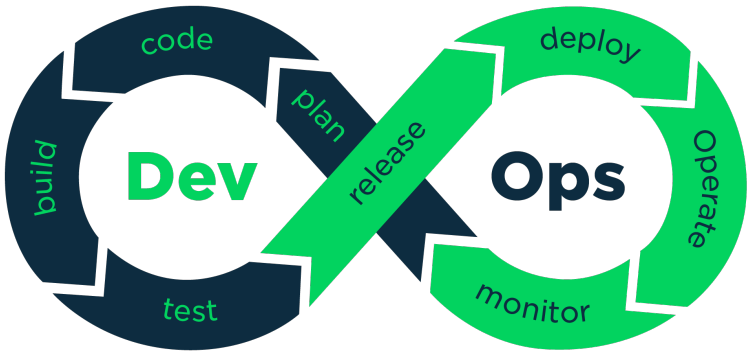
B4 - DevOps

B-DOP-400

Octopus

Grow tentacles and control machines



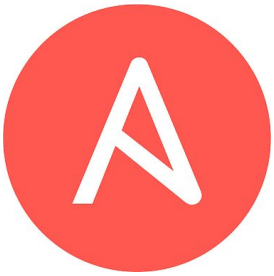
Octopus

- The totality of your source files, except all useless files (binary, temp files, obj files,...), must be included in your delivery.

Configuring a machine (virtual or not) is easy, you can do what you want manually.
Configuring a few machines can be tedious to do manually.
Configuring manually a lot of machines is exhausting, and not worth of investing that much time into it.

There comes the solution, for us perfectly lazy DevOps engineers (in the making): Ansible!

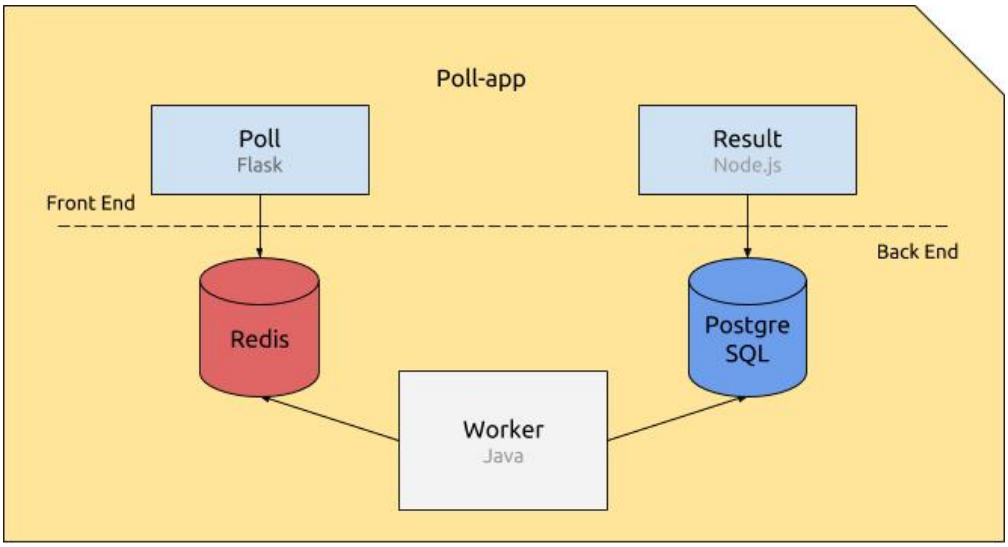
Ansible is an automation tool that allows one to automate an other part of the duty of operators and developers: *configuration management*.
Configuration management refers to the tools and practices used to manage the state in which machines needs to be, in a given set of machines.
Ansible is an incredibly handy tool that allows you to do that in an efficient and scalable way.



General objective

You are going to work again with the poll application you worked with during the Popeye project.

