IaC: Building a Universal NameSpace

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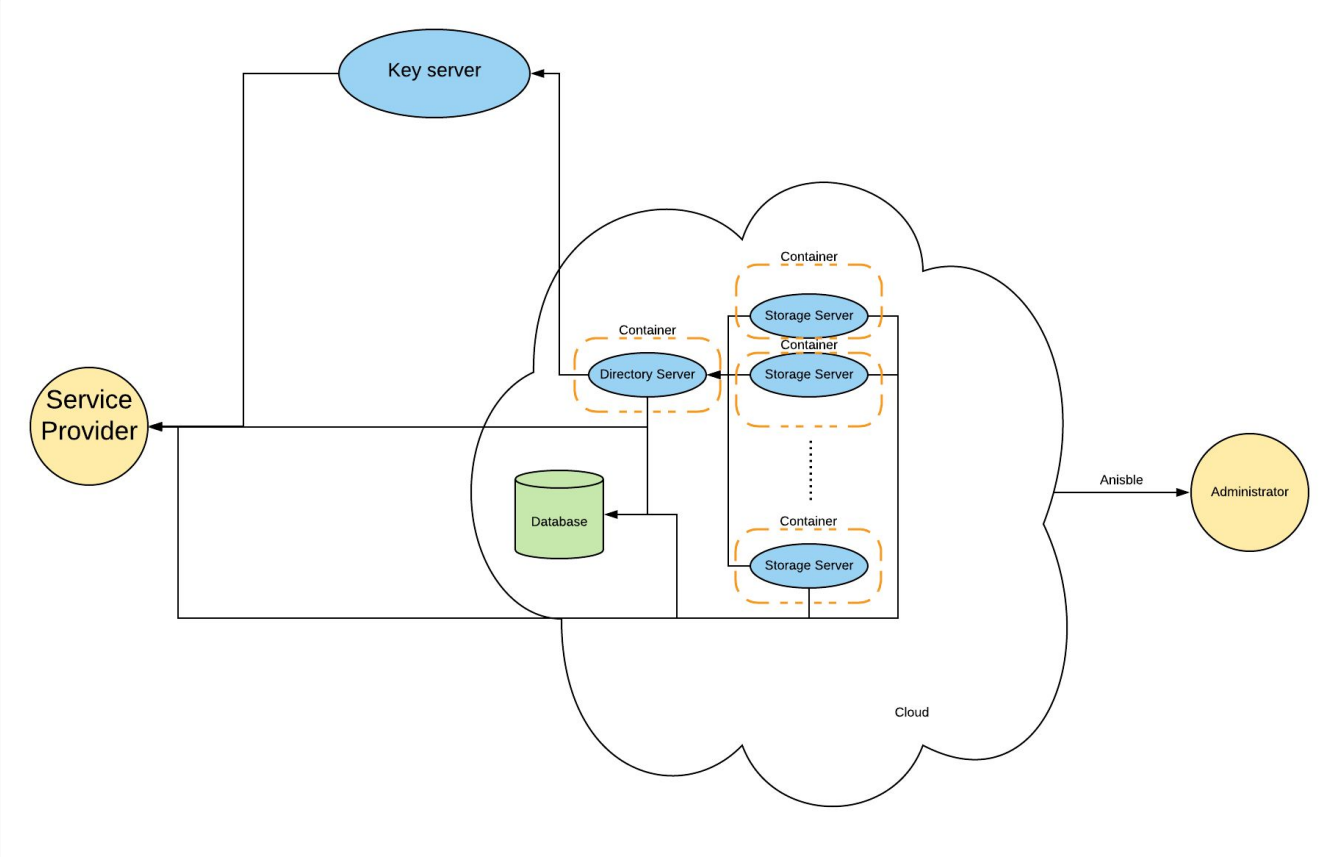
Purpose and Goals

This project will establish an Ansible playbook that automates the process of provisioning Upspin infrastructure.

- Create necessary infrastructure on MOC (OpenStack)
- Build an operator on OpenShift
- Deploy and configure Upspin

Project Overview



Source:https://github.com/BU-CLOUD-S20/Infrastructure-as-Code-Building-a-Universal-Namespace

Upspin Overview

What is Upspin?

- **Primary purpose:** Data stored in a safe, secure and shareable way
- Provide a secure platform for naming, storing and sharing information
- Serve as a layer of infrastructure that supports software and services to build on

