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// TUTORIAL //

How To Install Apache Tomcat 10 on Ubuntu 20.04

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Java Ubuntu 20.04 Apache

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How To Install Apache Tomcat 10 on Ubuntu 20.04

Introduction

Apache Tomcat is a web server and servlet container that is used to serve Java applications. It's an open source implementation of the Jakarta Servlet, Jakarta Server Pages, and other technologies of the Jakarta EE platform.

In this tutorial, you'll deploy Apache Tomcat 10 on Ubuntu 20.04. You will install Tomcat 10, set up users and roles, and navigate the admin user interface.

Prerequisites

- One Ubuntu 20.04 server with a sudo non-root user and a firewall, which you can set up by following the Ubuntu 20.04 Initial Server Setup.

Step 1 – Installing Tomcat

In this section, you will set up Tomcat 10 on your server. To begin, you will download its latest version and set up a separate user and appropriate permissions for it. You will also install the Java Development Kit (JDK).

For security purposes, Tomcat should run under a separate, unprivileged user. Run the following command to create a user called `tomcat`:

```
$ sudo useradd -m -d /opt/tomcat -U -s /bin/false tomcat
```
Copy

By supplying `/bin/false` as the user's default shell, you ensure that it's not possible to log in as `tomcat`.

You'll now install the JDK. First, update the package manager cache by running:

```
$ sudo apt update
```
Copy

Then, install the JDK by running the following command:

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

Answer when prompted to continue with the installation.

When the installation finishes, check the version of the available Java installation:

```
$ java -version
```
Copy

The output should be similar to this:

```
Output
openjdk version "11.0.14" 2022-01-18
OpenJDK Runtime Environment (build 11.0.14+9-Ubuntu-0ubuntu2.20.04)
OpenJDK 64-Bit Server VM (build 11.0.14+9-Ubuntu-0ubuntu2.20.04, mixed mode, sha
```

To install Tomcat, you'll need the latest Core Linux build for Tomcat 10, which you can get from the downloads page. Select the latest Core Linux build, ending in `.tar.gz`. At the time of writing, the latest version was `10.0.20`.

First, navigate to the `/tmp` directory:

```
$ cd /tmp
```
Copy

Download the archive using `wget` by running the following command:

```
$ wget https://dlcdn.apache.org/tomcat/tomcat-10/ v10.0.20/bin/apache-t
```
Copy 10

The `wget` command downloads resources from the Internet.

Then, extract the archive you downloaded by running:

```
$ sudo tar xzvf apache-tomcat-10*tar.gz -C /opt/tomcat --strip-componen
```
Copy

Since you have already created a user, you can now grant `tomcat` ownership over the extracted installation by running:

```
$ sudo chown -R tomcat:tomcat /opt/tomcat/
$ sudo chmod -R u+x /opt/tomcat/bin
```
Copy

Both commands update the settings of your `tomcat` installation. To learn more about these commands and what they do, visit Linux Permissions Basics and How to Use Umask on a VPS.

In this step, you installed the JDK and Tomcat. You also created a separate user for it and set up permissions over Tomcat binaries. You will now configure credentials for accessing your Tomcat instance.

Step 2 – Configuring Admin Users

To gain access to the **Manager** and **Host Manager** pages, you'll define privileged users in Tomcat's configuration. You will need to remove the IP address restrictions, which disallows all external IP addresses from accessing those pages.

Tomcat users are defined in `/opt/tomcat/conf/tomcat-users.xml`. Open the file for editing with the following command:

```
$ sudo nano /opt/tomcat/conf/tomcat-users.xml
```
Copy

Add the following lines before the ending tag:

/opt/tomcat/conf/tomcat-users.xml

```
<role rolename="manager-gui" />
<user username="manager" password=" manager_password " roles="manager-gui" />

<role rolename="admin-gui" />
<user username="admin" password=" admin_password " roles="manager-gui,admin-gui"
```
Copy

Replace highlighted passwords with your own. When you're done, save and close the file.

Here you define two user roles, `manager-gui` and `admin-gui`, which allow access to **Manager** and **Host Manager** pages, respectively. You also define two users, `manager` and `admin`, with relevant roles.

By default, Tomcat is configured to restrict access to the admin pages, unless the connection comes from the server itself. To access those pages with the users you just defined, you will need to edit config files for those pages.

