Universidad Evangélica de El Salvador


UNIVERSIDAD EVANGÉLICA
DE EL SALVADOR

# Proceso de Instalación y Configuración de DSPACE 5.3

*Gerencia de Tecnología de Información*
*Administración de Red*

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# Índice de contenido

# DSpace

**These installation instructions apply best Unix system administration practice and therefore differ from the official DSpace instructions**
***** Do not miss a procedure or a step in the procedures themselves *****
***** It is essential that you follow each step in the procedures one-by-one *****

## Introduction

The following wiki pages describe the procedures to install a "vanilla" DSpace instance using an Ubuntu LTS server as we did for our SUNScholar server.

You are also welcome to use these pages to build a test/development/training version of DSpace.

*If you intend to use these wiki pages for an installation workshop on your campus, then make sure each computer and server to be used for this purpose, has open and unrestricted access to the internet via your institutions firewall and/or proxy server.*

# Install Ubuntu

## Step 1. Requirements

### Server Guide

Click here to download the Ubuntu 14.04 LTS server guide.

### Hardware

**Please read** hardware upgrading **to view the pro's and con's of virtualisation, if you are considering virtualisation.**

Click here to view an example quote for a DELL production server.

#### RAID Array

When your new server arrives, you will need to setup a RAID array on the server. At Stellenbosch we use RAID6 as policy on our critical servers. For RAID setups consult the guide supplied with your server and the links below.

https://en.wikipedia.org/wiki/RAID
https://en.wikipedia.org/wiki/Standard_RAID_levels

**Prepare your server with the RAID type you have selected to use, before doing ANY server operating system installation.**

**Estimate Disk Usage**

See: https://wiki.duraspace.org/display/DSPACE/EndUserFaq#EndUserFaq-WhatsortofhardwaredoesDSpacerequire?Whataboutsizingtheserver?HowmuchdiskspacedoIneed?

If you can, try to get estimates of the number of research articles published and the number of masters and doctorates published by your institution.

For each "born digital" item budget approx 5MB storage and for print items digitised approx 30MB.

If your archive is going to host research data and OER items then double your disk usage calculation.

If your server should run out of disk space, then simply add more storage. See link below for help.

`http://wiki.lib.sun.ac.za/index.php/SUNScholar/Upgrading/Hardware/Add_a_New_Disk`

At the moment we use a DELL R710 server. With the following specifications:

- 2x Intel E5650 64 bit = 12 real CPU's and 24 virtual CPU's
- 12GB 1333Hz RAM
- 400GB RAID5 disk array using 10K RPM disks
- 4x 100MB Ethernet ports

## Software

- We use the LTS versions of Ubuntu for our servers.
- Please **click here** to find out why Ubuntu was selected as the server operating system platform.

Download and burn one of ISO images to a blank CD. Do not copy it as data, it **MUST** be burned as an ISO image.

If you have problems burning your own CD, then please ask your IT support people to help you.

The server installation CD can be downloaded from:

*PLEASE NOTE: DSpace versions =>4.X require Ubuntu 14.04 LTS!*

`ftp://ftp.sun.ac.za/iso-images/ubuntulinux/14.04/ubuntu-14.04-server-amd64.iso`

`ftp://ftp.sun.ac.za/iso-images/ubuntulinux/12.04/ubuntu-12.04-server-amd64.iso`

# Step 2. Before Ubuntu Installation

## Hostname/URL considerations

## Avoid these words at all costs!

Try to avoid using "dspace", "space", "ir", "repository" or e-something in the URL selection because the connotation is confusing to current users and will be for future users when DSpace no longer exists or the "new" concept of an "institutional repository".

**The software and IR concept are only the vehicles for the repository and should not define it's URL.**

## What name to use?

It is assumed that you have not yet decided on a hostname for your server.

At Stellenbosch University we chose a URL of http://scholar.sun.ac.za for a purely research outputs repository and http://digital.lib.sun.ac.za for our library digital collections.

For a repository of digitised heritage items, then something like: http://heritage.my.ac.za may be appropriate.

For a repository that will be a general archive of digital items, then http://archives.my.ac.za may be appropriate.

**Therefore you have to decide what the function of the repository is, before naming it.**

## Keep it short, easy to remember and persistent!

Think of the Google and Facebook URL's. Everybody knows how to search Google and get onto Facebook because they have remembered the URL's.

**There are many thousands of websites and your repository will be one of them, so you are fighting for good web visibility and marketing mindshare by selecting a good URL .**

Whatever you decide, **it is very important that you do not change it later** for the purposes of preventing "linkrot" and web server "error 404, item not found" errors, *because this will completely destroy your present website ranking and your research articles electronic citation persistence*.

## Cool URI's

- http://www.w3.org/Provider/Style/URI.html
- http://www.w3.org/TR/cooluris

### Last, but not least!

For more detailed information about the reason for our hostname selection, please read the **web analytics wiki page**.

**Discuss the hostname selection with your repository manager/owner and campus network administrator first, before finalising on a name.**

---

**Do not continue with the installation until you have finalised the hostname (URL) with your repository manager and campus network administrator.**

---

### Hostname/URL FAQ

#### Hostname selection

Q. What is the difference, between a hostname and a URL (domain name)?

A. http://wiki.lib.sun.ac.za/index.php/Install_DSpace/S04/1.8.2#Server_Hostname

#### What is a domain name?

http://www.commoncraft.com/video/domain-names-and-hosting

#### Persistent marketing friendly host name

http://wiki.lib.sun.ac.za/index.php/SUNScholar/Guidelines/Step_2

#### Network Registration

http://wiki.lib.sun.ac.za/index.php/SUNScholar/Install_Ubuntu/S04#Network_registration

# Step 3. Ubuntu Installation

See links below for Ubuntu server installation help.

- https://help.ubuntu.com/14.04/serverguide/installation.html
- http://ubuntuserverguide.com/2014/04/how-to-install-ubuntu-server-14-04-trusty-tahr.html
- http://ubuntuserverguide.com/2013/02/manual-disk-partition-guide-for-ubuntu-server-edition.html

Use the following instructions to navigate the screen when doing the installation because your mouse will not work. There is no GUI for the installation.

- **Use the "TAB" key and arrow keys to move between items.**
- **Use the "SPACE" key to select items.**
- **Use the "ENTER" key to activate controls/buttons.**

Below are sections with screenshots of the **most important parts** of the Ubuntu server installation.

## Hostname

## DSpace User

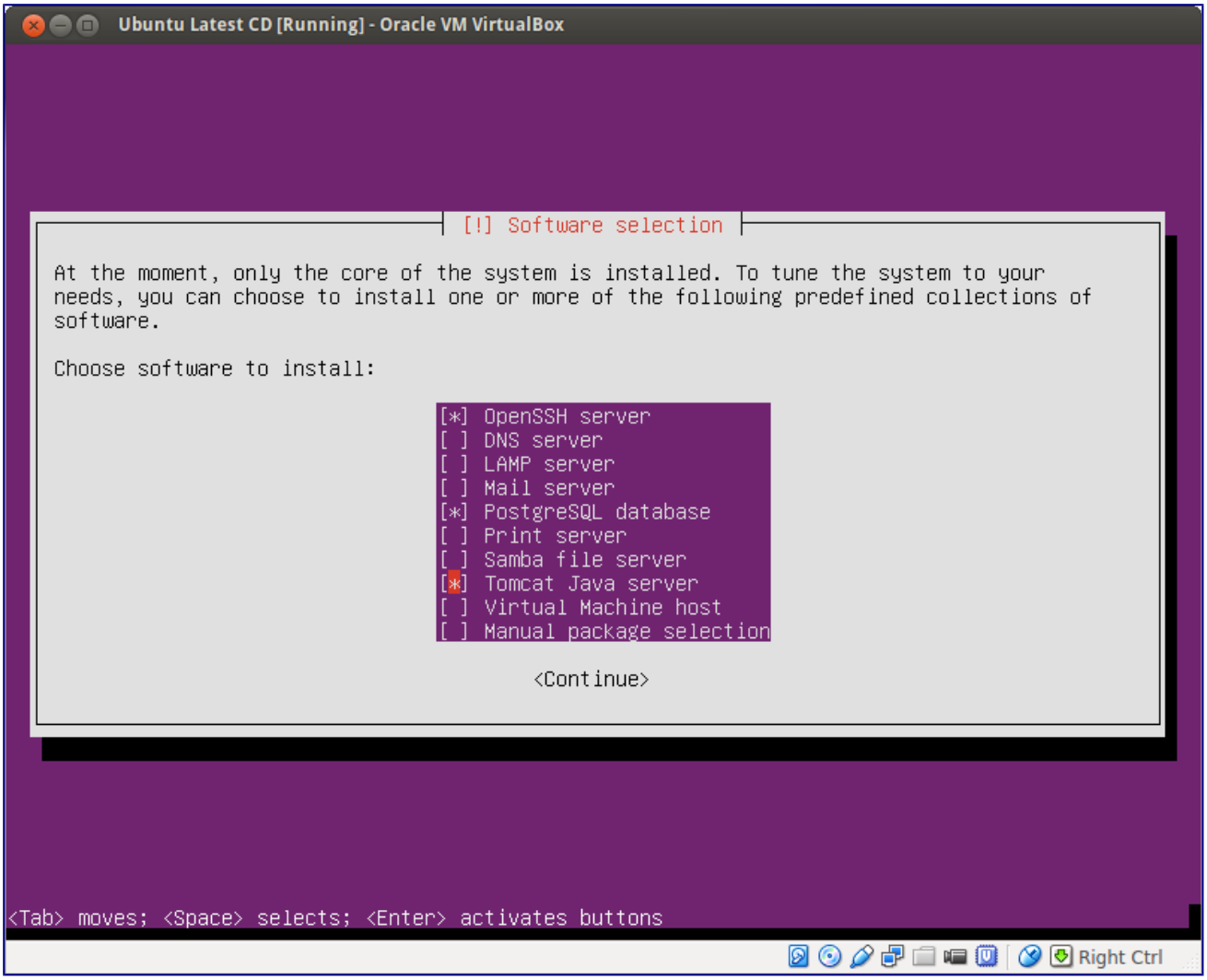
(Se recomienda que se llame dspace el usuario y la clave que se desee… para efectos de éste manual).

