



Oracle Project Highlights

Openlab Technical Workshop

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11/01/2018

Agenda

Cloud Computing
Databases
Analytics
Middleware
Take-aways

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Cloud Computing

Context



Oracle provided Access to **10,000 cores & 1 PB data**

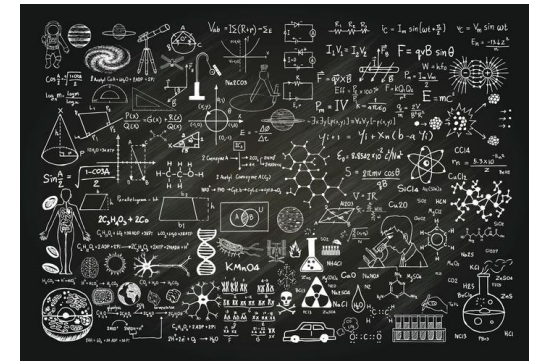
2nd Generation **IaaS**

Previously known as Bare Metal Cloud

Oracle Cloud Infrastructure

Cloud Computing

Benefits



Oracle: **feedback**

CERN: **experience** and **collaboration** (IT-CM, WLCG, IT-CS)

Experiments: **computing**

Cloud Computing

Challenges



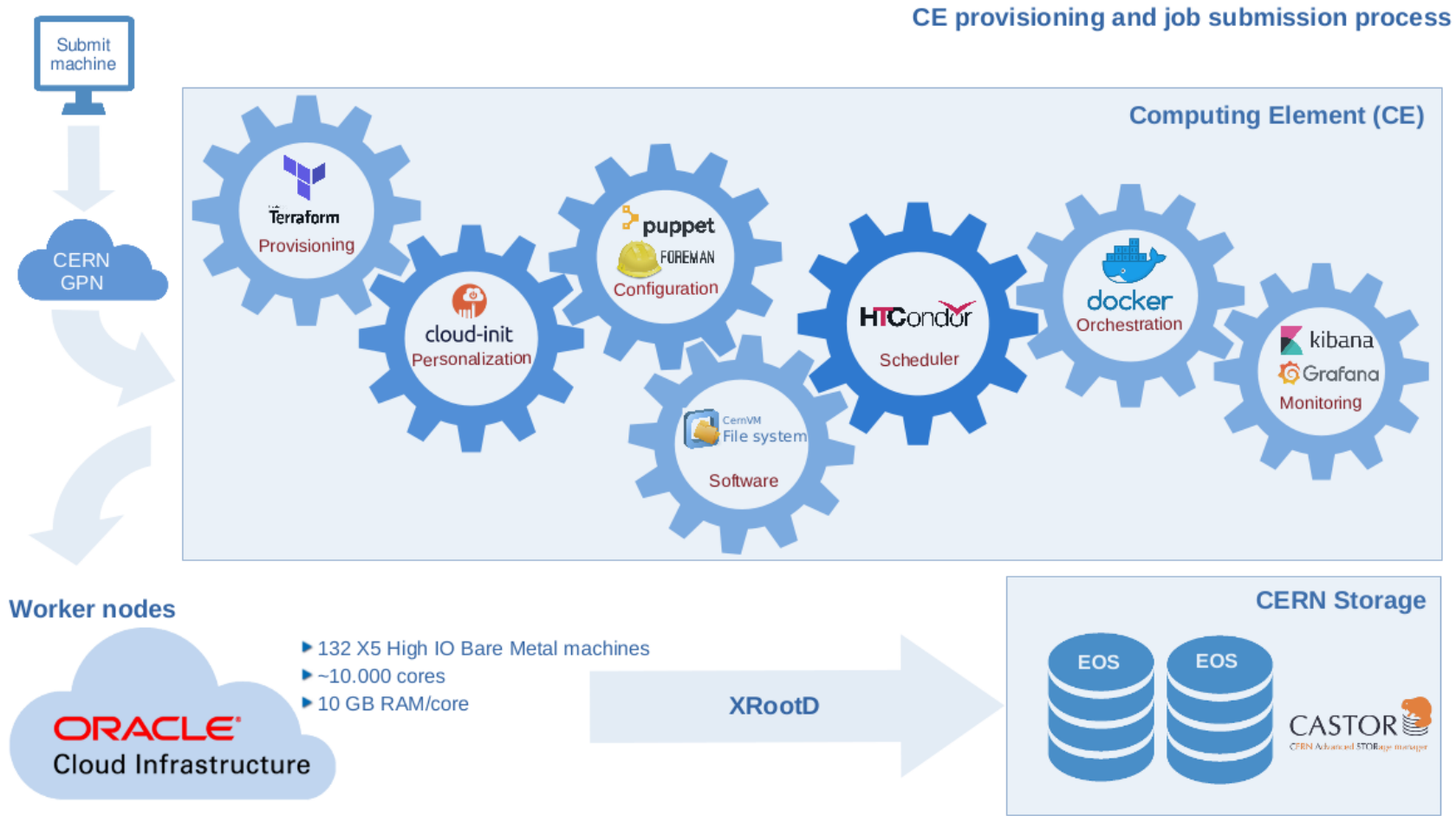
Networking: orabmc.cern.ch IP range

Configuration: puppet code refactor

Storage: some type of jobs required high IO

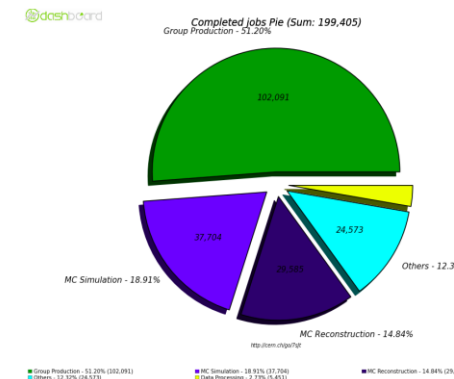
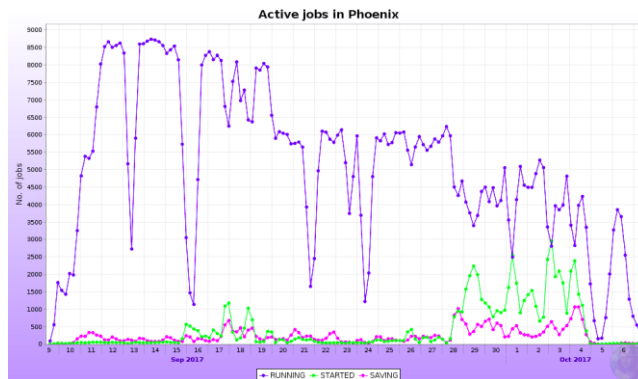
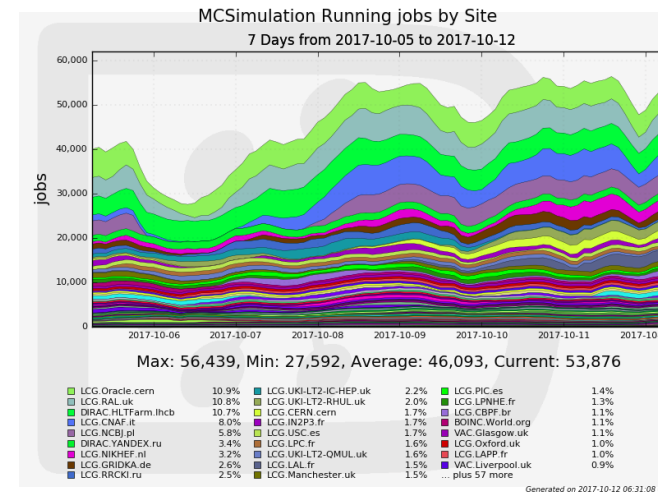
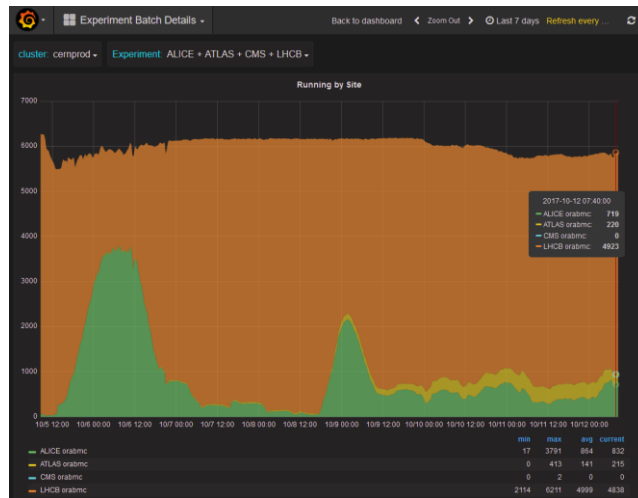
Cloud Computing