As a reminder, the poll application starts with a Python Flask web client that gathers the votes, and then pushes them into a Redis queue. Afterwards, the Java worker consumes the votes stored in the Redis queue, and pushes them into a PostgreSQL database. Finally, the Node.js web client fetches the votes from the PostgreSQL database and displays the results.



This time, you are going to *deploy* the application onto 5 different machines, without using containers, by using Ansible.

TECHNICAL DETAILS

For this project, you have to turn in a `playbook.yml` file, an inventory file, and a directory named `roles` that will hold your Ansible roles (see section *Repository structure* below).

Your project will be manually evaluated.
It will be tested using the following commands:

```
Terminal
~/B-DOP-400> export ANSIBLE_VAULT_PASSWORD_FILE=/tmp/.vault_pass
~/B-DOP-400> echo verySecretPassword > /tmp/.vault_pass
~/B-DOP-400> ansible-playbook -i production playbook.yml
```

Docker and Ansible Galaxy are forbidden for this project.

Security cannot be ignored when working in a DevOps environment.
As such, any clear-text password found in your repository will cause the evaluation to stop right away, and the entire project will be considered as failed. You have been warned.

Features

Roles

You have to write 6 roles.

`base`

- Installs essential packages (using `apt`).
- Configures instance.

`redis`

- Installs Redis.
- Sets up Redis.

`postgresql`

- Installs PostgreSQL 12 and `psql` tool.
- Creates a user `paul` with the password `democracyIsFragile` and limited permissions.
- Creates the schema of the database `paul`.

`poll`

- Uploads `poll` service.
- Installs dependencies.
- Runs the poll web client.

`worker`

- Uploads `worker` service.
- Installs dependencies.
- Builds the worker.
- Runs the worker.

`result`

- Uploads `result` service.
- Installs dependencies.
- Runs the result web client.

Always use adapted Ansible modules instead of using `command`.
Have a look at dedicated and cleaner modules, such as `apt_key`, `apt_repository`, or `pip`.

All services must be managed by `systemd` and start automatically on boot.

In order to respect the 12 factor best practices, services must be configured with environment variables, such as: host, port, user, password, database name, etc.

After applying an Ansible playbook twice, you should have 0 “changed” tasks in your “PLAY RECAP” (see the example below).
This is the famous notion of *idempotence* that Ansible is famous for, and which you should strive for.

```
PLAY RECAP *********************************************************************
1.1.1.1    : ok=49 changed=0 unreachable=0 failed=0 skipped=12 rescued=0 ignored=0
2.2.2.2    : ok=25 changed=0 unreachable=0 failed=0 skipped=16 rescued=0 ignored=0
3.3.3.3    : ok=42 changed=1 unreachable=0 failed=0 skipped=22 rescued=0 ignored=0
```

Environment

Your inventory will have 5 groups, each containing 1 instance: `redis`, `postgres`, `poll`, `result` and `worker`.

You will need 5 virtual machines based on Debian 10 (Buster).
You can run it locally, it is however recommanded to use a cloud platform.

Do not spend too much credit however, you may also need cloud platforms for the next DevOps projects.

Repository structure

In the end, your repository must at least contain the following files:

```
|-- production
|-- playbook.yml
|-- poll.tar
|-- result.tar
|-- worker.tar
|-- group_vars
|   `-- all.yml
`-- roles
    |-- base
    |   `-- tasks
    |       `-- main.yml
    |-- postgresql
    |   |-- files
    |   |   |-- pg_hba.conf
    |   |   `-- schema.sql
    |   `-- tasks
    |       `-- main.yml
    |-- redis
    |   |-- files
    |   |   `-- redis.conf
    |   `-- tasks
    |       `-- main.yml
    |-- poll
    |   |-- files
    |   |   `-- poll.service
    |   `-- tasks
    |       `-- main.yml
    |-- result
    |   |-- files
    |   |   `-- result.service
    |   `-- tasks
    |       `-- main.yml
    `-- worker
        |-- files
        |   `-- worker.service
        `-- tasks
            `-- main.yml
```