ID3.27 Guidelines describing installation, configuration, maintenance and monitoring of the TENCompetence infrastructure

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TENCompetence

Building the European Network for Lifelong Competence Development

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ID3.27 - Guidelines describing installation, configuration, maintenance and monitoring of the TENCompetence infrastructure

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Building the European Network
For Lifelong Competence Development

TENCompetence IST-2005-027087

Project Internal Deliverable Report

ID3.27 - Guidelines describing installation, configuration, maintenance and monitoring of the TENCompetence infrastructure

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EC Project Officer	Martin Májek
Abstract (for dissemination)	*Describes how to install and configure the tools of the TENCompetence infrastructure.*
Keywords List	Software installation, configuration, infrastructure

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Table of contents

Version history

Version	Date	Description
0.1	19-11-2009	Initial version, which uses the previous installation & configuration manual (ID3.21) as basis.
0.2	30-11-2009	Updated the WP3 related sections. Required changes for the software from WP5 and WP6 are not clear yet.
1.0	22-12-2009	Final version, updated the sections for the WP5 and WP6 tools.
1.1	02-01-2010	Updated the cross references.

Introduction

This document describes how to install and configure the TENCompetence services and applications. It includes not only the software of WP3 ("Technical Design & Implementation of the integrated System"), but also the software of other work packages that is part of the integrated system.

The deployment as used by the WP3 software is used as leading example to illustrate the installation and configuration of the tools.

The TENCompetence infrastructure

The TENCompetence infrastructure is schematically described in "Chapter 5 - Deployment view" from [5].

In this document, installation, configuration, maintenance and monitoring of the relevant parts of that chapter is described. The deployment scheme described in [5] is shown in *Figure 1: Deployment overview.*

