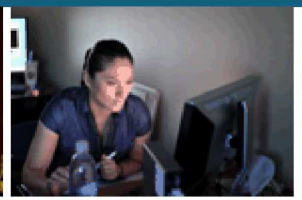
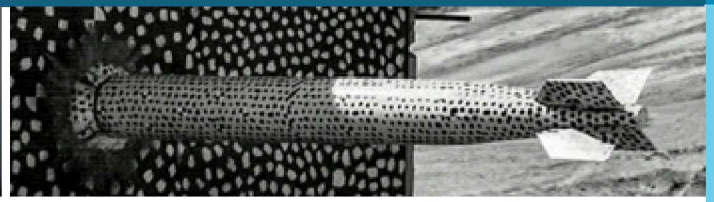
SAND2020-11024C

Empowering Developers with EPIC Pipelines





Presented By:

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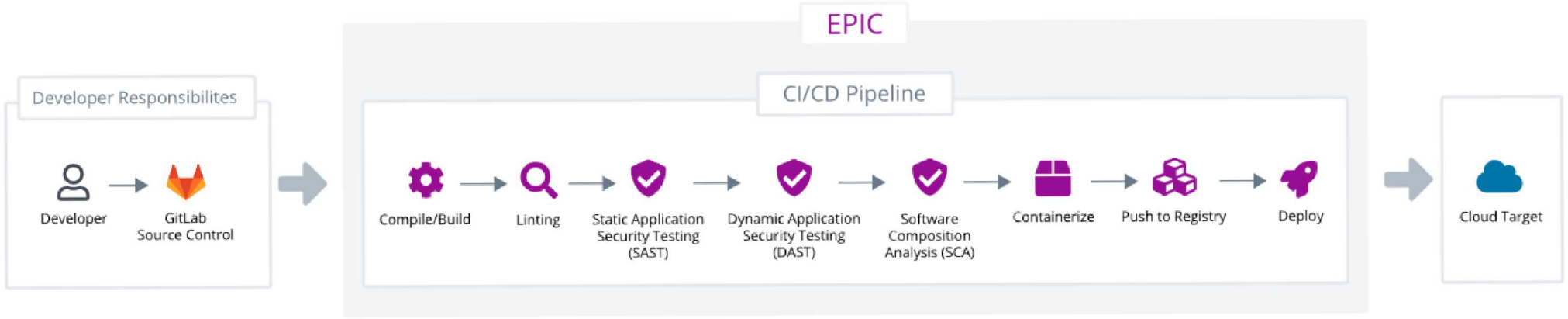
What Is EPIC?

- A set of standardized CI/CD Pipeline
- Developer tool that simplifies CI/CD at Sandia
- An opinionated view on certain CI/CD steps
- A tool that helps applications get to production faster, more secure, and with high quality.
- Learning tool

