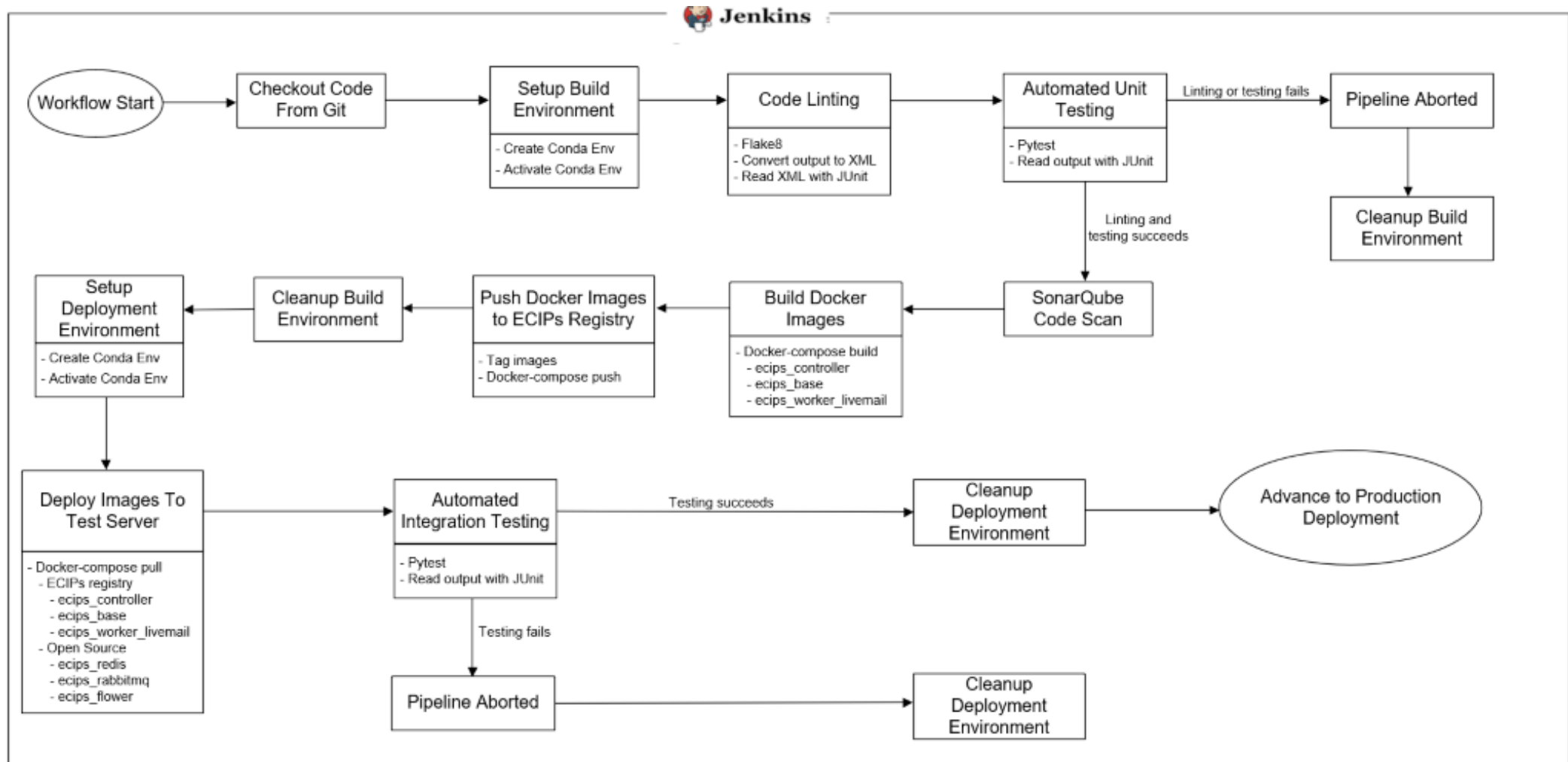# ECIP Continuous Integration/ Continuous Delivery (CI/CD) Demo

USPS Engineering

5/11/2019

DevOps Workflow

Setup Build Environment

- Conda virtual environment leveraged for build process steps such as
  - Code Linting
    - Highlights syntactical and stylistic problems in Python source code
    - Leverages the Flake8 Plugin for checking against standard rulesets such as pycodestyle, pyflakes and mccabe
  - Unit Testing
    - Method level testing of source code leveraging PyTest and Coverage.py for automated unit testing
    - Tests the smallest piece code that can run independently from other parts of the system
  - Integration Testing
    - Testing of aggregate system functionality that is a collection of individual system components and source code pieces.
    - Exercises application endpoints to test aggregate API behavior and interfaces

SonarQube Scan

- Utilized to perform Static Application Security Testing (SAST) based on SonarSource Python Rulesets
- Security Issues such as vulnerabilities and hotspots based on industry standards such as CWE, SANS Top 25 and OWASP Top 10
    - Vulnerabilities are confirmed security problems needing fixes
    - Hotspots are potential security issues requiring manual code review
- Bugs – Issues related to operational risks or unexpected behavior
    - Critical programming errors leading to failures at runtime.
- Code Smells – refers to low priority issues related to maintainability of code.
    - Includes checks for modularity, understandability, changeability, testability and reusability

Docker Integration

- Pipeline builds Docker images of software based on successfully built and tested code

- Images tagged and published for deployment to Harbor.io Docker Registry following successful authentication.
  - Harbor registry performs vulnerability scan of published images
  - Also prevents deployment of vulnerable images

- Images are tested by deploying software to test server and running automated integration tests

Next Steps

- Steps for further operationalization of Jenkins
  - Webhook from Github to trigger new builds
  - Email notification to developers with feedback from stages
  - Improving version of registry images within Docker registry
  - Publishing of reports to a Wiki site
  - Kubernetes integration (deployment and integration testing)