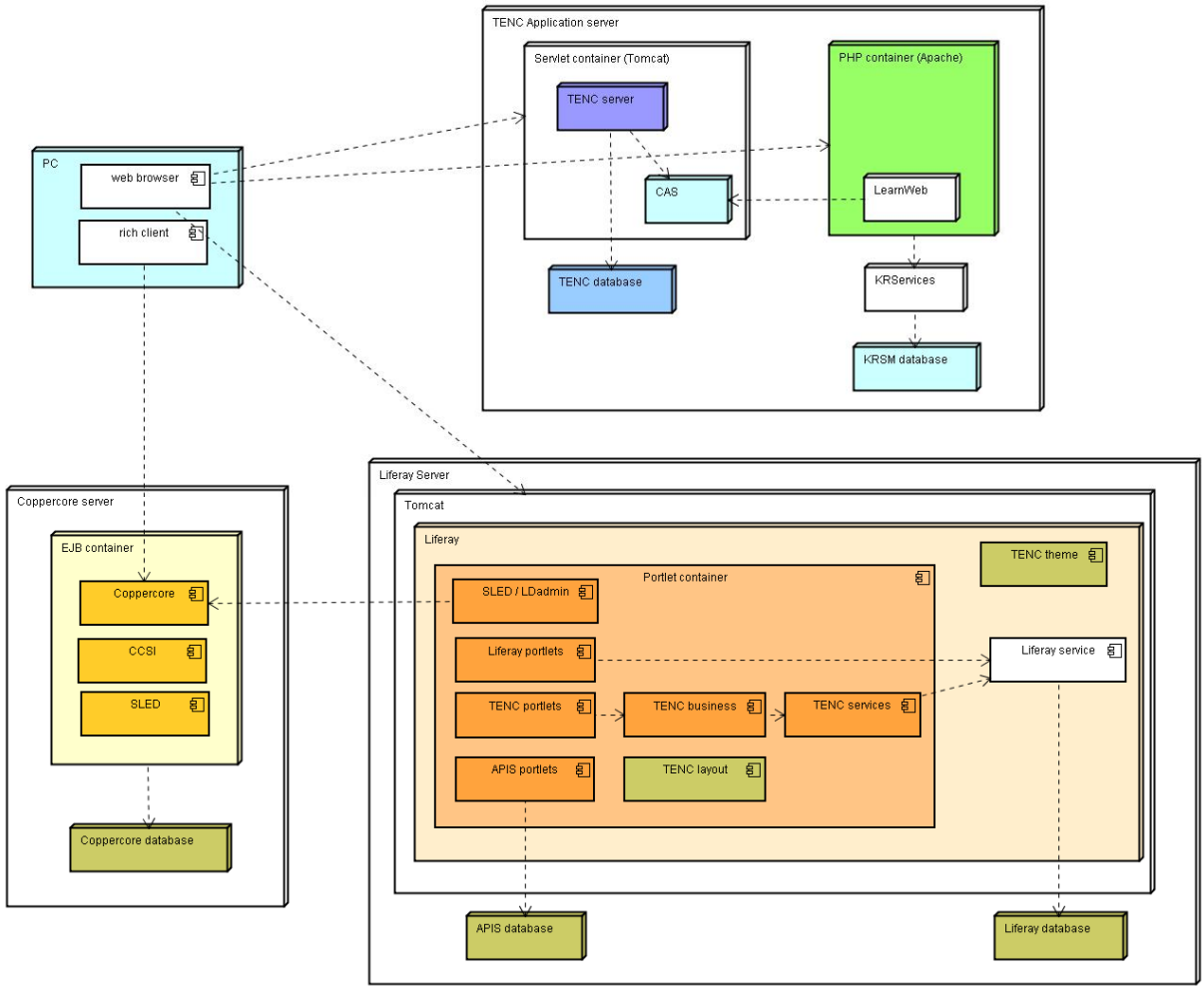

Figure 1: Deployment overview

1. Installation and configuration

1.1. Client configuration for web applications

Almost all software is implemented as web applications. To use these applications, clients only need a graphical browser with JavaScript enabled and a Flash player for the Flex portlets.

1.1.1. Rich client (ReCourse)

The only application that is installed and run locally is the IMS Learning Design authoring tool ReCourse. To use it: download ReCourse from [4] and unzip it to a folder. The folder to which you unzip the package will contain the ReCourse executable. No further configuration is required, just run the ReCourse executable to start using the application.

For further documentation about ReCourse, see [4].

1.2. Server configuration

1.2.1. Liferay server

1. Download Liferay. The current version of the TENCompetence tools were developed on Liferay Portal 5.2.3 Bundled with Tomcat 6.0 (http://sourceforge.net/projects/lportal/files/Liferay%20Portal/liferay-portal-tomcat-6.0-5.2.3.zip)
   Unzip liferay to <Liferay_Installation_Folder>
2. Make sure Liferay uses a Java 1.6 version, because the TENCompetence software needs it. For a Tomcat installation on Windows, Liferay uses the following approach to find a Java version:
   a) If JAVA_HOME is set, Liferay will use that version and
   b) if JAVA_HOME is not set, Liferay will set it to the <Liferay_Installation_Folder>/tomcat-6.0.18/jre1.5.0_17/win folder of your Liferay installation via the setenv.bat file.
   Adapt JAVA_HOME or setenv.bat when Liferay doesn't use a Java 1.6 version yet.
3. Download tencompetence_<Latest_Release>.zip from http://sourceforge.net/projects/tencompetence/
4. Check the correctness of the .war files in tencompetence_<Latest_Release>.zip using their MD5 values. The .zip file supplies the MD5 values as separate files.
5. Copy the .war files to the hot deploy folder of Liferay (<Liferay_Installation_Folder>/deploy).
6. By default, Liferay uses an HSQL database, which is only recommended for demo and development purposes. To use another database, create a file

<Liferay_Installation_Folder>/portal-ext.properties.

To use a MySQL instance "myDatabaseName", via a user named "myUserName" and password "myUserPassword", set the following in your portal-ext.properties file:

```
jdbc.default.driverClassName=com.mysql.jdbc.Driver
jdbc.default.url=jdbc:mysql://localhost/myDatabaseName?useUnicode=true&amp;cha
racterEncoding=UTF-8&amp;useFastDateParsing=false
jdbc.default.username=myUserName
jdbc.default.password=myUserPassword
com.liferay.portal.servlet.filters.gzip.GZipFilter=false
com.liferay.portal.servlet.filters.header.HeaderFilter=true
axis.servlet.hosts.allowed=127.0.0.1
axis.servlet.https.required=false
```

Create a MySQL database instance with name "myDatabaseName", which is accessible by user "myUserName". "myUserName" needs rights to drop tables, create tables, retrieve data, insert rows, etc on the "myDatabaseName" database.

