

# Kubernetes Practical

## Overview

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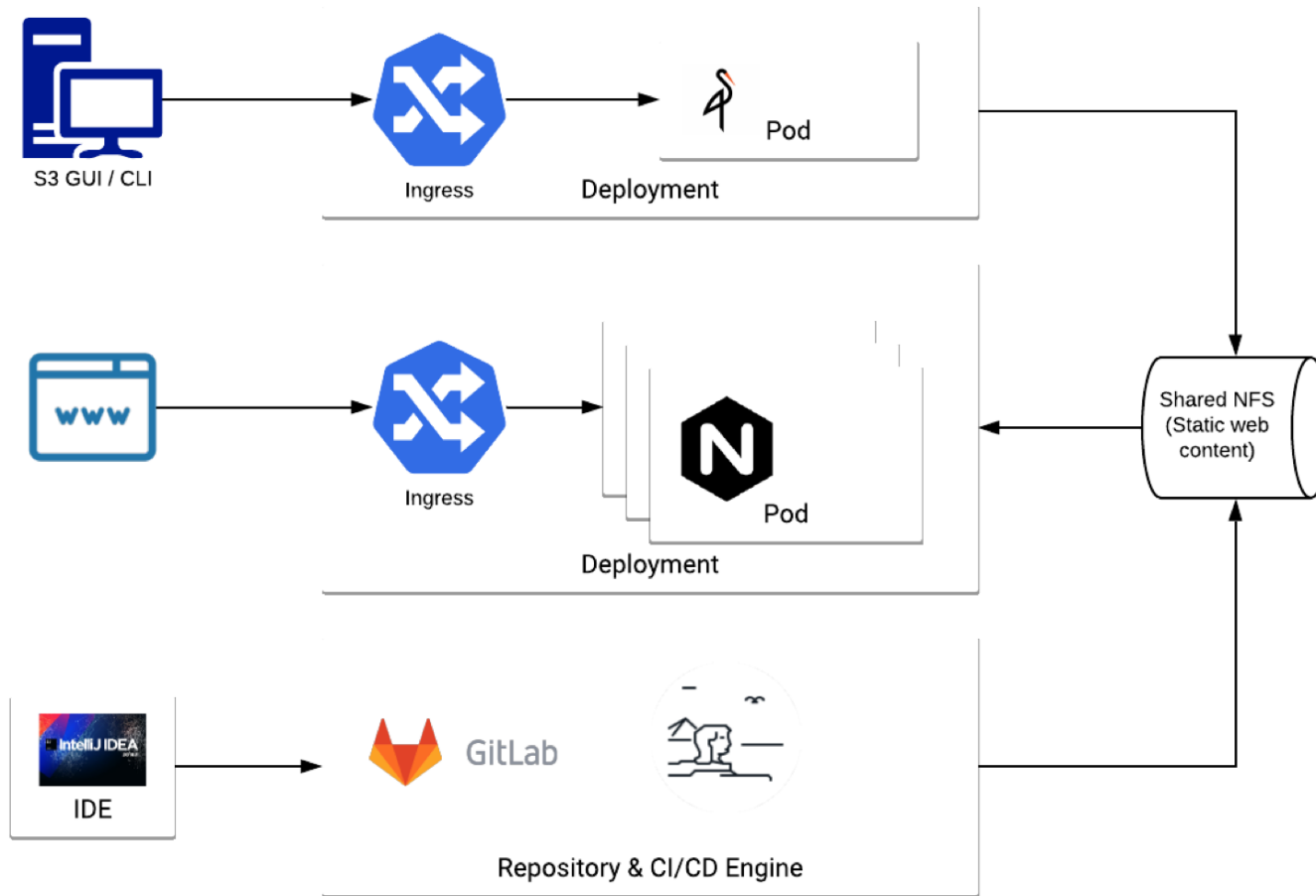
*Technology and Science Integration*

European Bioinformatics Institute, EMBL

# Kubernetes Demonstration

- Credentials and Floating IP [FIP]
  - Accessing a newly created K8S cluster
- Kubectl
  - Interacting with the cluster with CLI
- Kubernetes Dashboard
  - Interacting with the cluster with GUI
- Prometheus and Grafana
  - Monitoring the cluster with GUI
- Homework: An example end-to-end
  - Application for web (NGINX)
    - Persistent volume claim shared between Minio and NGINX
    - Stateful set and service for NGINX
    - Ingress to expose service externally
  - Data Loading via S3 (Minio)
    - Minio deployment and service
    - Deleting Minio after using it for better security
  - Integrating NGINX, NFS and Minio

