

## **Unit 1. Task 4: Tomcat installation**

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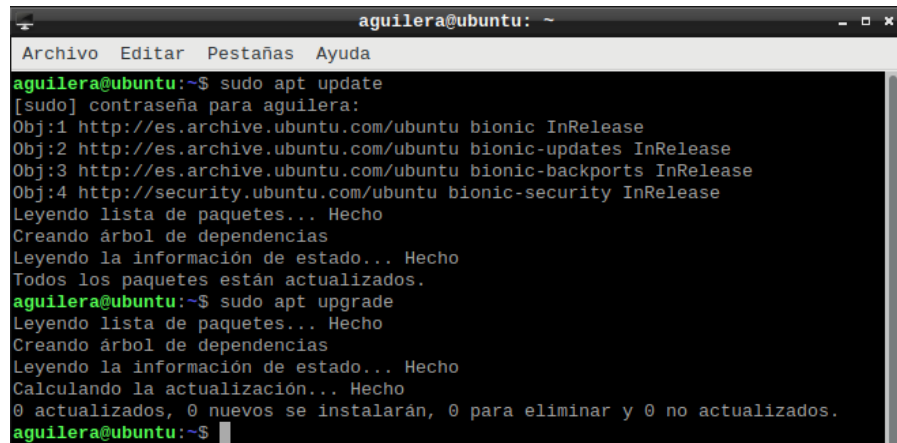
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# 1 Previous steps

## 1.1 Check for updates

Before making the installation, we are going to update our system executing in the terminal the following commands:

```
$ sudo apt update
$ sudo apt upgrade
```



```
aguilera@ubuntu: ~
Archivo  Editar  Pestañas  Ayuda
aguilera@ubuntu:~$ sudo apt update
[sudo] contraseña para aguilera:
Obj:1 http://es.archive.ubuntu.com/ubuntu bionic InRelease
Obj:2 http://es.archive.ubuntu.com/ubuntu bionic-updates InRelease
Obj:3 http://es.archive.ubuntu.com/ubuntu bionic-backports InRelease
Obj:4 http://security.ubuntu.com/ubuntu bionic-security InRelease
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias
Leyendo la información de estado... Hecho
Todos los paquetes están actualizados.
aguilera@ubuntu:~$ sudo apt upgrade
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias
Leyendo la información de estado... Hecho
Calculando la actualización... Hecho
0 actualizados, 0 nuevos se instalarán, 0 para eliminar y 0 no actualizados.
aguilera@ubuntu:~$
```

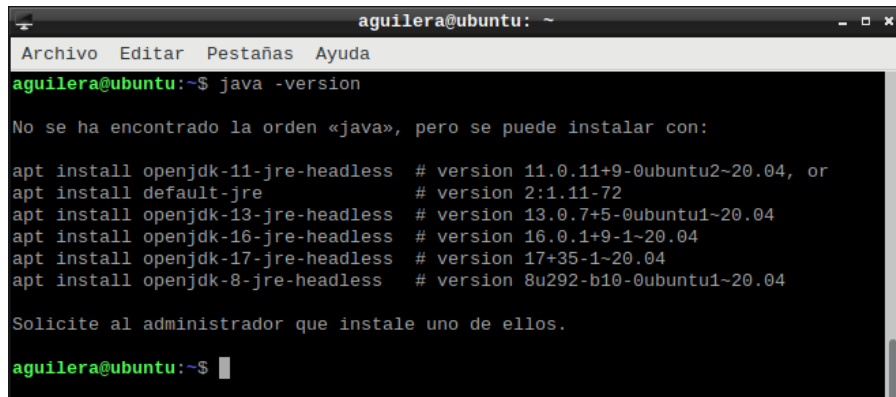
Figure 1: We have our system up to date

## 1.2 Installing JDK

### 1.2.1 Check if Java is Installed

First of all, you have to check if you have Java already installed in your machine:

```
$ java -version
```



```
aguilera@ubuntu: ~  
Archivo Editar Pestañas Ayuda  
aguilera@ubuntu:~$ java -version  
  
No se ha encontrado la orden «java», pero se puede instalar con:  
  
apt install openjdk-11-jre-headless # version 11.0.11+9-0ubuntu2~20.04, or  
apt install default-jre # version 2:1.11-72  
apt install openjdk-13-jre-headless # version 13.0.7+5-0ubuntu1~20.04  
apt install openjdk-16-jre-headless # version 16.0.1+9-1~20.04  
apt install openjdk-17-jre-headless # version 17+35-1~20.04  
apt install openjdk-8-jre-headless # version 8u292-b10-0ubuntu1~20.04  
  
Solicite al administrador que instale uno de ellos.  
aguilera@ubuntu:~$
```