7. Add some additional settings to <Liferay_Installation_Folder>/portal-ext.properties :

```
# Set the default theme id.
default.theme.id=orgtencompetencedefault_WAR_orgtencompetencedefaulttheme

# Set the layout template id of the public layout.
default.user.public.layout.template.id=2_columns_ii

# Set the portlet ids for the columns specified in the layout template.
default.user.public.layout.column-1=
default.user.public.layout.column-2=Progress_WAR_org.tencompetence.all-portlet
default.user.public.layout.column-3=
default.user.public.layout.column-4=

# Set the regular theme id for the default user public layout.
default.user.public.layout.regular.theme.id=orgtencompetencedefault_WAR_orgten
competencedefaulttheme
```

8. Remove the demo portlets in the <Liferay_Installation_Folder>\liferay-portal-tomcat-6.0-5.2.3\tomcat-6.0.18\webapps directory:
   - chat-portlet
   - google-maps-portlet
   - mail-portlet
   - sevencogs-hook
   - sevencogs-theme
   - web-form-portlet
   - wol-portlet

   Warning: in case Liferay is started without deleting these portlets, a few demo users will be created automatically. Those demo users could be exploited by hackers to manipulate to your system!
9. Start Liferay using <Liferay_Installation_Folder>\liferay-portal-tomcat-6.0-5.2.3\tomcat-6.0.18\bin\startup.bat or startup.sh
10. In Liferay, select a theme. Example: Manage Pages => Look and Feel => Select the TENCompetence default theme from the available themes.
11. In Liferay, change the logo. Example: Control Panel => Settings => Display Settings => Change logo.

Select the company_logo.png file (the TENCompetence logo) from <Liferay_Installation_Folder>/tomcat-6.0.18/webapps/org.tencompetence.default-theme/images

12. Login to the Liferay using:
    User = test@liferay.com
    Password = test
    and change the password (My Account => Password) to change the default password.

1.2.2. TENCompetence updates on a Liferay server

After Liferay is installed, new portlets can be deployed through the Web interface, or by copying war files manually (on the server) to the directory /usr/local/liferay/deploy. Liferay will pick them up and deploy them.

lr_release.sh

Another option is to copy the war files to a directory liferay_deploy in the home directory of every user. This assumes that every user on the system is someone who is authorized to deploy war files. Note: users in this context are operating system users, not Liferay users.

```
see lr_release.sh (place in /usr/local/sbin)
```

build_tenc.sh

It's also possible to perform automatical builds every night. A server gets the sources from all projects from CVS to a development environment, builds them, and deploys them to Liferay. See `build_tenc.sh` for an example script.

1.2.3. LearnWeb server

This section describes how to install and configure a server for LearnWeb, the frontend delivered by WP5 (Knowledge Resources Sharing and Management).

Installation Preconditions

Required

PHP 5, PEAR, and Apache 2 should be installed on the machine you intend to use as a server for LearnWeb.

Additional requirements

Enable mod_rewrite in Apache:

- Locate the httpd.conf file (usually you will find it in a folder called conf, config or something along those lines).

- Inside the httpd.conf file uncomment the line LoadModule rewrite_module modules/mod_rewrite.so (remove the pound '#' sign from in front of the line) # to enable *module LoadModule rewrite_module modules/mod_rewrite.so*

Enable curl extension in PHP:

- Locate the php.ini file (usually you will find it in a folder called conf, config or something along those lines).
- Inside the php.ini file uncomment the line containing php_curl extension (remove the ';' sign from in front of the line).

```
; to enable under windows
extension=php_curl.dll
; to enable under linux
;extension=php_curl.so
```

Installation

Download LearnWeb:

- Create a local directory where LearnWeb will be downloaded and installed.
- Change working directory to the newly created directory.