## Disk Partitioning

## Install Software

Select the following for installation:

- **OpenSSH server**
- **PostgreSQL database**
- **Tomcat Java server**




# Step 4. After Ubuntu Installation

## Network registration

**You need to contact the campus network administrator and register your servers MAC address for TCP/IP hostname registration.**

To get your servers MAC address type the following in a terminal as the dspace or root user:

```
sudo ifconfig
```

Something like the following should scroll by:

```
dspace@ir2:~$ sudo ifconfig
[sudo] password for dspace:
eth0      Link encap:Ethernet  HWaddr 00:0c:29:02:3e:00
```

```
          inet addr:146.232.129.131  Bcast:146.232.129.255  Mask:255.255.254.0
          inet6 addr: fe80::20c:29ff:fe02:3e00/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:81959326 errors:23 dropped:0 overruns:0 frame:0
          TX packets:55609424 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3646385659 (3.3 GB)  TX bytes:1837131118 (1.7 GB)
          Interrupt:16 Base address:0x1424

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:2843219 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2843219 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:1171132031 (1.0 GB)  TX bytes:1171132031 (1.0 GB)
```

Take note of: **HWaddr 00:0c:29:02:3e:00** from the third line above, this is the MAC address that your campus network administrator will need in order to register your server. Of course yours will be different to the one above. MAC address's are normally unique per network adapter per computer.

There are two options for network setup:

- a) Use a static IP address
- b) Use DHCP for assigning the IP address.

It is good practice to use the static method for assigning the IP address. Request the campus network administrator to do so.

We use **static** network registration for all our servers. Below is an example of our servers network config file in: **/etc/network/interfaces**

```
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

auto eth0
iface eth0 inet static
        address 146.232.66.15
        netmask 255.255.254.0
        network 146.232.66.0
        broadcast 146.232.67.255
        gateway 146.232.66.1
        # dns-* options are implemented by the resolvconf package, if installed
        dns-nameservers 146.232.128.1 146.232.128.10
        dns-search *.sun.ac.za
        dns-domain sun.ac.za
```

Type the following to setup the network interface. **This can only be done after the campus network administrator has registered your server on the network.**

```
sudo nano /etc/network/interfaces
```

Apply the network settings given to you by the campus network administrator.

---

NANO Editor Help

| | |
|---|---|
| **CTL+O** | = Save the fi |
| **CTL+X** | = Exit "nano |
| **CTL+K** | = Delete line |
| **CTL+U** | = Undelete l |
| **CTL+W** | = Search for |
| **CTL+** | = Search for |
| **CTL+C** | = Show line |

More info = http://en.wikipedia.org/wiki/Nano_(text_editor)

---

## Setup the software repositories

After you have correctly registered your servers TCP/IP hostname, then you can setup the software repositories.

### Step 1

On your client PC with the Ubuntu desktop installed, open a command line terminal by typing the following:

```
CTL+ALT+t
```

### Step 2

**Login to your remote server as the "dspace" user by typing as follows in the terminal**.

```
ssh dspace@%hostname%
```

Replace **%hostname%** with the hostname of your server.

### Step 3

Type the following in a console/terminal/xterm to back up the original file:

```
sudo cp /etc/apt/sources.list /etc/apt/sources.list-original
```

Type the following in a console/terminal/xterm to edit a new file:

```
sudo nano /etc/apt/sources.list
```

*Tip: It is always a good idea to maximise the open nano window so that the copy and paste of long lines does not wrap around.*

**Step 4**

No lo veo necesario...

**Step 5**

To update the repository list, type:

```
sudo apt-get update
```

**Step 6**

To upgrade to the latest software., type:

```
sudo apt-get dist-upgrade
```

**Step 7**

If this server is running on a VMWare host server, then setup the VMWare client tools by clicking on the link below.

http://ubuntu.sun.ac.za/wiki/index.php/VMWare-Tools

# Prepare Ubuntu

***** Complete the following steps as the "dspace" user, unless otherwise explicitly specified *****

## Step 1. Login to the remote server

***** It is assumed that you have installed the Ubuntu server with the OpenSSH server software *****
***** It is also assumed that during the Ubuntu server installation, you created the default "dspace" user account *****
***** It is further assumed that during the Ubuntu server installation, you applied a proper "hostname" for your server *****

**Option A - Login with Microsoft Windows Desktop**

**Option B - Login with Remote Desktop (aka Windows server mode)**

**Option C - Login with Ubuntu Desktop**

# Step 2. Review "nano" command line editor instructions

(uso de nano… no es necesario explicar)

# Step 3. Install the Java software dependencies

### PLEASE NOTE:

- **When using "tasksel" during the Ubuntu server installation, and selecting Tomcat as an installation option, the "default-jre" was installed.**
- **Please ensure you have enabled the** Ubuntu partner repositories **before continuing.**
- **If using Ubuntu 12.04 LTS and DSpace versions => 4.2, then check the following:**

`http://wiki.lib.sun.ac.za/index.php/SUNScholar/Upgrading/DSpace/Release_Notes/4.X#Java_Version_Upgrade`

## Step 3.1: Install Java

Type as follows:

```
sudo apt-get install default-jdk default-jre
```

List the Java alternatives by typing as follows:

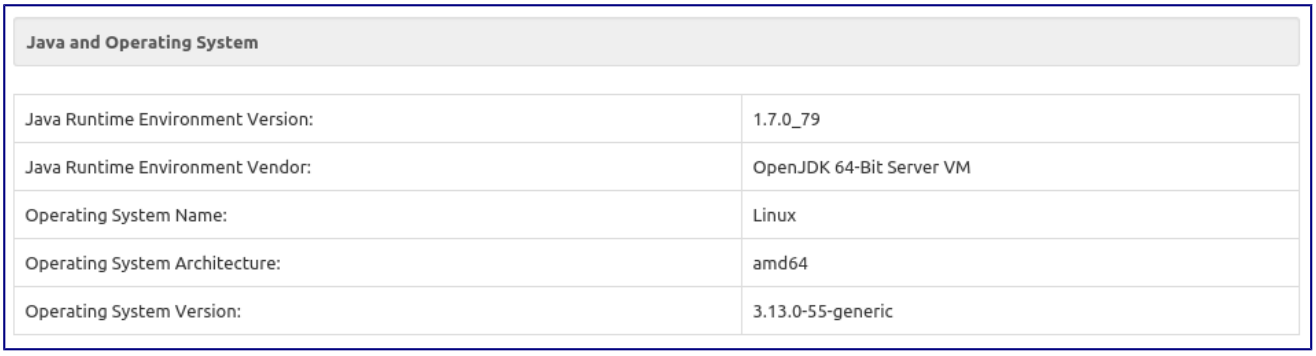
```
sudo update-java-alternatives -l
```

Depending on which version of the Ubuntu server you use, you should get something like the following:

**Ubuntu 14.04**

```
java-1.7.0-openjdk-amd64 1051 /usr/lib/jvm/java-1.7.0-openjdk-amd64
```

Screenshot



| Java and Operating System | |
|---|---|
| Java Runtime Environment Version: | 1.7.0_79 |
| Java Runtime Environment Vendor: | OpenJDK 64-Bit Server VM |
| Operating System Name: | Linux |
| Operating System Architecture: | amd64 |
| Operating System Version: | 3.13.0-55-generic |

### Step 3.2: Install Ant

Type as follows:

```
sudo apt-get install ant ant-optional
```

## Step 4. Install the Maven Java WAR builder

**PLEASE NOTE:**

1. Check this first: https://wiki.duraspace.org/display/DSDOC4x/Installing+DSpace#InstallingDSpace-ApacheMaven3.x(Javabuildtool)
2. See below the output of the maven version on Ubuntu 12.04 LTS:

```
dspace@dspace:~# mvn -v
Apache Maven 3.0.5
Maven home: /usr/share/maven
Java version: 1.7.0_79, vendor: Oracle Corporation
Java home: /usr/lib/jvm/java-7-openjdk-amd64/jre
Default locale: en_ZA, platform encoding: UTF-8
OS name: "linux", version: "3.13.0-66-generic", arch: "amd64", family: "unix"
```

### Step 4.1: Install Maven

Type as follows:

```
sudo apt-get install maven
```

### Step 4.2: Create the Maven home folder

(Optional: This may or may not be needed) Type the following;

```
mkdir $HOME/.m2
```

