

Cloud Infrastructure and storage for IBiSCo and ICSC at the INFN Section of Naples

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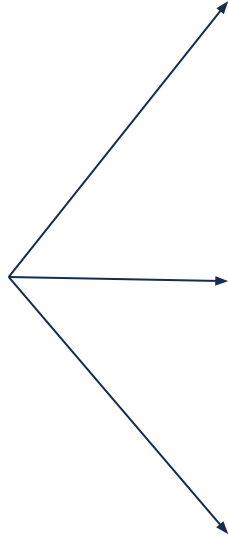
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Cloud computing refers to the **delivery of computing services** over the internet ("the cloud") to offer faster innovation, flexible resources, and economies of scale. In essence, cloud computing allows users to access and utilize computing resources, such as servers, storage, databases, networking, software, and analytics, without the need for owning or managing the physical infrastructure themselves.



Infrastructure as a Service (IaaS): Provides virtualized computing resources. Users can provision and manage virtual machines, storage, and networking infrastructure.

Platform as a Service (PaaS): Offers a platform allowing customers to develop, run, and manage applications without worrying about the underlying infrastructure. PaaS providers handle the hardware and software infrastructure, including middleware, development tools, database management systems, and runtime environments.

Software as a Service (SaaS): Delivers software applications. Users can access and use the software without needing to install

Why Cloud Computing ?

Cost Effective

Complex Shared Security

Scalable

Virtualization Overhead

Robust Disaster Recovery

Latency (distance from user)

Easier for Users

Harder for Admins

Resilient

In scientific computing the pros outweigh the cons

OpenStack - An open source Cloud platform



OpenStack Components



Virtualization Layer



Nova: Manages the creation and lifecycle of VMs.



Neutron: Provides networking services for VMs.



Keystone: Handles user authentication and authorization.



Placement: Manages resource allocation and usage.



Glance: Stores and manages virtual machine images.



Cinder: Provides block storage services for VMs.



Swift: Offers object storage for unstructured data.



Designate: Provides DNS and DHCP for VMs.



Ironic: Performs Bare Metal provisioning



Horizon: Dashboard, provides an user interface to Openstack services

Proxmox, Puppet and Foreman for Cloud Deployment

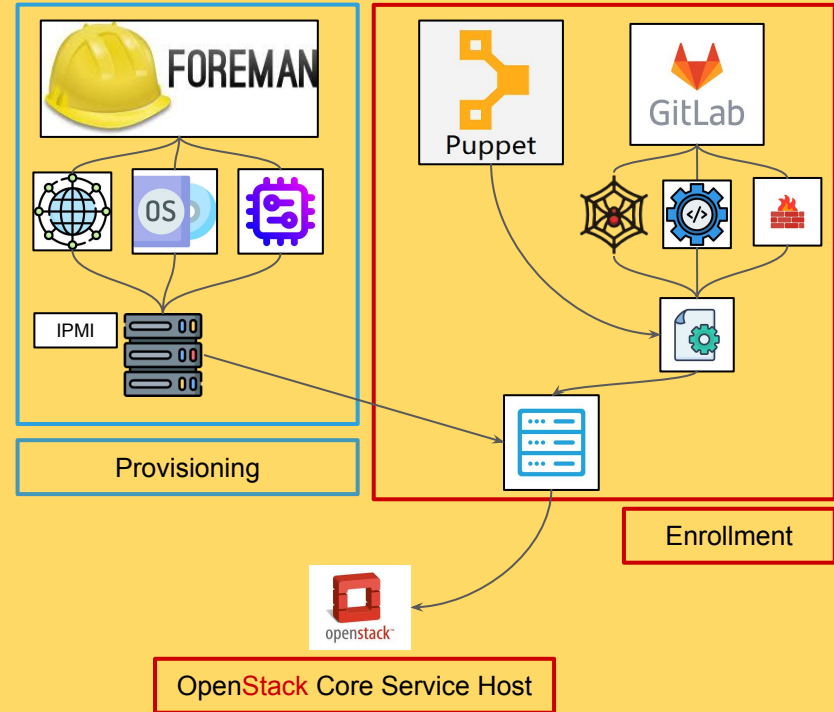


Proxmox: Proxmox Virtual Environment (Proxmox VE) is a free, open-source virtualization platform based on the Debian Linux distribution. It allows you to easily manage virtual machines (VMs), containers, and storage within a user-friendly web interface.

