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

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Introduction

- **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.
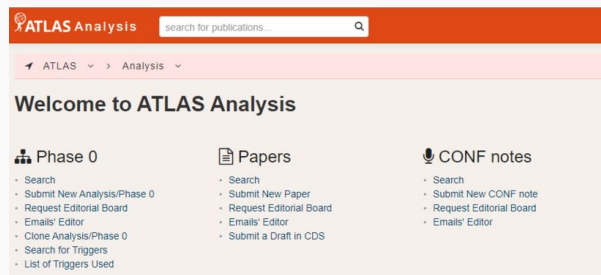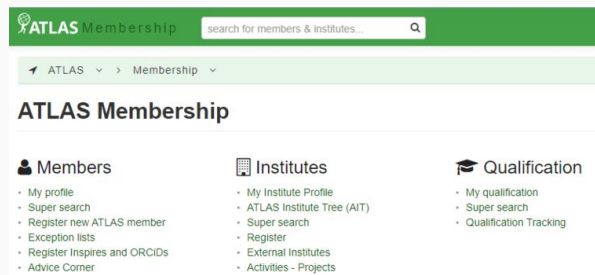

Fig 3: ATLAS Publication Tracking System

Fig 4: ATLAS Membership System

Fig 5: ATLAS Speakers System

Glance's Infrastructure

- 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
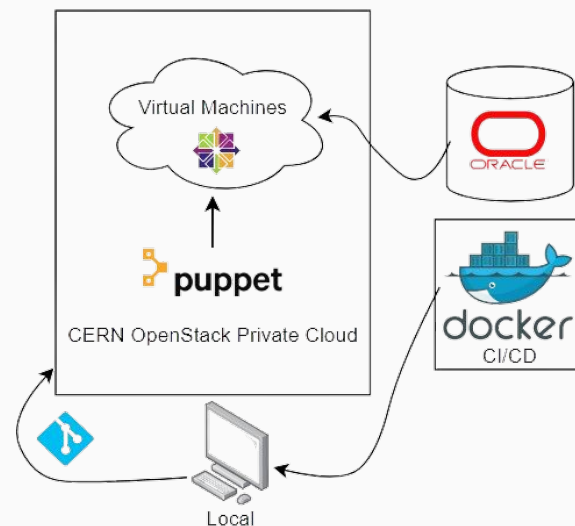 - PHP, Nodejs and Vuejs
  - Manually managed secrets

Fig 6: Glance's infrastructure

Dependencies upgrade 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

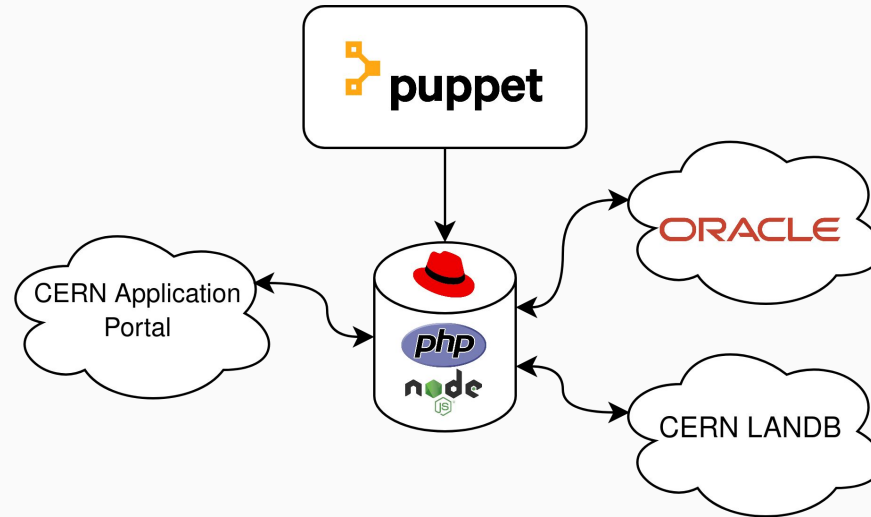- Migrate to Red Hat Enterprise Linux 9, updating PHP and Node.js runtimes