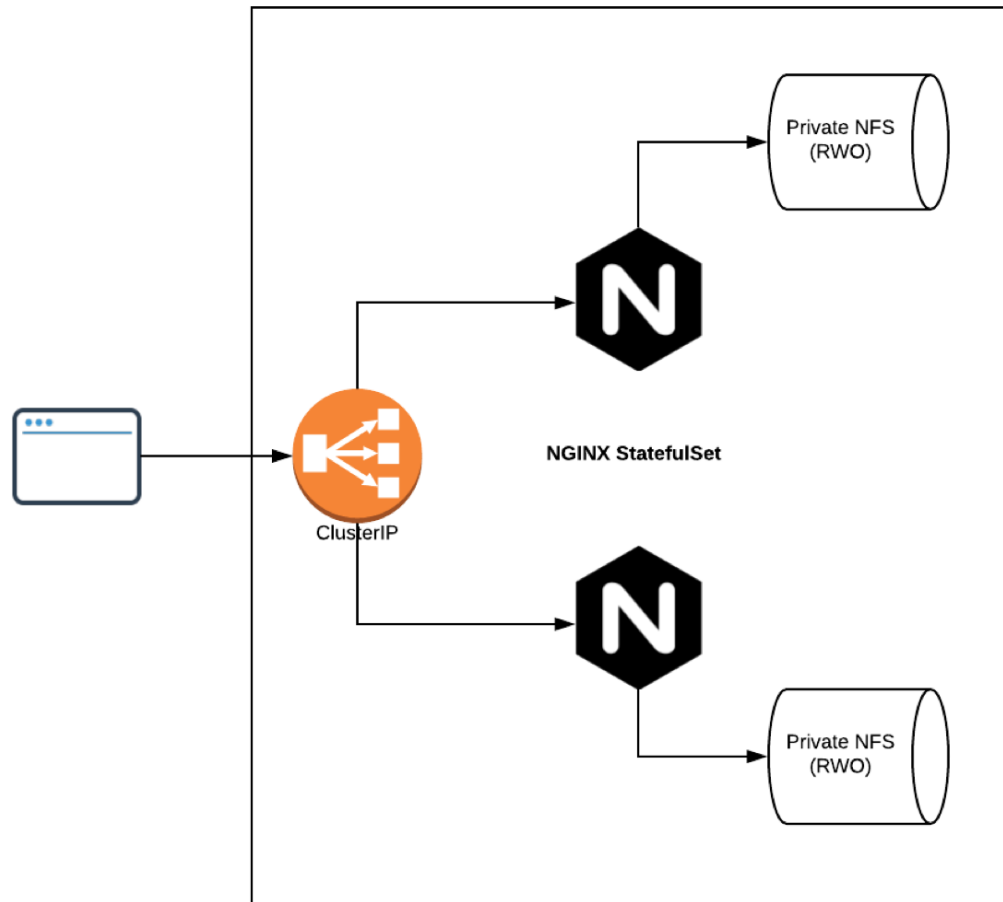
# Kubernetes Demonstration



# Kubernetes Practical

- Reading 0: Adding Minikube to the new VMs
  - Minikube & Docker on Ubuntu 18.04 LTS for developer's sandbox
- Exercise 0: Starting Minikube under your own ID
- Exercise 1: Creating NGINX
- Exercise 2: Adding HTML to pods
- Exercise 3: Persistence and disaster recovery
  - Importance to separate compute from data
- Exercise 4: Problem determination step-by-step
- Homework: Additional exercises after the workshop