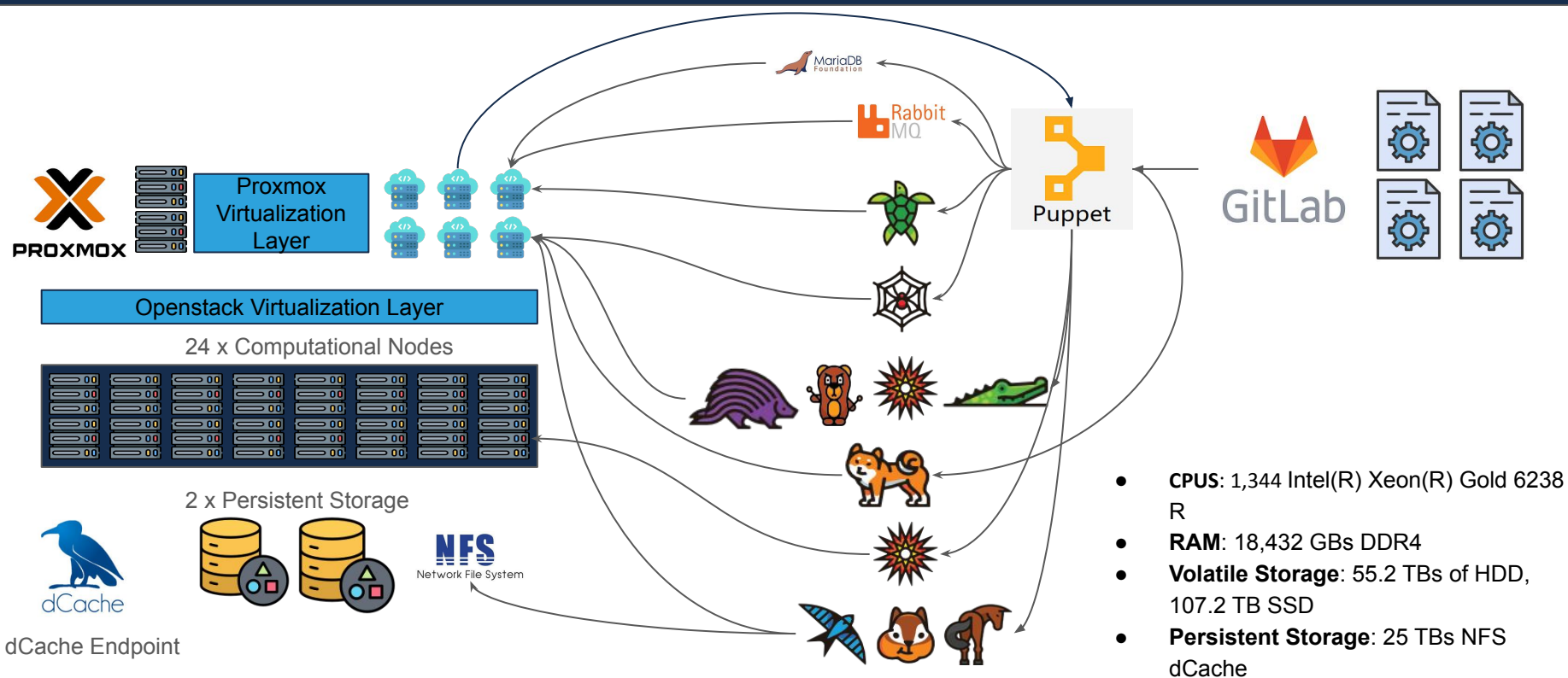
- Free and Open-Source
- Supports multiple operating systems
- Allows for the creation of templates



Openstack Core Service Template: AlmaLinux 9.3, between 4 and 32 GBs of RAM, 4 to 9 Virtual Cores and 50 GBs of SSD storage.