How to?



Cloud Computing

Results



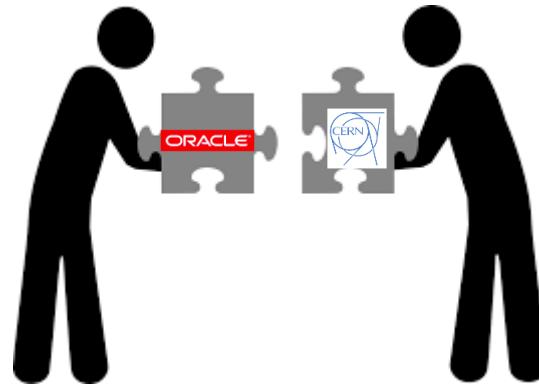
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Databases

Oracle 12.2. Beta Program



Feedback: 26 Service Request opened to Oracle Support

Improvements

Installation

Optimizer

Bug

Compression ratios on the In Memory Columnar

Databases

Oracle 12.2. Beta Program. In memory

Since Oracle Database Release 1 (12.1.0.2)

Goal: improve performance of **analytic queries**
Few **columns** but **entire dataset**

Both **row** and **columnar** format **simultaneously** in **memory**

Buffer **cache** for **OnLine Transaction Processing** and data modifications (**DML**)

Transparent for applications

No storage overhead



Databases

In memory. CERN Administrative Dataware House.

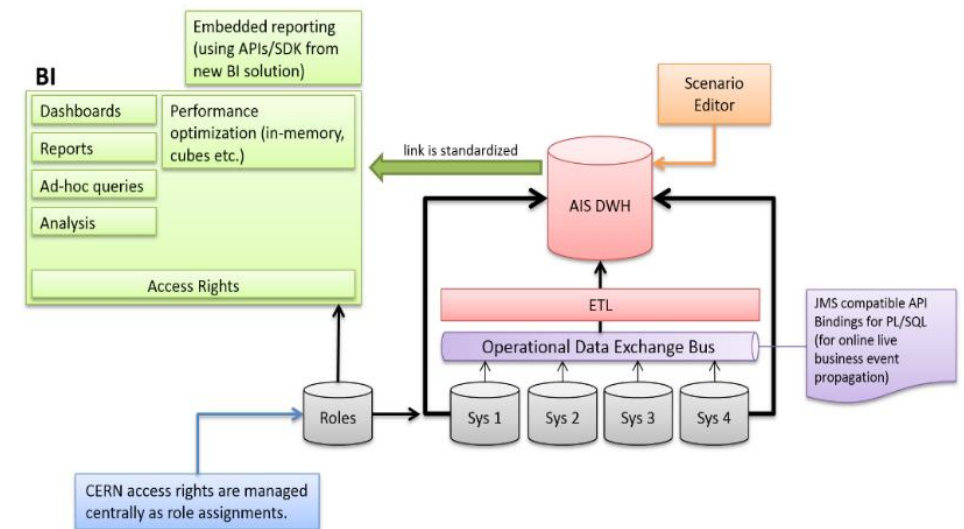
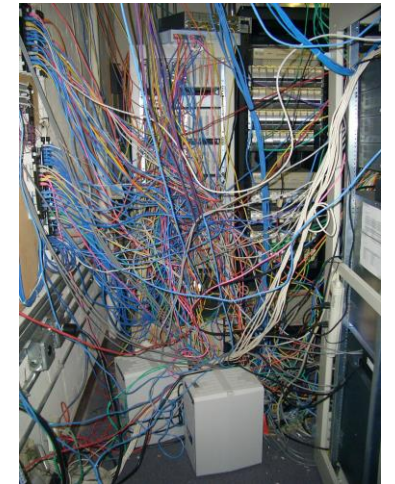
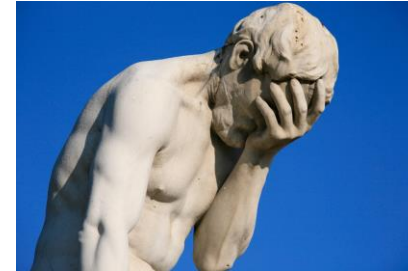
Reports, dashboards and data analytics
HR, financial, ERP...

