Infrastructure as Code - VPS provisioning and configuration on Hetzner Cloud

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All views and opinions in this talk are my own and do not reflect those of my employer.

About Me

- Service Delivery Engineer at Dell Technologies
- RHCSA / RHCE
- Homelab and self-hosting ❤️
- PC and Board games 🎲
- Let's talk about:
  - Ansible (*obviously*) 😉
  - Infrastructure as Code
  - Linux
  - Proxmox
  - K8s
  - And more!

What is Infrastructure as Code (IaC)?

- Manage infrastructure desired state as code.
- Define *what* is deployed.
- Automate infrastructure lifecycle.
- Integrate with version control (Git) for reviewing/auditing infrastructure changes.
- Key benefits: repeatable, consistent.
- Popular IaC tooling: Ansible, Terraform or OpenTofu (Terraform Fork).

What is Hetzner Cloud?

- Cloud provider based in Germany.
- Datacenters in Germany, Finland, USA and Singapore.
- Virtual Private Server (VPS), Storage, Load Balancer services etc.
- Great REST APIs.
- CLI, Ansible collection, Terraform provider etc.
- I have no affiliation with Hetzner Cloud.

Demo

```
demos/ansible/meetup-nov-21 on ⑂ ansible-meetup-nov-21 [?] via 🐍 v3.12.3 (meetup-nov-21)
❯ ansible-playbook -i inventory/inventory.yml provision-playbook.yml


PLAY [Infrastructure as Code - VPS provisioning with Ansible on Hetzner Cloud] ********************************

TASK [Prepare | Get public IP] *********************************************************************
[WARNING]: Platform darwin on host localhost is using the discovered Python interpreter at
/Users/dab/.virtualenvs/meetup-nov-21/bin/python3.12, but future installation of another Python interpreter
could change the meaning of that path. See https://docs.ansible.com/ansible-
core/2.17/reference_appendices/interpreter_discovery.html for more information.
ok: [localhost]

TASK [Prepare | Local SSH key] *********************************************************************
changed: [localhost]

TASK [Create | Hetzner Cloud SSH Key] **************************************************************
changed: [localhost]

TASK [Create | Hetzner Cloud Firewall] *************************************************************
changed: [localhost]

TASK [Create | Hetzner Cloud Servers] *************************************************************
changed: [localhost] => (item={'name': 'demo-server-01', 'server_type': 'cx22', 'image': 'ubuntu-24.04', 'labels
': {'instance_type': 'demo'}, 'location': 'fsn1'})


PLAY RECAP *****************************************************************************************
localhost                  : ok=5    changed=4    unreachable=0    failed=0    skipped=0    rescued=0    ignored
=0
```

```
demos/ansible/meetup-nov-21 on  ansible-meetup-nov-21 [?] via  v3.12.3 (meetup-nov-21) took 27s
❯ ansible-playbook -i inventory/hcloud.yml post-deploy-playbook.yml


PLAY [Infrastructure as Code - Configure VPS on Hetzner Cloud | Wait for SSH to be ready] ***********************

TASK [Wait for SSH to be ready] ********************************************************************************
[WARNING]: Platform darwin on host demo-server-01 is using the discovered Python interpreter at
/Users/dab/.virtualenvs/meetup-nov-21/bin/python3.12, but future installation of another Python interpreter
could change the meaning of that path. See https://docs.ansible.com/ansible-
core/2.17/reference_appendices/interpreter_discovery.html for more information.
ok: [demo-server-01]


PLAY [Infrastructure as Code - Configure VPS on Hetzner Cloud] **************************************************

TASK [Gathering Facts] *****************************************************************************************
The authenticity of host '49.12.242.94 (49.12.242.94)' can't be established.
ED25519 key fingerprint is SHA256:ZklEkk8pwrz7XZYpfdNLrDHo1gVT3qfXPO9MEtNlHWg.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
ok: [demo-server-01]


TASK [Update system packages] **********************************************************************************
ok: [demo-server-01]


TASK [nginxinc.nginx : Validate distribution and role variables] ***********************************************
included: /Users/dab/.ansible/roles/nginxinc.nginx/tasks/validate/validate.yml for demo-server-01


TASK [nginxinc.nginx : Check whether you are using a supported NGINX distribution] *****************************
ok: [demo-server-01] => {
    "changed": false,
    "msg": "Your distribution, Ubuntu 24.04 (x86_64), is supported by NGINX Open Source."
```

```
TASK [nginxinc.nginx : Check that 'nginx_setup' is an allowed value] *************************************
ok: [demo-server-01] => {
    "changed": false,
    "msg": "All assertions passed"
}

TASK [nginxinc.nginx : Check that 'nginx_branch' is an allowed value] ************************************
ok: [demo-server-01] => {
    "changed": false,
    "msg": "All assertions passed"
}

TASK [nginxinc.nginx : Check that 'nginx_install_from' is an allowed value] ******************************
ok: [demo-server-01] => {
    "changed": false,
    "msg": "All assertions passed"
}

TASK [nginxinc.nginx : Set up prerequisites] **********************************************************
included: /Users/dab/.ansible/roles/nginxinc.nginx/tasks/prerequisites/prerequisites.yml for demo-server-01

TASK [nginxinc.nginx : Install dependencies] *********************************************************