IBISCo Cloud Napoli - Building the cloud automatically



IBISCo Cloud Napoli - Puppet Profiles

Name	Last commit	Last update
data	feat: begin dividing hiera facts based on environments	1 day ago
docs	docs: logging setup	2 months ago
manifests	moved nova scheduler from controller to ironic	2 weeks ago
modules	feat: containers should now use kata-containers	1 month ago
gltignore	feat(gltignore): ignore viscode local settings	7 months ago
gltab-ci.yml	Configure SAST in .gltab-ci.yml, creating this file if it...	9 months ago
Puppetfile	feat(Puppetfile): remove inactive projects	3 weeks ago
README.md	updated README	just now
environment.conf	updated initial files	9 months ago
hiera.yaml	feat: begin dividing hiera facts based on environments	1 day ago

IBISCo Cloud Openstack Puppet Configurations

Puppet files to install an instance of OpenStack Antelope 2023.2

Full documentation

This is a brief README, for details please see the docs folder

Software Versions

Tested on:

- AlmaLinux 9.3
- OpenStack 2023.2
- Puppet 7.x

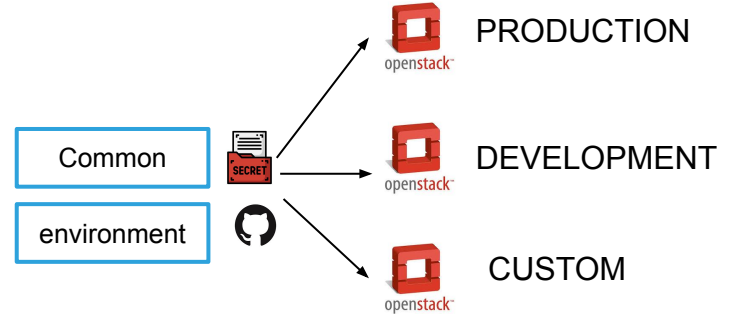
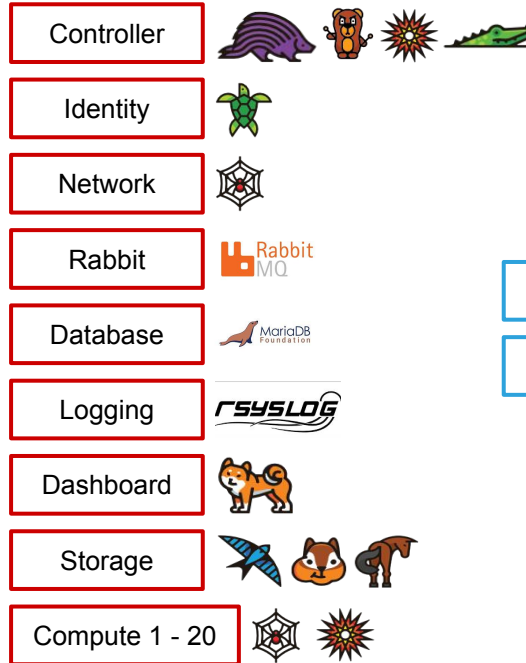
Features

Provided OpenStack Components

- OpenStack Services
 - Compute
 - Nova
 - Hardware Lifecycle
 - ironic
 - Storage
 - Cinder
 - Networking
 - Neutron
- Shared Services
 - Keystone
 - Placement
 - Glance
- Orchestration
 - Heat
- Web Frontends
- Horizon
- Operations Tooling
 - Monitoring Services
 - Cellometer

Authors

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- Michele Dell'Veneri
- Francesco Di Nucci