Before in memory
Different reporting systems
Multiple data model
Lack of data consistency
Low performance

After in memory
Improved performance
Reduce maintenance costs

Artur Zygadlo. XLDB17. <http://cern.ch/go/8ZnN>

Roger MacNicol. 12 Jan 2018 14:45 !!!



Databases

Cloud Testing

Oracle Database Cloud Tests

Feasibility

Integration

Performance

Monitoring

Backup & Recovery



Launch DB System

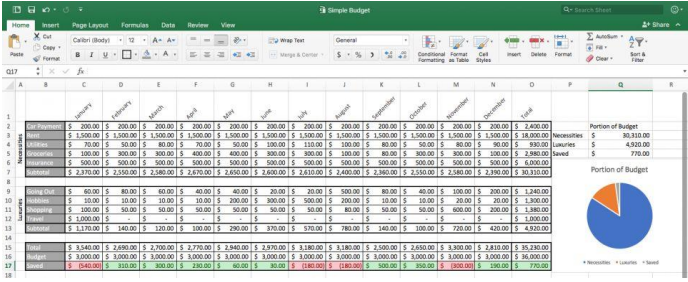
If the Virtual Cloud Network or Subnet is in a different Compartment than the DB System, you must select the Compartment to enable Compartment selection for those resources.

DB System Information	
DISPLAY NAME	<input type="text" value="CERNEXA1"/>
AVAILABILITY DOMAIN	<input type="text" value="aMLs:US-ASHBURN-AD-3"/>
SHAPE	<input type="text" value="Exadata.Quarter1.84"/>
TOTAL NODE COUNT	<input type="text" value="2"/>
ORACLE DATABASE SOFTWARE EDITION	<input type="text" value="Enterprise Edition Extreme Performance"/>
CLUSTER NAME <small>(Optional)</small>	<input type="text" value="CERNEXA1"/>
CPU CORE COUNT	<input type="text" value="22"/>

The number of CPU cores to enable on the DB System. Specify a multiple of 2, up to 84.

