

The Glance project common infrastructure dependencies upgrade from the ATLAS Glance perspective

Luis Guilherme Neri Ferreira,

Ana Clara Loureiro Cruz, Carolina Niklaus da Rocha Rodrigues, Gabriela Lemos Lúcidí Pinhão, Leonardo Mira Marins, Pedro Henrique Goes Afonso, Rafaella Lenzi Romano and Rodrigo Coura Torres



- CERN
 - The European Organization for Nuclear Research (CERN), founded in 1954.
 - World's largest particle physics laboratory.
- ATLAS
 - Part of the Large Hadron Collider (LHC), the world's highest energy particle accelerator
 - One of the largest experiments conducted at CERN with over 6,000 active members.



Fig 1: Globe of Science and Innovation - CERN



Fig 2: ATLAS logo

The Glance Project

- Main Purpose

- Responsible for an integrated ecosystem that manages personnel and logistics data for experiments such as ALICE, ATLAS, CMS, LHCb, SND and AMBER.

- The ATLAS Glance Project

- Responsible for a variety of applications, embracing a wide range of systems, such as: ATLAS Publication Tracking, Membership and Speakers.

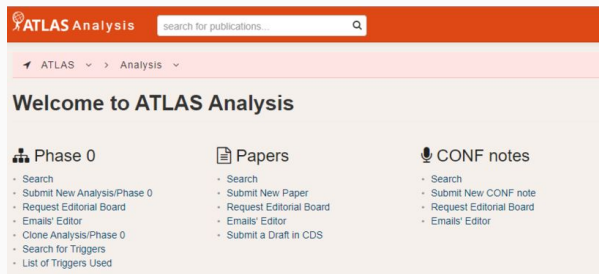


Fig 3: ATLAS Publication Tracking System

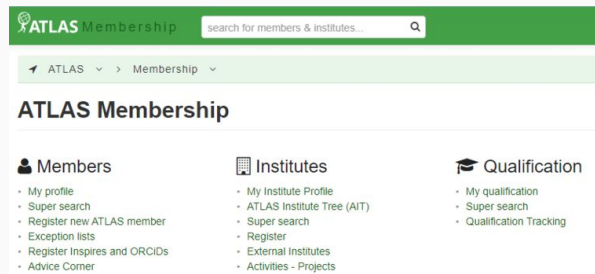


Fig 4: ATLAS Membership System



Fig 5: ATLAS Speakers System

- Puppet for automating VM configuration on CERN's Openstack.
 - Consistency
 - Scalability
 - Shared modules
 - Centralized Management
 - Not easy for newcomers
- Docker images
 - Local development environment
 - CI pipelines for isolated testing environments.
- Application
 - PHP, Nodejs and Vuejs
 - Manually managed secrets

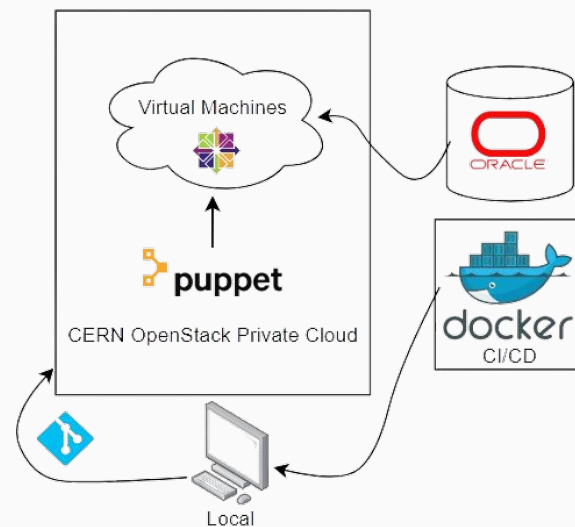


Fig 6: Glance's infrastructure

Migration Project introduction

- CentOS 7 reached end of life (EOL) on June 30th, 2024
- Approaches under consideration
 - CentOS 7
 - Red Hat Enterprise Linux (RHEL)
 - AlmaLinux
 - Other OS (Debian, Ubuntu etc.)
 - Docker