## Step 4.3: Setup the Maven config file

**The Maven configuration file is only needed if your connection to the internet is via a campus proxy server. You can skip this step if you have a direct connection to the internet.**

### Maven proxy notes

Use the proxy settings for your campus. **Check with your IT department**. You need to ensure that the following two sites are allowed to pass through your campus proxy server and/or campus firewall:

1. maven.apache.org
2. repo1.maven.org

More information about Maven can be found here at the following links:

- http://maven.apache.org/guides/mini/guide-configuring-maven.html
- http://maven.apache.org/guides/mini/guide-proxies.html

### Maven proxy config file

Type the following to enable Maven proxy settings:

```
nano $HOME/.m2/settings.xml
```

*Tip: It is always a good idea to maximise the open nano window so that the copy and paste of long lines does not wrap around.*

Add the following:

```
<settings xmlns="http://maven.apache.org/SETTINGS/1.0.0"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/SETTINGS/1.0.0
                      http://maven.apache.org/xsd/settings-1.0.0.xsd">
  <localRepository/>
  <interactiveMode/>
  <usePluginRegistry/>
  <offline/>
  <pluginGroups/>
  <servers/>
  <mirrors/>
  <proxies>
    <proxy>
      <id>%my-name-for-maven-settings%</id>
      <active>true</active>
      <protocol>http</protocol>
      <host>%my-campus-proxy-hostname%</host>
      <port>%my-campus-proxy-port%</port>
      <username>%my-campus-proxy-username%</username>
      <password>%my-campus-proxy-password%</password>
      <nonProxyHosts></nonProxyHosts>
    </proxy>
  </proxies>
```

```
  <profiles/>
  <activeProfiles/>
</settings>
```

Replace everything between the % signs with your campus settings !

# Step 5. Install the Tomcat Java server

## PLEASE NOTE:

1. *** *This procedure is completely different from the official DSpace documentation, in that it applies best system admin practice for Unix based systems* ***
2. This procedure does NOT require "mod_jk", "jsvc" or Apache2 port re-direction with firewall rules or the Apache2 server installation itself, in fact.
3. This procedure enables Tomcat security, please check carefully that it is enabled correctly!
4. If you want to do URL rewrites as you did with Apache2, then try: http://tuckey.org/urlrewrite to do the same with Tomcat.
5. If you want to enable Shibboleth with Java only, try: http://shibboleth.net/products/opensaml-java.html.

## Step 5.1: Install Tomcat

Type the following:

```
sudo apt-get install tomcat7
```

## Step 5.2: Allow Tomcat to listen on ports "80" and "443"

### Step 5.2.1: Setup "authbind" for Tomcat

To enable Tomcat to listen on a privileged port below 100, we need to enable "authbind". Edit the **/etc/default/tomcat7** file as follows:

```
sudo nano /etc/default/tomcat7
```

Remove the hash sign from in front of the authbind parameter and change authbind to yes as follows

```
# If you run Tomcat on port numbers that are all higher than 1023, then you
# do not need authbind.  It is used for binding Tomcat to lower port numbers.
# NOTE: authbind works only with IPv4.  Do not enable it when using IPv6.
# (yes/no, default: no)
AUTHBIND=yes
```

Now we need to tell "authbind" that Tomcat is allowed to use lower port numbers. Type the following

commands:

```
sudo touch /etc/authbind/byport/80

sudo touch /etc/authbind/byport/443

sudo chmod 0755 /etc/authbind/byport/80

sudo chmod 0755 /etc/authbind/byport/443

sudo chown tomcat7.tomcat7 /etc/authbind/byport/80

sudo chown tomcat7.tomcat7 /etc/authbind/byport/443

cd /etc/authbind/byport

ls -l
```

Now Tomcat has permission to use ports 80 and 443. See below for an example listing of the files in the **/etc/authbind/byport** folder.

```
dspace@dspace:/etc/authbind/byport# ls -l
total 0
-rwxr-xr-x 1 tomcat7 tomcat7 0 2011-06-10 18:33 443
-rwxr-xr-x 1 tomcat7 tomcat7 0 2011-06-10 18:33 80
```

### Step 5.2.2: Setup Tomcat to listen on insecure port 80

Now we tell the Tomcat server to listen on the "authbind" ports. Edit the following file.

```
sudo nano /etc/tomcat7/server.xml
```

Find the connector for port 8080 and change it to port 80.

See example below.

```
    <Connector port="80" protocol="HTTP/1.1"
               enableLookups="false"
               maxConnections="-1"
               maxThreads="450"
               maxHttpHeaderSize="16384"
               connectionTimeout="20000"
               URIEncoding="UTF-8"
               redirectPort="443" />
```

**If enabled, comment out the AJP 1.3 connector. It is not needed.**

### Step 5.2.3: Setup Tomcat to listen on secure port 443

Please go to: http://wiki.lib.sun.ac.za/index.php/SUNScholar/Secure_Internet_Connections later, after installation to do secure port 443 setup.

For now and testing it is ok, just to use port 80 only for Tomcat connections.

## Step 5.3: Setup Tomcat admin users

Type as follows:

```
sudo nano /etc/tomcat7/tomcat-users.xml
```

Delete all the contents of the file and add the following admin and manager roles with a password. *Replace XXXX with your password!*

```
<?xml version='1.0' encoding='utf-8'?>
<tomcat-users>
  <role rolename="manager-gui"/>
  <role rolename="manager-jmx"/>
  <user username="dspace" password="XXXX" roles="manager-gui,manager-jmx"/>
</tomcat-users>
```

## Step 5.4 Java environment settings for Tomcat webapp server

To setup the environment variables for Tomcat java web applications, type the following:

```
sudo nano /etc/default/tomcat7
```

Check the following for comparison:

```
# You may pass JVM startup parameters to Java here. If unset, the default
# options (-Djava.awt.headless=true -Xmx128m) will be used.
#JAVA_OPTS="-Djava.awt.headless=true -Xmx128m"
JAVA_OPTS="-Djava.awt.headless=true -Xms1024m -Xmx2048m -XX:MaxPermSize=1024m"
```

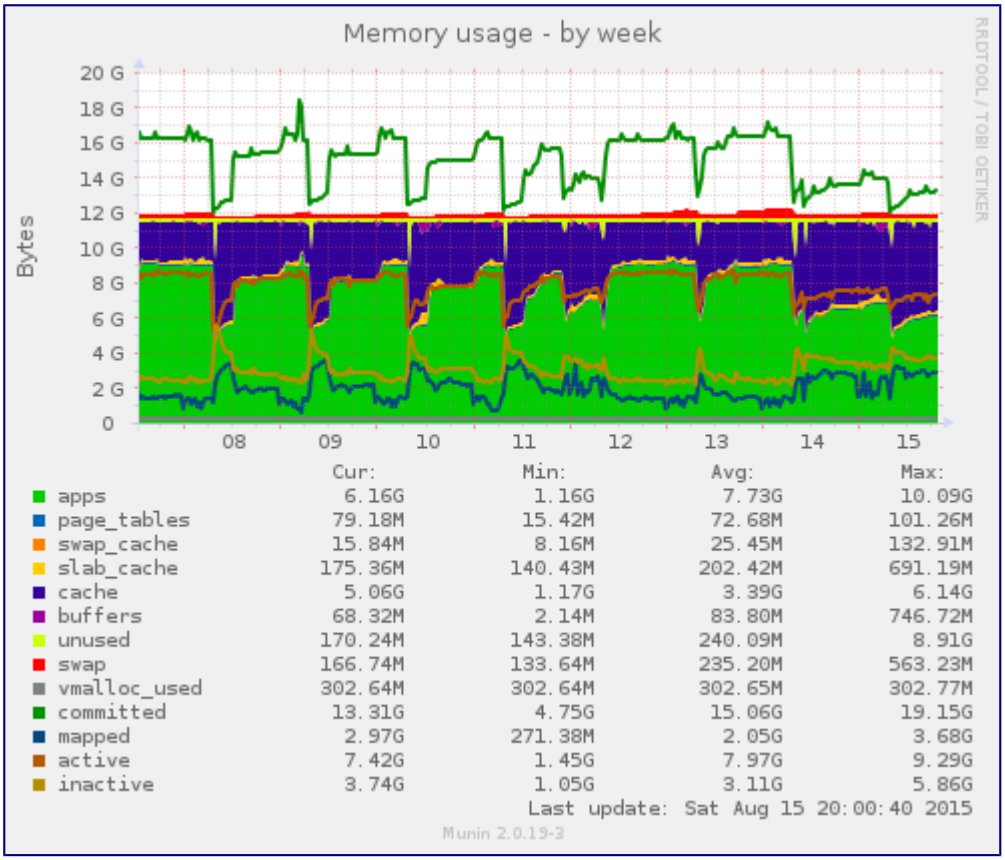
### Java environment settings used for SUNScholar

Your settings will depend on how much RAM you have available to assign to the Tomcat server. See graph below as well.

```
JAVA_OPTS="-Djava.awt.headless=true    -Xmx8192m    -Xms4096m    -XX:PermSize=4096m
-XX:MaxPermSize=8192m -Dfile.encoding=UTF-8 -XX:+UseConcMarkSweepGC"
```

---

Graph of RAM memory usage on SUNScholar.