Figure 2: As you can see, I don't have it installed

### 1.2.2 JRE vs JDK

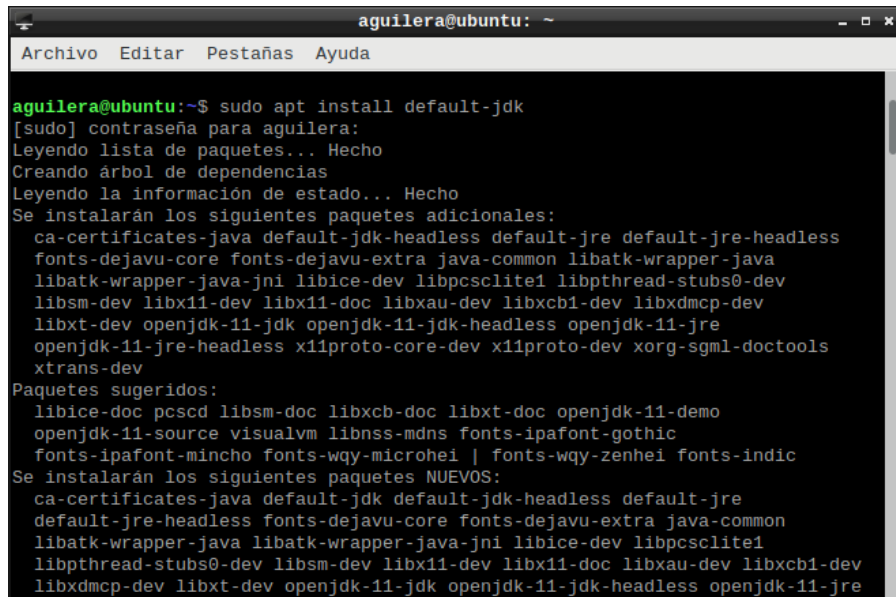
If we reach these point, we have two diffents options, install JRE or JDK:

- JRE is the acronym for Java Runtime Environment. It is a package that contains all stuff needed to execute a compiled Java program (java virtual machine, class library, ....). Nevertheless, it cant't be used to create new programmms.
- JDK is the acronym for Java Development Kit. It has all the components that JRE has, the compiler and development tools.

Sometimes, even if you aren't going to make any development in Java you need to have the JDK installed. In our case, as the web server is going to transform the JSP files into Servlets it will need the Java compiler which is only avaiable if you install the JDK. So it is clear that we are going to install JDK.

