



PUZZLE ITC
changing IT for the better

Infrastructure as Code (IaC) with Terraform and Ansible

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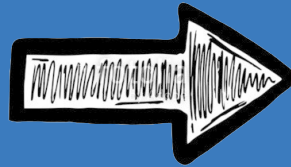
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Agenda

1. IaC - What is it ?
 1. Short Intro
 2. Benefits and Challenges
2. Building Infrastructure with Terraform
3. Configuring Infrastructure with Ansible
4. Demo
5. Questions

Infrastructure as Code

```
51 resource "openstack_compute_instance_v2" "web_1" {
52   name = "web_1"
53   flavor_name = "m1.small"
54   key_pair = "sbeffa"
55   network {
56     uuid = "${openstack_networking_network_v2.private_ubuntu.id}"
57   }
58   user_data = "${template_file.web_1.rendered}"
59
60   floating_ip = "192.168.122.250"
61   block_device {
62
63     boot_index = 0
64     delete_on_termination = true
65     destination_type = "volume"
66     source_type = "image"
67     uuid = "e4ce4179-9971-40f5-9c24-1230538ef82e"
68     volume_size = 5
69   }
70 }
71 }
```



Infrastructure as Code (2nd)

Describe all infrastructure components by text

- Virtual Machines
- Networks
- Firewalls, Load Balancers ...
- In the end: Complete services ...

Infrastructure as Code (3rd)

- Use tools to build and configure actual infrastructure on top of an IaaS
- e.g. Terraform, Salt Cloud, Ansible, Openstack Heat

Infrastructure as Code (4th)

Benefits:

- Reproducible Infrastructure
- Versioned Infrastructure
- Validated Infrastructure
- Documented Infrastructure
- Infrastructure changes become visible
- Re-usable infrastructure

Infrastructure as Code (5th)

Short:

- Treat infrastructure as data (text) and use the same techniques as software developers:
 - VCS: keep infrastructure definitions versioned
 - TDD: test infrastructure using serverspec, testinfra
 - CI / CD: infrastructure changes walk through a CI / CD pipeline

Infrastructure as Code (6th)

Some challenges:

- How to work securely with API access tokens in a team ?
- Automation Fear
 1. No confidence in automation tools, because
 2. servers were not consistent configured, because
 3. automation is not run frequently ... go to 1

Infrastructure as Code (7th)

Virtual machine templates:

- build new infrastructure using pre-built images
- automate building process: e.g. using packer from HashiCorp

Building Infrastructure with Terraform

- DSL (Domain Specific Language) to build infrastructure
- Terraform is a provisioning tool, not a configuration management tool
- Terraform uses a declarative syntax
- Terraform can make incremental changes to existing infrastructure

Building Infrastructure with Terraform (2nd)

Incremental change needs state information:

- Terraform creates a state file:
 - terraform.tfstate

How to share this state information between team members ?

- Git, Amazon S3, Openstack Swift, etcd, consul

Building Infrastructure with Terraform (3rd)

Resource definition for a virtual machine:

```
38 resource "openstack_compute_instance_v2" "web_1" {
39
40     name = "web_1"
41     flavor_name = "m1.small"
42     key_pair = "sbeffa"
43
44     network {
45         uuid = "${openstack_networking_network_v2.private_ubuntu.id}"
46     }
47
48     user_data = "${template_file.web_1.rendered}"
49     floating_ip = "192.168.122.250"
50     image_id = "e4ce4179-9971-40f5-9c24-1230538ef82e"
51
52 }
```

Building Infrastructure with Terraform (4th)

- Terraform searches for the file `main.tf` in the current working directory, main entrypoint
- Modularization is supported

Configuring Infrastructure with Ansible

- Ansible is a configuration management tool
- Distinction between configuration management and provisioning is not that easy
- Can also be used to manage infrastructure, e.g. `ansible os_server` or `ec2` modules
- But has no way to store infrastructure state as Terraform does

Configuring Infrastructure with Ansible (2nd)

Therefore we use

- Terraform to build (create) infrastructure
- Ansible to configure infrastructure

Configuring Infrastructure with Ansible (3rd)

How to glue Terraform and Ansible together ?

- Custom orchestrator which first executes Terraform and Ansible afterwards

DEMO TIME



LET'S HOPE THE DEMO-GODS ARE SMILING!

memegenerator.net

Questions

Thank you!

...for not having slept during the presentation