## Step 5.5 Setup Tomcat server permissions

Please see: http://stackoverflow.com/questions/2645298/how-to-sanely-configure-security-policy-in-tomcat-6 and https://www.mulesoft.com/tcat/tomcat-security

Type the following;

```
sudo nano /etc/default/tomcat7
```

Change "TOMCAT7_SECURITY" to yes.

```
# Use the Java security manager? (yes/no, default: no)
TOMCAT7_SECURITY=yes
```

Create DSpace security policy

```
sudo nano /etc/tomcat7/policy.d/05dspace.policy
```

Copy and paste the following;

```
grant codeBase "file:/home/dspace/-" {
  permission java.security.AllPermission;
};
grant codeBase "file:/tmp/-" {
```

```
  permission java.security.AllPermission;
};
```

Update file permissions for the policy

```
sudo chown root.tomcat7 /etc/tomcat7/policy.d/05dspace.policy
```

Finally restart Tomcat

```
sudo service tomcat7 restart
```

## Step 5.6: Setup file permissions

```
cd

sudo adduser tomcat7 dspace

sudo adduser dspace tomcat7

sudo chown dspace.dspace -R $HOME

sudo chmod 0777 -R $HOME
```

## Step 5.7: Restart the Tomcat server

Now restart the tomcat server as follows:

```
sudo service tomcat7 restart
```

## Step 5.8: Post Tomcat installation checks

Now let's look if all went well:

```
sudo netstat -tapn | grep java
```

Tomcat should be listening on port 80 now:

```
dspace@dspace:~# sudo netstat -tapn | grep java
tcp6        0       0 127.0.0.1:8005            :::*                    LISTEN
11093/java
tcp6        0       0 :::80                     :::*                    LISTEN
11093/java
```

Thats it, now you have a working Java webapp server.

## Step 5.9: Troubleshooting (No es necesario)

- Check optimisations done for Tomcat in the link below

http://wiki.lib.sun.ac.za/index.php/SUNScholar/Optimisations/Tomcat

- Please remember only **ONE** server at time may listen on any TCP/UDP port on your server.
- A reboot of the server may be needed to get Tomcat working on ports 80 and 443 correctly.
- Later on during the actual DSpace installation, you will have to select a "root" webapp so that you have a clean URL. See link below.

http://wiki.lib.sun.ac.za/index.php/SUNScholar/Install_DSpace/S08

**References**

- http://manage.jujucharms.com/charms/trusty/tomcat

# Step 6. Install the PostgreSQL database server

DSpace can use the PostgreSQL or Oracle database server for the main database.

The following procedure installs the PostgreSQL database server and creates the "dspace" database and "dspace" database user with the very secret dspace database user password.

**The PostgreSQL database server was chosen because it is open source software and this in keeping with the open access pathos.**

## PLEASE NOTE

- Please see critical database connection bug: https://jira.duraspace.org/browse/DS-2563
- http://wiki.lib.sun.ac.za/index.php/SUNScholar/Optimisations/Database

## Step 6.1: Increase the kernel shared memory for PostgreSQL server client connections

Edit the "/etc/sysctl.conf" file:

```
sudo nano /etc/sysctl.conf
```

Copy and paste the following to the end of the file:

```
# For PostgreSQL server client connections
kernel.shmmax = 500000000
kernel.shmall = 500000000
```

Also see: http://www.postgresql.org/docs/9.3/static/kernel-resources.html

Type the following in a terminal:

```
sudo sysctl -p
```

## Step 6.2: Install PostgreSQL server software

```
sudo apt-get install postgresql-9.3 postgresql-contrib-9.3 libpg-java
```

## Step 6.3: Setup the PostgreSQL server host based access permissions

See official documentation links below for detailed information about the **"pg_hba.conf"** file.

- http://www.postgresql.org/docs/9.3/static/auth-pg-hba-conf.html
- https://wiki.duraspace.org/display/DSDOC4x/Installing+DSpace#InstallingDSpace-RelationalDatabase:%28PostgreSQLorOracle%29

**Check these host based permissions carefully. Remember security on your server is your responsibility!**

Change database user permissions to "trust" only.

```
sudo sed -i 's/ident/trust/' /etc/postgresql/9.3/main/pg_hba.conf

sudo sed -i 's/md5/trust/' /etc/postgresql/9.3/main/pg_hba.conf

sudo sed -i 's/peer/trust/' /etc/postgresql/9.3/main/pg_hba.conf
```

See example below.

```
# DO NOT DISABLE!
# If you change this first entry you will need to make sure that the
# database superuser can access the database using some other method.
# Noninteractive access to all databases is required during automatic
# maintenance (custom daily cronjobs, replication, and similar tasks).
#
# Database administrative login by Unix domain socket
local   all             postgres                                trust

# TYPE  DATABASE        USER            ADDRESS                 METHOD

# "local" is for Unix domain socket connections only
local   all             all                                     trust
# IPv4 local connections:
host    all             all             127.0.0.1/32            trust
# IPv6 local connections:
host    all             all             ::1/128                 trust
# Allow replication connections from localhost, by a user with the
# replication privilege.
#local   replication     postgres                                trust
#host    replication     postgres        127.0.0.1/32            trust
#host    replication     postgres        ::1/128                 trust
```

Restart database server.

```
sudo service postgresql restart
```

### Step 6.4: Create the PostgreSQL "dspace" DB user

Create the "dspace" DB user with full privileges.

```
sudo createuser -U postgres -d -A -P dspace
```

Answer "y" for yes, for any of the user creation questions.

### Step 6.5: Create the PostgreSQL "dspace" database

Enter the Ubuntu server postgres user shell.

```
sudo su - postgres
```

Create the "dspace" database.

```
createdb -E UNICODE dspace
```

### Step 6.6: Setup PostgreSQL dspace DB user password, ownership and privileges

Connect to the PostgreSQL database server and enter a PostgreSQL database server shell.

```
psql -U postgres -d dspace
```

Set the dspace DB user password:
**SECURITY WARNING: Use your unique dspace database password for this on a production system !**

```
ALTER ROLE dspace WITH PASSWORD 'XXXXXX';
```

Let the dspace DB user own the dspace database

```
ALTER DATABASE dspace OWNER TO dspace;
```

Grant all privileges for the dspace database to the dspace DB user

```
GRANT ALL PRIVILEGES ON DATABASE dspace TO dspace;
```

Add the "crypto" extension to the "dspace" database.

```
CREATE EXTENSION pgcrypto;
```

Quit the database shell.

```
\q
```

We exit from PostgreSQL database server postgres user shell and return to the Ubuntu server dspace user shell.

```
exit
```

### Step 6.7: Setup the PostgreSQL server host based access permissions to the dspace database

Type the following:

```
sudo -i

sudo echo "## DSpace DB user access">> /etc/postgresql/9.3/main/pg_hba.conf

sudo echo "host     dspace          dspace        127.0.0.1/32            md5" >>
/etc/postgresql/9.3/main/pg_hba.conf

exit
```

### Step 6.8: Setup maximum number of PostgreSQL server client connections

**PLEASE NOTE:** https://jira.duraspace.org/browse/DS-2563

Edit the postgresql config file:

```
sudo nano /etc/postgresql/9.3/main/postgresql.conf
```

Change the number of "max_connections" to 300. *Please note: If you get connection errors, then adjust this value!*

### Step 6.9: Restart the PostgreSQL server

Type the following:

```
sudo service postgresql restart
```

**References**

- http://www.postgresql.org/about/featurematrix
- http://manage.jujucharms.com/charms/trusty/postgresql

# Step 7. Install the Postfix mail server

Para mi, no es necesario. Ya tenemos un servidor de correo y se direccionará hacia él.

# Step 8. Configure the environment variables

## Step 8.1 Java environment settings for other java web applications

To setup the environment variables for other java applications (such as the Handle and SOLR servers), type the following:

```
sudo nano /etc/environment
```

Copy and paste the following to the bottom of the file.

```
JAVA_HOME="/usr/lib/jvm/default-java"
JAVA_OPTS="-Djava.awt.headless=true -Xmx2048m -Xms1024m -Dfile.encoding=UTF-8"
```

## Step 8.2 Increase number of open files available

Open the following file as follows:

```
sudo nano /etc/security/limits.conf
```

Add the following to the bottom of the file:

```
*            hard       nofile          65536
*            soft       nofile          65536
```

Make sure to check the files open parameter with the next computer reboot by typing the following as the root user:

```
ulimit -n
```

## Step 8.3: Setup file creation permissions

```
nano $HOME/.bashrc
```

Add the following to the bottom of the file

```
umask 002
```

**References**

- http://en.wikipedia.org/wiki/Environment_variable
- http://wiki.apache.org/tomcat/FAQ/Memory
- http://en.wikipedia.org/wiki/Java_performance#Memory_usage
- http://javaperformancetuning.com
- http://wiki.lib.sun.ac.za/index.php/SUNScholar/Optimisations
- https://wiki.duraspace.org/display/DSDOC3x/Performance+Tuning+DSpace

## Step 9. Check the installation

Type the following to reboot the server:

```
sudo reboot
```

When the server has started up again, start a web browser session on another machine and type the following in the address bar:

```
http://%hostname%/manager/html
```

Replace **%hostname%** with your DSpace server hostname.