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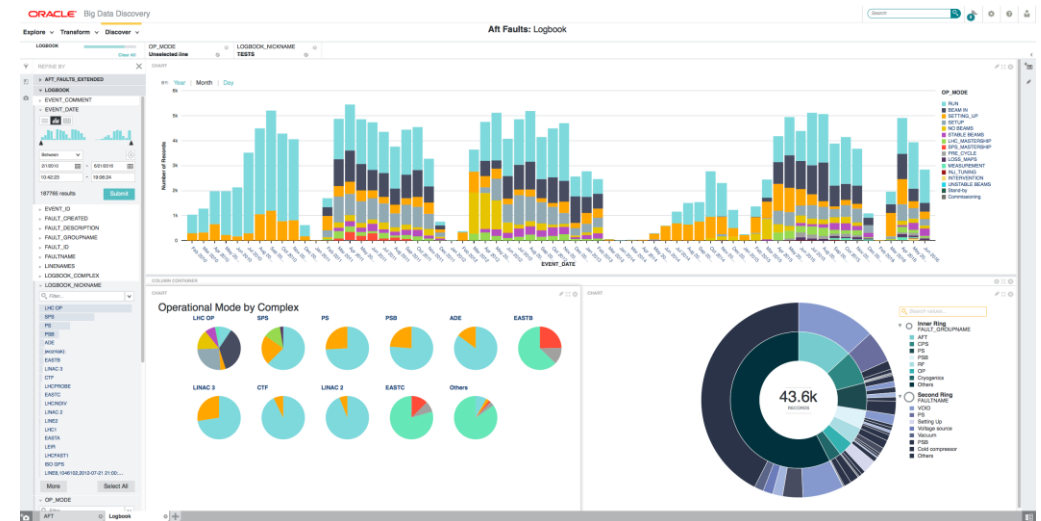


Analytics

Oracle Big Data Discovery test

Self-Service **Data Analytics** platform
Data distributed across **multiple sources**
Heterogeneous data
Scalability
Reliability

Oracle Big Data Discovery
Self-Service discovery tools
Hide technology complexity
Advance analytics **integration**



Analytics

Oracle PGX evaluation and PoC

Graph Databases

Find patterns and indirect relations

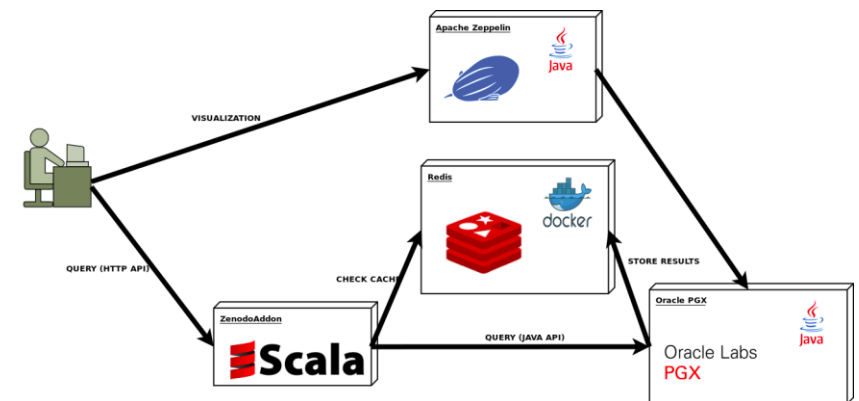
E.g.: networks, recommendation engines...

Oracle Parallel Graph Analytix (PGX)

Evaluation

Zenodo Keyword recommendation engine

<https://github.com/alastairparagas/ZenodoAddon>



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Middleware

Context

500 **Oracle WebLogic Servers** in 40 domains
Administrative, Engineering & Networking systems

Integrated in the **CERN IT** infrastructure
Authentication, monitoring, virtualization
High level of **automation**
WLST, REST Management API

New requirements

Faster time to production
Simpler deployments (dev & ops)
Portable
Easier to maintain



CERN Single Sign-On

Sign in with a CERN account, a Federation account or a public service account

Sign in with your CERN account
Remember: you have agreed to comply with the CERN computing rules

Use credentials
Username or Email address: Password:
 Remember Username or Email Address [Need password help?](#)

Use one-click authentication
 Sign in using your current Windows/Kerberos credentials [autologon]
Use your current authentication token. You need Internet Explorer or CERN Windows or Firefox on SLC (Platform only)
 Sign in using your Certificate [autologon]
Use a valid PKI issued certificate. Don't forget to first map your Certificate to your CERN Account.

Use strong two factor authentication [Show](#)

Sign in with a public service account
 Facebook, Google, Live, etc.
Authenticate using an external account provider such as Facebook, Google, Live, Yahoo, Orange.

