EPAM Systems, RD Dep., RD Dep.

MTN.NIX.11.Module.Automated Environment Configuration Management.Docker_annotation

REVISION HISTORY					
Ver.	Description of Change	Author	Date	Approved	
				Name	Effective Date
1.0	Initial Version	Siarhei Beliakou	23/May/2017		

Task. Docker. Part 1

Task:
Using base docker image **sbeliakou/centos:7.2**
Repository: https://github.com/MNTLab/docker/docker-1

1. **With Dockerfiles**:
   - Create Docker Image of nginx (web.Dockerfile)
   - Create Docker Image of Tomcat 7 (tomcat.Dockerfile)
   - Create Docker Image (Data Volume) with hello world application for Tomcat (application.Dockerfile)
   - Run these Images so that http://localhost/sample shows hello world page
   - Nginx container forwards http requests to Tomcat container; Only nginx container exposes port (80)

2. **With docker-compose:**
   - Create docker-compose.yml file to build containers from previos task
   - Run "environment" in daemon mode
   - Create own branch (epam login without @epam.com, in lowercase)
   - Create PR with description of reported task
   - All needed resources (if they are) must be placed into /resources folder

Task. Docker. Part 2

Task:

Repository: https://github.com/MNTLab/docker/docker-2

- Create custom ansible (v2.2.1) image
- Launch Jenkins from official image
- Link Docker Host as Jenknis slave (ssh)
- Create custom gradle image
- Configure a job to build spring-boot application using gradle image built on previous step
- Configure a job to run just built Spring Boot app with docker-compose

Dockerfile with NGINX

```
FROM sbeliakou/centos:7.2
MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
RUN yum install nginx -y
EXPOSE 80
CMD nginx -g 'daemon off;'
```

Creating image

```
[student@epbyminw2466 docker]$ sudo docker build -f ./Web.Dockerfile .
```

```
Step 5/5 : CMD nginx -g 'daemon off;'
 ---> Running in 9226fc63af47
 ---> 38aa511ec039
Removing intermediate container 9226fc63af47
Successfully built 38aa511ec039
```

Running image and create new container

```
[student@epbyminw2466 docker]$ sudo docker run -d -P 38aa511ec039
1a929554f8130c0e989d24d913c1a625838210f03aeca3218f920c611b387848
[student@epbyminw2466 docker]$ sudo docker ps -a
CONTAINER ID    IMAGE          COMMAND            CREATED         STATUS              PORTS                     NAMES
1a929554f813    38aa511ec039   "/bin/sh -c 'nginx..."   3 seconds ago   Up 2 seconds        0.0.0.0:32770->80/tcp    tender_beaver
c8401511f0fd    38aa511ec039   "/bin/sh -c 'nginx..."   15 minutes ago  Exited (0) 4 minutes ago                          relaxed_einstein
1d1ff90c8c51    ubuntu         "/bin/bash"        3 hours ago     Up 3 hours                                    wonderful_minsky
```

Check NGINX with 32770 port

localhost:32770

Welcome to **nginx** on Fedora!

This page is used to test the proper operation of the **nginx** HTTP server after it has been installed. If you can read this page, it means that the web server installed at this site is working properly.

Website Administrator

This is the default `index.html` page that is distributed with **nginx** on Fedora. It is located in `/usr/share/nginx/html`.

You should now put your content in a location of your choice and edit the `root` configuration directive in the **nginx** configuration file `/etc/nginx/nginx.conf`.

