ASSESSMENT - 9

Application Server

1. **What is the difference between an Application Server and a Web Server?**

WEB SERVER	APPLICATION SERVER
1. Web server is useful or fitted for static content.	Whereas application server is fitted for dynamic content.
2. Web server consumes or utilizes less resources.	While application servers utilize more resources.
3. Web servers arrange the run environment for web applications.	While application servers arrange the run environment for enterprises applications.
4. In web servers, multithreading is not supported.	While in application server, multithreading is supported.
5. Web server's capacity is lower than application server.	While application server's capacity is higher than web server.
6. In web server, HTML and HTTP protocols are used.	While in this, GUI as well as HTTP and RPC/RMI protocols are used.

2. **What is Catalina?**

Catalina is Tomcat's servlet container. In Tomcat, a Realm element represents a "database" of usernames, passwords, and roles assigned to those users. Different implementations of Realm allow Catalina to be integrated into environments where such authentication information is already being created and maintained, and then use that information to implement Container Managed Security as described in the Servlet Specification

3. **Describe tomcat directory structure.**

```
garima@garima:/opt/tomcat$ tree
.
├── bin [error opening dir]
├── BUILDING.txt
├── conf [error opening dir]
├── CONTRIBUTING.md
├── examples.desktop
├── lib [error opening dir]
├── LICENSE
├── logs [error opening dir]
├── NOTICE
├── README.md
├── RELEASE-NOTES
├── RUNNING.txt
├── temp [error opening dir]
├── webapps [error opening dir]
└── work [error opening dir]

7 directories, 8 files
```
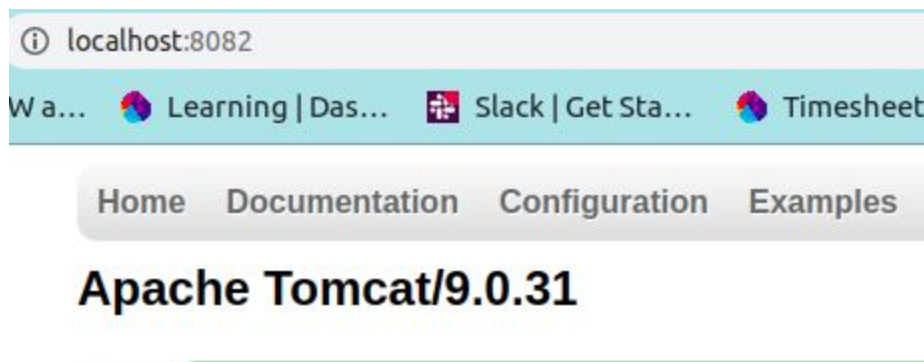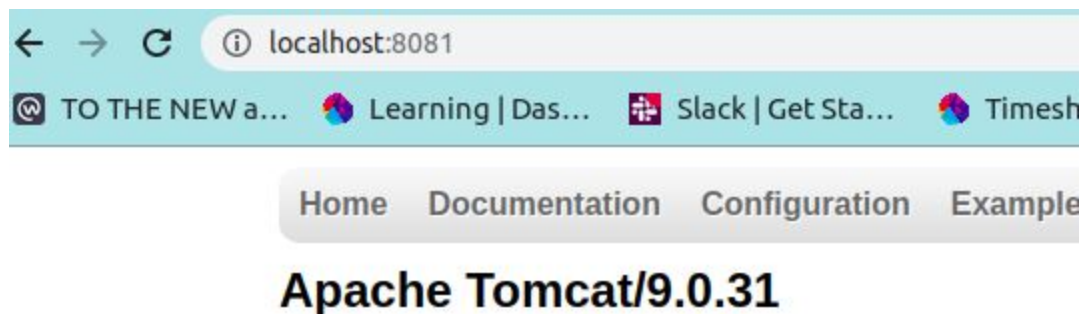
4. **Connect any sample.war to MySQL running on localhost.**