To remove the restriction for the **Manager** page, open its config file for editing:

```
$ sudo nano /opt/tomcat/webapps/manager/META-INF/context.xml
```
Copy

Comment out the `Valve` definition, as shown:

opt/tomcat/webapps/manager/META-INF/context.xml

```
...
<Context antiResourceLocking="false" privileged="true" >
  <CookieProcessor className="org.apache.tomcat.util.http.Rfc6265CookieProcessor
                   sameSiteCookies="strict" />
 <!- -  <Valve className="org.apache.catalina.valves.RemoteAddrValve"
         allow="127\.\d+\.\d+\.\d+|::1|0:0:0:0:0:0:0:0 :1"  /> -->
  <Manager sessionAttributeValueClassNameFilter="java\.lang\.(?:Boolean|Integer|
</Context>
```
Copy

Save and close the file, then repeat for **Host Manager**:

```
$ sudo nano /opt/tomcat/webapps/host-manager/META-INF/context.xml
```
Copy

You have now defined two users, `manager` and `admin`, which you will later use to access restricted parts of the management interface. You'll now create a `systemd` service for Tomcat.

Step 3 – Creating a `systemd` service

The `systemd` service that you will now create will keep Tomcat quietly running in the background. The `systemd` service will also restart Tomcat automatically in case of an error or failure.

Tomcat, being a Java application itself, requires the Java runtime to be present, which you installed with the JDK in step 1. Before you create the service, you need to know where Java is located. You can look that up by running the following command:

```
$ sudo update-java-alternatives -l
```
Copy

The output will be similar to this:

```
Output
java-1.11.0-openjdk-amd64      1111       /usr/lib/jvm/java-1.11.0-openjdk-amd6
```

Note the path where Java resides, listed in the last column. You'll need the path momentarily to define the service.

You'll store the `tomcat` service in a file named `tomcat.service`, under `/etc/systemd/system`. Create the file for editing by running:

```
$ sudo nano /etc/systemd/system/tomcat.service
```
Copy

Add the following lines:

/etc/systemd/system/tomcat.service

```
[Unit]
Description=Tomcat
After=network.target

[Service]
Type=forking

User=tomcat
Group=tomcat

Environment="JAVA_HOME= /usr/lib/jvm/java-1.11.0-openjdk-amd64"
Environment="JAVA_OPTS=-Djava.security.egd=file:///dev/urandom"
Environment="CATALINA_BASE=/opt/tomcat"
Environment="CATALINA_HOME=/opt/tomcat"
Environment="CATALINA_PID=/opt/tomcat/temp/tomcat.pid"
Environment="CATALINA_OPTS=-Xms512M -Xmx1024M -server -XX:+UseParallelGC"

ExecStart=/opt/tomcat/bin/startup.sh
ExecStop=/opt/tomcat/bin/shutdown.sh

RestartSec=10
Restart=always

[Install]
WantedBy=multi-user.target
```
Copy

Modify the highlighted value of `JAVA_HOME` if it differs from the one you noted previously.

Here, you define a service that will run Tomcat by executing the startup and shutdown scripts it provides. You also set a few environment variables to define its home directory (which is `/opt/tomcat` as before) and limit the amount of memory that the Java VM can allocate (in `CATALINA_OPTS`). Upon failure, the Tomcat service will restart automatically.

When you're done, save and close the file.

Reload the `systemd` daemon so that it becomes aware of the new service:

```
sudo systemctl daemon-reload
```
Copy

You can then start the Tomcat service by typing:

```
sudo systemctl start tomcat
```
Copy

Then, look at its status to confirm that it started successfully:

```
sudo systemctl status tomcat
```
Copy

The output will look like this:

```
Output
● tomcat.service - Tomcat
     Loaded: loaded (/etc/systemd/system/tomcat.service; disabled; vendor preset
     Active: active (running) since Fri 2022-03-11 14:37:10 UTC; 2s ago
    Process: 4845 ExecStart=/opt/tomcat/bin/startup.sh (code=exited, status=0/SU
   Main PID: 4860 (java)
      Tasks: 15 (limit: 1132)
     Memory: 90.1M
     CGroup: /system.slice/tomcat.service
             └─4860 /usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -Djava.util.
```

Press `q` to exit the command.