Anonymous CVS access

This project's CVS repository can be checked out through anonymous (pserver) CVS with the following instruction set. When prompted for a password for anonymous, simply press the Enter key.

```
cvs  -d:pserver:anonymous@tencompetence.cvs.sourceforge.net:/cvsroot/tencompetence login

cvs -z3 -d:pserver:anonymous@tencompetence.cvs.sourceforge.net:/cvsroot/tencompetence co
wp5/learnWeb
```

Prepare Environment Variables

Configure Apache name-based Virtual Host

You must have the name in DNS, resolving to your IP address, or nobody else will be able to see your web site. You can put entries in your hosts file for local testing, but that will work only from the machine with those hosts entries.

- Locate the hosts file (usually you will find it for Windows in a folder %SystemRoot%\system32\drivers\etc\ and for Linux in /etc) 127.0.0.1 localhost learnweb.localhost

- Locate apache virtual hosts configuration file (usually you will find it in a folder called conf, config or something along those lines) and add following lines (change paths according to you local file system, and directories created in previous steps).

```
<VirtualHost 127.0.0.1:80>
      ServerAdmin webadmin@localhost
      ServerName learnweb.localhost
      DocumentRoot C:/development/tenc/wp5/learnWeb
      ErrorLog C:/xampp/apache/logs/learnweb.localhost-error_log
      CustomLog C:/xampp/apache/logs/learnweb.localhost-access_log combined
      HostnameLookups Off
      UseCanonicalName On
      ServerSignature Off
      AddDefaultCharset utf-8
      <Directory "C:/development/tenc/learnWeb/">
            Options Indexes FollowSymLinks
            php_admin_value display_errors 0
            php_admin_value safe_mode 0
            php_admin_value eaccelerator.enable 1
            php_admin_value eaccelerator.optimizer 1
            php_admin_value default_charset UTF-8
            php_admin_value short_open_tag 1
            php_admin_value max_input_time 1000
            php_admin_value max_execution_time 1000
            AllowOverride All
            Order allow,deny
            Allow from all
      </Directory>
</VirtualHost>
```

Configuring LearnWeb

Change the configuration parameters (e.g. Fedora, KRSM, InterWeb servers) according to your installation environment in the following files:

```
app/config/bootstrap.php
app/config/lw.config.php
app/config/cas.config.php
app/controllers/components/config_l_w.php
```

Running LearnWeb

Restart Apache server and open a web browser with URL http://learnweb.localhost

References

- Apache Virtual Host documentation http://httpd.apache.org/docs/1.3/vhosts/ Apache
- Module mod_rewrite http://httpd.apache.Org/docs/2.0/mod/mod_rewrite.html
- PHP's cURL support http://php.net/curl.installation.

1.2.4. KR Services

This section describes how to install and configure a server for KR Services, the backend delivered by WP5 (Knowledge Resources Sharing and Management).

Installation Preconditions

Tomcat 5.5 should be installed on the machine you intend to use as a server for the KR Services.

Installation

Download KR Services:
- Download FedoraKRSM.war and place it in the webapps folder of Tomcat.
- Start Tomcat.

Configuring KR Services

Change the configuration parameters (e.g. Fedora, KRSM, TENTube, Liferay servers) according to your installation environment in the following file:

```
webapps/FedoraKRSM/WEB-INF/classes/config.properties
```

Restart Tomcat.

1.2.5. Widget server

Installation and configuration is described in D6.4 - Compilation of internal deliverable outcomes ID6.13 - 6.18 (see [1]). For future use, [2] and [3] are better references, because the Apache project will maintain these documents.

1.2.6. Coppercore server

Instructions for installing and configuring a CopperCore environment are available at [6].

