DevOps Practices for Pharma Study Traceability & Reproducibility

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Traceability & Internal Reproducibility of Study Results is Critical for Research Integrity

“Which version of the results did we send to stakeholders?”

“What would happen to the results if we just changed one small parameter?”

“It worked when I ran it.”

“Why did this number in the results change from last time?”

“Where did the prior version of results go?”

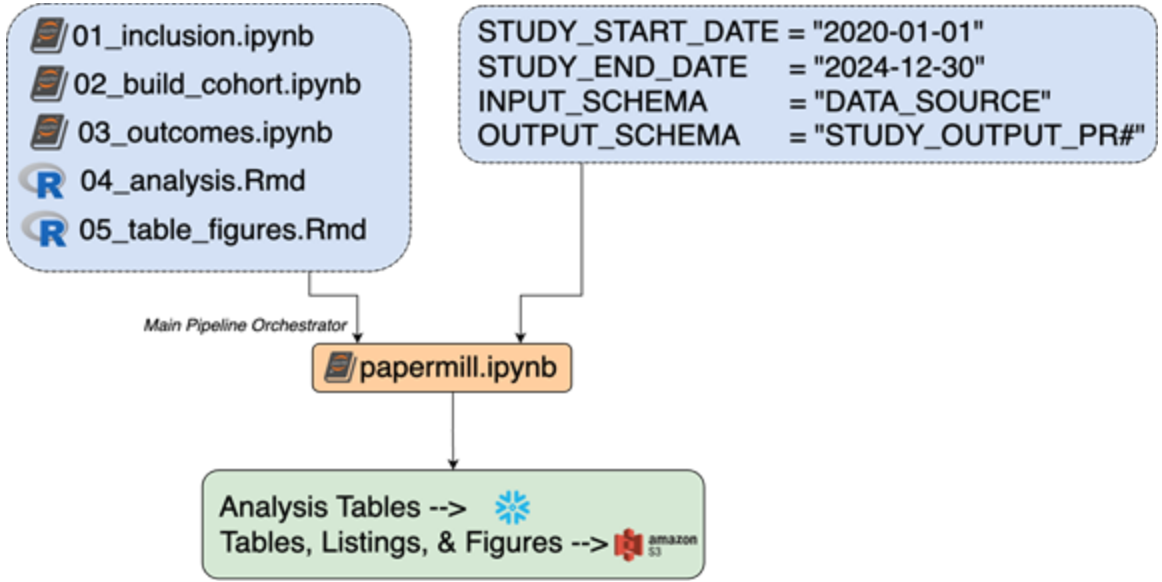
DevOps

- Improve speed & reliability of product delivery
- Automate testing & deployment
- Monitor pipelines & infrastructure

Study Programmer

- Write analysis code
- Discuss study details with study team
- Interpret study results
- Validate outputs