To e Tomcat starting up with the system, run the following command:

```
$ sudo systemctl enable tomcat
```
Copy

In this step, you identified where Java resides and enabled `systemd` to run Tomcat in the background. You'll now access Tomcat through your web browser.

Step 4 – Accessing the Web Interface

Now that the Tomcat service is running, you can configure the firewall to allow connections to Tomcat. Then, you will be able to access its web interface.

Tomcat uses port `8080` to accept HTTP requests. Run the following command to allow traffic to that port:

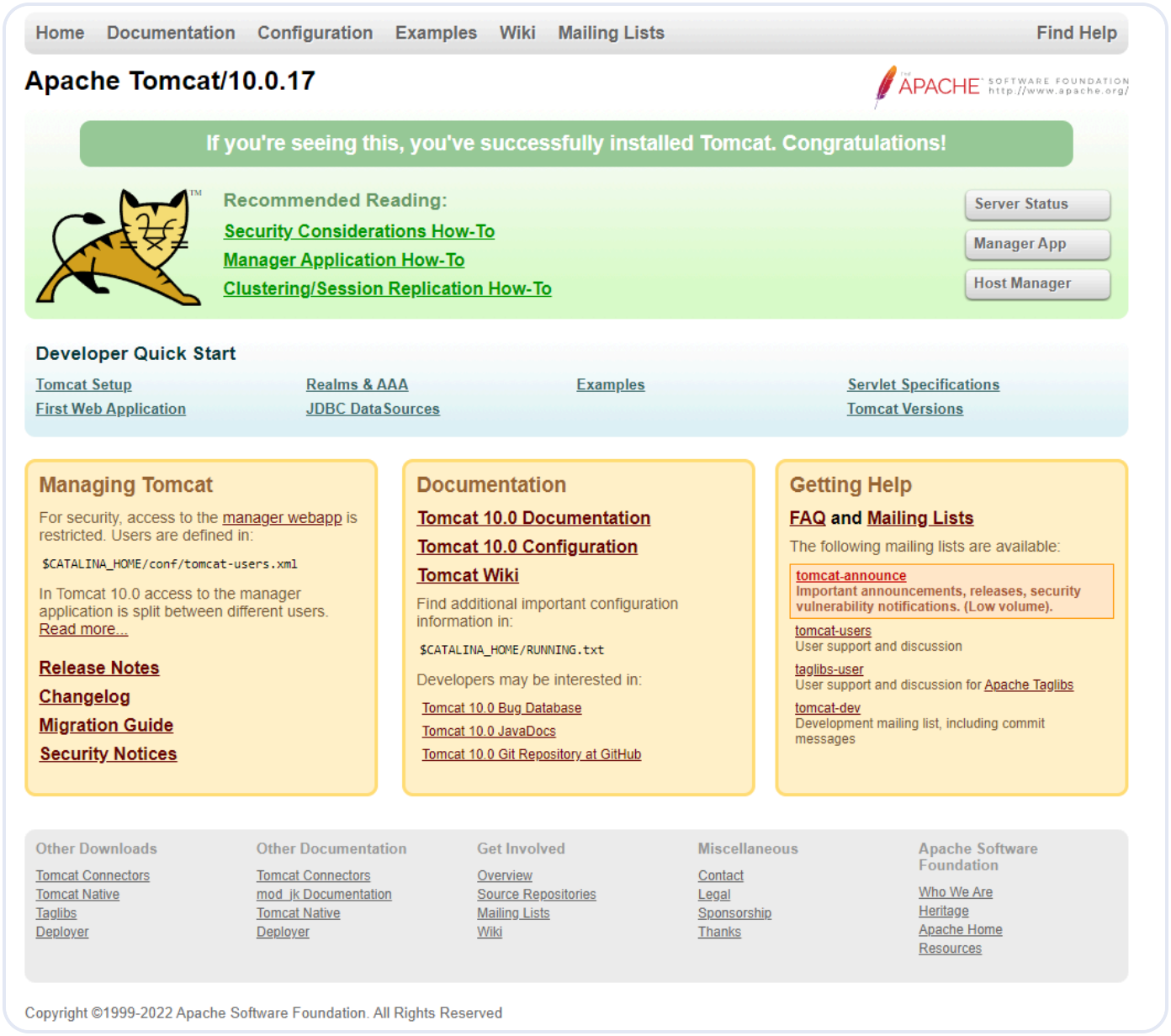
```
$ sudo ufw allow 8080
```

Copy

In your browser, you can now access Tomcat by navigating to the IP address of your server:

```
http:// your_server_ip :8080
```