Sign in with your organization or institution account
Use with



Middleware

Architecture

Container technologies match the new requirements

Fast & Lightweight

Self-contained & **immutable**

Simple to maintain

Leverage **CD & CI** techniques

Cross Platform

Challenges

Networking

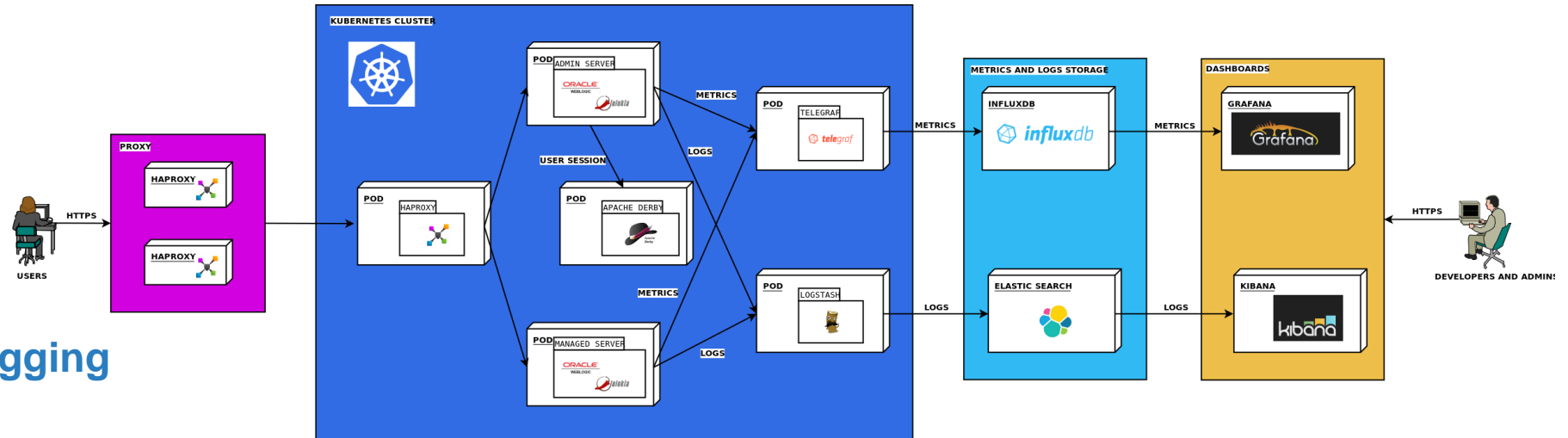
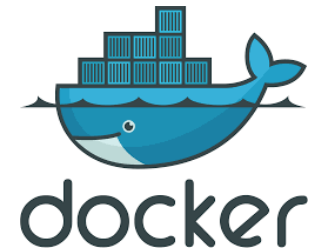
Security