*You should notice that you now have a Tomcat server running, if not, debug using all of the previous steps until you have a Tomcat Java webapp server running.*

Please note

If you have installed a test version of DSpace on a local Ubuntu computer, then type the following to connect to your test server.

```
http://localhost/manager/html
```

# INSTALL DSPACE

## Step 1. Login to the remote server

## Step 2. Get DSpace

The current stable version of DSpace is: 5.3

Type the following:

```
cd
```

### For DSpace 5.X

```
wget http://web.lib.sun.ac.za/dspace/dspace-5.3-src-release.tar.gz
```

**PLEASE NOTE:**

- https://wiki.duraspace.org/display/DSPACE/Support
- Click here to check the release notes before continuing.
- Stellenbosch University Library has decided not to install the latest versions of DSpace when they are released because we do not employ a fulltime Java programmer, therefore we stay one version behind the latest version.
- Also see: http://wiki.lib.sun.ac.za/index.php/List_of_Repository_Software

# Step 3. Unpack DSpace

## Step 3.1

Type the following to extract the source code.

**Replace all instances of XXX with the DSpace version number selected for installation.**

```
tar -xzvf $HOME/dspace-XXX-src-release.tar.gz
```

## Step 3.2

To be able to simplify the wiki documentation when doing upgrades and to simply path references to the source code we create a shortcut or in the Unix world a "symbolic link" to point to the source folder of interest.

This creates the **$HOME/source** path which will then be used for all of the following documentation to refer to the source code.

This is also the **[dspace-source]** folder referred to in the official DSpace documentation.

To create the **symbolic link** type the following:

**Replace all instances of XXX with the DSpace version number selected for installation.**

```
cd $HOME

ln -s dspace-XXX-src-release source
```

See example below:

```
dspace@repository:~$ ls -l source
lrwxrwxrwx 1 dspace dspace 35 Dec 18 11:47 source -> /home/dspace/dspace-5.3-src-release
```

### Step 3.3

A bug was introduced in DSpace 5.2, whereby the "webapp" folders are not created. To remedy this, type the following:

```
cd $HOME/source/dspace/modules; for X in jspui lni oai rdf rest sword swordv2 xmlui; do mkdir -p $X/src/main/webapp; done
```

Please see: https://jira.duraspace.org/browse/DS-2590

#### References

- http://en.wikipedia.org/wiki/Symbolic_link

## Step 4. *** Edit the DSpace configuration ***

### For DSpace 5.X

### Requirements

1. http://wiki.lib.sun.ac.za/index.php/SUNScholar/Install_DSpace/S03
2. http://wiki.lib.sun.ac.za/index.php/SUNScholar/Upgrading/DSpace/Release_Notes/5.X

### Procedure

With the release of DSpace versions => 3.X, a new way of configuring DSpace was introduced.

The critical core elements of the old "dspace.cfg" file have been superseded by a "build.properties" file.

The idea is to put all the custom configs in the "config" folder and use the **build.properties** file for the core "building" of DSpace.

To edit the **build.properties** file, type the following:

```
nano $HOME/source/build.properties
```

### Example Config

Replace all the places with a pair of percent signs (**%something%**), with the settings for your system.

1. **Be careful to NOT comment out any settings, leave them as they are with blanks!!**
2. **Make sure the installation directory is correctly specified, it should be "dspace.install.dir = /home/dspace"**

```
# DSpace build.properties
# This file should be customised to suit your build environment.
# Note that not all configuration is handled here, only the most common
```

```
# properties that tend to differ between build environments.
# For adjusting global settings or more complex settings, edit the relevant config
file.
#
# IMPORTANT: Do not remove or comment out settings in build.properties
# When you edit the "build.properties" file (or a custom *.properties file),
# take care not to remove or comment out any settings. Doing so, may cause
# your final "dspace.cfg" file to be misconfigured with regards to that
# particular setting.  Instead, if you wish to remove/disable a particular
# setting, just clear out its value.  For example, if you don't want to be
# notified of new user registrations, ensure the "mail.registration.notify"
# setting has no value, e.g. "mail.registration.notify="
#

############################
# SERVER CONFIGURATION #
############################

# DSpace installation directory. This is the location where you want
# to install DSpace. NOTE: this value will be copied over to the
# "dspace.dir" setting in the final "dspace.cfg" file. It can be
# modified later on in your "dspace.cfg", if needed.

dspace.install.dir = %/home/dspace%

# DSpace host name - should match base URL.  Do not include port number
dspace.hostname = %scholar.sun.ac.za%

# DSpace base host URL.  Include port number etc.
dspace.baseUrl = %http://scholar.sun.ac.za%

# The user interface you will be using for DSpace. Common usage is either xmlui or
jspui
dspace.ui = %xmlui%

# Full link your end users will use to access DSpace. In most cases, this will be
the baseurl followed by
# the context path to the UI you are using.
#
# Alternatively, you can use a url redirect or deploy the web application under the
servlet container root.
# In this case, make sure to remove the /${dspace.ui} from the dspace.url property.
dspace.url = ${dspace.baseUrl}

# Name of the site
dspace.name = %SUNScholar Research Repository%

# Solr server
solr.server = http://localhost/solr

# Default language for metadata values
default.language = %en_ZA%

############################
# DATABASE CONFIGURATION #
############################
```

```
# Uncomment the appropriate block below for your database.
# postgres
db.driver=org.postgresql.Driver
db.url=jdbc:postgresql://localhost:5432/dspace
db.username=%dspace%
db.password=%dspace%

# oracle
#db.driver= oracle.jdbc.OracleDriver
#db.url=jdbc:oracle:thin:@//localhost:1521/xe
#db.username=dspace
#db.password=dspace

# Schema name - if your database contains multiple schemas, you can avoid
# problems with retrieving the definitions of duplicate object names by
# specifying the schema name that is used for DSpace.
# ORACLE USAGE NOTE: In Oracle, schema is equivalent to "username". This means
# specifying a "db.schema" is often unnecessary (i.e. you can leave it blank),
# UNLESS your Oracle DB Account (in db.username) has access to multiple schemas.
db.schema =

# Maximum number of DB connections in pool
db.maxconnections = 50

# Maximum time to wait before giving up if all connections in pool are busy
(milliseconds)
db.maxwait = 5000

# Maximum number of idle connections in pool (-1 = unlimited)
db.maxidle = 150

# Determine if prepared statement should be cached. (default is true)
db.statementpool = true

# Specify a name for the connection pool (useful if you have multiple applications
sharing Tomcat's dbcp)
# If not specified, defaults to 'dspacepool'
db.poolname = dspacepool

########################
# EMAIL CONFIGURATION #
########################

# SMTP mail server
mail.server = %smtp.example.com%

# SMTP mail server authentication username and password (if required)
# mail.server.username = myusername
# mail.server.password = mypassword
mail.server.username=
mail.server.password=

# SMTP mail server alternate port (defaults to 25)
mail.server.port = 25
```

```
# From address for mail
mail.from.address = %dspace-noreply@myu.edu%

# Currently limited to one recipient!
mail.feedback.recipient = %dspace-help@myu.edu%

# General site administration (Webmaster) e-mail
mail.admin = %dspace-help@myu.edu%

# Recipient for server errors and alerts
mail.alert.recipient = %dspace-help@myu.edu%

# Recipient for new user registration emails
mail.registration.notify = %dspace-help@myu.edu%

########################
# HANDLE CONFIGURATION #
########################

# Canonical Handle URL prefix
#
# By default, DSpace is configured to use http://hdl.handle.net/
# as the canonical URL prefix when generating dc.identifier.uri
# during submission, and in the 'identifier' displayed in JSPUI
# item record pages.
#
# If you do not subscribe to CNRI's handle service, you can change this
# to match the persistent URL service you use, or you can force DSpace
# to use your site's URL, eg.
#handle.canonical.prefix = ${dspace.url}/handle/
#
# Note that this will not alter dc.identifer.uri metadata for existing
# items (only for subsequent submissions), but it will alter the URL
# in JSPUI's 'identifier' message on item record pages for existing items.
#
# If omitted, the canonical URL prefix will be http://hdl.handle.net/
handle.canonical.prefix = http://hdl.handle.net/

# CNRI Handle prefix
handle.prefix = %123456789%

########################
# PROXY CONFIGURATION #
########################
# uncomment and specify both properties if proxy server required
# proxy server for external http requests - use regular hostname without port
number
http.proxy.host =

# port number of proxy server
http.proxy.port =

######################
# LOGLEVEL SETTINGS #
######################
loglevel.other = INFO
```

```
# loglevel.other: Log level for other third-party tools/APIs used by DSpace
# Possible values (from most to least info): DEBUG, INFO, WARN, ERROR, FATAL
loglevel.dspace = INFO
# loglevel.dspace: Log level for all DSpace-specific code (org.dspace.*)
# Possible values (from most to least info): DEBUG, INFO, WARN, ERROR, FATAL
```

**References**

- https://wiki.duraspace.org/display/DSDOC5x/Configuration+Reference#ConfigurationReference-Thebuild.propertiesConfigurationPropertiesFile
- https://github.com/DSpace/DSpace/blob/dspace-5_x/build.properties
- https://github.com/DSpace/DSpace/blob/dspace-5_x/dspace/config/dspace.cfg

# Step 5. Build the DSpace Java webapps

First make sure we have the right file permissions for a build.

```
sudo chown dspace.dspace -R $HOME
```

```
sudo chmod 0777 -R $HOME
```

Change to the source folder as follows:

```
cd $HOME/source
```

Type the following to download the maven packages. *Ensure you have an open connection to the internet first*.

```
mvn -U clean package
```

*A lot of stuff will start to be downloaded and scroll by on the screen.*

If the downloads start, then go make a cup of coffee and check your emails... **this takes quite a while with slow internet connections !!**

When complete you will get a message at the end like this:

```
[INFO] ------------------------------------------------------------------------
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESSFUL
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 5 minutes 15 seconds
[INFO] Finished at: Fri Aug 03 13:45:02 SAST 2012
[INFO] Final Memory: 95M/273M
[INFO] ------------------------------------------------------------------------
```

### Troubleshooting

*If your* maven proxy settings *are ok and you still get download errors, then try the following:*

```
mvn install
```

**If nothing starts downloading or you get download errors, then check your** maven config file for proxy settings **or ask for an open connection to the internet for your server from your central IT department.**

Another possibility of a failure to build maybe a slow machine, in that case just restart the build several times until the build is complete.