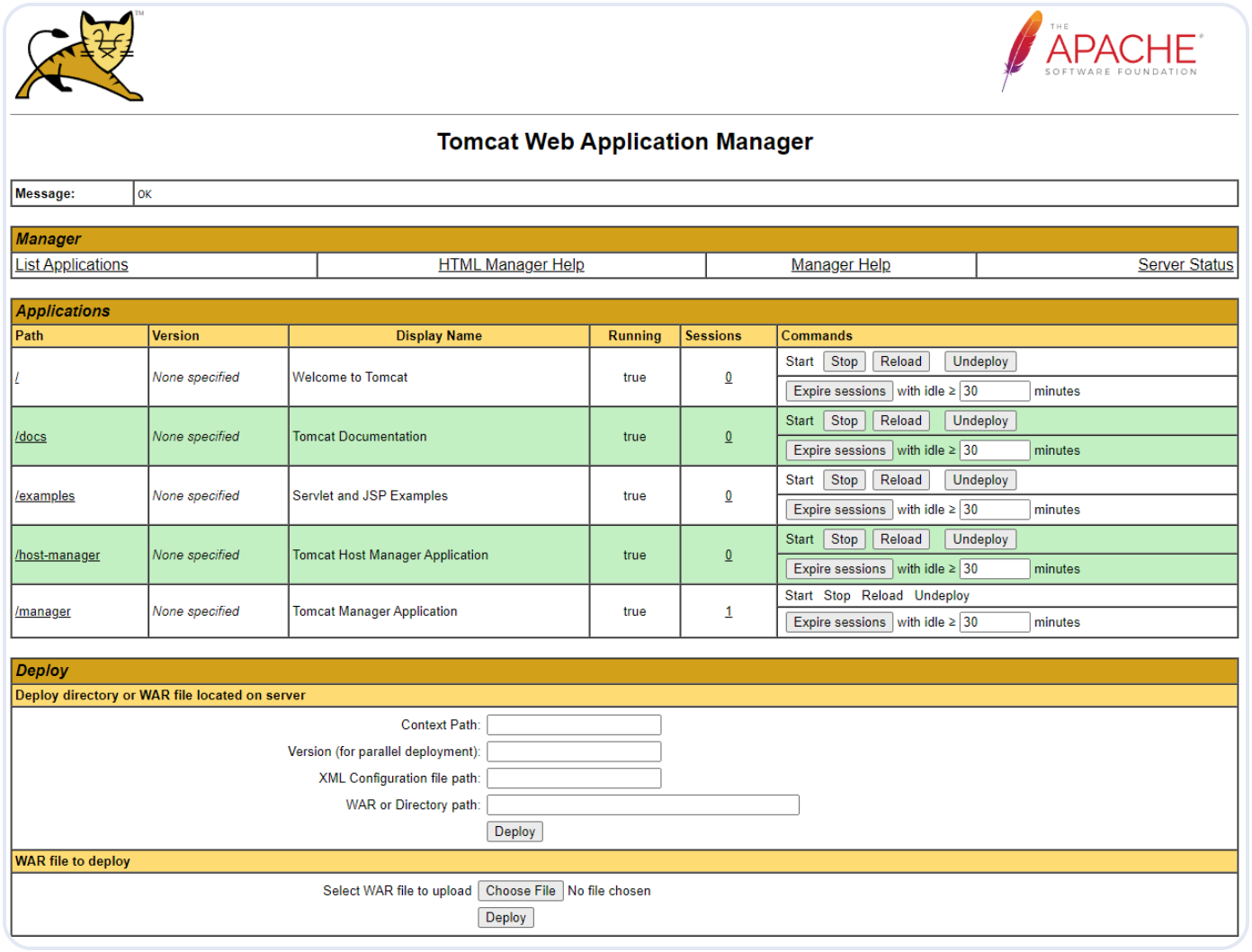
You'll see the default Tomcat welcome page:



You've now verified that the Tomcat service is working.