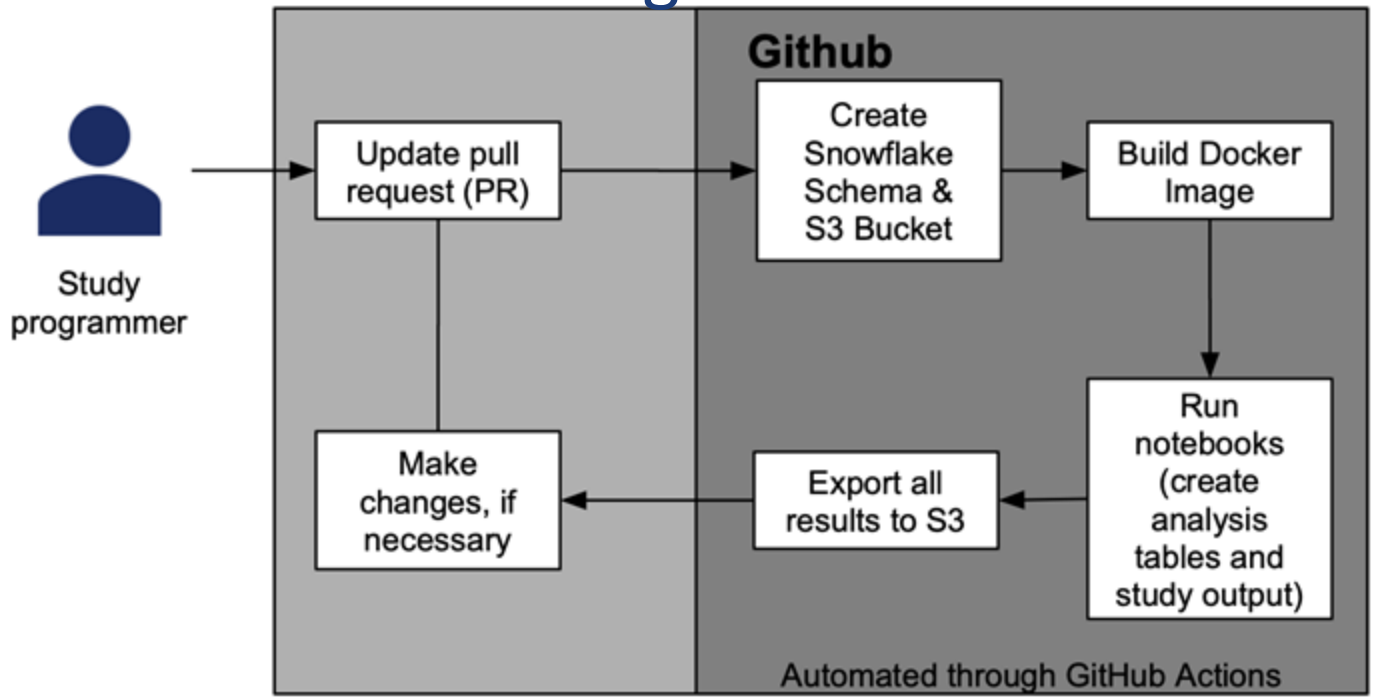
CI/CD Study Execution Using Papermill



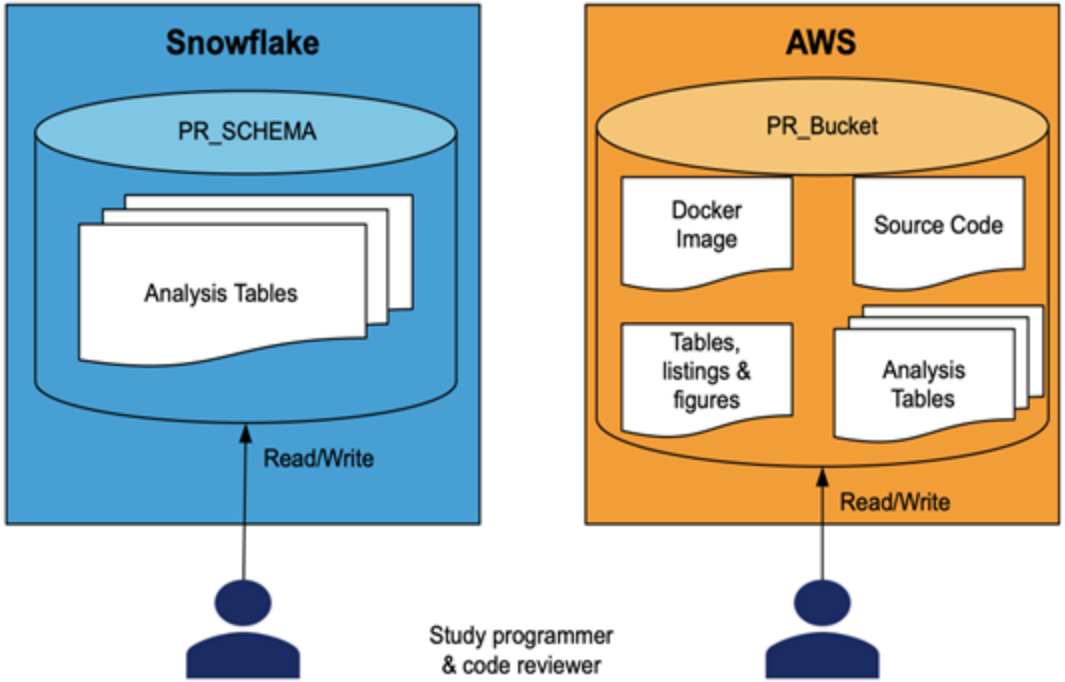
CI - Continuous Integration

- Incrementally & collaboratively work on a project
- Keeps code in a reliable, deployable state
- Pull Requests (PRs) protect us from harmful changes
- Automation treats all code changes the same, ensuring highest quality
- Trace results back to the exact code change and PR