SSO & SSL

Secrets

Monitoring & Logging

Storage



Middleware

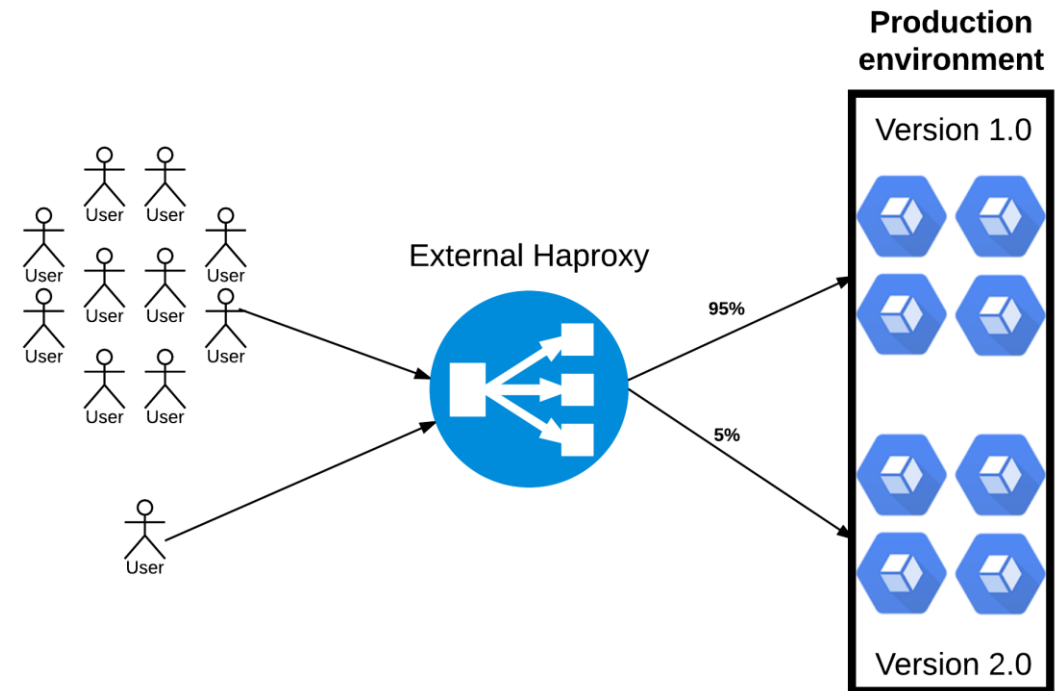
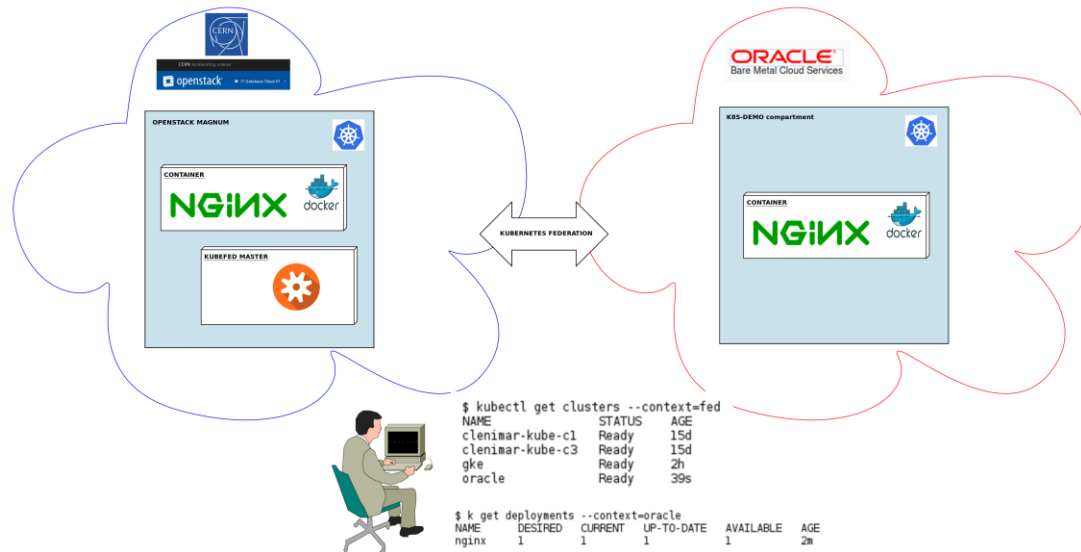
New features

Canary deployment

Test new application features

Kubernetes federation

Disaster Recovery



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Take-aways

Lessons learned

Successful testing work on **Oracle Cloud** with (part of) LHC experiments' workloads.

Relational Databases

In memory add significant **improvement** in reporting apps
Cloud as Disaster Recovery solution

Graph databases

Can reveal **latent information** in your data (relationships)

Containers are becoming the **standard** in **application deployment**

Take-aways

Education and outreach

Summer Student Program

More than 20 students during the phase V
Oracle & MTN foundation

Presentations

OOW, ICALEPS, UKOUG...

<http://openlab.cern/publications>

Technical Documents

Posters, Articles, Reports...

<http://openlab.cern/publications/technical-documents>

Software

Weblogic images, libraries, clients...

<https://github.com/cerndb/>

Blog

<http://db-blog.web.cern.ch/>





QUESTIONS?

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