5. **Run multiple services on different ports with different connectors (AJP/HTTP) on same tomcat installation.**

```xml
<Service name="app1">
  <Connector port="8081" protocol="org.apache.coyote.http11.Http11NioProtocol"
          connectionTimeout="20000"
          redirectPort="8443" />
  <Engine name="Catalina" defaultHost="localhost">
    <Host name="localhost"  appBase="webapps"
      unpackWARs="true" autoDeploy="true">
    </Host>
  </Engine>
</Service>
<Service name="app2">
  <Connector port="8082" protocol="org.apache.coyote.http11.Http11NioProtocol"
          connectionTimeout="20000"
          redirectPort="8443" />
  <Engine name="Catalina" defaultHost="localhost">
    <Host name="localhost"  appBase="webapps"
      unpackWARs="true" autoDeploy="true">
    </Host>
  </Engine>
</Service>
</Server>
```

```
<!-- Define an AJP 1.3 Connector on port 8009 -->
<Connector protocol="AJP/1.3"
           address="::1"
           port="8009"
           redirectPort="8443" />
```

```
root@garima:/opt/tomcat/conf# vim server.xml
root@garima:/opt/tomcat/conf# sudo systemctl restart tomcat
root@garima:/opt/tomcat/conf# sudo systemctl status tomcat
● tomcat.service - Apache Tomcat Web Application Container
   Loaded: loaded (/etc/systemd/system/tomcat.service; disabled; vendor preset: enabled)
   Active: active (running) since Fri 2020-02-21 17:49:30 IST; 11s ago
  Process: 4623 ExecStop=/opt/tomcat/bin/shutdown.sh (code=exited, status=0/SUCCESS)
  Process: 4661 ExecStart=/opt/tomcat/bin/startup.sh (code=exited, status=0/SUCCESS)
 Main PID: 4668 (java)
    Tasks: 64 (limit: 4915)
   CGroup: /system.slice/tomcat.service
           └─4668 /usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -Djava.util.logging.config.file=/opt/

Feb 21 17:49:30 garima systemd[1]: Starting Apache Tomcat Web Application Container...
Feb 21 17:49:30 garima startup.sh[4661]: Tomcat started.
Feb 21 17:49:30 garima systemd[1]: Started Apache Tomcat Web Application Container.
lines 1-13/13 (END)
```