Fig 7: Technology options

Adopted solution

- Migrate to Red Hat Enterprise Linux 9, updating PHP and Node.js runtimes

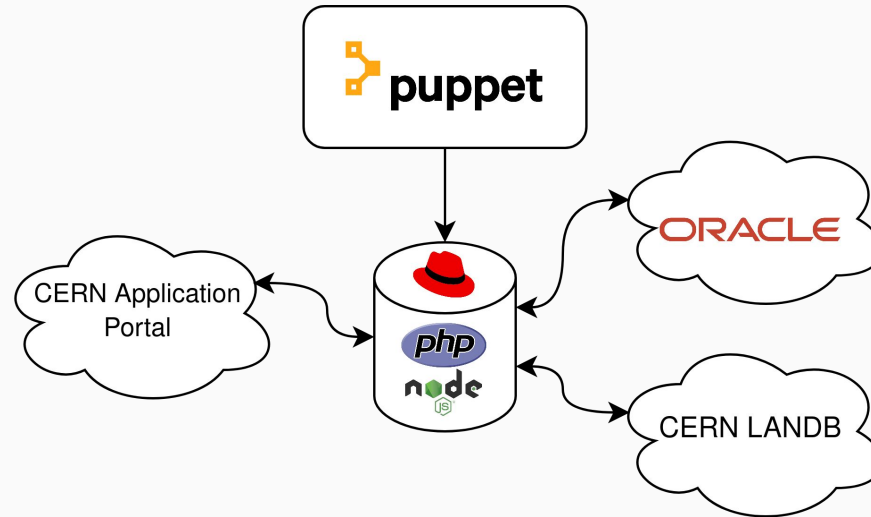


Fig 8: - Glance's VMs infrastructure

Preparation strategy

- Operating System Migration
 - Update of shared puppet module
 - SAML to OIDC
 - Development VM
- Application Stack migration
 - Docker images upgrade
 - Code base upgrade
 - Composer
 - SLIM
 - Glance Bundles and Systems
 - Validation

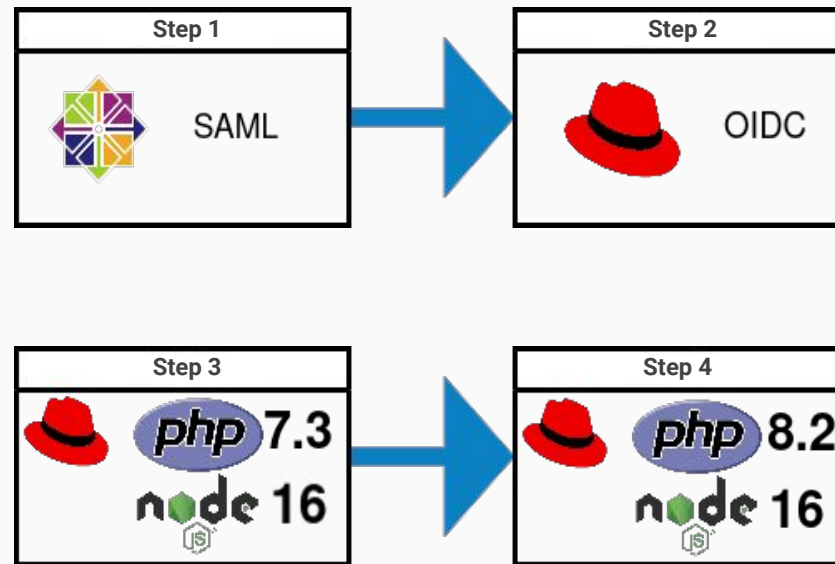


Fig 9: Preparation steps

Deployment steps

1. Build Staging RHEL 9 virtual machine with OIDC
2. Build production RHEL 9 virtual machine and deactivate CentOS 7 production machine (before CentOS 7 EOL)
3. Upgrade the application stack runtimes with puppet
4. Upgrade the dependencies with puppet and npm

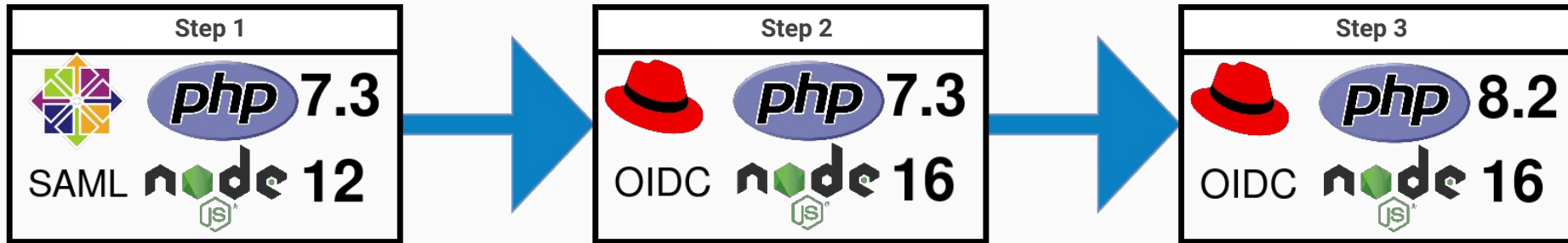


Fig 10: Deployment steps

- OS with long term security updates and support
- Knowledge transfer inside the team
 - Hands-on training on ATLAS Glance infrastructure
- Better process for infrastructure changes
 - Integrated with Git flow and Puppet setup at CERN
- Better configuration management
 - Less scattered configuration files
- Better secret management
 - Centralized secrets in a safe repository

- **Dependency Management**

- Outdated dependency packages
- Unclear upgrade criteria
- How could we improve?
 - Evaluate dependencies updates periodically
 - Leverage CI pipeline



Fig 11: Composer and NPM logos

- **Inconsistent infrastructure for environments**

- Inaccurate application configuration
- Late identification of misconfigurations
- How could we improve?
 - Implementation of Docker



Fig 12: Puppet and docker logos

- Successful migration to RHEL 9
- Successful migration to PHP 8 and Node.js 16 and new features
- Glance experiments integrated to work together in a common issue
- Identified opportunities for enhancing the Glance project infrastructure

Thank you!