CI - Continuous Integration



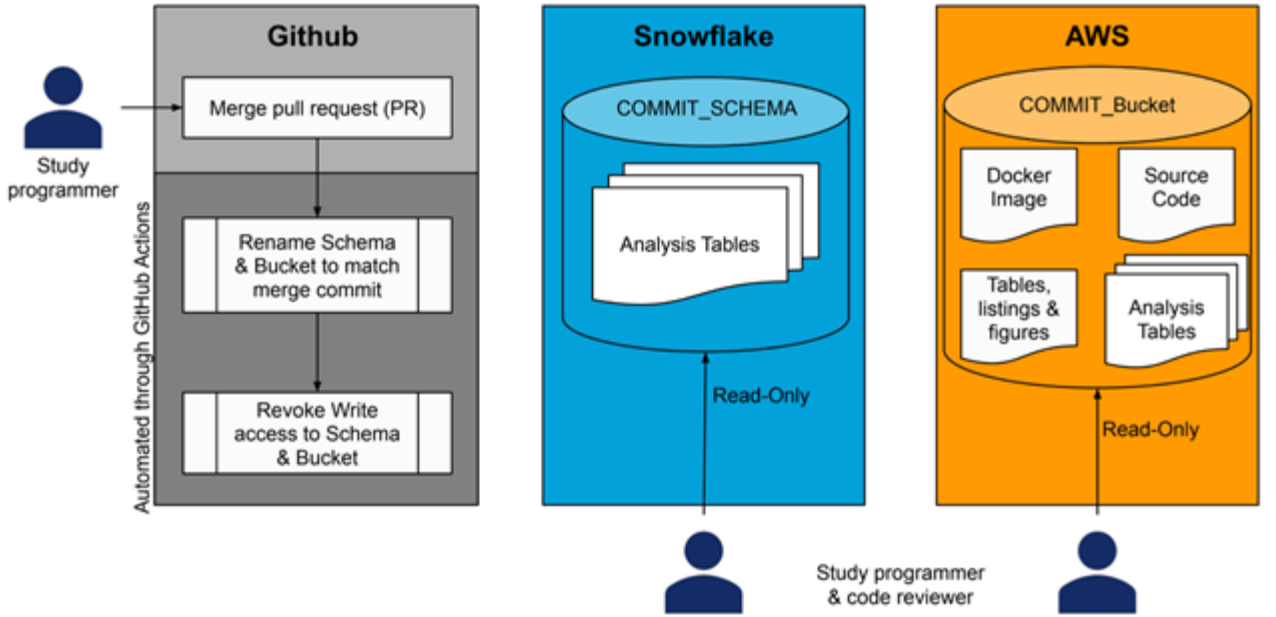
CI - Continuous Integration



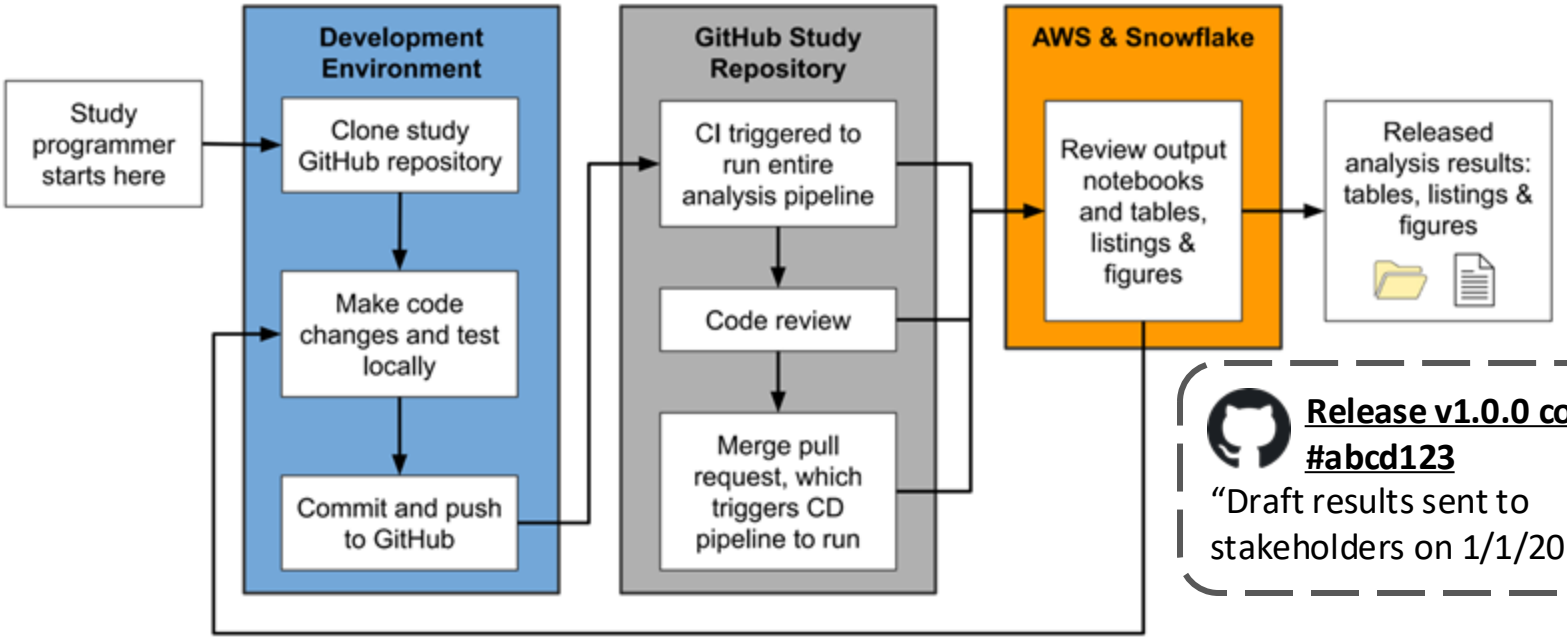
CD - Continuous Delivery

- Delivery of final product that is ready for release
- Software deployments and archival stage
- CI checks prevent PRs from merging before they’re ready

CD - Continuous Delivery



Analyst's Workflow



Limitations & Challenges

- Connecting multiple technologies
- Python & R with just Papermill
- Team collaboration

Conclusion:

CI/CD helps ensure reproducibility & traceability

- Structured analysis pipelines run consistently in isolated environments
- Outputs directly linked to the version of code that created them
- All outputs & code are archived at every code change
- Intra-team collaboration between DevOps & Study Programmers

Questions?

Integrating Collaborative Programming with Automated Traceability and Reproducibility in Pharma Studies and Real-World Data projects by Adapting DevOps Best-Practices

https://github.com/graticule-life/PharmaSUG-DevOps-for-Pharma

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