Cloud Computing Applications and Services

Case-study application: Swap

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Swap

Consider the Swap application, used to handle class enrolment and shift exchanges. It is available from: `https://github.com/Hackathonners/swap`. The goal is to install Swap along with its dependencies and a MySQL database in separate virtual machines.

Tasks

1. Create two VMs (see warm-up guide).
2. VM1 should have ip 10.0.0.3 and VM2 should have ip 10.0.0.4.
3. Install and configure MySQL (sudo apt install mysql-server) in VM2.
4. Use the mysql client command line to:
   (a) create a database.

   ```
   sudo mysql -p

   CREATE DATABASE swap;
   ```

   (b) create/grant privileges to a user on VM1 to access the database.
   Note that user, password and ip fields should be replaced by the appropriate values.
   For example, the ip should be 10.0.0.3 (ip configured at the warmup exercise) and the user and password fields can be chosen as desired.

   ```
   CREATE USER 'user'@'ip' IDENTIFIED BY 'password';

   GRANT ALL PRIVILEGES ON swap.* TO 'user'@'ip' WITH GRANT OPTION;
   ```

   (c) exit the mysql console and edit bind-address configurations at:

   ```
   /etc/mysql/mysql.conf.d/mysqld.cnf
   ```

   (d) Note: The bind-address is the ip of the VM where MySQL server is deployed (e.g., 10.0.0.4)
   (e) restart mysql service (sudo /etc/init.d/mysql restart).
5. In the other virtual machine (VM1) install the Swap platform and dependencies.
6. Install PHP, as required by the application, by using the following commands:
   (a) `sudo add-apt-repository ppa:ondrej/php`
   (b) `sudo apt update`
   (c) install php extensions with apt install

   ```
   php7.4 php7.4-{fpm,zip,mbstring,tokenizer,mysql,gd,xml,bcmath,intl,curl}
   ```

7. Install remaining dependencies (NodeJS, Composer and npm)

(a) `sudo apt install nodejs`

(b) `sudo apt install composer`

(c) `sudo apt install npm`

8. Clone Swap's git repository and cd to Swap directory.

   (a) Do not forget to change the database configurations (DB_HOST, DB_PORT, DB_DATABASE, DB_USERNAME and DB_PASSWORD) at the .env.example and rename the file to .env

   (b) `composer install`

   (c) use npm instead of yarn to install Swap:

   ```
   npm install
   ```

   (d) `php artisan key:generate`

9. Start swap with:

   ```
   php artisan serve --host=0.0.0.0
   ```

10. Try it out!

    (a) access swap from your browser. The url should contain the ip of VM1 and port 8000 (e.g., 10.0.0.3:8000)

    (b) run database migration at the webpage

Extras

1. Setup an external mail server account (e.g., by using mailtrap).
2. Use Redis for session management.

Questions

1. What is this application's architecture and what pattern(s) are present?
2. What would you expect the bottleneck of this application to be? Why?
3. How would you scale this application? Which patterns would you use? Why?

Learning outcomes Experiment the distributed deployment and configuration of multi-tier applications.