You have to run at the command line:

```
$ sudo apt install default-jdk
```

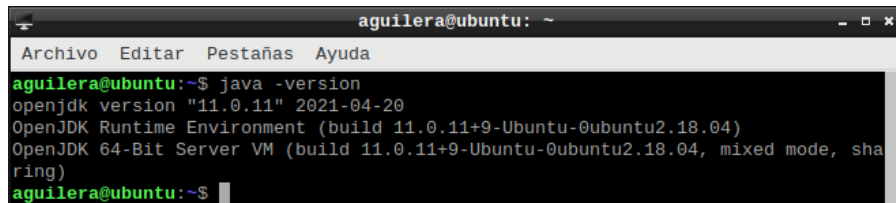


```
aguilera@ubuntu: ~  
Archivo  Editar  Pestañas  Ayuda  
  
aguilera@ubuntu:~$ sudo apt install default-jdk  
[sudo] contraseña para aguilera:  
Leyendo lista de paquetes... Hecho  
Creando árbol de dependencias  
Leyendo la información de estado... Hecho  
Se instalarán los siguientes paquetes adicionales:  
  ca-certificates-java default-jdk-headless default-jre default-jre-headless  
  fonts-dejavu-core fonts-dejavu-extra java-common libatk-wrapper-java  
  libatk-wrapper-java-jni libice-dev libpcsc-lite1 libpthread-stubs0-dev  
  libsm-dev libx11-dev libx11-doc libxau-dev libxcb1-dev libxdmcp-dev  
  libxt-dev openjdk-11-jdk openjdk-11-jdk-headless openjdk-11-jre  
  openjdk-11-jre-headless x11proto-core-dev x11proto-dev xorg-sgml-doctools  
  xtrans-dev  
Paquetes sugeridos:  
  libice-doc pcsd libsm-doc libxcb-doc libxt-doc openjdk-11-demo  
  openjdk-11-source visualvm libnss-mdns fonts-ipafont-gothic  
  fonts-ipafont-mincho fonts-wqy-microhei | fonts-wqy-zenhei fonts-indic  
Se instalarán los siguientes paquetes NUEVOS:  
  ca-certificates-java default-jdk default-jdk-headless default-jre  
  default-jre-headless fonts-dejavu-core fonts-dejavu-extra java-common  
  libatk-wrapper-java libatk-wrapper-java-jni libice-dev libpcsc-lite1  
  libpthread-stubs0-dev libsm-dev libx11-dev libx11-doc libxau-dev libxcb1-dev  
  libxdmcp-dev libxt-dev openjdk-11-jdk openjdk-11-jdk-headless openjdk-11-jre
```

Figure 3: Installing JDK

Then we run again:

```
$ java -version
```



```
aguilera@ubuntu: ~  
Archivo  Editar  Pestañas  Ayuda  
  
aguilera@ubuntu:~$ java -version  
openjdk version "11.0.11" 2021-04-20  
OpenJDK Runtime Environment (build 11.0.11+9-Ubuntu-0ubuntu2.18.04)  
OpenJDK 64-Bit Server VM (build 11.0.11+9-Ubuntu-0ubuntu2.18.04, mixed mode, sha  
ring)  
aguilera@ubuntu:~$
```

Figure 4: It seems to be installed correctly

### 1.2.3 Adding Java to PATH

Once JDK is installed, you have to create an environment variable to indicate where Java is installed, and add it to PATH variable.

```
$ export JAVA_HOME=/usr/lib/jvm/java-11-openjdk-amd64
```

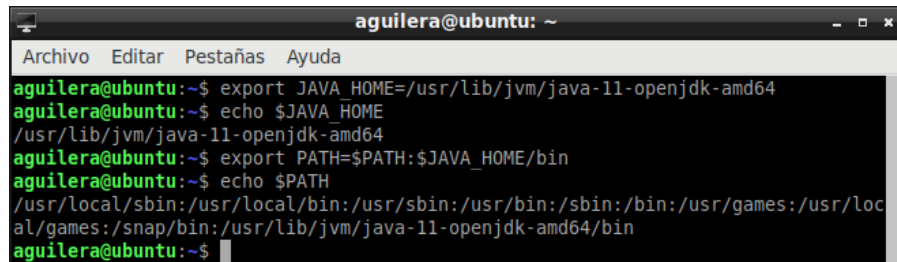
To check if JAVA\_HOME is defined right:

```
$ echo $JAVA_HOME
```

Then we add it to PATH:

```
$ export PATH=$PATH:$JAVA_HOME/bin
```

```
$ echo $PATH
```



```
aguilera@ubuntu: ~  
Archivo  Editar  Pestañas  Ayuda  
aguilera@ubuntu:~$ export JAVA_HOME=/usr/lib/jvm/java-11-openjdk-amd64  
aguilera@ubuntu:~$ echo $JAVA_HOME  
/usr/lib/jvm/java-11-openjdk-amd64  
aguilera@ubuntu:~$ export PATH=$PATH:$JAVA_HOME/bin  
aguilera@ubuntu:~$ echo $PATH  
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin:/usr/lib/jvm/java-11-openjdk-amd64/bin  
aguilera@ubuntu:~$
```

Figure 5: Adding Java to PATH

After all, you have to update the environment variables by the command:

```
$ source /etc/profile
```

## 2 Installing Tomcat

### 2.1 Download

Now is time to install Tomcat. First of all you have to download the source code from:

- <http://ldp.rediris.es/mirror/apache/tomcat/tomcat-9/>

Taken a look from the URL given, the latest version available is the 9.0.54:



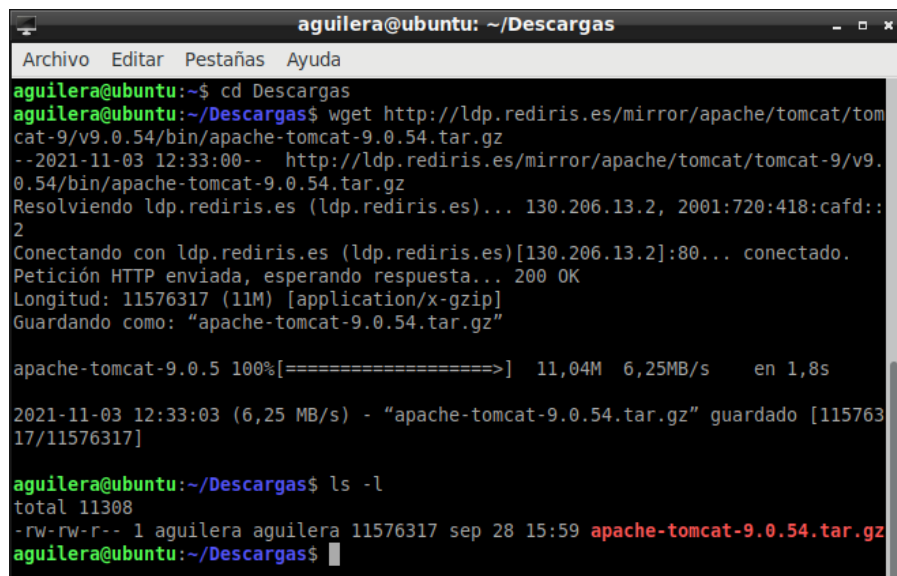
Figure 6: Tomcat mirror

Then we have to navigate through the directories until we reach:

- `http://ldp.rediris.es/mirror/apache/tomcat/tomcat-9/v9.0.54/bin/apache-tomcat-9.0.54.tar.gz`

You can download it using the web browser or using the command *wget* in the terminal:

```
$ wget http://ldp.rediris.es/mirror/apache/tomcat/tomcat-9/v9.0.54/bin/apache-tomcat-9.0.54.tar.gz
```



```

aguilera@ubuntu: ~/Descargas
Archivo  Editar  Pestañas  Ayuda
aguilera@ubuntu:~$ cd Descargas
aguilera@ubuntu:~/Descargas$ wget http://ldp.rediris.es/mirror/apache/tomcat/tomcat-9/v9.0.54/bin/apache-tomcat-9.0.54.tar.gz
--2021-11-03 12:33:00-- http://ldp.rediris.es/mirror/apache/tomcat/tomcat-9/v9.0.54/bin/apache-tomcat-9.0.54.tar.gz
Resolviendo ldp.rediris.es (ldp.rediris.es)... 130.206.13.2, 2001:720:418:cafd::2
Conectando con ldp.rediris.es (ldp.rediris.es)[130.206.13.2]:80... conectado.
Petición HTTP enviada, esperando respuesta... 200 OK
Longitud: 11576317 (11M) [application/x-gzip]
Guardando como: "apache-tomcat-9.0.54.tar.gz"

apache-tomcat-9.0.5 100%[=====] 11,04M 6,25MB/s en 1,8s

2021-11-03 12:33:03 (6,25 MB/s) - "apache-tomcat-9.0.54.tar.gz" guardado [11576317/11576317]

aguilera@ubuntu:~/Descargas$ ls -l
total 11308
-rw-rw-r-- 1 aguilera aguilera 11576317 sep 28 15:59 apache-tomcat-9.0.54.tar.gz
aguilera@ubuntu:~/Descargas$