Press on the **Manager App** button on the right. You'll be prompted to enter the account credentials that you defined in a previous step.

You should see a page that looks like this:



Tomcat Web Application Manager

Message:	OK

Manager

List Applications	HTML Manager Help	Manager Help	Server Status

Applications

Path	Version	Display Name	Running	Sessions	Commands
/	None specified	Welcome to Tomcat	true	0	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/docs	None specified	Tomcat Documentation	true	0	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/examples	None specified	Servlet and JSP Examples	true	0	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/host-manager	None specified	Tomcat Host Manager Application	true	0	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/manager	None specified	Tomcat Manager Application	true	1	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes

Deploy

Deploy directory or WAR file located on server

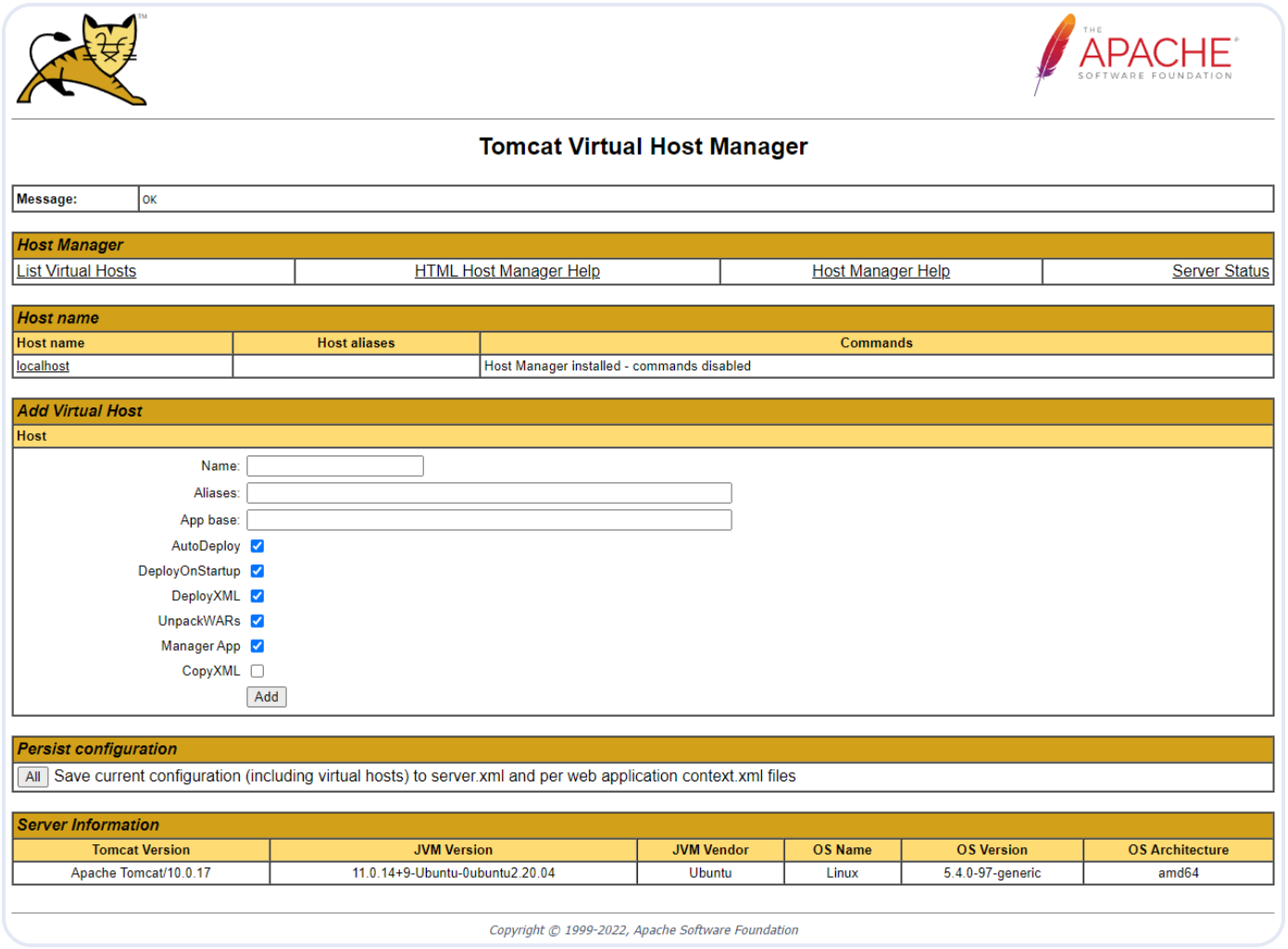
Context Path:
Version (for parallel deployment):
XML Configuration file path:
WAR or Directory path:
Deploy