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ⓘ localhost:8082

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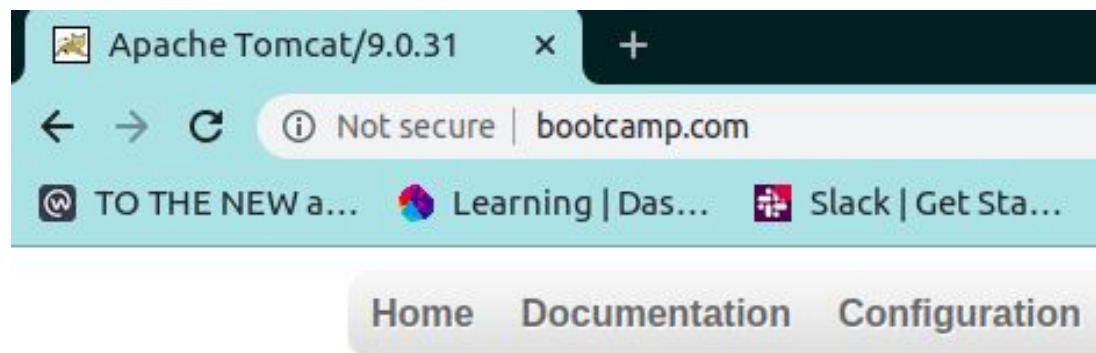6. **Use nginx as a reverse proxy for tomcat application.**

```
garima@garima:/etc/nginx/sites-available$ sudo vim bootcamp.com
[sudo] password for garima:
garima@garima:/etc/nginx/sites-available$ cd ../sites-enabled/
garima@garima:/etc/nginx/sites-enabled$ ln -s /etc/nginx/sites-available/bootcamp.com .
ln: failed to create symbolic link './bootcamp.com': Permission denied
garima@garima:/etc/nginx/sites-enabled$ sudo ln -s /etc/nginx/sites-available/bootcamp.co
m .
garima@garima:/etc/nginx/sites-enabled$ sudo systemctl start nginx
garima@garima:/etc/nginx/sites-enabled$ sudo nginx -t
nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
nginx: configuration file /etc/nginx/nginx.conf test is successful
```

```
garima@garima:/etc/nginx/sites-enabled$ cat bootcamp.com
server{
        listen 80;
        server_name bootcamp.com www.bootcamp.com;
        location /{
                proxy_pass http://127.0.0.1:8080;
        }
}
```

```
garima@garima:/etc$ sudo vim hosts
[sudo] password for garima:
garima@garima:/etc$ sudo cat hosts
127.0.0.1        localhost abc.com www.abc.com xyz.com loadbalancing.com bootcamp.com
127.0.1.1        garima

# The following lines are desirable for IPv6 capable hosts
::1     ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
```
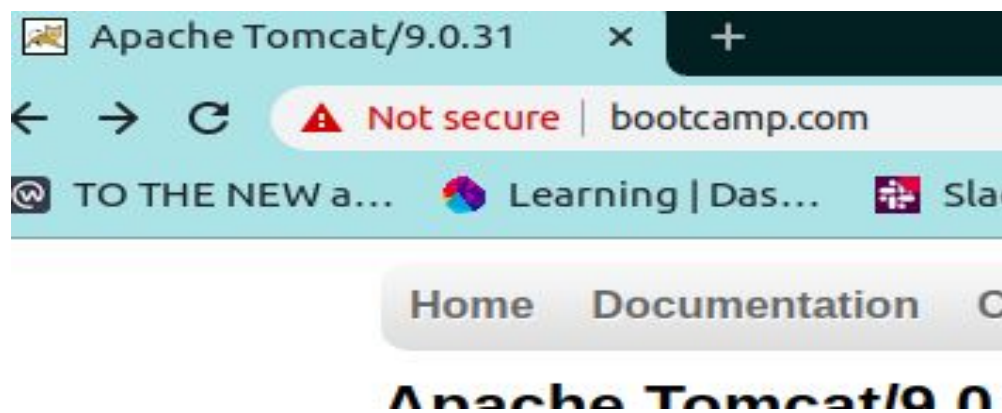
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a. **Setup self signed certificate on that nginx for bootcamp.com.**

```
garima@garima: /opt/tomcat                    ×              garima@ga
garima@garima:/opt/tomcat$ cd /etc/nginx/sites-enabled/
garima@garima:/etc/nginx/sites-enabled$ ls
abc.com  balancing  bootcamp.com  drupal  load-balancing  xyz.com
garima@garima:/etc/nginx/sites-enabled$ sudo vim bootcamp.com
[sudo] password for garima:
garima@garima:/etc/nginx/sites-enabled$ sudo cat bootcamp.com
server{
        listen 80;
        server_name www.bootcamp.com;
        return 302 https://www.bootcamp.com;
}
server{
        listen 443 ssl;
        server_name www.bootcamp.com;
        ssl_certificate /etc/nginx/ssl/public.pem;
        ssl_certificate_key /etc/nginx/ssl/private.key;
        location /{
                proxy_pass http://127.0.0.1:8080;
        }
}

garima@garima:/etc/nginx/sites-enabled$ sudo nginx -t
nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
nginx: configuration file /etc/nginx/nginx.conf test is successful
garima@garima:/etc/nginx/sites-enabled$ sudo systemctl restart nginx
garima@garima:/etc/nginx/sites-enabled$ ▮
```

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b. **What is the difference between proxy_pass & proxy_pass reverse?**

In case of forward proxy(i.e proxy_pass) client's identity is hidden eg. in VPN.

In case of reverse proxy server's identity is hidden for eg when we hit nginx tomcat's content is served.