1.2.7. Fedora Open Source Repository Software

Installation

To install the Fedora server on a Windows machine, take the following steps:

1) Download and install the Java Runtime Environment (JRE) 5.0 Update 6 (or a later 5.0 update or a 6.0 version) from http://java.sun.com/javase/downloads/index_jdk5.jsp
2) Download and install the MySQL 5.0.41 Community Server (or a later 5.0 update) from http://dev.mysql.com/downloads/mysql/5.0.html#downloads
3) Download Fedora Release 2.2.1 http://www.fedora.info/download

Prepare Environment Variables

The following environment variables must be correctly defined:

- *JAVA_HOME* This should point to the base directory of your Java installation.
- *FEDORA_HOME* This is the directory where Fedora will be installed, for example, C:\fedora.
- *PATH* This must include the Java and Fedora bin directories. For Windows, this will be %FEDORA_HOME%\server\bin, %FEDORA_HOME%\client\bin and usually %JAVA_HOME%\bin.
- *CATALINA_HOME* For Windows, this will be %FEDORA_HOME%\server\tomcat.

Installation Procedure MySQL Server Configuration

- Please note that the MySQL JDBC driver provided by the installer requires MySQL v3.23.x or higher. The MySQL commands listed below can be run within the mysql program, which may be invoked as follows: *mysql -u root -p*
- Create the database. For example, to create a database named fedora22, enter: *CREATE DATABASE fedora22;*
- Set username, password and permissions for the database. For example, to set the permissions for user fedoraAdmin with password fedoraAdmin on database fedora22, enter: *GRANT ALL ON fedora22.* TO fedoraAdmin@localhost IDENTIFIED BY 'fedoraAdmin'; GRANT ALL ON fedora22.* to fedoraAdmin@'%' IDENTIFIED BY 'fedoraAdmin';*

Fedora Configuration & Installation

(Full documentation is available at: http://www.fedora.info/download/2.2.1/userdocs/).

Download Fedora

The latest version of the software can be found at http://www.fedora.info/download/. There are two download options: the Fedora Installer and the source code distribution – download Fedora Installer.

Installing the Fedora Server

- To start the installer, change to the directory where you downloaded the installer and at a command prompt, enter: java -jar fedora-2.2.1-installer.jar
- In the dialogue menu enter custom installation type. Follow the steps and fill-in the appropriate values for parameters.
- On the step "*Authentication requirement for API-A*" choose option **false**.
- On the step "*SSL availability*" choose option **true**.
- On the step "*SSL required for API-A*" choose option **false**.

- On the step "*Database*" choose option mysql and fill-in appropriate values (see MySQL Server Configuration section).

Post installation configurations

The Fedora Server's configuration is chiefly governed by the Fedora Server Configuration File (fedora.fcfg) located at FEDORA_HOME\server\config\fedora.fcfg.

The Resource Index Module Configuration

The Resource Index module should be configured as follows:

```
<module role="fedora.server.resourceIndex.ResourceIndex"
class="fedora.server.resourceIndex.ResourceIndexModule">
    <param name="level" value="2"/>
    <param name="datastore" value="localKowariTriplestore"/>
    <param name="syncUpdates" value="true"/>
</module>
```

After modifying the resource index run %FEDORA_HOME%\server\bin\fedora-rebuild.bat and Choose “Rebuild the Resource Index” then “Yes”.

Persistent IDentifier namespaces Configuration

Fedora's support for Persistent IDentifier namespaces allows for PIDs to be generated from a pool of user specified namespaces that go beyond the default namespace specified in the fedora.fcfg pidNamespace property. It is important to remember that any custom namespace you wish to use outside of the default must be included in the retainPIDs parameter.

<param name="retainPIDs" value="**category user config tagging resource rating tag comment krsm-bdef-category krsm-bmech-category** demo test changeme fedora-bdef fedora-bmech tutorial">

<comment>Namespaces of PIDs to retain during the ingest process. When an object is ingested, Fedora normally allocates a unique PID within pidNamespace for it regardless of what the object says its PID is. This

option provides a way to override that behavior on a per-pid-namespace basis. If specified, this should be a space-delimited list of pid namespaces that will be accepted in the object as-is. Default value is"demo test".</comment>

</param>

Running Fedora Server

- Ensure that MySQL database server is running.
- `%FEDORA_HOME%\tomcat\bin\startup.bat`

Post Installation Configurations

Ingesting pre-defined bDef and bMech KRSM objects

Ingesting Behavior Definition Object (krsm-bdef-category:2) and Behavior Mechanism Object (krsm-bmech-category:2) used to define and implement the methods getParentCategory and getSubCategories.

