WP4 Developers Meeting
VISA Deployment and Adaptation at CERIC

21 Sep, 2021

Authors: Emiliano Coghetto, Marco De Simone
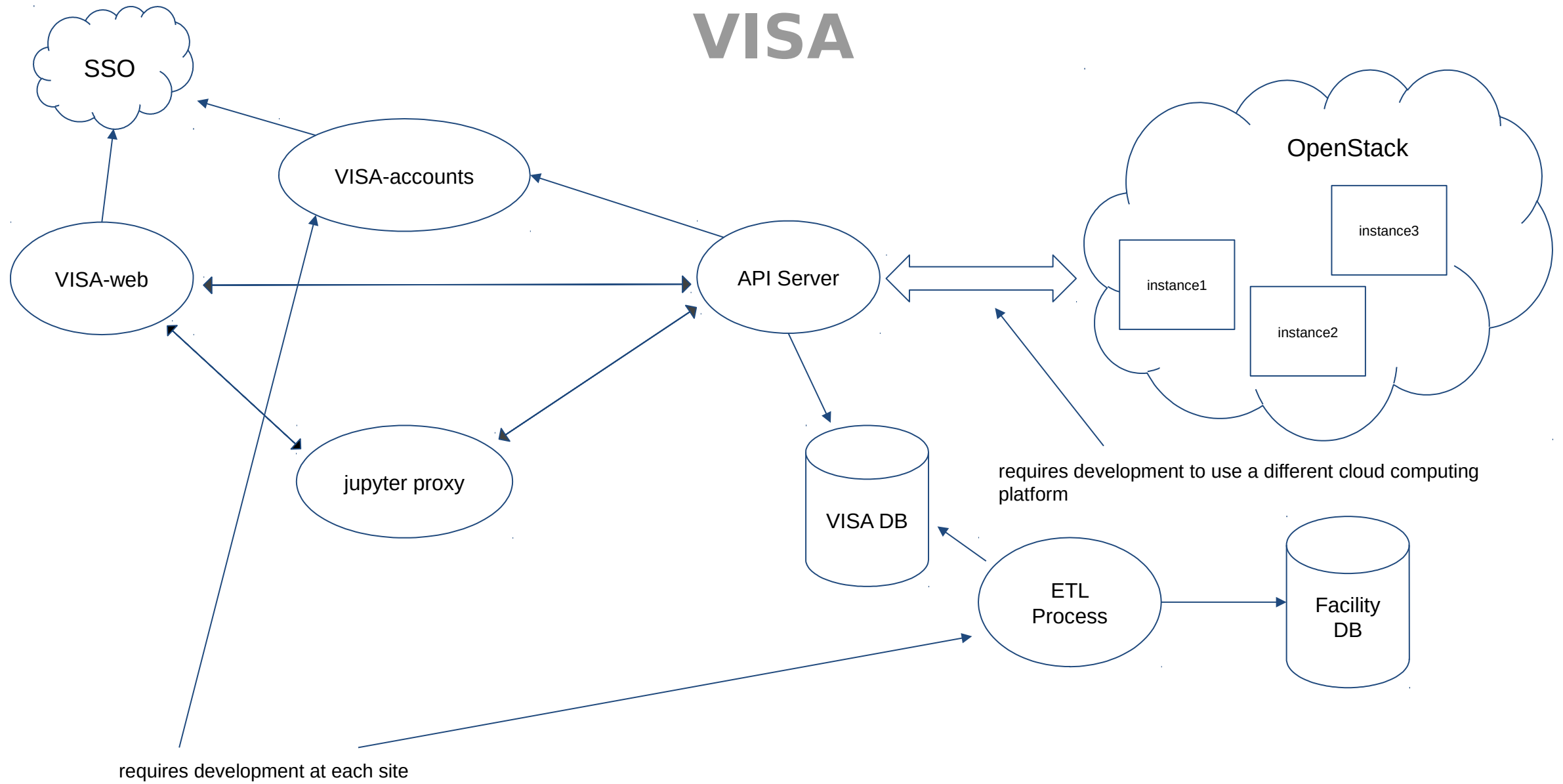
Introduction

Outline

- VISA

- Database ETL Process

- Authentication

- Cloud Computing Platform

VISA

VISA (Virtual Infrastructure for Scientific Analysis)

- VISA offers **Data Analysis as a Service** in the cloud

- It consists of the following services

  - **visa-web** the VISA UI
    https://github.com/ILLGrenoble/visa-web

  - **visa-accounts** the authentication process of VISA
    https://github.com/ILLGrenoble/visa-accounts

  - **visa-api-server** the main REST API and Desktop Service
    https://github.com/ILLGrenoble/visa-api-server