```

Figure 7: The tar.gz file has downloaded correctly

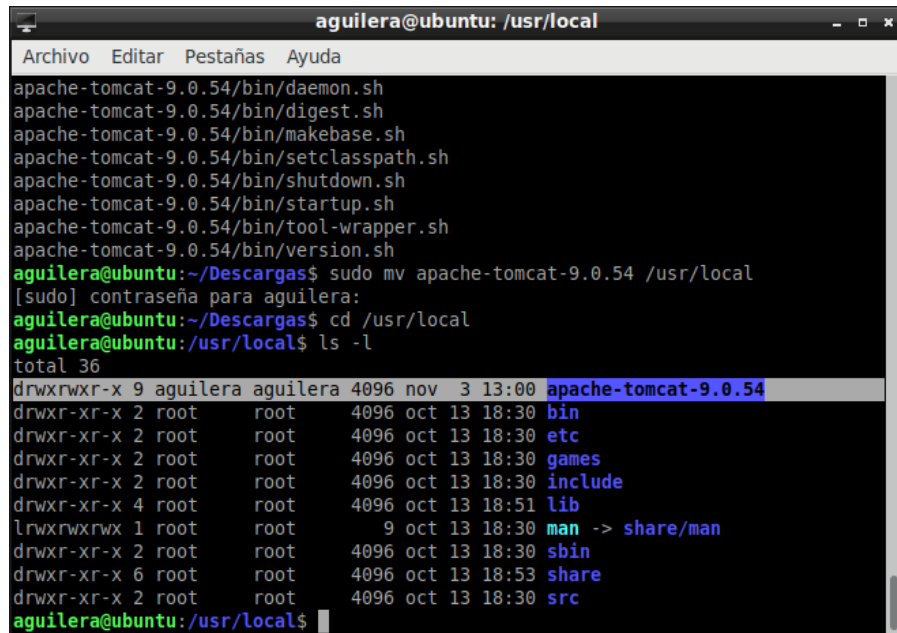
## 2.2 Installation

Next, decompress the tar.gz file using the *tar* instruction:

```
$ tar xvfz apache-tomcat-9.0.54.tar.gz
```

Move it to the destination folder:

```
$ sudo mv apache-tomcat-9.0.54 /usr/local
```

A terminal window titled 'aguilera@ubuntu: /usr/local' showing the installation of Apache Tomcat 9.0.54. The user lists files in the 'bin' directory, then runs 'sudo mv apache-tomcat-9.0.54 /usr/local'. After a password prompt, they run 'cd /usr/local' and 'ls -l'. The output shows the directory listing for /usr/local, with 'apache-tomcat-9.0.54' highlighted in blue.

```
aguilera@ubuntu: /usr/local
Archivo  Editar  Pestañas  Ayuda
apache-tomcat-9.0.54/bin/daemon.sh
apache-tomcat-9.0.54/bin/digest.sh
apache-tomcat-9.0.54/bin/makebase.sh
apache-tomcat-9.0.54/bin/setclasspath.sh
apache-tomcat-9.0.54/bin/shutdown.sh
apache-tomcat-9.0.54/bin/startup.sh
apache-tomcat-9.0.54/bin/tool-wrapper.sh
apache-tomcat-9.0.54/bin/version.sh
aguilera@ubuntu:~/Descargas$ sudo mv apache-tomcat-9.0.54 /usr/local
[sudo] contraseña para aguilera:
aguilera@ubuntu:~/Descargas$ cd /usr/local
aguilera@ubuntu:/usr/local$ ls -l
total 36
drwxrwxr-x 9 aguilera aguilera 4096 nov  3 13:00 apache-tomcat-9.0.54
drwxr-xr-x 2 root      root      4096 oct 13 18:30 bin
drwxr-xr-x 2 root      root      4096 oct 13 18:30 etc
drwxr-xr-x 2 root      root      4096 oct 13 18:30 games
drwxr-xr-x 2 root      root      4096 oct 13 18:30 include
drwxr-xr-x 4 root      root      4096 oct 13 18:51 lib
lrwxrwxrwx 1 root      root        9 oct 13 18:30 man -> share/man
drwxr-xr-x 2 root      root      4096 oct 13 18:30 sbin
drwxr-xr-x 6 root      root      4096 oct 13 18:53 share
drwxr-xr-x 2 root      root      4096 oct 13 18:30 src
aguilera@ubuntu:/usr/local$
```

Figure 8: It has moved as we wanted

Now, this step is optional, but it is advisable to do it: I am going to create a link in order to do updates more comfortable:

```
$ sudo ln -s /usr/local/apache-tomcat-9.0.54 /usr/local/tomcat
```