- Select File/Ingest/One Object/From File... in the Fedora Administrator. This will bring up a file selection dialogue box as follows:
- Browse the file system to select the ingest file for the bDef object whose file name is *krsm-bdef-category_2.xml*. Since this ingest file is encoded as FOXML select the FOXML radio button as below:
- This will create the digital object with PID krsm-bdef-category:2 in your repository. This bDef defines two methods getParentCategory and getSubCategories.

Follow the same procedure to ingest a sample bMech object into the repository. This bMech represents a concrete implementation of the abstract service operations defined in the bDef krsm-bdef-category:2. Select the file krsm-bdef-category_2.xml. This will create the digital object with the PID currently *krsm-bmech-category:2*.

Use the same procedure to ingest User Behavior Definition Object (user_bdef.xml) and Behavior Mechanism Object (user_bmech.xml) to define and implement the method GetUserConfigs.

Ingesting KRSM root category object

Follow the steps from „Ingesting pre-defined bDef and bMech KRSM objects“ section and ingest `category_krsm-root.xml` file.

1.3. Monitoring / Maintenance for a Liferay server

In a live environment much more monitoring should be implemented than described in this section. Tools like Nagios / Cacti are very useful and there should be availability checking done from outside the server instance to see if it and its services are still available. This document shows the basics as a starting point.

Passwords

Passwords are stored in files like /etc/gmail_password and /etc/liferay_mysql_password. These files are only readable by root. This is done to make sure that scripts can run unattended while still having access to the right credentials, and securing them by making them readable only for the root users.

Scheduled tasks

Beside these scripts, the scripts that were scheduled by the operating system are still effective too.

```
* * * * *       root /usr/local/sbin/check_ooo.sh
Only on the servers that run openOffice

*/7 * * * *     root /usr/local/sbin/zombies.sh –cron
```

```
On every server

* * * * *       root /usr/local/sbin/ >> /var/log/lr_release.log

On every server

13 2 * * *      root  /usr/local/sbin/system_backup.sh >> /var/log/backup

On every server

13 3 * * *      root  apt-get update && apt-get dist-upgrade -y >> /var/log/upgrade

On every server

33 3 * * *      root  shutdown -r 0

On every server

03 4 * * *      root /usr/local/sbin/build_tenc.sh >> /var/log/build_tenc.log
Only on the INT (integration) server

44 4 * * *      root /etc/init.d/tomcat restart

On every server

58 * * * *      root /usr/local/sbin/disk_space_check.sh

On every server

20 8-19 * * 1-5 root /usr/local/sbin/db_dump.sh >> /var/log/backup

On every server
```

Note: apt-get dist-upgrade should be done controlled (not by crontab but by a human after reading upgrade notes and testing) in a live environment.

check_ooo.sh

This script checks if Open Office is running. oOo runs headless to make storing Liferay content as PDF etc. possible.

```
see check_ooo.sh (place in /usr/local/sbin)
```

zombies.sh

Try to kill any running zombie processes

```
see zombies.sh (place in /usr/local/sbin)
```

system_backup.sh

Every night vital parts of the system are backed up to the Amazon volume. The backed up information should be sufficient to setup this server again on a running but unconfigured (no Liferay etc,) new server.

```
see system_backup.sh (place in /usr/local/sbin)
```

db_dump.sh

Make a dump of the MySQL database plus the Trac database (if present) at every hour during office times.

```
see db_dump.sh (place in /usr/local/sbin)
```

disk_space_check.sh

A script that checks if the server instance and the volume have a reasonable amount of free space left. If not, a mail is sent out to inform the administrator of the server.

```
see disk_space_check.sh (place in /usr/local/sbin)
```

Test if Liferay is running

```
sudo /etc/init/d/tomcat start
w3m http://127.0.0.1:8080
```

The tomcat logfile

You can follow output with the command `tail -f /usr/local/liferay/tomcat-6.0.18/logs/catalina.out`

Startup script tomcat

Put this script in /etc/init.d/tomcat and sudo chmod +x /etc/init.d/tomcat

```
see tomcat (place in /etc/init.d)
```

Make it run at startup of the server with these commands

```
sudo ln -s /etc/init.d/tomcat /etc/rc1.d/K99tomcat
sudo ln -s /etc/init.d/tomcat /etc/rc2.d/S99tomcat
```

1.4. Hosting at Amazon EC2

This section contains some info regarding setup at Amazon EC2 on an Ubuntu operating system settings.