included: /Users/dab/.ansible/roles/nginxinc.nginx/tasks/prerequisites/install-dependencies.yml for demo-server-
01

TASK [nginxinc.nginx : (Alpine Linux) Install dependencies] *****************************************
skipping: [demo-server-01]

TASK [nginxinc.nginx : (Debian/Ubuntu) Install dependencies] ***************************************
changed: [demo-server-01]
```

```
TASK [nginxinc.nginx : (Debian/Ubuntu) Install dependencies] ******************************
changed: [demo-server-01]


TASK [nginxinc.nginx : (Amazon Linux/CentOS/Oracle Linux/RHEL) Install dependencies] ******
skipping: [demo-server-01]


TASK [nginxinc.nginx : (SLES) Install dependencies] ***************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : (FreeBSD) Install dependencies using package(s)] *******************
skipping: [demo-server-01]


TASK [nginxinc.nginx : (FreeBSD) Install dependencies using port(s)] **********************
skipping: [demo-server-01] => (item=security/ca_root_nss)
skipping: [demo-server-01]


TASK [nginxinc.nginx : Check if SELinux is enabled] ***************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Configure SELinux] ************************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Set up signing keys] *********************************************
included: /Users/dab/.ansible/roles/nginxinc.nginx/tasks/keys/setup-keys.yml for demo-server-01


TASK [nginxinc.nginx : (Alpine Linux) Set up NGINX signing key URL] **********************
skipping: [demo-server-01]


TASK [nginxinc.nginx : (Alpine Linux) Download NGINX signing key] ************************
skipping: [demo-server-01]
```

```
TASK [nginxinc.nginx : (Debian/Red Hat/SLES OSs) Set up NGINX signing key URL] ***************************************
ok: [demo-server-01]

TASK [nginxinc.nginx : (Debian/Ubuntu) Add NGINX signing key] *****************************************************
changed: [demo-server-01]

TASK [nginxinc.nginx : (Red Hat/SLES OSs) Add NGINX signing key] **************************************************
skipping: [demo-server-01]

TASK [nginxinc.nginx : Install NGINX Open Source] ****************************************************************
included: /Users/dab/.ansible/roles/nginxinc.nginx/tasks/opensource/install-oss.yml for demo-server-01

TASK [nginxinc.nginx : Install NGINX from the official package repository] ****************************************
included: /Users/dab/.ansible/roles/nginxinc.nginx/tasks/opensource/install-debian.yml for demo-server-01

TASK [nginxinc.nginx : (Debian/Ubuntu) Configure NGINX repository] ***********************************************
changed: [demo-server-01] => (item=deb [signed-by=/usr/share/keyrings/nginx-archive-keyring.gpg] https://nginx.o
rg/packages/mainline/ubuntu/ noble nginx)
changed: [demo-server-01] => (item=deb-src [signed-by=/usr/share/keyrings/nginx-archive-keyring.gpg] https://ngi
nx.org/packages/mainline/ubuntu/ noble nginx)

TASK [nginxinc.nginx : (Debian/Ubuntu) Pin NGINX repository] *****************************************************
changed: [demo-server-01]

TASK [nginxinc.nginx : (Debian/Ubuntu) Install NGINX] ***********************************************************
changed: [demo-server-01]

TASK [nginxinc.nginx : Install NGINX from the distribution's package repository] *********************************
skipping: [demo-server-01]
```

```
TASK [nginxinc.nginx : Install NGINX from source] ******************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Install NGINX in Unix systems] *************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Set up NGINX Plus license] ****************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Install NGINX Plus] *********************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Install NGINX dynamic modules] ***********************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Remove NGINX Plus license] ****************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Modify systemd parameters] ****************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Trigger handlers if necessary] *********************************


RUNNING HANDLER [nginxinc.nginx : (Handler) Start/reload NGINX] *************************
changed: [demo-server-01]


RUNNING HANDLER [nginxinc.nginx : (Handler) Check NGINX] ********************************
ok: [demo-server-01]


RUNNING HANDLER [nginxinc.nginx : (Handler) Print NGINX error if syntax check fails] ****
skipping: [demo-server-01]
```

```
TASK [nginxinc.nginx : Debug NGINX output] ************************************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Configure logrotate for NGINX] ************************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Install NGINX Amplify] ********************************************************
skipping: [demo-server-01]


TASK [nginxinc.nginx : Install NGINX Agent] *********************************************************
skipping: [demo-server-01]


TASK [Copy the Nginx configuration file] ***********************************************************
changed: [demo-server-01]


RUNNING HANDLER [Reload Nginx] ********************************************************************
changed: [demo-server-01]


PLAY RECAP ***************************************************************************************
demo-server-01             : ok=23   changed=8   unreachable=0   failed=0   skipped=23   rescued=0   ignored
=0
```