  - **visa-jupyter-proxy** the JupyterLab integration
    https://github.com/ILLGrenoble/visa-jupyter-proxy

VISA

SSO

VISA-accounts

VISA-web

jupyter proxy

API Server

OpenStack

instance1

instance2

instance3

VISA DB

requires development to use a different cloud computing platform

ETL Process

Facility DB

requires development at each site

panosc

4

Database ETL Process

## Database ETL (Extraction, Transformation and Load) Process

- VISA uses a relational database to store information (images, flavours, instances, sessions, members, etc) and also user and facility data (users, roles, instruments, proposals, experiments, etc)

- The user and facility data is injected independently by a process called ETL process that takes data from the site's data source and injects this into the VISA database

Database ETL Process

■ CERIC uses VUO (Virtual Unified Office – vuo.elettra.eu) to manage users, proposals, experiments, etc

■ The ETL Process will be a daily job that takes data from VUO database and injects this into the VISA database
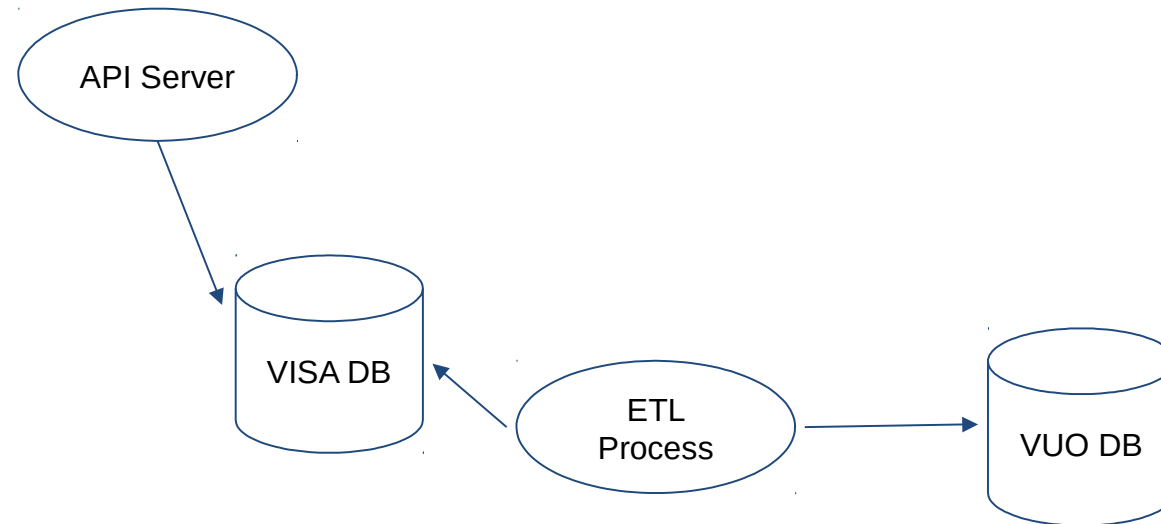
Database ETL Process
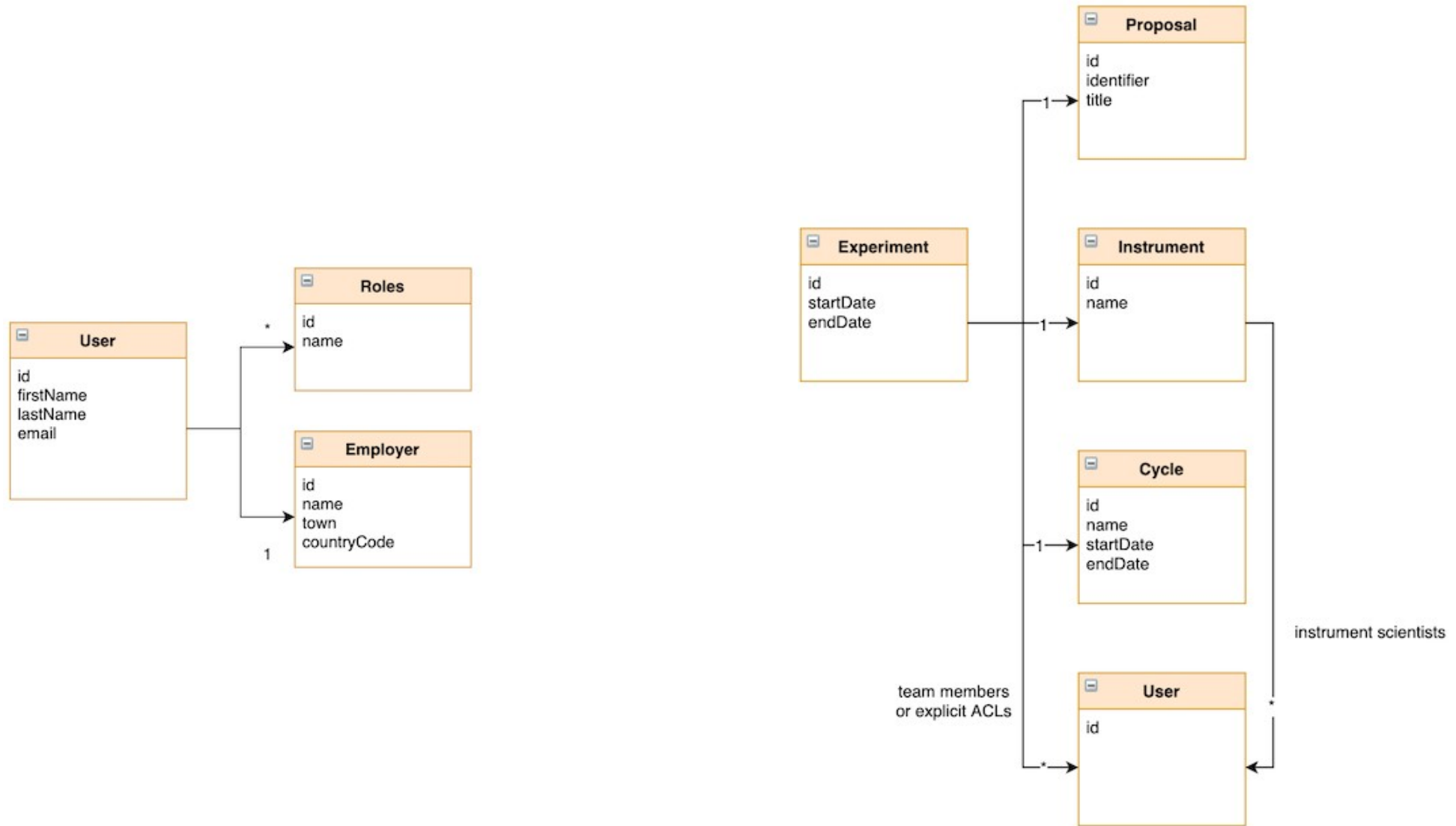
Authentication

