University of Amsterdam

DevOps and Cloud-based Software

Assignment 4: Ansible

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Course:
DevOps and Cloud-based Software

Course code:
5364DCBS6Y

Git repo: https://github.com/dimll/ansible.git

1 Ansible

This report is about the forth lab assignment that introduces us to Ansible.

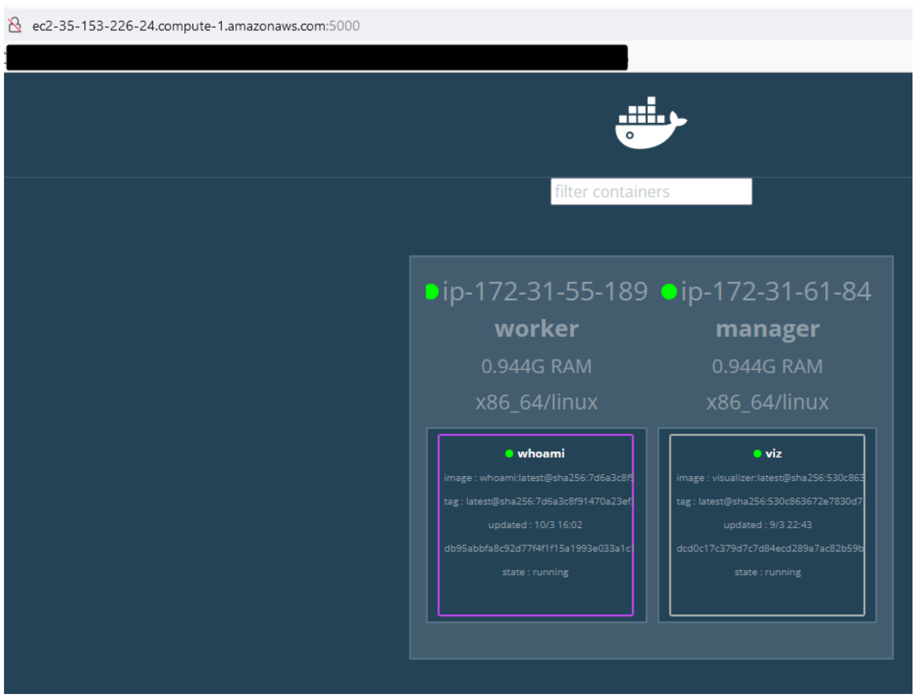
1.1 Installation

An EC2 t2.micro running Ubuntu Linux was used as control node and two EC2 instances with the same specifications were also created as managed nodes (hosts). All the EC2 instances were accessed via SSH using the same key-pair and all inbound traffic was allowed for the instances.

1.2 Exercises

1.2.1 Req/Sec

Firstly, *ansible_cluster_hosts* was updated to reflect the public IPv4 DNS of the created instances. The file *configure-cluster.yml* was also modified according to [1] so that *join_cmd* output is captured as a variable that is accessible by the worker. Screenshot 1 illustrates the docker swarm visualizer after accessing port 5000 of the instance.


ec2-35-153-226-24.compute-1.amazonaws.com:5000

[redacted]

filter containers

ip-172-31-55-189
worker
0.944G RAM
x86_64/linux

whoami
image : whoami:latest@sha256:7d6a3c8f
tag : latest@sha256:7d6a3c8f91470a23ef
updated : 10/3 16:02
db95abbfa8c92d77f4f1f15a1993e033a1c
state : running

ip-172-31-61-84
manager
0.944G RAM
x86_64/linux

viz
image : visualizer:latest@sha256:530c863
tag : latest@sha256:530c863672e7830d7
updated : 9/3 22:43
dcd0c17c379d7c7d84ecd289a7ac82b59b
state : running

Figure 1: Docker swarm visualizer after accessing port 5000

In order to perform tests (monitoring average requests per second) for 2,4 and 8 instances, the number after *–replicas* at the *benchmark-cluster.yml* file was changed accordingly. File *monitoring.txt* at the attached GitHub reposity, summarizes the results for 1,2,4 and 8 instances, respectively. Figure 2 illustrates the histogram of the monitoring results and was created using the programming language R.

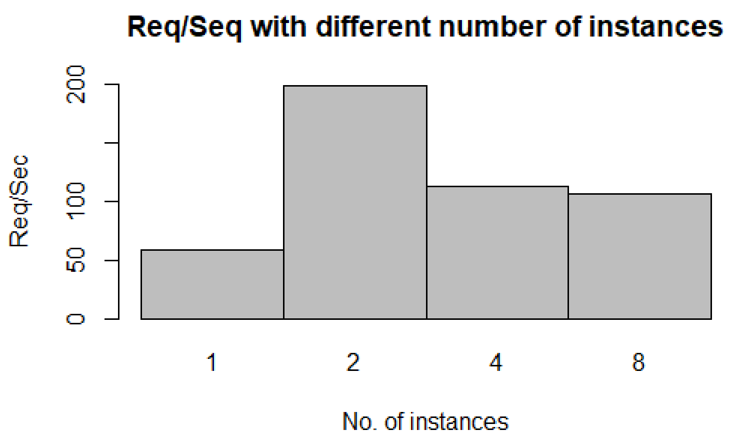


Figure 2: Histogram graph. X-axis represents the number of instances and y-axis represents the Req/Sec.

The Req/Sec average numbers indicate that there is not a linear behavior between the requests per second and the number of instances so performance is not guaranteed to be increased with more instances used. We can increase the requests per second by making sure that the workload is distributed across the nodes so that the load on a single node is reduced. The workload distribution for the docker swarm can be done using load balancers or predefined node labels and constraints. Another way to achieve more request per second is to use more powerful infrastructure, meaning better cloud instances (instead of t2.micro for example).

1.2.2 Ansible Play Failure

The file *playbook_example2.yml* refers to specific hosts namely *web-server1* and *web-server2* that are not defined at *aws_hosts1* inventory file (they are both defined as *aws*).

1.2.3 Ansible Play Development

A way to run only the *start nginx* play is by using the following command:
ansible-playbook playbook.yml –limit web-server2 –tags "start nginx"

1.2.4 Ansible in DevOps

Ansible can automate the creation, development and deployment of application in numerous ways. It can be used for example to set up and configure multiple environments or automate the Continuous Integration and Continuous Deployment (CI/CD) pipelines. Additionally, it is usually utilized to monitor health and performance or even perform automatic scaling and manage load balancers. It can be used in most DevOps stages such as build, test, release, deploy and monitor. Ansible is scalable, easy to use, it supports a wide range of operating systems and it is used by many popular companies. Alternatives of Ansible include but are not limited to Puppet [1], Chef [2] and Terraform [3].

References

[1] *Using variables.* Mar. 2023. URL: `https://docs.ansible.com/ansible/latest/playbook_guide/playbooks_variables.html#accessing-information-about-other-hosts-with-magic-variables`.

2 Appendix

This report is written in LaTeX, using the template entitled "UvA Informatica Template Artikel" by Robert van Wijk and Frederick Kreuk.

[1] https://www.puppet.com/
[2] https://www.chef.io/
[3] https://www.terraform.io/