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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.

SatLAS Analysis search for publications Q			<b>PATLAS</b> Membership search for members & institutes Q			<b><i>R</i>ATLAS</b> Speakers		
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Welcome to ATLAS Analysis			ATLAS Membership			Welcome to ATLAS Speakers		
Phase 0     Search     Submit New Analysis/Phase 0     Request Editorial Board     Emails/Editorial Board     Clone Analysis/Phase 0     Search for Triggers     List of Triggers Used	Papers Search Submit New Paper Request Editoral Board Request Editoral Board Emails Editor Submit a Draft in CDS	CONF notes Search Submit New CONF note Request Editoral Board Emails' Editor	Members     My profile     Super search     Register new ATLAS member     Exception lists     Register Inspires and ORCIDs     Advice Corner	Institutes My institute Profile ATLAS institute Tree (AIT) Super search Register External institutes Activities - Projects	Qualification     My qualification     Super search     Qualification Tracking	Conferences     Overview     Search     Register     Task 1 report     My Conferences	<ul> <li>Talks</li> <li>Search</li> <li>Register</li> <li>Emails editor</li> <li>Invitations</li> <li>Abstracts</li> </ul>	<ul> <li>SCAB</li> <li>Profile</li> <li>Regular search</li> <li>Volunteers search</li> <li>Settings</li> </ul>

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

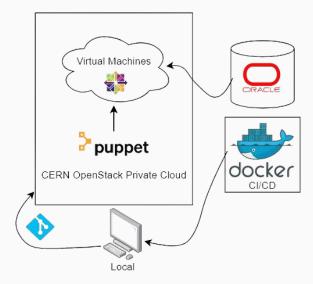


Fig 6: Glance's infrastructure

- 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.)
  - $\circ$  Docker



Fig 7: Technology options

# Adopted solution

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

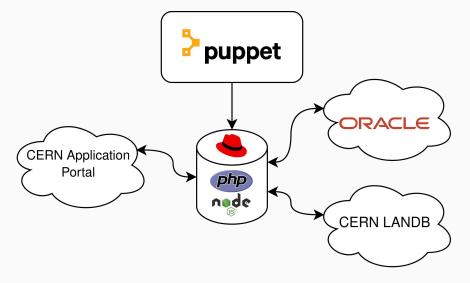
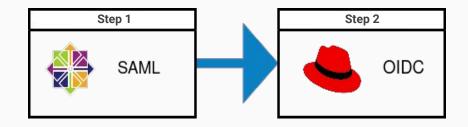
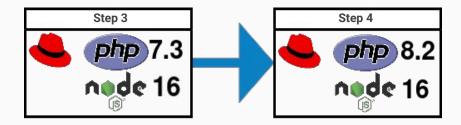


Fig 8: - Glance's VMs infrastructure

# **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
  - $\circ$  Validation







- 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

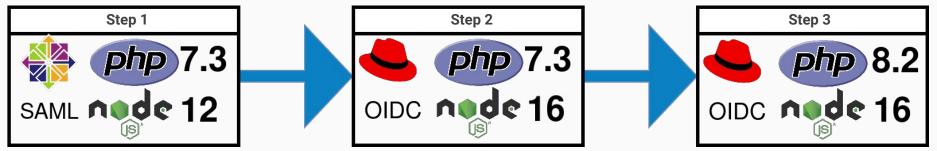


Fig 10: Deployment steps

- 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!