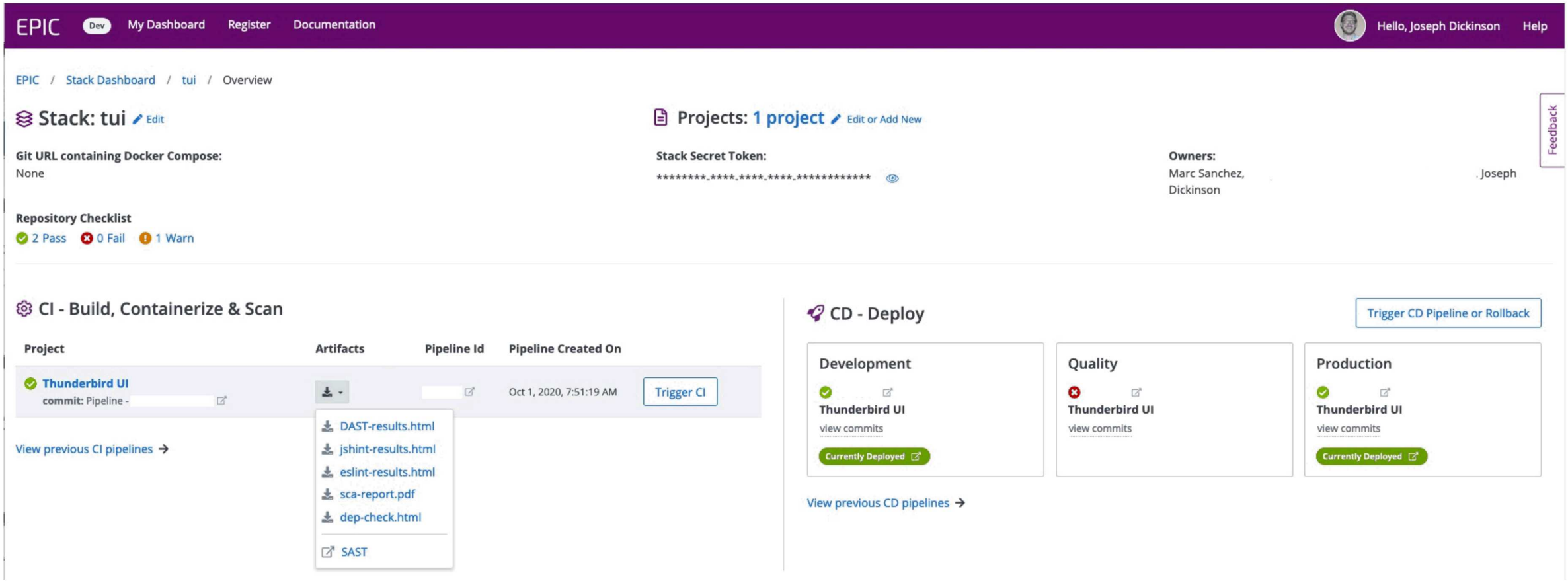


The Problem EPIC solves

- Getting pipelines set up is hard
- Getting tools access is hard (and expensive)
- Need to be a sys-admin to do anything on underlying machines
- Choosing tooling is difficult

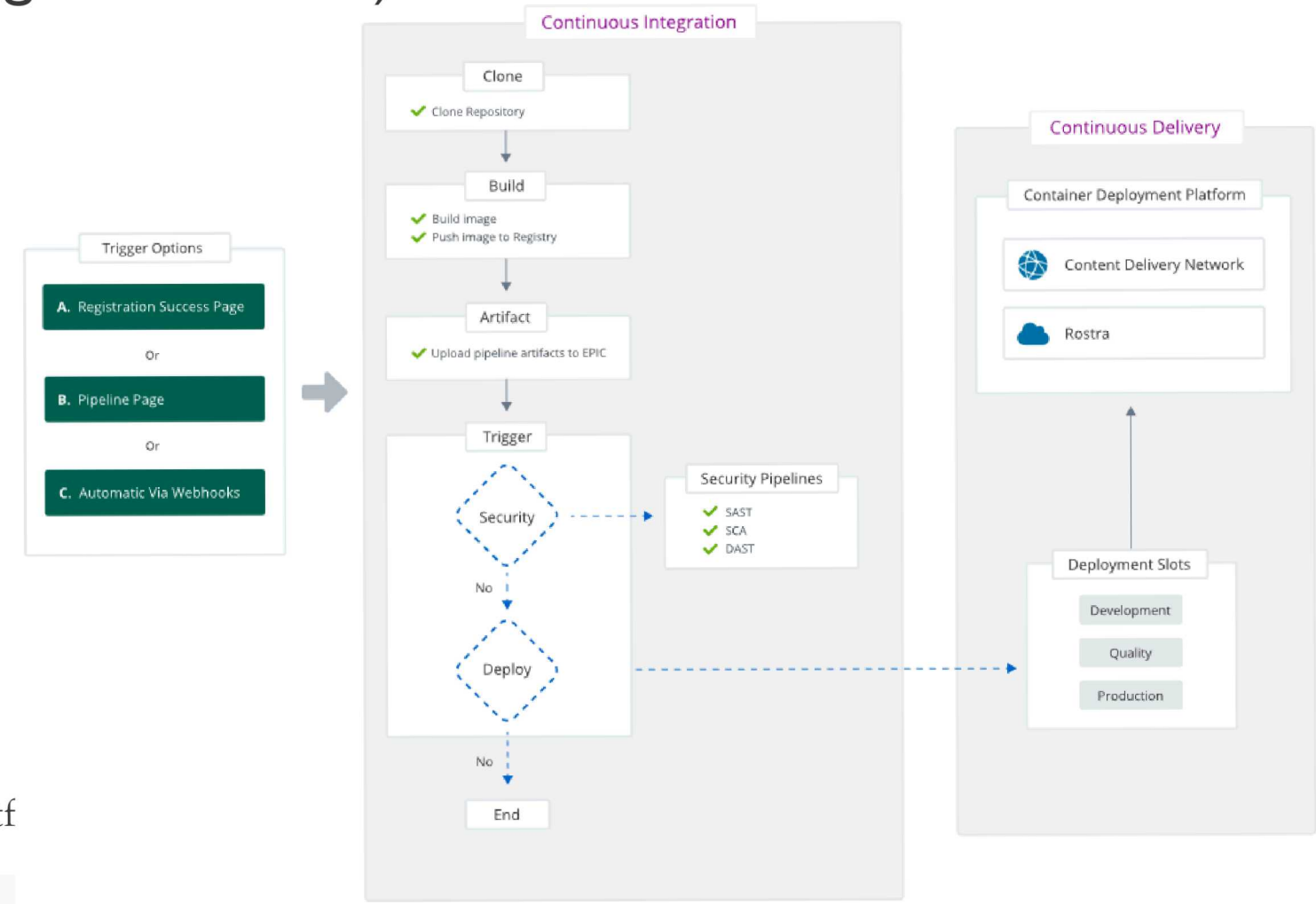
What separates EPIC from other CI/CD platforms?