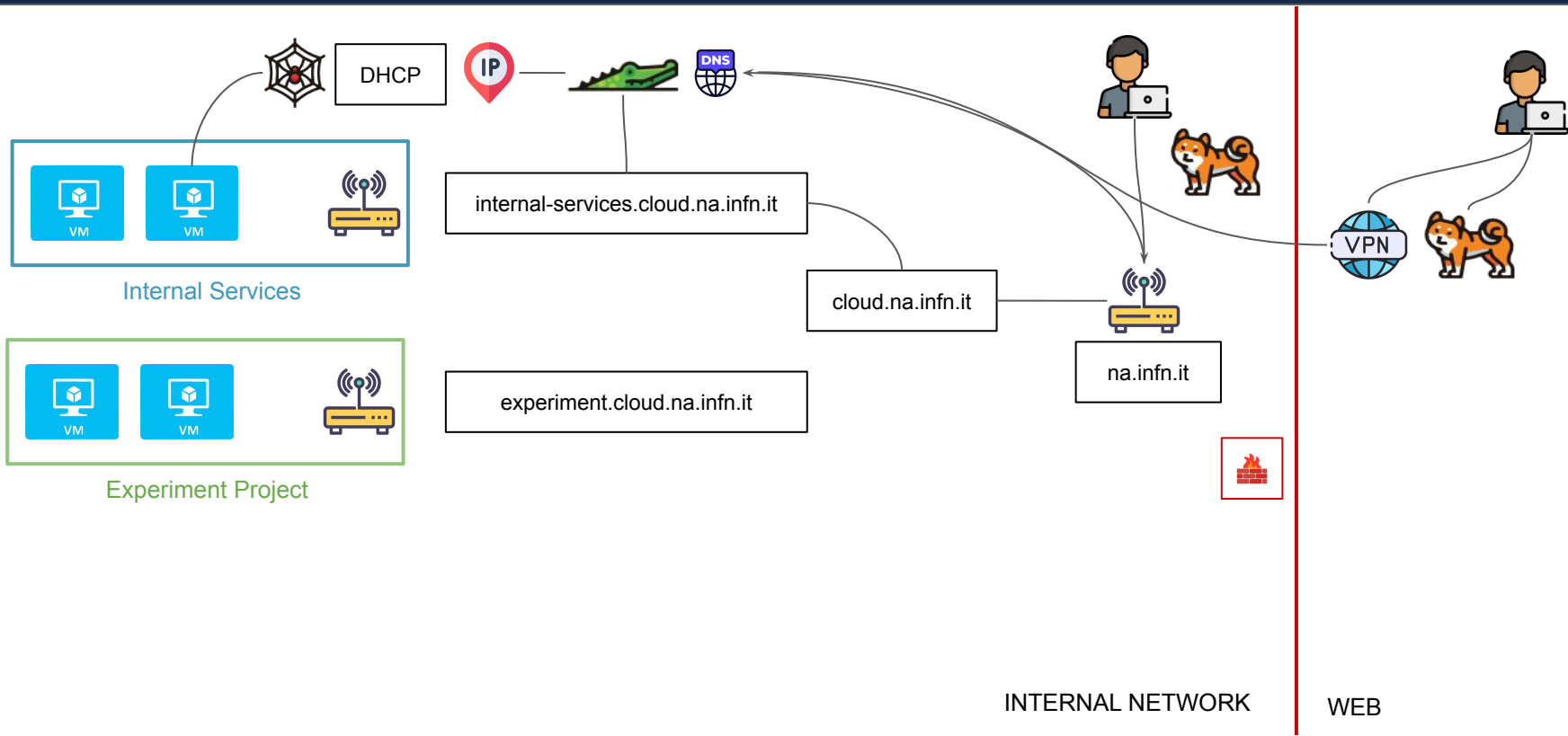


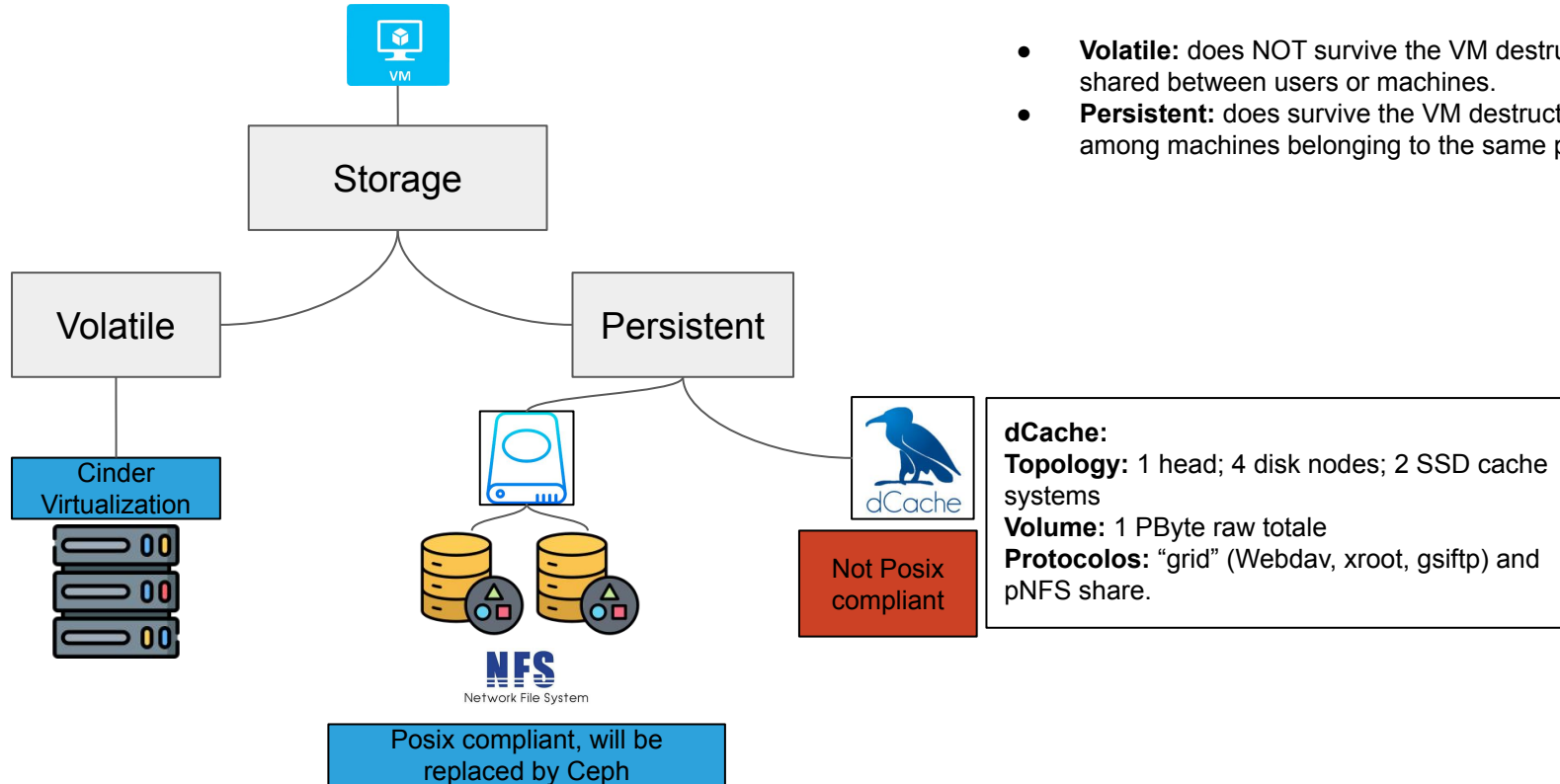
FIXED

CUSTOMIZABLE

 [BALTIG Repo](#)


IBISCo Cloud Napoli - Networking, DHCP and DNS





- **Volatile:** does NOT survive the VM destruction. Can't be shared between users or machines.
- **Persistent:** does survive the VM destruction. Can be shared among machines belonging to the same project

IBISCo Cloud - Dashboard and Login


openstack.

