Leveraging **SBOMS** to Automate Packaging, Transfer, and Reporting of Dependencies Between Secure Environments

CloudNativeSecurityCon

PRESENTER

Ian Dunbar-Hall

Jerod Heck

DATE

Feb 2nd 2023

Introductions

Ian Dunbar-Hall

Lockheed Martin Software Factory Chief Engineer

Jerod Heck

Lockheed Martin Software Factory Product Architect

Hoppr™

Premise

Common Practice

- SBOMS are often a build artifact and used for compliance or tracking

Consider SBOMs as a packaging definition or interface

- What if it were used to package dependencies instead of just an artifact?
- It becomes a package type independent method for defining dependencies

Problem

It sucks being a developer in disconnected strict environments!

- Slow to get packages approved
- Slow to get package updates
- Way too much paperwork
- Lots of “rinse and repeat”

Is there a way to …

- Automate the patching, compliance, and delivery of build dependencies to ”strict environments”?
- Can this be done using existing tooling?
- Can this be automated for multiple teams in a single dataflow?
- Can many artifacts be collected from many different sources at once?

Hoppr™

- **Hoppr™** is a framework for defining, validating, and transferring dependencies between environments using **Software Bill of Materials (SBOM) Open Source Standards**.
- **Hoppr™** is a solution for delivering a well-defined, repeatable bundle to secure environments combating customer problems with digital asset delivery.

Leveraging Other Excellent Projects

Automate Dependency Updates

- **Renovate** detects updates to packages, container images, and other projects in gitlab.

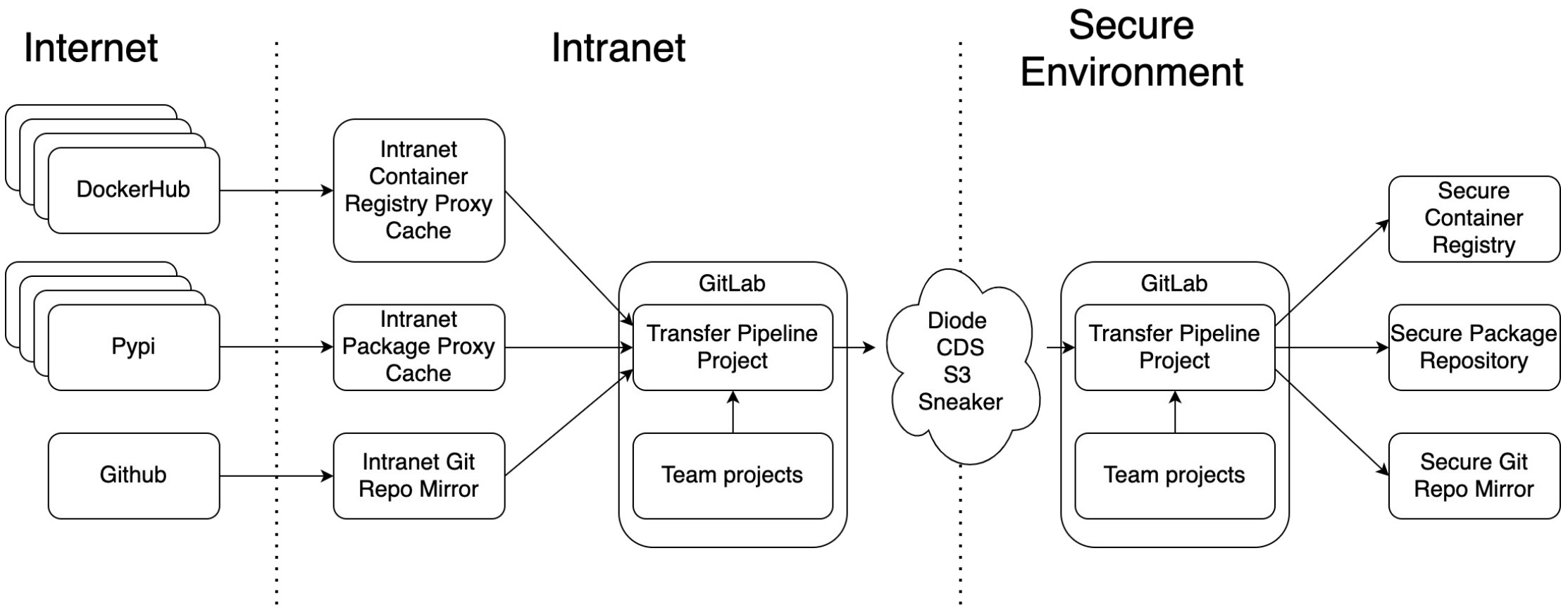
Semantic version generate

- **Semantic Release** used to create semantic versioned releases based on conventional commit messages

When pair together, you have the ability to create semantic versioned SBOMs which are updated automatically with dependency updates.

Hoppr™ consumes these semantic versioned **SBOMs** to collect, validate, and delivery of “stuff” to a strict environment. Since these updates are triggered by renovate, this results in a continuous delivery pipeline.

Dataflow


Internet
Intranet
Secure Environment
DockerHub
Pypi
Github
Intranet Container Registry Proxy Cache
Intranet Package Proxy Cache
Intranet Git Repo Mirror
GitLab
Transfer Pipeline Project
Team projects
Diode CDS S3 Sneaker
GitLab
Transfer Pipeline Project
Team projects
Secure Container Registry
Secure Package Repository
Secure Git Repo Mirror

Multiple teams, Single Process

Renovate Maintains:

- Upstream “patching” of build dependencies
- Hoppr included project changes

Semantic Release
provides semver of internal products

Diagram
showing multi-team workflow

Hoppr Machine

Hurdles

- **Incomplete SBOM metadata for security approvals**
  - Lack of tooling or incomplete BOMs
- **Generate** compliance documentation in custom formats
- **Legacy** approval processes
- **Ability to restrict** source repositories
- **Ability to detect** new packages in partially connected networks to address security patching
- **Ability to automate** collection of build dependencies in a consistent manner across teams
- **Delivery** into environments with one way connectivity

Advantages

- Reproducible Releases
- Continuous detection of patched dependencies push to an disconnected environment
- All components entering disconnected environment are tracked using **CycloneDX SBOMs** which can be leveraged by other opensource tooling **(like DepdencyTrack!)**
- **Hoppr™** provides process for augmenting **SBOMs** with additional data
  - Vex CVE
  - Attestation creating from collection and reports
- No manual interaction

Demo Features

- Show dependencies between teams and projects
- Show CVE report with Hoppr-cop
- Attestation creation
- Show tar bundle

Hoppr™

Demo

Located in
gitlab.com/hoppr/examples

[Gitpod Demo]

Future

- **Unified Report Generation**
- **Expand component validation**
  - Signature validation with rekor
  - Attestation validation with in-toto
- **OpenSSF ScoreCard SBOM augmentation**
- **Unbundling and installation on disconnected networks**
- **In-Toto Secured Digitally Attested SBOM (its-da-(s)bom)**
  - An in-toto attestation implementation for SBOMs

Hoppr™

Shout Outs

Inspiration

- Sigstore

Communities we engage in

- CycloneDX
- In-toto

Other interesting projects in this space

- Zarf – DefenseUnicorns
- Witness – TestifySec

Hoppr™

Questions?

Hoppr.dev