i]))!=null) { v=args[i+2];
    if (obj.style) { obj=obj.style;
v=(v=='show')?'visible':(v=='hide')?'hidden':v; }
    obj.visibility=v; }
}
function MM_hideAllDrops(drop) { //v6.0
var i,obj;
     for (i=1; i<5; i++) {
           if (drop != i) { obj=MM_findObj('dropdown' + i);
obj=obj.style; obj.visibility='hidden'; }
     }
}
```

Chapter 8: Conclusion

8.1 Changes Done

- Most of the visual changes are done in CSS

- XSLT templates are overridden to make structural and content modifications

- The theme manager is configured to apply certain themes to specific DSpace components

8.2 Use

The digital library makes information accessible to the end user, in an easy to use form, over the world wide web. The main reasons to digitize are to enhance access and improve preservation. The intent is to encourage users to search collections rapidly and comprehensively from anywhere at any time. There are some preliminary tasks of deciding on collection, careful evaluation of collection and the digitations of only those items that will provide maximal advantage to end users.

8.3 Implementation

The digital library we have developed named "CSE Digital Library (CSEDL)" has been implemented as the official digital library of the Department of Computer Science and Engineering at Indian Institute of Technology, Kharagpur. It is already being used by the faculty members, research scholars and other masters and bachelor degree students as an online repository for their works. As of now, the CSEDL is available on the LAN (at **http://10.5.16.234:8080/manakin**) of the CSE department. It will also be available on the world wide web shortly, once it is done with licensing and other official and legal formalities.

9.References

DSpace Home Page - http://www.dspace.org

DSpace Installation Guide - http//casin.ncsi.iisc.ernet.in

Manakin Home Page - http://www.di.tamu.edu

DSpace Wiki -http://www.wiki.dspace.org

XML Tutorial - http://www.w3schools.com/xml/default.asp

HTML Tutorial - http://www.w3schools.com/html/default.asp

CSS Tutorial - http://www.w3schools.com/css/default.asp

XSLT Tutorial - http://www.w3schools.com/xsl/default.asp

Apache Cocoon Project - http://cocoon.apache.org/

Texas Digital Library - http://www.tdl.org

Download Sites

DSpace - http://www.sourceforge.net/projects/dspace

Apache Tomcat - http://tomcat.apache.org

Apache Ant - http://ant.apache.org

Apache Maven - http://maven.apache.org/download.html

PostgreSQL - http://www.postgresql.org

Java Compiler - http://java.sun.com/javase/downloads/index.jsp

Ultimately, the Magic Machine Google - http://www.google.com