WAR file to deploy

Select WAR file to upload Choose File No file chosen
Deploy

The Web Application Manager is used to manage your Java applications. You can start, stop, reload, deploy, and undeploy them from here. You can also run some diagnostics on your apps (for example, to find memory leaks). Information about your server is available at the very bottom of this page.

Now, take a look at the **Host Manager**, accessible by pressing its button on the main page:



Tomcat Virtual Host Manager

Message:	OK

Host Manager			
List Virtual Hosts	HTML Host Manager Help	Host Manager Help	Server Status

Host name		
Host name	Host aliases	Commands
localhost		Host Manager installed - commands disabled

Add Virtual Host

Host

Name:
Aliases:
App base:
AutoDeploy
DeployOnStartup
DeployXML
UnpackWARs
Manager App
CopyXML
Add

Persist configuration

All Save current configuration (including virtual hosts) to server.xml and per web application context.xml files

Server Information

Tomcat Version	JVM Version	JVM Vendor	OS Name	OS Version	OS Architecture
Apache Tomcat/10.0.17	11.0.14+9-Ubuntu-0ubuntu2.20.04	Ubuntu	Linux	5.4.0-97-generic	amd64

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Here, you can add virtual hosts to serve your applications from. Keep in mind that this page is not accessible by users who don't have the `admin-gui` role assigned, such as `manager`.

Conclusion

You installed Tomcat 10 on your Ubuntu 20.04 server and configured it to be accessible remotely with management accounts. You can now use it to deploy your Java applications, based on Jakarta EE technologies. You can learn more about Java apps by visiting the official docs.

Currently, your Tomcat installation is functional, but its traffic is not encrypted. This means that all data, including sensitive items like passwords, are sent in plain text that can be intercepted and read by other parties on the internet. To prevent this from happening, you can add a domain name to your server and install a TLS certificate on it with this tutorial on securing Tomcat 10 with Apache or Nginx. For more on encryption, see An Introduction to Let's Encrypt. To add a domain to a DigitalOcean Droplet, follow this guide on How To Add Doma

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Shad Hashmi • August 29, 2023

i am unbale to login wiht my user id password

Reply

Makari Kevin • August 10, 2023

Good tutorial, but 1 mistake.

After you navigated to the `/tmp` directory, you forgot to navigate back to the root directory after downloading and extracting the tomcat archive file.

Fo[illegible]yone following the tutorial, after running the following command `sudo tar xzvf apache-tomcat-10*tar.gz -C /opt/tomcat --strip-components=1`, run `cd ~`

to navigate back to the root directory, then proceed with the rest of the tutorial.

Happy coding!

Reply

JJenus • July 6, 2023

If after following this process and you're unable to connect, simply update your java version to at least 9 for tomcat 10.1*. And go back to this process to update the JAVA_ENVIRONMENT "sudo update-java-alternatives -l"

Reply

33d3ded26d1c4350a3810705be4dd7 • February 10, 2023

Hello,

This tutorial isn't working. First, I have the error below,

vagrant@tomcat2:/opt/tomcat/bin$ sudo systemctl status tomcat ● tomcat.service - Apache Tomcat Web Application Container Loaded: loaded (/etc/systemd/system/tomcat.service; disabled; vendor preset: enabled) Active: activating (auto-restart) (Result: exit-code) since Fri 2023-02-10 12:23:15 UTC; 5s ago Process: 5053 ExecStart=/opt/tomcat/bin/startup.sh (code=exited, status=2) Main PID: 5053 (code=exited, status=2)

Feb 10 12:23:15 tomcat2 startup.sh[5053]: /opt/tomcat/bin/catalina.sh: 504: cannot create /opt/tomcat/logs/catalina.out: Permission denied Feb 10 12:23:15 tomcat2 systemd[1]: tomcat.service: Main process exited, code=exited, status=2/INVALIDARGUMENT Feb 10 12:23:15 tomcat2 systemd[1]: tomcat.service: Failed with result 'exit-code'. sudo

I created the logs file and granted 777 permission sudo chmod 777 /opt/tomcat/logs

Tomcat service came up but port 8080 was not opened. I opened it with the sudo ufw 8080, I still can't connect to my tomcat server.