Authentication

■ The VISA Account Service authenticates a user using OpenID Connect and returns details concerning the user (username, email, home path, userId, groupId, etc)

■ We will use a Keycloak instance for using OpenID Connect, we will populate user identities from VUO's LDAP system, our Keycloak will connect UmbrellaID in the upcoming weeks, we plan to be production ready by the end of October (~ 6w)
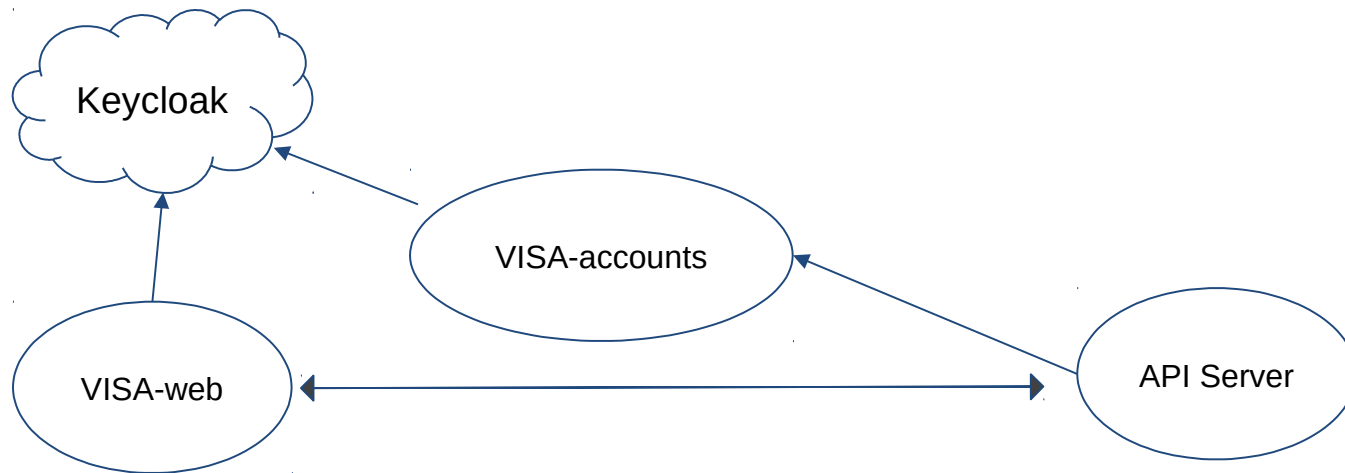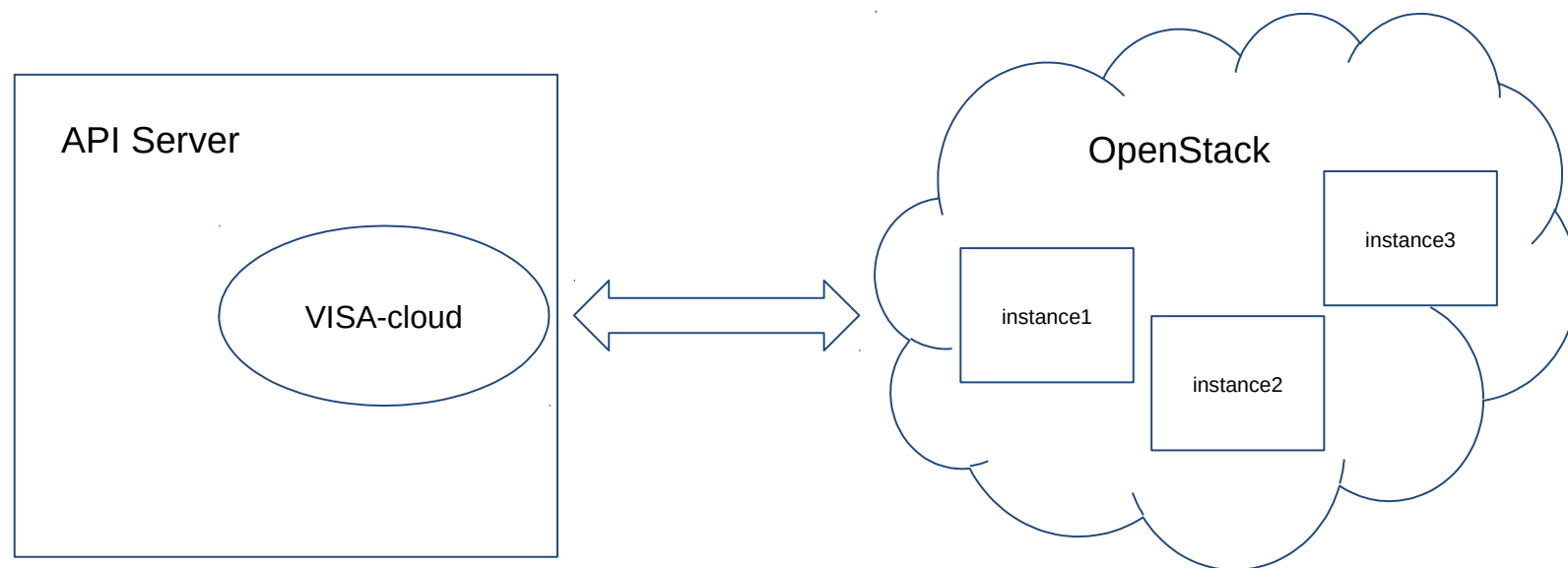
Cloud Computing Platform

Cloud Computing Platform

- VISA uses **OpenStack** as its cloud computing platform https://www.openstack.org/

- The visa-api-server is organized as a set of sub-projects and communicates with OpenStack via an API implemented in the **visa-cloud** sub-project https://github.com/ILLGrenoble/visa-api-server/tree/main/visa-cloud

Cloud Computing Platform

Plugging in different cloud providers into VISA

- CERIC (Elettra) uses **Proxmox** as its virtualization platform. Proxmox is based on Debian and supports CEPH https://www.proxmox.com/

- A different cloud provider can be plugged in implementing the interface **eu.ill.visa.cloud.providers.CloudProvider.java**

  - methods to retrieve images, flavours, instances
  - methods to create, start, shutdown, reboot, delete instances

- As an alternative the project **VISA Cloud Web Provider for OpenStack** can be used to implement a provider for a cloud platform of choice https://github.com/ILLGrenoble/visa-cloud-web-provider-openstack

Cloud Computing Platform

Openstack / Proxmox brief comparison

naming / features	Openstack	Proxmox
Orchestration platform	Yes	No
Self Host private cloud computing support	Yes	No
KVM virtualization support	Yes	Yes
Images	Flavours	Templates
IP address Management	Yes	No, we need to implement an integration with Elettra's custom IP manager for DHCP & DNS subsystems
Automatic node selection for spawning VMs	Yes	No, you have to select on which node of the proxmox cluster you want to start them
Cloud init support	Yes	Yes

panosc

Thank you

Acknowledgments: Aljosa Hafner, Andrea Lorenzon, Alessandro Olivo