Fig 8: - Glance's VMs infrastructure

Preparation strategy

- Operating System migration
  - SAML to OIDC (Authentication)
  - Update of shared puppet module
  - Development VMs

- Application Stack migration
  - Docker images upgrade
  - Code base upgrade
    - Composer
    - SLIM
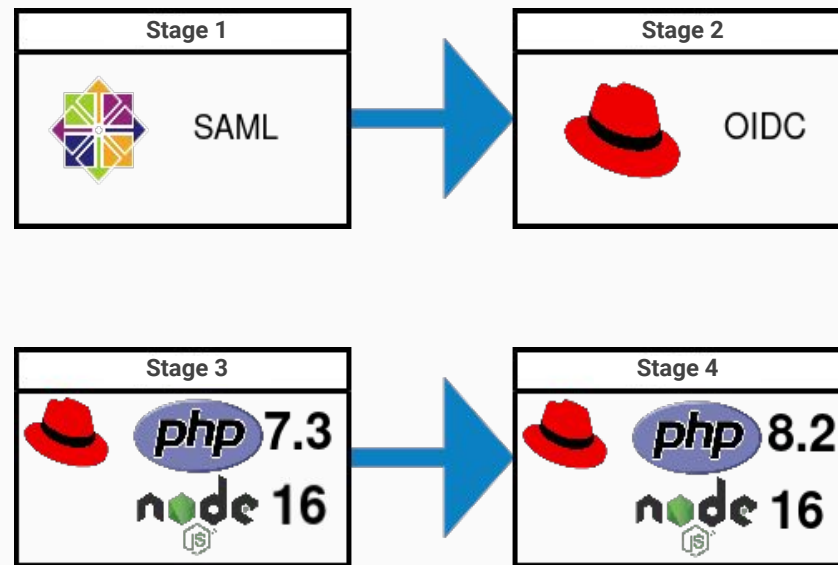   - Glance Bundles and Systems
  - Validation

Fig 9: Preparation steps

Deployment steps

1. Build staging RHEL 9 virtual machine with OIDC, PHP 7, Node 16.
2. Build production RHEL 9 virtual machine and deactivate CentOS 7 production machine (before CentOS 7 EOL)
3. Upgrade PHP version with puppet
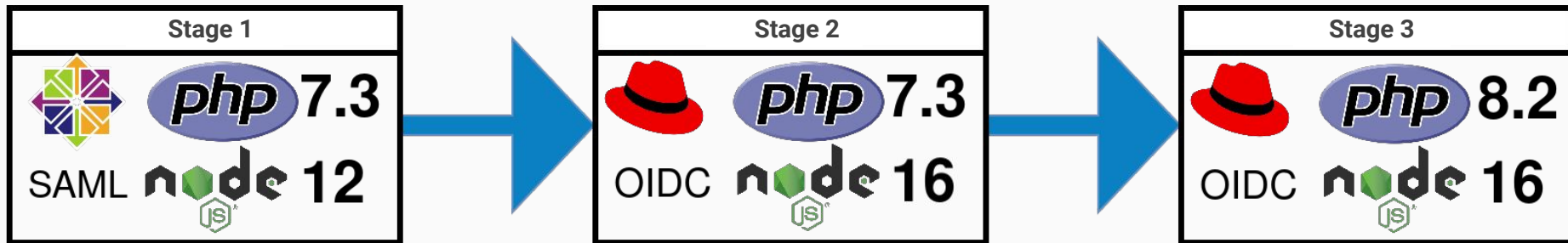4. Upgrade the dependencies with composer and npm

Fig 10: Deployment steps

Accomplishments

- 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 file management
  - Less scattered configuration files
- Better secret management
  - Centralized secrets in a safe repository

Issues to be addressed

- 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?
    - Have the same technology in all environments

Fig 12: Puppet and docker logos

Conclusion

- Successful migration to RHEL 9

- Successful migration to PHP 8 and Node.js 16

- Glance experiments integrated to work together in a common issue

- Identified opportunities for enhancing the Glance project infrastructure

Thank you!

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