Have you tested the above script to make sure that is it working?

Show replies Reply

ani-hovhannisyan • September 6, 2022

The `wget https://dlcdn.apache.org/tomcat/tomcat-10/v10.0.20/bin/apache-tomcat-10.0.20.tar.gz` link is not working. I searched from "https://archive.apache.org/dist/tomcat/tomcat-10/v10.0.20/" the originak link and replaced it, after that it worked. Currently working link is: `https://archive.apache.org/dist/tomcat/tomcat-10/v10.0.20/bin/apache-tomcat-10.0.20.tar.gz` Note: If you prefer other version of Tomcat you can download from the "https://archive.apache.org/dist/" archive.

Reply

272c7f5d09cd4dbbb33ca2b0db • April 9, 2022

+919672210800

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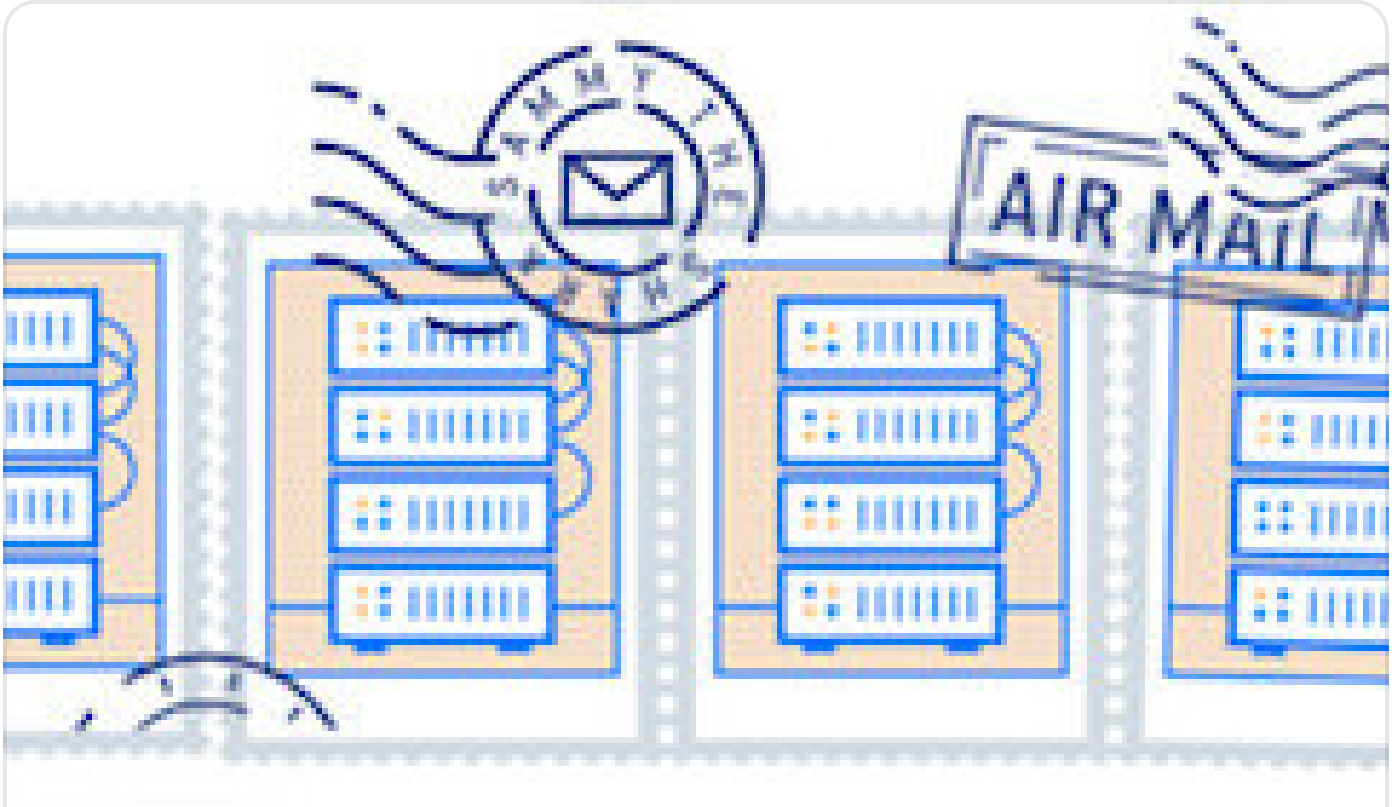