Stop this container and remove it

```
[student@epbyminw2466 docker]$ sudo docker stop 1a929554f813
1a929554f813
[student@epbyminw2466 docker]$ sudo docker rm 1a929554f813
1a929554f813
[student@epbyminw2466 docker]$ sudo docker ps -a
CONTAINER ID    IMAGE          COMMAND            CREATED         STATUS              PORTS     NAMES
c8401511f0fd    38aa511ec039   "/bin/sh -c 'nginx..."   31 minutes ago  Exited (0) 20 minutes ago            relaxed_einstein
1d1ff90c8c51    ubuntu         "/bin/bash"        3 hours ago     Up 3 hours                    wonderful_minsky
```
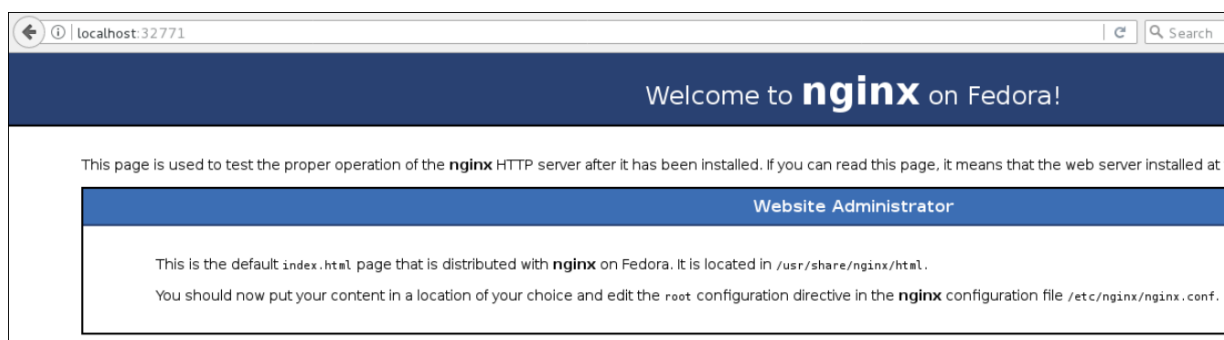
Firefox can't establish a connection to the server at localhost:32770.
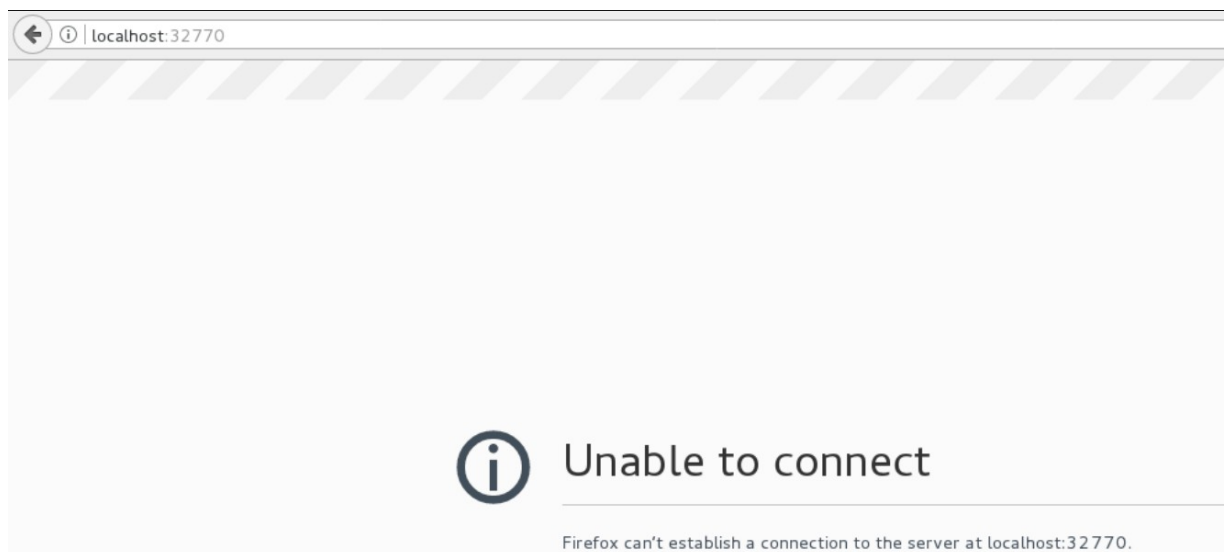
Run new container with the same image

```
[student@epbyminw2466 docker]$ sudo docker run -d -P 38aa511ec039
58ebd3d46c771913d98ef84b62e5e86b73c0152c1e78035bdccd083803e6e314
[student@epbyminw2466 docker]$ sudo docker ps -a
CONTAINER ID    IMAGE         COMMAND             CREATED         STATUS                  PORTS                     NAMES
58ebd3d46c77    38aa511ec039  "/bin/sh -c 'nginx..." 4 seconds ago  Up 3 seconds           0.0.0.0:32771->80/tcp     dreamy_pasteur
c8401511f0fd    38aa511ec039  "/bin/sh -c 'nginx..." 31 minutes ago Exited (0) 21 minutes ago                        relaxed_einstein
1d1ff90c8c51    ubuntu        "/bin/bash"         3 hours ago     Up 3 hours                                        wonderful_minsky
[student@epbyminw2466 docker]$
```

Check NGINX with 32771 port

Welcome to **nginx** on Fedora!