### References

- https://wiki.duraspace.org/display/DSPACE/Maven+Project+Consolidation
- https://wiki.duraspace.org/display/DSPACE/Set+Maven+Web+Proxy+Server+Settings
- http://mvnrepository.com/artifact/org.dspace

## Step 6. Install the DSpace Java webapps

After the java webapp WAR files have been complied they need to be "installed" by the java "ant" installer in preparation for them to be hosted by the Tomcat java webapp server.

### For DSpace 5.X

Change directory to the install directory by typing as follows:

```
cd $HOME/source/dspace/target/dspace-installer
```

Type the following in the above named directory:

```
ant fresh_install
```

**Please note:** If this is an upgrade, then type the following:

```
ant update
```

A lot of information now appears on the screen. Below are shown the last lines confirming success:

```
     [java] Started: 1349777373408
     [java] Ended: 1349777373778
     [java] Elapsed time: 0 secs (370 msecs)
     [echo]
     [echo] ================================================================
     [echo]  The DSpace code has been installed, and the database initialized.
     [echo]
```

```
     [echo]  To complete installation, you should do the following:
     [echo]
     [echo]  * Setup your Web servlet container (e.g. Tomcat) to look for your
     [echo]    DSpace web applications in: $HOME/webapps/
     [echo]
     [echo]    OR, copy any web applications from $HOME/webapps/ to
     [echo]    the appropriate place for your servlet container.
     [echo]    (e.g. '$CATALINA_HOME/webapps' for Tomcat)
     [echo]
     [echo]  * Make an initial administrator account (an e-person) in DSpace:
     [echo]
     [echo]    $HOME/bin/dspace create-administrator
     [echo]
     [echo]  * Start up your servlet container (Tomcat etc.)
     [echo]
     [echo]  You should then be able to access your DSpace's 'home page':
     [echo]
     [echo]    http://bibj-lt-hgibson.sun.ac.za
     [echo]
     [echo]  You should also be able to access the administrator UI:
     [echo]
     [echo]    http://bibj-lt-hgibson.sun.ac.za/dspace-admin
     [echo] ====================================================================
     [echo]

BUILD SUCCESSFUL
```

**Please note:**

- If you change anything later then rebuild your DSpace.
- Do not run "ant fresh_install" again, this is only done once during installation.

# Step 7. *** Create the DSpace super-admin user ***

If you get a "build successful" message from the previous step, then add an admin user for your DSpace installation.

Type the following as the "dspace" user:

```
cd

$HOME/bin/dspace create-administrator
```

Fill in all the details when prompted and keep the credentials a secret. See example activation below.

*** Do not let any unauthorised persons have access to your DSpace admin account. ***

*** WARNING: Your admin password is displayed on the screen. Be careful! ***

```
Creating an initial administrator account
```

```
E-mail address: %emailaddress%
First name: Hilton
Last name: Gibson
WARNING: Password will appear on-screen.
Password: XXXXXXXX
Again to confirm: XXXXXXXX
Is the above data correct? (y or n): y
Administrator account created
```

This is what should happen. Change the **%emailaddress%** to the email address of the system admin or repository manager. You decide.

# Step 8. Enable the DSpace Java webapps on the Java Tomcat webapp server

The DSpace webapps have been compiled in the **$HOME/webapps** folder but Tomcat only serves up webapps in the **/var/lib/tomcatX/webapps** folder.

So, how do we get all the files into the Tomcat webapps folder? There are several methods.

We are going to architect an "automatic linkage" method, so that if you change anything in the DSpace **$HOME/webapps** folder and then re-compile, the changes automatically occur in the Tomcat **/var/lib/tomcatX/webapps** folder.

This also saves you from constantly copying webapps after a compile, which is a tricky business.

*It also saves you from having to change the Tomcat server configuration files, which is very definitely not recommended by the Debian/Ubuntu software package maintainers.*

## Requirements

**Please make sure that Tomcat is listening on port 80 first, before setting this up. See link below.**
http://wiki.lib.sun.ac.za/index.php/SUNScholar/Prepare_Ubuntu/S05

## PLEASE NOTE:

1. **** This procedure is completely different from the official DSpace documentation, in that it applies best system admin practice for Unix based systems ****
2. This procedure does NOT require "mod_jk" or Apache2 port re-direction with firewall rules or the Apache2 server installation itself, in fact.

## For Ubuntu 14.04 LTS

### Step 8.0 Create web application shortcuts

We create shortcuts (symlinks in the Unix world) in the default Tomcat webapps folder, to the DSpace webapps in the **$HOME/webapps** folder by typing as follows:

```
cd /var/lib/tomcat7/webapps

sudo ln -s /home/dspace/webapps/solr

sudo ln -s /home/dspace/webapps/rest

sudo ln -s /home/dspace/webapps/oai

sudo ln -s /home/dspace/webapps/sword
```

### Step 8.1 Configure the default ROOT webapp

DSpace has two web interfaces, the XMLUI and the JSPUI.

This procedure allows you to select which interface will be used as the ROOT webapp.

In other words, the one that does not need a **/xmlui** or a **/jspui** URL addition.

Start by removing the default Tomcat ROOT webapp with the following command:

```
sudo rm -rf /var/lib/tomcat7/webapps/ROOT
```

Then apply one of the following.

- **Please Note: You can only choose one UI as the default ROOT Tomcat webapp!. The other can be referenced as "/" something if needed.**

**Option A: XMLUI**

*Complex setup but very customisable using modern web UI technologies and has a low server load.*

Type the following to make the XMLUI the default interface.

```
cd /var/lib/tomcat7/webapps

sudo ln -s /home/dspace/webapps/xmlui ROOT
```

**Option B: JSPUI**

*Easy to setup but hard to customise and has a high server load.*

Type the following to make the JSPUI the default interface.

```
cd /var/lib/tomcat7/webapps

sudo ln -s /home/dspace/webapps/jspui ROOT
```

**Example listing of DSpace Java webapps in the Tomcat webapp folder**

To get a listing of active Tomcat webapps type the following:

```
cd /var/lib/tomcat7/webapps

sudo ls -l
```

See example listing below.

```
dspace@ir1:/var/lib/tomcat7/webapps$ ls -l
total 0
lrwxrwxrwx  1  root         root                    24  2012-09-05  11:28  oai  ->
/home/dspace/webapps/oai
lrwxrwxrwx  1  root         root                    26  2012-09-05  11:29  ROOT  ->
/home/dspace/webapps/xmlui
lrwxrwxrwx  1  root         root                    25  2012-09-05  11:28  rest  ->
/home/dspace/webapps/rest
lrwxrwxrwx  1  root         root                    25  2012-09-05  11:28  solr  ->
/home/dspace/webapps/solr
lrwxrwxrwx  1  root         root                    26  2012-09-05  11:29  sword  ->
/home/dspace/webapps/sword
```

### Step 8.2 Restart Tomcat Server

Type the following.

```
sudo service tomcat7 restart
```

# Step 9: Perform system tests

### Database Tests

Type the following in a terminal:

```
cd
```

Test Connection

```
sudo $HOME/bin/dspace database test
```

*PLEASE NOTE:* This command changed with the release of DSpace versions =>5.X. The previous

command was: **`test database`**.