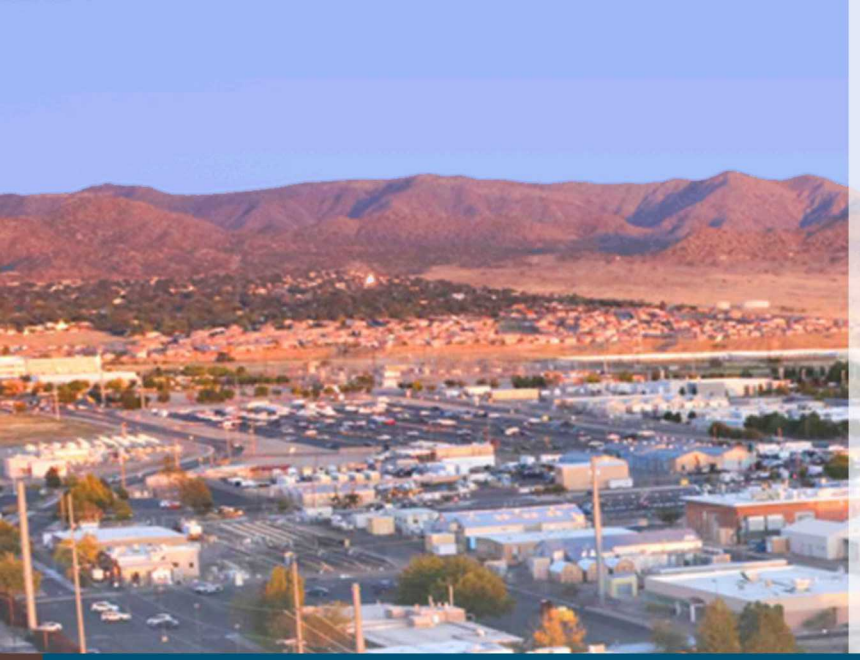
- Standardization of tools
- Low barrier to entry for customers
- Built to be in line with SNL target architecture
- Integrates with SNL container hosting platforms



How does it work (high level view)

- Register
- Kickoff build pipeline
  - Clone repo's
  - Build with Dockerfile
  - Trigger other pipelines
    - SCA
    - Image Scanning
    - SAST
    - DAST
    - Deploy to container hosting platf





Security Tools

SCA – Software Composition Analysis

- OWASP Top 10 Web Application Security Risks
  - #9 – Using Components with Known Vulnerabilities
- Looks at the packages utilized in an application and scans for known vulnerabilities
- Utilize National Vulnerability Database and proprietary databases to match packages to vulnerabilities
  - https://nvd.nist.gov/
- Will usually offer guidance on how to resolve the vulnerability
  - Update package
  - Stay away from a known piece or function that is vulnerable
  - Change dependencies altogether

Image Scanning

- Evolution of SCA that takes a containerized image and scans it for known vulnerabilities
- Can identify vulnerabilities in OS-level dependencies
  - SCA tools will only look at the deployable application, not how it's deployed
- Also identify common bad practices with running containers
  - Running as root
  - Running without health checks

SAST – Static Application Security Testing

- Looks at the application's source code to identify security errors made by the developers
  - Using an insecure cryptographic algorithm
  - Using unsafe input validation
- Some of these tools will also call out places to be careful in the code
  - A small syntax error or incorrect function could cause a vulnerability
- Like SCA, will usually provide remediations
  - Use a similar, more secure function
  - Use input validation on user-controlled input

DAST – Dynamic Application Security Testing

- Tests against the full application stack by supplying malicious inputs
  - Works like an automated penetration tester
- Can find vulnerabilities that may be impossible with SAST or SCA alone
  - Cross-site Scripting
  - SQL Injection
  - Data Exposure
- Generally requires some work by developers to help the tool navigate the application
  - Can be done fully automatically, but tools have a hard time with different authentication methods

Key Principles

- Provide users with security relevant information early and often
  - Don't wait until the code is moving to production to run security tests
- Don't break builds on found vulnerabilities
  - Other processes in place to ensure quality + security in production
- Tools may evolve over time
  - Keep the same categories of security tests without relying on a specific vendor

Q&A