This page is used to test the proper operation of the **nginx** HTTP server after it has been installed. If you can read this page, it means that the web server installed at th

Website Administrator

This is the default `index.html` page that is distributed with **nginx** on Fedora. It is located in `/usr/share/nginx/html`.

You should now put your content in a location of your choice and edit the `root` configuration directive in the **nginx** configuration file `/etc/nginx/nginx.conf`.
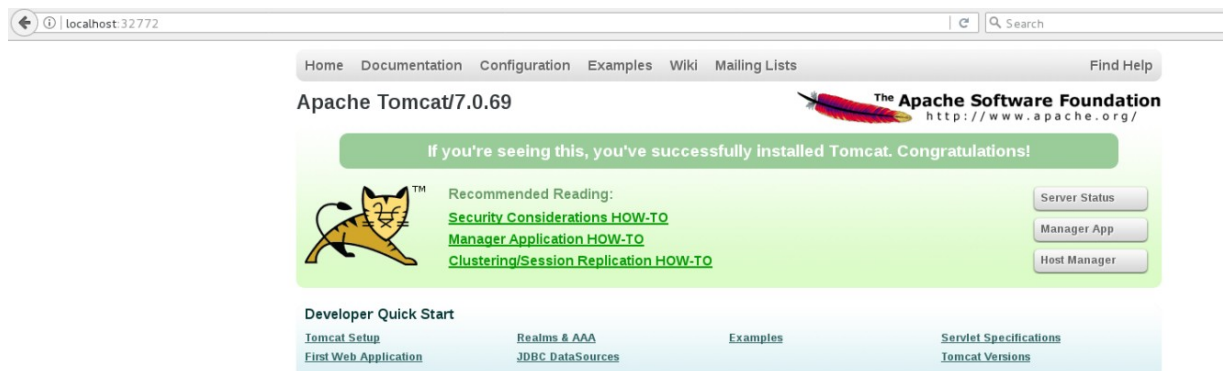
Tomcat

```
FROM sbeliakou/centos:7.2
MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
RUN yum install tomcat -y \
  yum install tomcat-webapps -y; yum clean all
EXPOSE 8080
CMD /usr/libexec/tomcat/server start
```

Built image and create containers

Deploy clusterjsp.war

```
FROM sbeliakou/centos:7.2
MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
VOLUME /var/lib/tomcat/webapps/
ADD clusterjsp.war /var/lib/tomcat/webapps/
CMD sleep infinity
```

Cluster - HA JSP Sample

HttpSession Information:

- Served From Server: **localhost**
- Server Port Number: **32774**
- Executed From Server: **a05a6cbbf20f**
- Executed Server IP Address: **172.17.0.4**
- Session ID: **985246A1F435681FFA848366AC49D7E8**
- Session Created: Fri Jul 28 13:03:57 UTC 2017
- Last Accessed: Fri Jul 28 13:06:01 UTC 2017
- Session will go inactive in **1800 seconds**

Enter session attribute data:

Name of Session Attribute: [   ]
Value of Sesion Attribute: [   ]
[ADD SESSION DATA] [RELOAD PAGE]

[CLEAR SESSION]

Data retrieved from the HttpSession:

INSTRUCTIONS

- Add session data using the form. Upon pressing ADD SESSION DATA, the current session data will be listed.
- Click on RELOAD PAGE to display the current session data without adding new data.
- Click on CLEAR SESSION to invalidate the current session.

Run datavolume container with application.image

```
[student@epbyminw2466 docker]$ sudo docker run -d --name datavolume 81b053a91439
6c3c5695875d7908d30cbfb2cc113a1af75087ca6c3d10025cceba7d45267750
```

Run tomcat container with application.image

```
[student@epbyminw2466 docker]$ sudo docker run -d -P --volumes-from datavolume b64966f1b1af
738e1f7364fe7024d424e6a57dac2c39393f71e9810ae40b125d2223b2521a55
```