Log in

Authenticate using

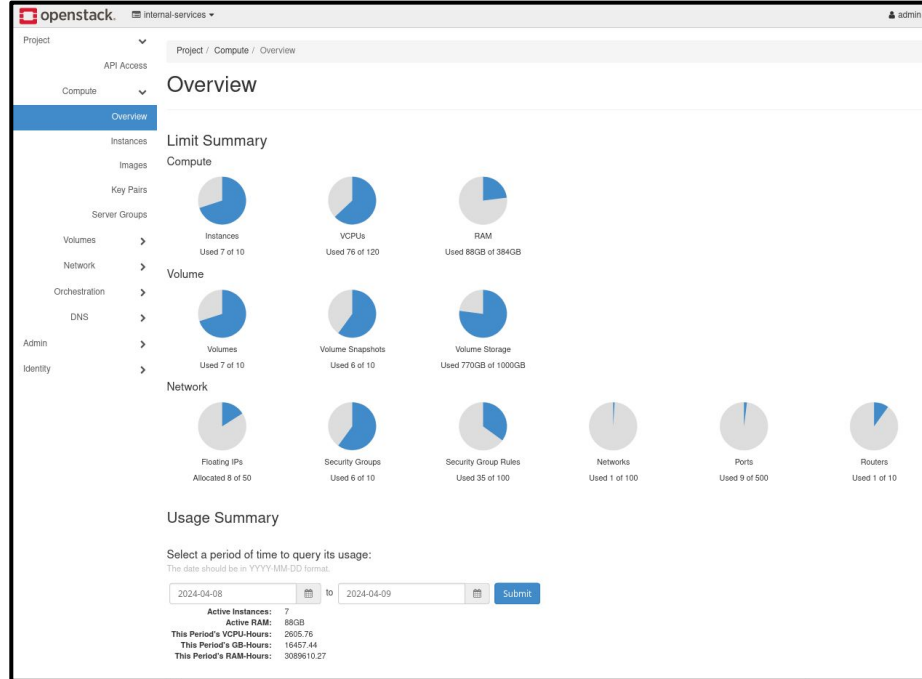
Keystone Credentials

If you are not sure which authentication method to use, contact your administrator.