Example Output

```
Attempting to connect to database:
 - URL: jdbc:postgresql://localhost:5432/dspace
 - Driver: org.postgresql.Driver
 - Username: XXXXXXX
 - Password: XXXXXXX
 - Schema: null

Testing connection...
Connected successfully!
```

Test Schema Updates

```
sudo $HOME/bin/dspace database info
```

Example Output

```
Database URL: jdbc:postgresql://localhost:5432/dspace
Database Schema: public
Database Software: PostgreSQL version 9.3.7
Database Driver: PostgreSQL Native Driver version PostgreSQL 9.1 JDBC4 (build 901)

+----------------+----------------------------+---------------------+---------+
| Version        | Description                | Installed on        | State   |
+----------------+----------------------------+---------------------+---------+
| 1.1            | Initial DSpace 1.1 databas |                     | PreInit |
| 1.2            | Upgrade to DSpace 1.2 sche |                     | PreInit |
| 1.3            | Upgrade to DSpace 1.3 sche |                     | PreInit |
| 1.3.9          | Drop constraint for DSpace |                     | PreInit |
| 1.4            | Upgrade to DSpace 1.4 sche |                     | PreInit |
| 1.5            | Upgrade to DSpace 1.5 sche |                     | PreInit |
| 1.5.9          | Drop constraint for DSpace |                     | PreInit |
| 1.6            | Upgrade to DSpace 1.6 sche |                     | PreInit |
| 1.7            | Upgrade to DSpace 1.7 sche |                     | PreInit |
| 1.8            | Upgrade to DSpace 1.8 sche |                     | PreInit |
| 3.0            | Upgrade to DSpace 3.x sche |                     | PreInit |
| 4.0            | Initializing from DSpace 4 | 2015-05-25 10:12:33 | Success |
| 5.0.2014.08.08 | DS-1945 Helpdesk Request a | 2015-05-25 10:12:33 | Success |
| 5.0.2014.09.25 | DS 1582 Metadata For All O | 2015-05-25 10:12:37 | Success |
| 5.0.2014.09.26 | DS-1582 Metadata For All O | 2015-05-25 10:12:37 | Success |
+----------------+----------------------------+---------------------+---------+
```

## Email Test

Type the following in a terminal:

```
cd

sudo $HOME/bin/dspace test-email
```

Check your DSpace admin email account to see if you received a message.

Example Output

```
About to send test email:
 - To: XXXXXX@XXX.XX.XX
 - Subject: DSpace test email
 - Server: mail.sun.ac.za

Email sent successfully!
```

# Step 10. Login to the DSpace application as the "super-admin" user

Restart your server by typing the following.

```
sudo reboot
```

After the reboot, type the following in the browser address bar on your local computer:

```
http://%hostname%
```

Replace **%hostname%** with the hostname of your server.

1. Select **Login**.
2. Then **Email Login**.
3. Login with the DSpace admin user, email address and password determined from Step 7 previously.

Please note

If you have installed a test version of DSpace on a local Ubuntu computer, then type the following to connect to your test server.

```
http://localhost
```

# Step 11. Critical after installation tasks

Please consult the **operational guide** for the operational management of a research archive using DSpace software.

## Step 11.1

After the DSpace installation, the next step is to ensure that the following are **completed immediately.**

1. **DAILY ADMIN** (Recomendado)
2. **REBUILD DSPACE** (Recomendado)
3. **RESTART DSPACE** (Recomendado)
4. REBUILD INDEXES **(Recomendado)**

### Daily Admin

### Introduction

**Just after installation it is critically important that you enable daily automated tasks for your digital archive. See details below.**

In order to send out subscription emails, update search, browse, full-text indexes and do general daily housekeeping on the system, a regular maintenance script must be run automatically daily.

On a Unix/Linux based system this is easy to accomplish with use of the "crontab" facility.

Click on the headings below for more details of required "crontab"'s.

### Step 1. Login

http://wiki.lib.sun.ac.za/index.php/SUNScholar/Prepare_Ubuntu/S01

Click on the link above to find out how to login to the server and then return here.

### Step 2. Create "dspace" user crontab

Edit the crontab, by typing the following in a terminal:

```
su - dspace
```

```
crontab -e
```

If asked to select an editor, choose **nano**

### *Sample crontab*

Delete all of the contents and then copy and paste the following into the NANO text editor, and then save. See help for NANO above.

```
## SAMPLE CRONTAB FOR A PRODUCTION DSPACE
## You obviously may wish to tweak this for your own installation,
## but this should give you an idea of what you likely wish to schedule via cron.
##
## NOTE: You may also need to add additional sysadmin related tasks to your crontab
## (e.g. zipping up old log files, or even removing old logs, etc).

####################
# GLOBAL VARIABLES #
####################
# Deliver cron email to the system administrator
MAILTO="root"

################
# HOURLY TASKS #
################
# (Recommended to be run multiple times per day, if possible)
# At a minimum these tasks should be run daily.

# Regenerate DSpace Sitemaps every 8 hours (12AM, 8AM, 4PM).
# SiteMaps ensure that your content is more findable in Google, Google Scholar, and
other major search engines.
0 0,8,16 * * * $HOME/bin/dspace generate-sitemaps > /dev/null

###############
# DAILY TASKS #
###############
# (Recommended to be run once per day. Feel free to tweak the scheduled times
below.)

# Update the OAI-PMH index with the newest content (and re-optimize that index) at
midnight every day
# NOTE: ONLY NECESSARY IF YOU ARE RUNNING OAI-PMH
# (This ensures new content is available via OAI-PMH and ensures the OAI-PMH index
is optimized for better performance)
0 0 * * * $HOME/bin/dspace oai import -o > /dev/null

# Clean and Update the Discovery indexes at midnight every day
#  (This ensures that any deleted documents are cleaned from the Discovery
search/browse index)
0 0 * * * $HOME/bin/dspace index-discovery > /dev/null

# Re-Optimize the Discovery indexes at 12:30 every day
#  (This ensures that the Discovery Solr Index is re-optimized for better
performance)
30 0 * * * $HOME/bin/dspace index-discovery -o > /dev/null

# Cleanup Web Spiders from DSpace Statistics Solr Index at 01:00 every day
# NOTE: ONLY NECESSARY IF YOU ARE RUNNING SOLR STATISTICS
# (This removes any known web spiders from your usage statistics)
0 1 * * * $HOME/bin/dspace stats-util -i > /dev/null

# Re-Optimize DSpace Statistics Solr Index at 01:30 every day
# NOTE: ONLY NECESSARY IF YOU ARE RUNNING SOLR STATISTICS
#  (This ensures that the Statistics Solr Index is re-optimized for better
performance)
```

```
30 1 * * * $HOME/bin/dspace stats-util -o > /dev/null

# Send out subscription e-mails at 02:00 every day
# (This sends an email to any users who have "subscribed" to a Collection, notifying them of newly added content.)
0 2 * * * $HOME/bin/dspace sub-daily > /dev/null

# Run the media filter at 03:00 every day.
# (This task ensures that thumbnails are generated for newly add images,
# and also ensures full text search is available for newly added PDF/Word/PPT/HTML documents)
0 3 * * * $HOME/bin/dspace filter-media -q > $HOME/log/media-filter.log 2>&1

# Run any Curation Tasks queued from the Admin UI at 04:00 every day
# (Ensures that any curation task that an administrator "queued" from the Admin UI is executed
# asynchronously behind the scenes)
0 4 * * * $HOME/bin/dspace curate -q admin_ui > /dev/null

# Check for items to release from embargo in DSpace.
#(This applies to embargoes created with DSpace versions <= 3.2)
0 5 * * * $HOME/bin/dspace embargo-lifter > $HOME/log/embargo-release.log 2>&1

# Update the local ORCID database with the latest information from the external ORCID database.
#(This only applies to DSpace versions => 5.2, if you enable ORCID lookups)
0 6 * * * $HOME/bin/dspace dsrun org.dspace.authority.UpdateAuthorities > $HOME/log/update-orcid-info.log 2>&1

#################
# WEEKLY TASKS #
#################
# (Recommended to be run once per week, but can be run more or less frequently, based on your local needs/policies)

# Run the checksum checker at 04:00 every Sunday
# By default it runs through every file (-l) and also prunes old results (-p)
# (This re-verifies the checksums of all files stored in DSpace. If any files have been changed/corrupted, checksums will differ.)
#0 4 * * * $HOME/bin/dspace checker -l -p > /dev/null
#
# NOTE: LARGER SITES MAY WISH TO USE DIFFERENT OPTIONS. The above "-l" option tells DSpace to check *everything*.
# If your site is very large, you may need to only check a portion of your content per week. The below commented-out task
# would instead check all the content it can within *one hour*. The next week it would start again where it left off.
0 4 * * 0 $HOME/bin/dspace checker -d 1h -p > /dev/null

# Mail the results of the checksum checker (see above) to the configured "mail.admin" at 05:00 every Sunday.
# (This ensures the system administrator is notified whether any checksums were found to be different.)
0 5 * * 0 $HOME/bin/dspace checker-emailer > /dev/null

# Run DSpace statistical analysis tools (12months takes approx 40secs)
```

```
30 0 * * 0 $HOME/bin/dspace stat-general  > /dev/null
35 0 * * 0 $HOME/bin/dspace stat-monthly  > /dev/null

# Generate DSpace statistical analysis reports
00 1 * * 0 $HOME/bin/dspace stat-report-general  > /dev/null
05 1 * * 0 $HOME/bin/dspace stat-report-monthly  > /dev/null

#################
# MONTHLY TASKS #
#################
# (Recommended to be run once per month, but can be run more or less frequently,
based on your local needs/policies)

# Permanently delete any bitstreams flagged as "deleted" in DSpace, on the first of
every month at 01:00
# (This ensures that any files which were deleted from DSpace are actually removed
from your local filesystem.
#   By default they are just marked as deleted, but are not removed from the
filesystem.)
0 1 1 * * $HOME/bin/dspace cleanup > /dev/null

# Remove all log files which are more than 30 days old
# on the first of every month
01 0 1 * * find $HOME/dspace/log/*.log.* -mtime +30 -exec rm {} \;

################
# YEARLY TASKS #
################
# (Recommended to be run once per year)

# At 2:00AM every January 1, "shard" the DSpace Statistics Solr index.
# This ensures each year has its own Solr index, which improves performance.
# NOTE: ONLY NECESSARY IF YOU ARE RUNNING SOLR STATISTICS
# NOTE: This is scheduled here for 2:00AM so that it happens *after* the daily
cleaning & re-optimization of this index.
0 2 1 1 * $HOME/bin/dspace stats-util -s > /dev/null

################
# HOUSEKEEPING #
################
# (Recommended to be run daily)

# Delete any ~/config/*/*.old files more than 30 days old (created by "ant update")
0 2 1 * * find $HOME/config -name "*-*-*.old" -mtime +30 -exec rm {} \;
# Delete any ~/*.bak-*-*/ directories more than 30 days old (created by "ant
update")
0 2 1 * * find $HOME/*.bak-*-* -maxdepth 0 -type d -mtime +30 -exec rm -rf {} \;
```

### *System Log*

To enable logging of cron events, edit the following file:

```
sudo nano /etc/rsyslog.d/50-default.conf
```

Enable the cron log by removing hash (#) in front of **`cron.*`**.