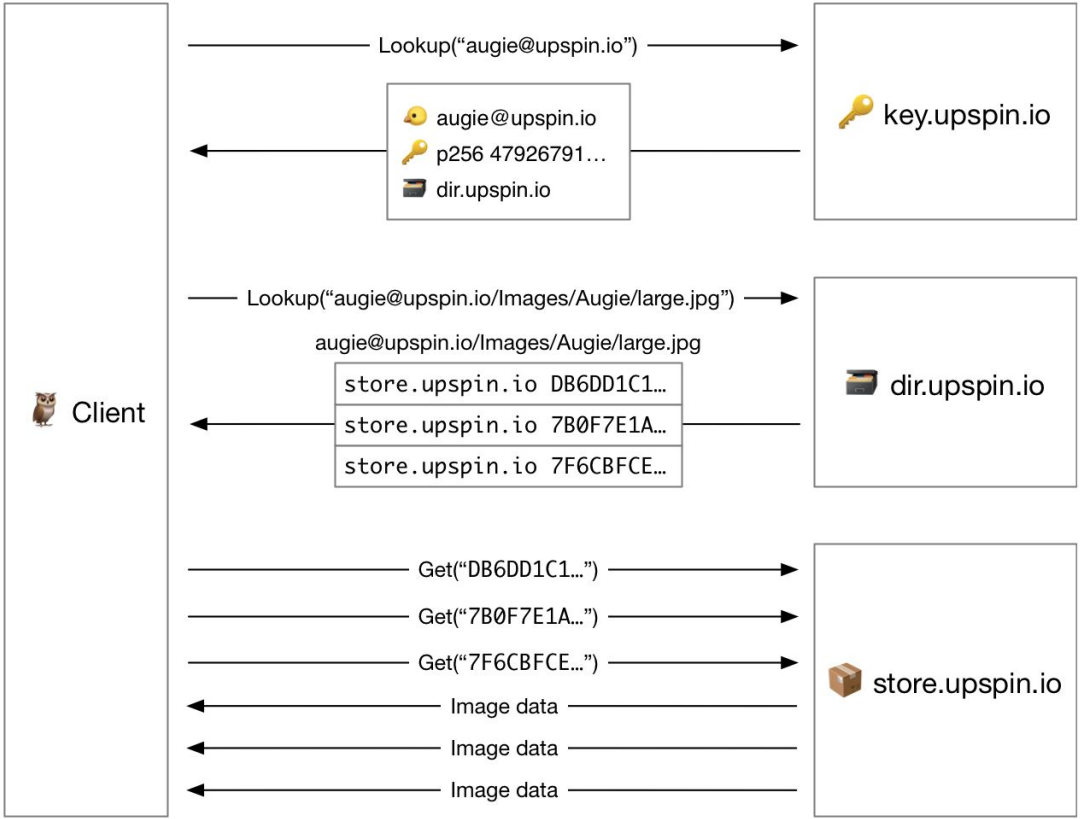
Users:

- Personal users
- Families
- Groups of friends
- Potentially in corporate environments

For more information: https://upspin.io/doc/overview.md

Upspin Architecture

- Key server
  - Centralized
- Directory server
  - A hierarchical tree of names pointing to user data
- Store server
  - Data storage



Source: https://upspin.io/doc/arch.md

Why Upspin?

Uniqueness

- A single global name space
- Focus on naming
- Federated protocols
  - In comparison to central service provider
- **Security**

source:https://upspin.io/doc/faq.md

Emphasis on Security

- End-to-end encryption
  - Using AES (Advanced Encryption Standard) to create file key
  - Also cryptographically signed for tampering detection
  - Different keys for encrypting and decrypting
- Access control
  - Granted access to file

Ansible & Playbook Overview

- Ansible is an IT **automation** tool (A python based module)
- Ansible is appropriate for managing **all environments**, from **small setups** with a handful of **instances** to **enterprise environments** with many thousands of instances.
- Playbooks are Ansible' s **configuration**, **deployment**, and **orchestration language**, they describe a **policy** you want your **remote** systems to enforce

source:https://docs.ansible.com/ansible/latest/index.html

Ansible Components

What is Ansible?

- **Inventory**: store a list of control nodes & **host nodes**
- **Module**: The units of code Ansible executes
- **Task**: Application of a module to process **a unit of work**
- **Play**: ordered **set of tasks** to execute against host selections from your inventory
- **Playbook**: a file that contains plays (**written in yaml**)

Advantages:

- Human Readable Language
- Simplicity and ease-of-use
- As long as Python installed on machine
- Open-source
- Automate setup & configuration

Playbook Architecture (YAML Syntax)

- Host Name
  - Manage nodes operating inside inventory
- Tasks
  - List of applications need to be run
- Handler & Variables
  - Initialization & Error handle

Execution Command: `ansible-playbook playbook.yml`

Our simple setup playbook

```
---
- hosts: localhost
  tasks:
    - name: Create a new server on MOC
      os_server:
        state: present
        auth:
          auth_url: 'https://kaizen.massopen.cloud:13000/v3'
          username:
          password:
          project_name: 'Infrastructure as Code: Building a Universal Namespace'
          identity_provider: moc
          protocol: openid
          client_id: kaizen-client
          client_secret: fac377a9-f2ba-41e7-bb7f
          access_token_endpoint: 'https://sso.massopen.cloud/auth/realms/moc/protocol/openid-connect/token'
          discovery_endpoint: 'https://sso.massopen.cloud/auth/realms/moc/.well-known/openid-configuration'
          project_domain_name: Default
        auth_type: v3oidcpassword
        name: playbook_test
        availability_zone: nova
        image: Ubuntu 16 LTS
        region_name: moc-kzn
        key_name:
        auto_ip: false
        interface: public
        flavor: m1.s2.medium
```

Task name

Configuration for Server

Progress

Accomplishment

- We are now able to create servers on OpenStack using playbook.
- We are now able to retrieve server information.

Next steps

- We need to develop more playbooks for various necessary functions.
- We need to translate the deployment steps of Upspin to playbooks.

Demo of Ansible

Thank you!
QUESTIONS?