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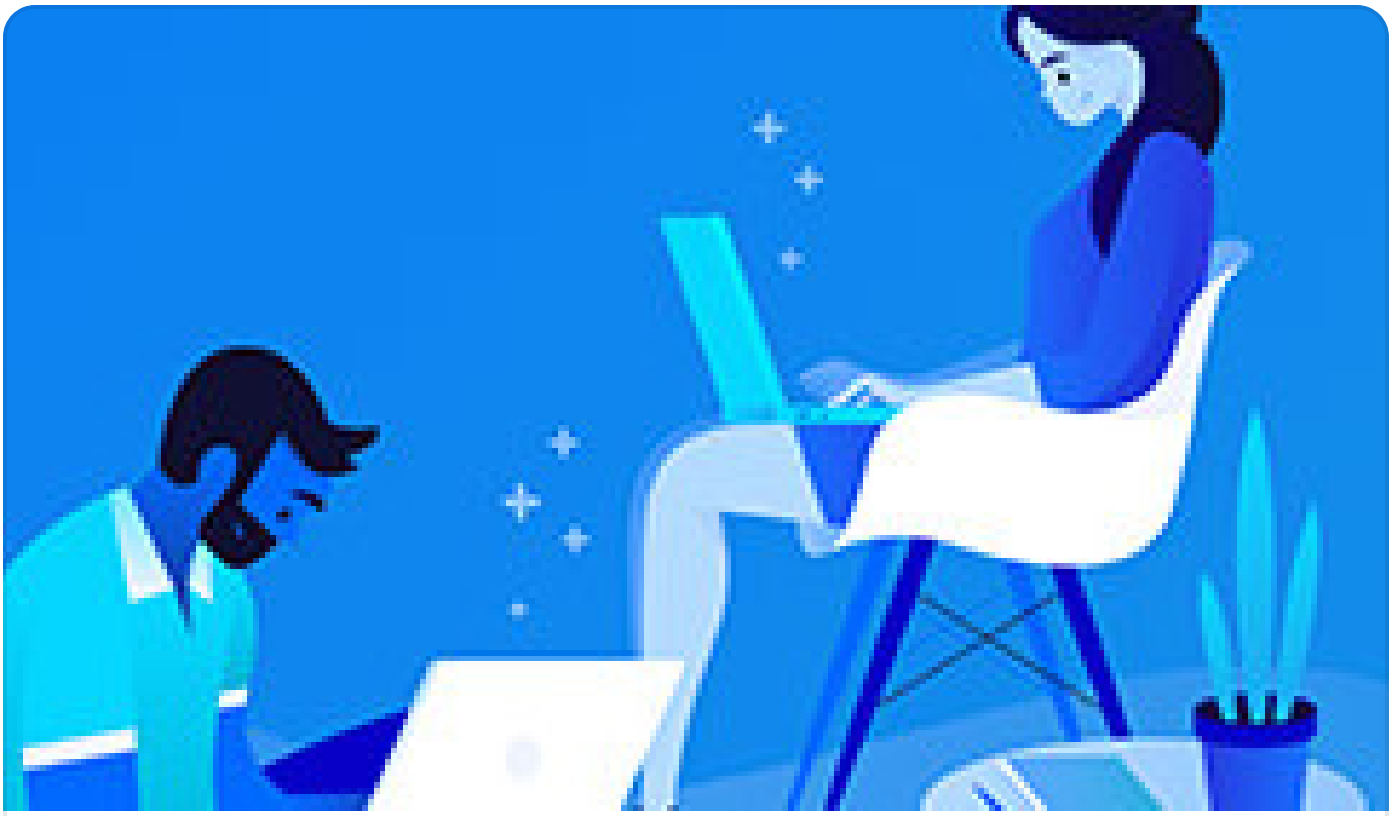

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