See example below.

```
#
# First some standard log files.  Log by facility.
#
auth,authpriv.*                 /var/log/auth.log
*.*;auth,authpriv.none          -/var/log/syslog
cron.*                          -/var/log/cron.log
```

Now restart the syslog service as follows:

```
sudo service rsyslog restart
```

**Rebuild DSpace**

### Rationale

To apply customisations, DSpace usually needs to be rebuilt, to update the Java WAR's for re-deployment by the Tomcat webapp server.

This wiki page helps you to create a customised rebuild script that you can use later any time you need it.

Also see: http://wiki.lib.sun.ac.za/index.php/SUNScholar/Customisation

### Requirements

Click here **to setup the "source" folder first.**

### Tips

The output of the build and compile process can be sent to a log file on Linux systems. Simply append "**`> compile.log`**" or "**`> update.log`**" to the command line instruction.

### Step 1 - Login to your server

Check the following wiki page, and then return.

`http://wiki.lib.sun.ac.za/index.php/SUNScholar/Prepare_Ubuntu/S01`

### Step 2 - Create a scripts folder

Type the following:

```
mkdir /home/dspace/scripts
```

### Step 3 - Create the script

Type the following:

```
nano /home/dspace/scripts/build-webapps
```

Copy and paste the following into the open nano editor.

```
#!/bin/bash

sudo service tomcat7 stop
sleep 3

#### Optional ####
#Remove old cache and log files. Uncomment below to enable.
#echo "Clean out old xmlui cache files"
#sudo rm /var/lib/tomcat7/work/Catalina/localhost/_/cache-dir/cocoon-ehcache.data
#sudo rm /var/lib/tomcat7/work/Catalina/localhost/_/cache-dir/cocoon-ehcache.index
#echo "Remove old catalina log file"
#sudo rm /var/log/tomcat7/catalina.out

#### Optional ####
#Remove old webapps. Uncomment below to enable.
#echo "Clean out old webapps"
#sudo rm -rf /home/dspace/webapps/*

#### Optional ####
#Remove old config folder. Uncomment below to enable.
#echo "Clean out old configs"
#sudo rm -rf /home/dspace/config/*

echo "Start MAVEN build"
cd /home/dspace/source
mvn -U clean package

echo "Start ANT updates"
cd /home/dspace/source/dspace/target/dspace-installer
ant update

#### Optional ####
#Clean backups. Uncomment below to enable.
#ant clean_backups

#### Optional ####
#Overwrite configs. Uncomment below to enable.
#ant -Doverwrite=true update_configs

#### Optional ####
#Geolite database updates.
# !!!! Your server should be open on the internet before you do this !!!!
#Uncomment below to enable.
#sudo ant update_geolite

#### Optional ####
#Fix file and folder permissions. Uncomment below to enable.
#echo "Fixing file permissions. Please wait..."
```

```
#sudo chmod 0777 -R /home/dspace/config
#sudo chmod 0777 -R /home/dspace/log
#echo "Fixing file ownership. Please wait..."
#sudo chown dspace.tomcat7 -R /home/dspace/config
#sudo chown dspace.tomcat7 -R /home/dspace/log

sleep 2
sudo service tomcat7 restart

echo "Rebuild complete."
```

### Step 4 - Make the script executable

Type the following:

```
chmod 0755 $HOME/scripts/build-webapps
```

### Step 5 - Run the script

Now you can rebuild DSpace **WHEN NEEDED** by simply typing the following;

```
$HOME/scripts/build-webapps
```

**After the rebuild check that the config files have been copied over from the source folder correctly.**

**Restart DSpace**

### Introduction

This is the DSpace restart script setup. The restart can be used for the following:

1. Restart DSpace after a "dspace.cfg" change.
2. Restart after an updated or new customisation.
3. Restart manually after a system failure.
4. Restart automatically at a predetermined time using a root user "crontab".

### Configuration

Log in to your server as the **dspace** user and then become the **root** user.

```
sudo -i
```

Create a **scripts** folder in the **/root** folder.

```
mkdir /root/scripts
```

Create the restart script

```
nano /root/scripts/restart-dspace
```

Add the following to the **restart-dspace** script using copy and paste with "nano".

```
#!/bin/bash
## This script is to be used to restart DSpace

echo "Stop Tomcat"
sudo service tomcat7 stop
sleep 5
sudo service tomcat7 stop
sleep 5

echo "Restarting PostgreSQL"
sudo service postgresql restart

echo "Cleaning out old xmlui cache files"
sudo rm /var/lib/tomcat7/work/Catalina/localhost/_/cache-dir/cocoon-ehcache.data
sudo rm /var/lib/tomcat7/work/Catalina/localhost/_/cache-dir/cocoon-ehcache.index

echo "Remove old catalina log file"
sudo rm /var/log/tomcat7/catalina.out

#### Optional ####
#Fix file and folder permissions. Uncomment below to enable.
#echo "Fixing file permissions. Please wait..."
#sudo chmod 0777 -R /home/dspace/config
#sudo chmod 0777 -R /home/dspace/log
#echo "Fixing file ownership. Please wait..."
#sudo chown dspace.tomcat7 -R /home/dspace/config
#sudo chown dspace.tomcat7 -R /home/dspace/log

echo "Start Tomcat"
sudo service tomcat7 restart

echo "Restart complete: `date`" > /var/tmp/restart-dspace
```

Now make the script executeable

```
chmod 0755 /root/scripts/restart-dspace
```

### Manual Restart

Now run the script when needed by typing:

```
sudo -i

/root/scripts/restart-dspace
```

You can watch the restart by typing:

```
tail -f /var/log/tomcat7/catalina.out
```

To quit tailing the log file, type: **CTL+c**

### Automatic Restart

To automatically and regularly restart, add a **root** user cron job.

As the "root" user user type the following:

```
crontab -e
```

Copy and paste the following to the bottom of the file and then save the file:

```
45 7 * * *    /root/scripts/restart-dspace
```

This will restart DSpace 07:45 in the morning each day.

## Rebuild

### Introduction

After modifying any index configuration and **then rebuilding your webapps**, you will need to rebuild your indexes.

Click on the headings below for more details per DSpace version.

### Rationale

After applying customisations, you need to rebuild the indexes. This is required after each change in the indexes configuration.

### Procedure

Login to your server:

http://wiki.lib.sun.ac.za/index.php/SUNScholar/Prepare_Ubuntu/S01

Create a scripts folder.

```
mkdir /home/dspace/scripts
```

Create the script.

```
nano /home/dspace/scripts/build-indexes
```

Copy and paste the following.

```
#!/bin/bash
```

```
#########################################################
## Select an option for index build/update below   ##
## Uncomment the relevant lines below              ##
#########################################################
## REINDEX: (re)build index, wiping out current one if it exists.
#echo "Re-indexing existing indexes... Please wait"
#/home/dspace/bin/dspace index-discovery -b

## RECREATE: if updating existing index, force each handle to be reindexed even if
uptodate
#echo "Re-creating new indexes... Please wait"
#/home/dspace/bin/dspace index-discovery -f

#########################################################################
## This is only required if you use the old browse indexes           ##
## Since DSpace version 4.2, discovery is default                    ##
## Uncomment the lines below with a single hash to enable, if needed ##
#########################################################################
#echo "Building non-SOLR search and browse indexes... Please wait"
#sudo service tomcat7 stop
#sleep 5
#/home/dspace/bin/dspace index-init
#sudo service tomcat7 start
```

Make the script executable.

```
chmod 0755 /home/dspace/scripts/build-indexes
```

Now you can re-build your indexes **WHEN NEEDED** by simply typing;

```
/home/dspace/scripts/build-indexes
```

## Step 11.2 (NO LO HICE)

The next step is to ensure that the following are **completed as soon as possible.**

1. **OPTIMISATIONS**
2. **HANDLE SERVER**
3. **INTERNET SECURITY**
4. **DISASTER RECOVERY**

## Step 11.2 (NO LO HICE)

The following can be completed at a later stage.

1. **RESEARCHER AUTHORISATION**
2. **RESEARCHER IDENTIFICATION**
3. **CUSTOMISATION**

# Referencia

Única referencia para éste manual.

http://wiki.lib.sun.ac.za/index.php/SUNScholar/DSpace

# Conclusiones

Lo único que se ha hecho es recopilar en un solo archivo la información del sitio de referencia, al cual estoy sumamente agradecido por su trabajo. Todo muy bien explicado, referenciado, práctico y funcional.