## 2.3 Testing

Tomcat service management is made by an included script called *catalina*. Using *catalina* you can manage the service manually providing the parameters “start” or “stop”:

```
$ sh /usr/local/tomcat/bin/catalina.sh start
```



```
aguilera@ubuntu: ~  
Archivo  Editar  Pestañas  Ayuda  
aguilera@ubuntu:~$ sh /usr/local/tomcat/bin/catalina.sh start  
Using CATALINA_BASE:   /usr/local/tomcat  
Using CATALINA_HOME:   /usr/local/tomcat  
Using CATALINA_TMPDIR: /usr/local/tomcat/temp  
Using JRE_HOME:        /usr  
Using CLASSPATH:       /usr/local/tomcat/bin/bootstrap.jar:/usr/local/tomcat/bin  
/tomcat-juli.jar  
Using CATALINA_OPTS:  
Tomcat started.  
aguilera@ubuntu:~$
```

Figure 9: Starting Tomcat

If you want to test if the server is listening, you have to introduce in your web browser the URL `http://127.0.0.1:8080` or `localhost:8080` and Tomcat home page should appear.

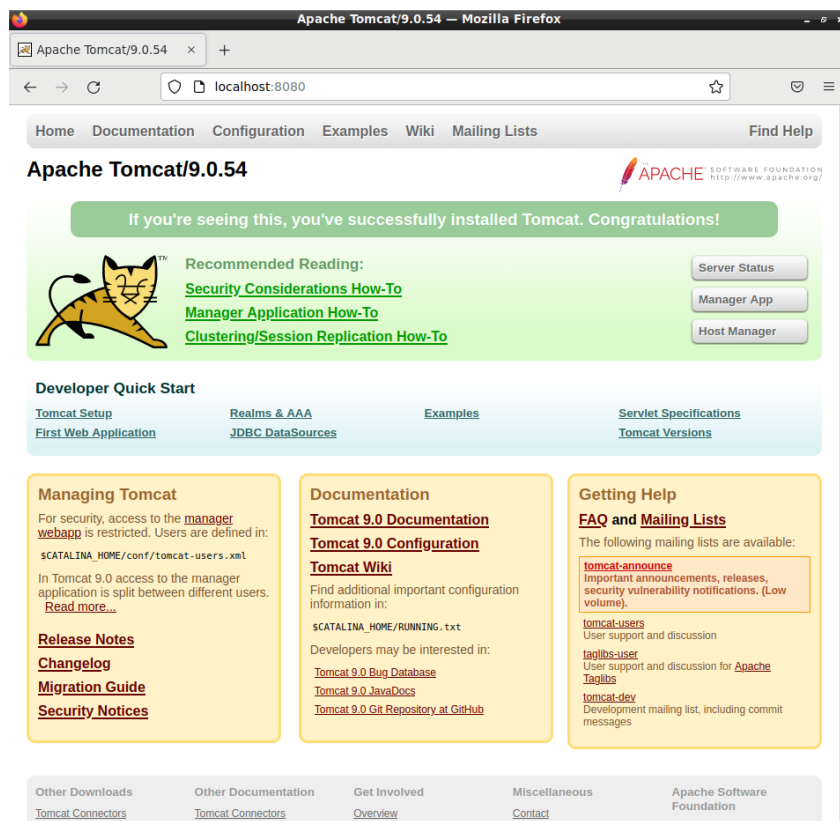


Figure 10: Tomcat home page

## References

- [1] <https://www.it-swarm-es.com/es/java/cual-es-la-diferencia-entre-jdk-y-jre/968588705/>
- [2] <https://ubunlog.com/tomcat-9-instalacion-ubuntu-18-04/>
- [3] [https://remot-technologies.com/como-anadir-java\\_home-a-las-variables-de-entorno-de-ubuntu-20-04-lts/](https://remot-technologies.com/como-anadir-java_home-a-las-variables-de-entorno-de-ubuntu-20-04-lts/)
- [4] [https://educacionadistancia.juntadeandalucia.es/centros/granada/pluginfile.php/862375/mod\\_resource/content/1/Tema1-ImplantacionArqWeb.pdf](https://educacionadistancia.juntadeandalucia.es/centros/granada/pluginfile.php/862375/mod_resource/content/1/Tema1-ImplantacionArqWeb.pdf) ()