eBook

CloudBees in High-Performance Computing (HPC) Environment

CloudBees

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Introduction

Continuous integration, delivery, and deployment (CI/CD) make it easier for DevOps teams to deploy new resources in their environments quickly and accurately. It reduces manual steps via automation and facilitates standardization with pipelines. It’s no surprise that these methodologies and tools enjoy widespread adoption for managing enterprise-scale systems, such as High-Performance Computing (HPC) systems.

HPC environments need faster and more reliable deployments that leverage robust automation. This reduces error-prone manual operations and makes high-performance computing more accurate and cost-effective. The University of Boulder (UCB) has already demonstrated success with HPC systems, where they integrated tools commonly used for HPC systems with Jenkins-based CI/CD.

These tools included EasyBuild, Spack, Singularity, and Puppet. CloudBees, the premier CI/CD and DevSecOps platform, enables complex organizations to leverage the power of the HPC environment with greater integration, standardization, and faster deployments with critical security and monitoring capabilities.

Auditable and Standardized Pipelines

Pipelines sit at the heart of any CI/CD system, providing automation. However, when these pipelines are all built from scratch by different engineers in an HPC system, standardization and efficiency suffer from siloed duplicative efforts, resulting in cumbersome and complicated upgrades and audits.

CloudBees solves this with templates for building compliant pipelines, and role-based access controls (RBAC) for governing who can change or use them. It allows developers to standardize build, test, and deploy steps.

Every aspect of your pipelines is auditable and repeatable, with logs for all user activity, including both pipeline executions and configuration changes.

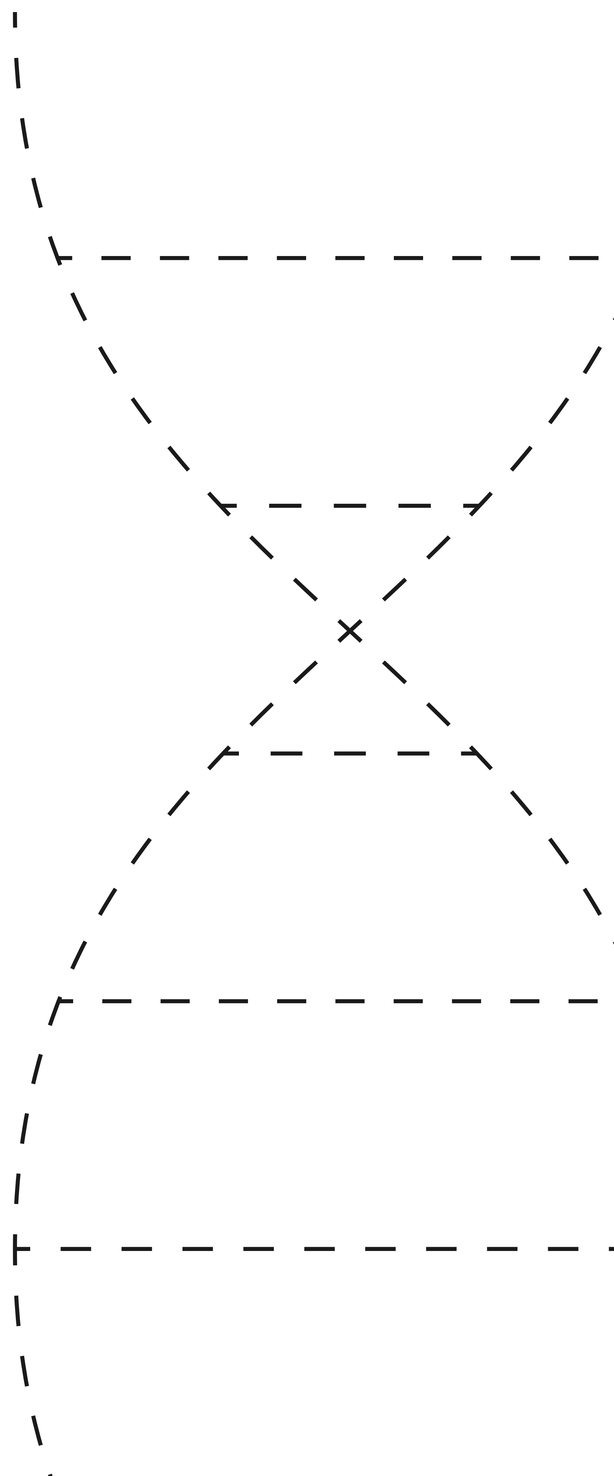
Entry and Exit Gates

Entry and exit gates mitigate the risk of automation by ensuring that build and deploy jobs can only occur when they meet specific criteria or gain the proper authorization.

Gates can be used to prevent changes from advancing to production without management approval, or, to verify that the developer tagged the change with the right information before it advances to the build stage. CloudBees supports manual and automated gates.

With manual gates, an approver must click a button before any pipeline advances to the gated step. Automated gates are opened or closed based on runtime information.

These gates can run procedures that query external systems or evaluate criteria for the job.



Centralized Security and Management

When controllers execute pipeline steps, they need credentials to check out code, commit changes, run builds, execute tests, deploy packages, and other activities required to get their jobs done. With CloudBees, administrators manage credentials from a central location.

This simplifies compliance with security regulations, encourages best practices, and enhances the system's overall security posture. CloudBees Platform's role-based access controls (RBAC) simplifies building sophisticated authorization models. It supports security roles and permissions for jobs and projects, as well as folders that make it easy to control access to jobs.

All these mechanisms are accessible from a centralized server and tie into your existing authentication systems with plugins for enterprise name services like LDAP (Lightweight Directory Access Protocol).

Supply Chain Security

Supply chain attacks are one of the most prevalent security concerns today. The rich plugin and integration ecosystem needed for a robust CI/CD pipeline needs protection from these attacks.

With the CloudBees Assurance Program, you can safely add and update plugins to maintain key integrations in your pipelines. The program is a rigorous vetting process that tests and verifies plugins are ready for the enterprise.

Only code that is stable, compatible with other plugins, and safe from attackers is available for installation on your site.

Real-Time Visibility with CloudBees Analytics

HPC administrators need insight into their pipelines and releases. This is especially important in a high-speed environment with extensive automation. They need a centralized view, with a single place to view release status, monitor workloads, and generate custom reports with a single click.

CloudBees administrators can build a customized view with multiple dashboards, where they can access reporting functions for scheduling, auditing, and tracking pipelines. These reports are audit-ready and are useful for monitoring release performance and value stream management.

With analytics tools tracking historical workload growth, HPC administrators can find patterns, anticipate capacity issues, and see unexpected spikes in demand, to avoid bottlenecks and prevent unplanned downtime.

Integration with HPC System Tools

HPC users require the latest updates to the applications they use for research and development. This software is often complex, so the systems use domain -specific tooling that addresses these needs, as well as mainstream packages for managing large-scale systems. When HPC system administrators look to adopt CI/CD, they need a platform that works with their existing tools.

CloudBees CI/CD for HPC Systems

As HPC software grows in scale and complexity, so does the need for rapid software delivery. DevOps teams must meet this demand without adding risk, so they need tools that will prevent faulty builds and deployments and don’t compromise security. The most effective way to achieve these goals is with centralized management, powerful automation, and continuous monitoring.

CloudBees provides these features and more, to strengthen your risk posture and improve the quality of the software you deliver to your clients.

Learn more cloudbees.com/get-started

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