Hello Ansible Meetup from Nginx!

```
demos/ansible/meetup-nov-21 on ⎇ ansible-meetup-nov-21 via 🐍 v3.12.3 (meetup-nov-21) took 24s
❯ ansible-playbook -i inventory/inventory.yml deprovision-playbook.yml


PLAY [Infrastructure as Code - VPS deprovisioning with Ansible on Hetzner Cloud] *******************************

TASK [Delete | Hetzner Cloud SSH Key] **************************************************************************
[WARNING]: Platform darwin on host localhost is using the discovered Python interpreter at
/Users/dab/.virtualenvs/meetup-nov-21/bin/python3.12, but future installation of another Python interpreter
could change the meaning of that path. See https://docs.ansible.com/ansible-
core/2.17/reference_appendices/interpreter_discovery.html for more information.
changed: [localhost]


TASK [Delete | Local SSH key] **********************************************************************************
changed: [localhost]


TASK [Delete | Hetzner Cloud Servers] **************************************************************************
changed: [localhost] => (item={'name': 'demo-server-01', 'server_type': 'cx22', 'image': 'ubuntu-24.04', 'labels
': {'instance_type': 'demo'}, 'location': 'fsn1'})


TASK [Delete | Hetzner Cloud Firewall] *************************************************************************
changed: [localhost]


PLAY RECAP *****************************************************************************************************
localhost                  : ok=4    changed=4    unreachable=0    failed=0    skipped=0    rescued=0    ignored
=0
```

```
PLAY [Infrastructure as Code - Configure VPS on Hetzner Cloud] ********************************************

TASK [Gathering Facts] ***********************************************************************************
fatal: [demo-server-01]: UNREACHABLE! => {"changed": false, "msg": "Failed to connect to the host via ssh: root@
78.47.216.66: Permission denied (publickey,password).", "unreachable": true}


PLAY [Infrastructure as Code - Configure VPS on Hetzner Cloud] ********************************************

TASK [Gathering Facts] ***********************************************************************************
fatal: [demo-server-01]: FAILED! => {"ansible_facts": {}, "changed": false, "failed_modules": {"ansible.legacy.s
etup": {"failed": true, "module_stderr": "Shared connection to 78.47.216.66 closed.\r\n", "module_stdout": "/bin
/sh: 1: /Users/dab/.virtualenvs/meetup-nov-21/bin/python3.12: not found\r\n", "msg": "The module failed to execu
te correctly, you probably need to set the interpreter.\nSee stdout/stderr for the exact error", "rc": 127}}, "m
sg": "The following modules failed to execute: ansible.legacy.setup\n"}
```

Questions

Demo resources are available on GitHub:

Socials

- https://dbren.uk
- https://www.linkedin.com/in/dbrenuk
- https://twitter.com/dbrenuk
- contact@danielbrennand.com