TIE-23546 Cloud Platforms
Exercise 4: Application Level Containers
v1.3

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In the exercise three, we used Linux LXC and LXD container technologies. Both technologies emulates closely a virtual machine. In this exercise, we focus on application level containers. Application level containers are lighter than virtual machines and operating system level containers. The best-known application container solution is Docker. Docker container includes the application and all its dependencies. You can download or upload Docker containers from Docker Hub.

Docker containers

In the traditional approach Linux application and all its dependencies are installed step by step. Usually the installation process is simple but sometimes you encounter packet dependency errors. If the installation process failed, you will need to do research to resolve the issue. In the worst case scenario, you have hours of difficulty and business is suspended. Docker containers have been developed to facilitate the installation process and management. In this exercise, we use Docker containers. The following instructions are made for Microsoft Windows. If you are using MacOS, then you have to adapt instructions.

1. Take a snapshot [VMware Workstation\ Ubuntu Server 01 -> Snapshot\ Take Snapshot\ Snapshot 5]. [Oracle VirtualBox\ Ubuntu Server 01 -> Snapshot\ Take\ Snapshot 5].

2. Select NAT adapter [VMware Workstation\ Ubuntu Server 01 -> Settings\ Network adapter\ NAT]. [Oracle VirtualBox\ Ubuntu Server 01 -> Settings\ Network\ Adapter 1\ Attached to: Bridge].

3. Turn on the Ubuntu Server 01 and open the SSH connection.

4. Install and configure Docker. Read installation instructions from the link.

5. Answer following questions:

Question	**Command**
Search CentOS images from Docker Hub	`docker search centos`
Download CentOS image from Docker Hub	`docker pull centos`
List locally stored Docker images	`docker images`
Start CentOS container	`docker run -d -t -i centos /bin/bash`
List only running containers	`docker ps`
Stop CentOS container	`docker stop a8b277ee73dd`
Remove CentOS container	`docker rm a8b277ee73dd`
Remove CentOS image	`docker rmi centos`

Table 1. Docker commands.

WordPress installation with Docker

WordPress is the most popular website management system in use. A user can easily create a website without any previous experience of web programming and development. A person with basic IT skills can create impressive websites. The downside is WordPress platform vulnerability. A number of vulnerabilities have been identified in the platform. The user must check for updates regularly.

1. Install MariaDB and WordPress platform. Read installation instructions from the link.

2. Check IP address of the virtual machine with ifconfig command (interface ens33).

3. Open your browser and enter the IP address in the address bar. You will be redirected to WordPress installation page.

4. In the Site Title field, enter name of the course.

5. Open WordPress dashboard and customize your site. Change the active theme. There are only three themes installed, but you can download more themes from WordPress.org. Select the appropriate theme and activate it.

6. Open WordPress dashboard and create a new post.

    - In the Site Title field, enter name of the exercise.
    - In the text box, enter your name or list members of your group in text box. Finally, publish your post.

7. Open a new browser tab and re-type the IP address in the address bar.

8. Take a screenshot and paste image to appendix one.

9. This was a straightforward exercise. We installed WordPress platform and MariaDB server. WordPress credentials and messages are stored on the MariaDB server.

    In real life, we would use the Nginx proxy. The proxy server takes a client request and forwards it to one or more WordPress servers. WordPress servers can use the same MariaDB server. In this exercise, the approach is simpler. We have one WordPress platform and one MariaDB server.

Finally

1. Stop Docker containers wordpress and wordpressdb.

2. First, shutdown Ubuntu Server 01 (sudo poweroff). Then, close WMware software.

3. Do not destroy the virtual machine. We will use it in future exercises.

4. Save the final report to your home directory in Word Doc and Adobe PDF format (Word / File / Save as/ PDF).

5. Return the final report in PDF format.

6. Good work! It is time to go for lunch or coffee.

Appendix 1: A screenshot from WordPress.