Build, run and proxy: Nginx80→Tomcat8080/Clusterjsp

At first built this Dockerfile with nginx and nginx.sh
FROM sbeliakou/centos:7.2
MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
RUN yum install nginx -y
EXPOSE 80
ADD nginx.sh /etc/nginx/
CMD chmod +x /etc/nginx/nginx.sh && /etc/nginx/nginx.sh && nginx -g 'daemon off;'

```
[student@epbyminw2466 docker]$ sudo docker build -f ./NGINX.Dockerfile .
Sending build context to Docker daemon  10.24kB
Step 1/6 : FROM sbeliakou/centos:7.2
 ---> 3adf11ba9dc7
Step 2/6 : MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
 ---> Using cache
 ---> ec51c99f5f5e
Step 3/6 : RUN yum install nginx -y
 ---> Using cache
 ---> b6d76d944663
Step 4/6 : EXPOSE 80
 ---> Using cache
 ---> b1c54be6869f
Step 5/6 : ADD nginx.sh /etc/nginx/
 ---> 312a3dccd7ba
Removing intermediate container 3399834dbe39
Step 6/6 : CMD chmod +x /etc/nginx/nginx.sh && /etc/nginx/nginx.sh && nginx -g 'daemon off;'
 ---> Running in 55fc019d1360
 ---> a63ae885cba1
Removing intermediate container 55fc019d1360
Successfully built a63ae885cba1
```

Then build DATAvolume
FROM sbeliakou/centos:7.2
MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
VOLUME /var/lib/tomcat/webapps/
ADD clusterjsp.war /var/lib/tomcat/webapps/
CMD sleep infinity

```
[student@epbyminw2466 docker]$ sudo docker build -f ./application.Dockerfile .
Sending build context to Docker daemon  10.24kB
Step 1/5 : FROM sbeliakou/centos:7.2
 ---> 3adf11ba9dc7
Step 2/5 : MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
 ---> Using cache
 ---> ec51c99f5f5e
Step 3/5 : VOLUME /var/lib/tomcat/webapps/
 ---> Using cache
 ---> 112ec6916141
Step 4/5 : ADD clusterjsp.war /var/lib/tomcat/webapps/
 ---> Using cache
 ---> 4c0991af36de
Step 5/5 : CMD sleep infinity
 ---> Using cache
 ---> 81b053a91439
Successfully built 81b053a91439
```

 # Then build tomcat with DATAvolume

FROM sbeliakou/centos:7.2
MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
RUN yum install tomcat -y \
  yum install tomcat-webapps -y; yum clean all
EXPOSE 8080
CMD /usr/libexec/tomcat/server start

```
[student@epbyminw2466 docker]$ sudo docker build -f ./tomcat.Dockerfile .
Sending build context to Docker daemon  10.24kB
Step 1/5 : FROM sbeliakou/centos:7.2
 ---> 3adf11ba9dc7
Step 2/5 : MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
 ---> Using cache
 ---> ec51c99f5f5e
Step 3/5 : RUN yum install tomcat -y   yum install tomcat-webapps -y; yum clean all
 ---> Using cache
 ---> e282602bf3e9
Step 4/5 : EXPOSE 8080
 ---> Using cache
 ---> 7b4d56ec56c6
Step 5/5 : CMD /usr/libexec/tomcat/server start
 ---> Using cache
 ---> b64966f1b1af
Successfully built b64966f1b1af
[student@epbyminw2466 docker]$ sudo docker run -d -P --n
--name            --network          --network-alias    --no-healthcheck
[student@epbyminw2466 docker]$ sudo docker run -d -P --volumes-from datavolume b64966f1b1af
619307f34d4c586310b28370f772e074d2f27a170770245ce613c64adb86140a
```

For NGINX build

```bash
#!/bin/bash
sed -i
'38d;39d;40d;41d;42d;43d;44d;45d;46d;47d;48d;49d;50d;51d;52d;53d;54d;55d;
56d;57d' /etc/nginx/nginx.conf;

touch /etc/nginx/conf.d/newser.conf;
echo "server {
    listen      80 default_server;
    listen      [::]:80 default_server;
    server_name  _;
    root        /usr/share/nginx/html;

    # Load configuration files for the default server block.
    include /etc/nginx/default.d/*.conf;

    location / {
      proxy_pass http://172.17.0.4:8080;

    }

    error_page 404 /404.html;
      location = /40x.html {
    }

    error_page 500 502 503 504 /50x.html;
      location = /50x.html {
    }
  } " >>/etc/nginx/conf.d/newser.conf;
```

tomcat running on 8080 port and we check this port on nginx container

```
[student@epbyminw2466 docker]$ sudo docker ps -a
CONTAINER ID    IMAGE          COMMAND            CREATED           STATUS          PORTS                       NAMES
619307f34d4c    b64966f1b1af   "/bin/sh -c '/usr/..."  5 seconds ago     Up 3 seconds    0.0.0.0:32787->8080/tcp     sleepy_kirch
5afe2ec65772    81b053a91439   "/bin/sh -c 'sleep..."  About a minute ago Up About a minute                           datavolume
90f2d197a481    a63ae885cba1   "/bin/sh -c 'chmod..."  2 minutes ago     Up 2 minutes    0.0.0.0:32786->80/tcp       jovial_yonath
[student@epbyminw2466 docker]$
```