1.4.1. Amazon EC2 setup

The process of creating servers ("instances"), volumes, elastic IP addresses, safety rules etc. is described in detail by Amazon: http://docs.amazonwebservices.com/AWSEC2/2008-02-01/GettingStartedGuide/.

The first step is to obtain an AWS account on this address http://aws.amazon.com/ ("sign up now"), sign up for EC2 and get an X.509 certificate. Once you have this you can create server instances. In steps:

- Log in and go to https://console.aws.amazon.com/ec2/home?region=eu-west-1.

- Go to instances, Launch instance, choose the AMI ID ami-e7b89093.
- Select the number of instances, m1.large, the correct keypair and security group.
- Go to volumes, create a 120GiB volume and attach it to the instance you just made.
- Go to elastic IPs, create one and link it to the instance ID of the instance you just created.
- Request a domain name and bind it to the elastic IP address you just bound to the instance.
- Go to security groups. (note:more than one instances can make use of a security group), open ports 19 and 22 (ssh), 80 (http), 8080 and 8081 (Tomcat and JBoss).

1.4.2. Ubuntu server post install

Install additional software

```
apt-get update && sudo apt-get dist-upgrade -y
dpkg-reconfigure tzdata
apt-get install sun-java6-bin sun-java6-jdk sun-java6-jre mysql-server vim figlet mc unzip
```

Configure SSH access

- vim /etc/ssh/sshd_config: set PubkeyAuthentication yes, PasswordAuthentication no
- Leave and reenter the ssh connection.
- `adduser your_admin_user`
- `mkdir /home/your_admin_user/.ssh`
- `cp /root/.ssh/authorized_keys /home/your_admin_user/.ssh && chown -R your_admin_user:your_admin_user /home/your_admin_user/.ssh`

Give the new user admin rights

- visudo: add

```
# Members of the admin group may gain root privileges
%admin ALL=(ALL) ALL
```

- `groupadd admin`
- `usermod -a -G admin your_admin_user`
- leave and reenter ssh connection, from now logon as user your_admin_user

Mount the Amazon volume

When adding an Amazon volume and linking it to an instance, it will be available on this instance as /dev/sdX (in our case /dev/sdf)

- format the volume as ext3 and mount it on /mnt/lifeRay, modify /etc/fstab accordingly

```
/dev/sdf /mnt/lifeRay1 ext3 defaults 0 0
```

Set the environment

Set these environment variables in /etc/bash.bashrc (~/.bashrc can be removed)

see[1] bash.bashrc_additions (add to /etc/bash.bashrc)

[1] The text refers to a number of external files via these "see" references. Those external files are available in a separate zip-file, which will be available for download at the same place as this document.

Create a separate user for running Liferay

For security reasons, it's advides to run Liferay under a separate user, for instance *tomcat*:

```
sudo useradd tomcat
sudo passwd tomcat ourTomcatPassword
sudo chown -R tomcat:tomcat /usr/local/liferay-portal-5.2.3
```

References

[1] *D6.4: Compilation of internal deliverable outcomes ID6.13 - 6.18, link not known yet.*

[2] Downloading and Installing Wookie, *http://incubator.apache.org/wookie/downloading-and-installing-wookie.html*

[3] Wookie Server Administrators Guide, *http://incubator.apache.org/wookie/wookie-server-administrators-guide.html*

[4] *ReCourse Learning Design Editor*, http://www.tencompetence.org/ldauthor/

[5] *ID3.24 Updated design for release 6.0 of the TENCompetence software*, *http://hdl.handle.net/1820/2258*

[6] *CopperCore – The IMS Learning Design Engine*, http://www.coppercore.org

Links checked on 22-12-2009.