

A Primer to Pharma DevOps

Empowering R Package Development with DevOps Workflows and Automation

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What is Pharma DevOps?

The PhUSE initiative establishes tailored DevOps workflows, empowering innovation through automation for reliable and efficient R package development.

Working Group Objectives

✍ Establish a knowledge base with tailored CI/CD workflows for R packages

🚀 Launchpad for researchers and developers, streamlining project initiation

⚡ Accelerate pace of pharma R&D

Automation for Scientific Innovation

- 🔧 Incorporating automation into R package development
 - 🗽 Liberating developers for scientific innovation in pharma R&D
 - 💪 Increased efficiency through automated processes
 - 🔬 Redirection of developer focus towards core scientific work
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Benefits of CI/CD Workflows

 Early issue detection through automated testing

 Enhanced code readability and reduced errors through formatting tools

 Automatic updating and versioning of documentation in CI/CD pipeline



Documentation of Best Practices

- 📖 Meticulous documentation for R package development
 - ✨ Adherence to best practices for efficiency and quality
 - 💻 Guide for developers to ensure industry-standard practices
 - ♻️ Promotion of work reproducibility and reliability
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Code Review & Version Control



Comprehensive code review checklist



Emphasis on version control using Git for provenance and traceability



Guidelines on branching strategies and commit message conventions



Collaboration best practices for effective code changes

Traceability Matrix, Validation Sign-Off Procedures

✚ Traceability matrix linking requirements, test cases, and code changes



Best practices for validation sign-off procedures within CI/CD pipeline



Efficient review and approval procedures for validation changes



Smooth transition from development to validation



Customizable CI/CD Workflows

-  Flexible workflows for diverse pharma R&D projects
 -  Empowering researchers to adapt DevOps processes
 -  Modular approach for adapting to unique challenges and requirements
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Environments as Code

🏗️ Customizing CI/CD workflow
using infrastructure-as-code
principles

🐳 Definition of reproducible
environments using tools like
Docker

✅ Addressing regulatory
compliance and infrastructure
considerations



Parallel Validation Environments

- 🏭 Supporting parallel validation environments for large-scale projects
 - ⌚ Reducing overall validation time and increasing workflow efficiency
 - 📦 Simultaneous validation of different aspects of the R package
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Future Implications

☁ Integration with cloud-based services

🤖 Integration with machine learning pipelines

📖 Integration with regulatory reporting

📁 Seamless deployment of R packages with machine learning models

Recommended Reading

"The Phoenix Project: A Novel About IT, DevOps, and Helping Your Business Win" by **Gene Kim, Kevin Behr, and George Spafford**

"The DevOps Handbook: How to Create World-Class Agility, Reliability, & Security in Technology Organizations" by **Gene Kim, Jez Humble, Patrick Debois, and John Willis**

"Accelerate: The Science of Lean Software and DevOps: Building and Scaling High Performing Technology Organizations" by **Nicole Forsgren, Jez Humble, and Gene Kim**

"Site Reliability Engineering: How Google Runs Production Systems" by **Niall Richard Murphy, Betsy Beyer, Chris Jones, and Jennifer Petoff**

Thank you!