Cluster - HA JSP Sample

HttpSession Information:

- Served From Server: **172.17.0.4**
- Server Port Number: **8080**
- Executed From Server: **619307f34d4c**
- Executed Server IP Address: **172.17.0.4**
- Session ID: **021BBC15CB956D05AD18A7A697413F61**
- Session Created: Fri Jul 28 16:36:01 UTC 2017
- Last Accessed: Fri Jul 28 16:36:01 UTC 2017
- Session will go inactive in **1800 seconds**

Enter session attribute data:

Name of Session Attribute: [   ]

Value of Sesion Attribute: [   ]

[ADD SESSION DATA]   [RELOAD PAGE]

[CLEAR SESSION]

Data retrieved from the HttpSession:

INSTRUCTIONS

- Add session data using the form. Upon pressing ADD SESSION DATA, the current session data will be listed.
- Click on RELOAD PAGE to display the current session data without adding new data.
- Click on CLEAR SESSION to invalidate the current session.

Create yml:

```yaml
version: '2'
services:
 app:
   build:
     context: .
     dockerfile: application.Dockerfile
   command: sleep infinity
 tomcat:
   build:
     context: .
     dockerfile: tomcat.Dockerfile
   depends_on: [ "app" ]
   volumes_from: [ "app" ]
   command: /usr/libexec/tomcat/server start
 nginx:
   build:
     context: .
     dockerfile: NGINX.Dockerfile
   depends_on: [ "tomcat" ]
   expose: [ "80" ]
   ports: [ "127.0.0.1:80:80" ]
```

application.Dockerfile
```dockerfile
FROM sbeliakou/centos:7.2
MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
VOLUME /var/lib/tomcat/webapps/
ADD clusterjsp.war /var/lib/tomcat/webapps/
CMD sleep infinity
```

tomcat.Dockerfile
```
FROM sbeliakou/centos:7.2
MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
RUN yum install tomcat -y \
  yum install tomcat-webapps -y; yum clean all
CMD /usr/libexec/tomcat/server start
```

#NGINX.Dockerfile
```
FROM sbeliakou/centos:7.2
MAINTAINER Aliaksei Karzhou (aliaksei_karzhou@epam.com)
RUN yum install nginx -y
EXPOSE 80
ADD nginx.sh /etc/nginx/
CMD chmod +x /etc/nginx/nginx.sh && /etc/nginx/nginx.sh && nginx -g 'daemon
off;'
```

localhost/80

localhost/clusterjsp/

Cluster - HA JSP Sample

HttpSession Information:

- Served From Server: docker_tomcat_1
- Server Port Number: 8080
- Executed From Server: 16f5c2cd87dc
- Executed Server IP Address: 172.18.0.3
- Session ID: B0175153061146822D0D1EEAC6126B26
- Session Created: Mon Jul 31 10:15:51 UTC 2017
- Last Accessed: Mon Jul 31 10:15:51 UTC 2017
- Session will go inactive in 1800 seconds

```
Creating docker_app_1 ...
Creating docker_app_1 ... done
Creating docker_tomcat_1 ...
Creating docker_tomcat_1 ... done
Creating docker_nginx_1 ...
Creating docker_nginx_1 ... done
```

```
[student@epbyminw2466 docker]$ sudo docker ps -a
CONTAINER ID    IMAGE          COMMAND               CREATED        STATUS        PORTS                  NAMES
299102238d85    docker_nginx   "nginx -g 'daemon ..." 8 minutes ago  Up 8 minutes  127.0.0.1:80->80/tcp   docker_nginx_1
5a596b5b7a60    docker_tomcat  "/usr/libexec/tomc..." 8 minutes ago  Up 8 minutes                         docker_tomcat_1
5280d3032509    docker_app     "sleep infinity"       8 minutes ago  Up 8 minutes                         docker_app_1
```