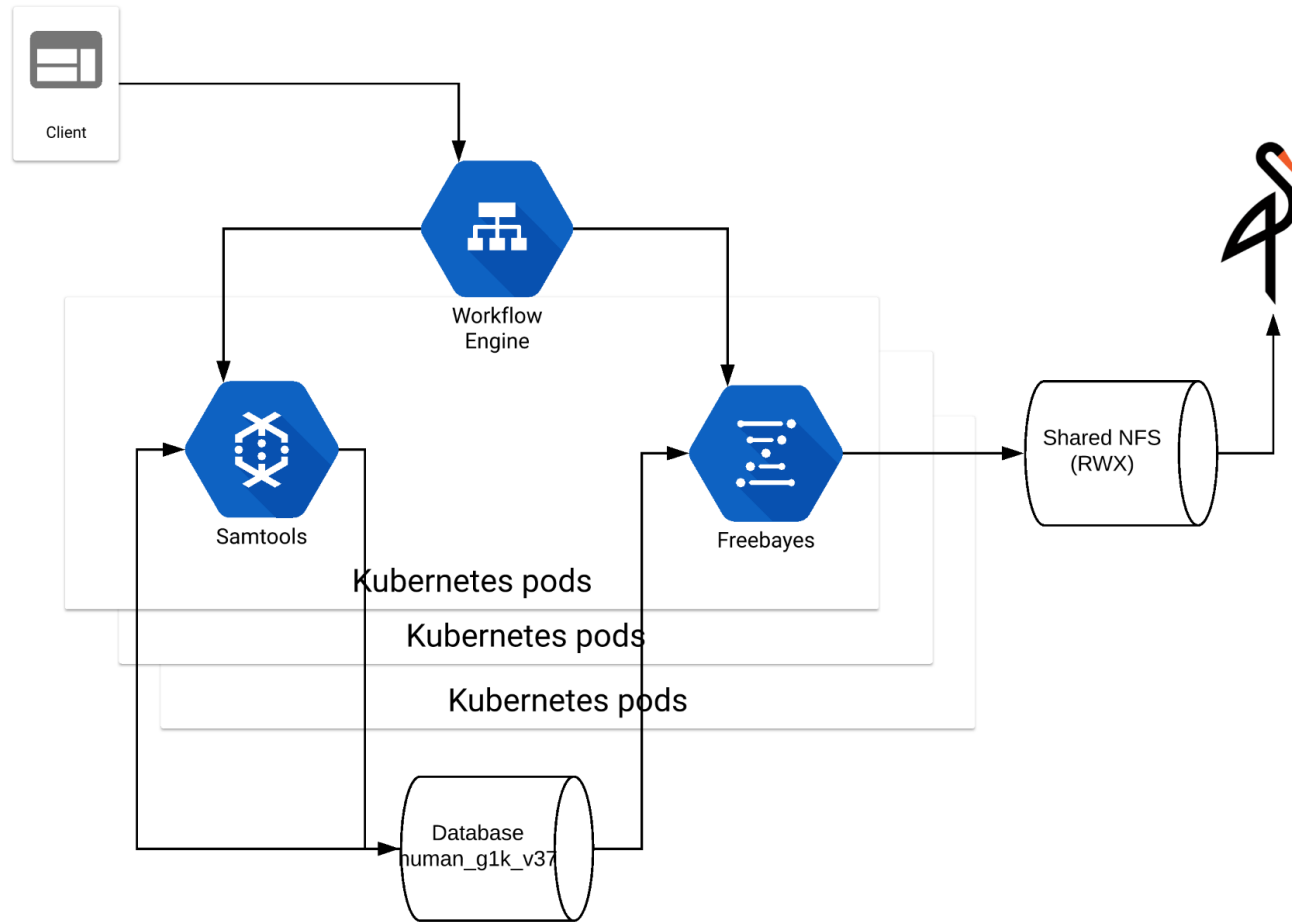
# Kubernetes Practical



# Kubernetes Advanced Practical

- Reading 0: Preparing Minikube VM to mimic EHK
- Accessing large amount of data from the source:
  - Exercise 1: ReadWriteMany for shared output
  - Exercise 2: ReadOnlyMany for data source
  - Exercise 3: ReadWriteOnce for private workspace
  - Exercise 4: Initialising persistent volumes
  - Exercise 5: Kubernetes secret & S3 interface
- Scaling up:
  - Exercise 6: Horizontal scaling
  - Reading 1: Vertical scaling
  - Exercise 7: Autoscaling

# Kubernetes Advanced Practical



# Kubernetes Advanced Reading

- Reading 1: Bringing compute close to data
- Reading 2: Resource consumption
- Reading 3: Docker builds
- Reading 4: CI/CD toolchain