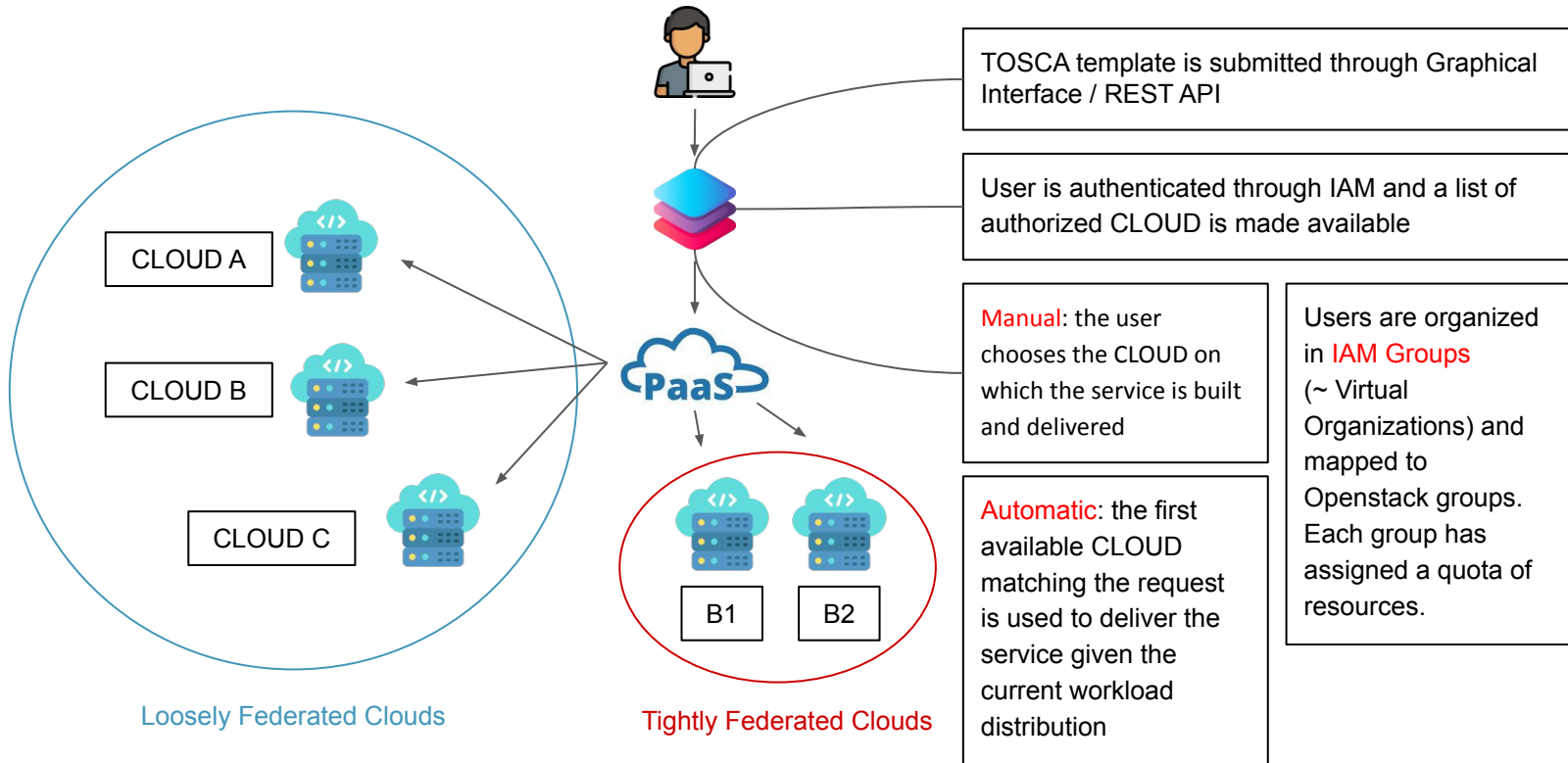
User Name

Password

Sign In



IBISCO Cloud - Federation




INFN Cloud - Dashboard and list of services

CENTRALISED SERVICES:


INFN Cloud object storage
the centrally managed service based on Minio-Gateway

[Go to service](#)


Notebooks as a Service (NaaS)



INFN Cloud Registry




INFN-Cloud monitoring



ON-DEMAND SERVICES:


Virtual machine




Docker compose
Deploy a virtual machine with docker engine and docker compose pre-installed. Optionally run a docker compose file [1,1]

[Read More](#) [Configure](#)


Run docker




INDIGO IAM as a Service




Elasticsearch and Kibana




Kubernetes cluster




Spark + Jupyter cluster




HTCondor mini




Jupyter with persistence for Notebooks



Jupyter + Matlab (with persistence for Notebooks)



Sync&Share aaS



Virtual machine

Description: Launch a compute node getting the IP and SSH credentials to access via ssh

Deployment description
description

Configuration [Advanced](#)

hostname

ports

[Add rule](#)

Ports to open on the host

flavor
--Select--

Number of vCPUs and memory size of the Virtual Machine

operating_system
--Select--

Operating System for the Virtual Machine

[Submit](#) [Cancel](#)

INFN Cloud Dashboard

Welcome to the INFN Cloud Dashboard!

[Please login, or register »](#)

INFN CLOUD
Istituto Nazionale di Fisica Nucleare

Welcome to **infn-cc**

Sign in with



Not a member?

[Apply for an account](#)

Protocol	Port Range	Source	
TCP	e.g. [8080,8082] or 80	0.0.0.0/0	Remove
Add rule			
Ports to open on the host			

Thank you
for the
attention

