DevSecOps, day 3

2. Lab: End to end testing

Get the test suites

- On your Dev Workstation, clone via https:
  - https://github.com/unixerius/selenium-juiceshop

- The test suite defaults to local testing.
  - It runs Selenium and JuiceShop in Docker.

Preparing the tests

- Using "*docker ps*",
  - Check that JuiceShop is not running locally.

- "*cd*" into "*selenium-juiceshop*" and run:

```
$ docker-compose -f docker-compose-v3.yml up
```

On Apple ARM, use docker-compose-arm.yml !

Preparing the tests

- Once Docker Compose is ready,
  - Visit http://localhost:4444
  - This should show Selenium Grid UI,
  - ... with zero queued jobs and two browsers.

- Also test that http://localhost:3000 *does* work now.

Run the test

- In another terminal (tab),
  - Inside the "*selenium-juiceshop*" repo,
  - Run:

```
$ mvn test
```

The results

- During the test, you can also watch the browser!
  - In Selenium Grid, go to sessions and click the camera.
  - The password is "*secret*".

- Hopefully, the tests will report that all's okay,
  - Or maybe 1-3 tests fail.

Run this against Azure?

- You can!
  - In file "*JuiceShopTests.java*",
  - Change the "websiteLink" variable,
  - to https://unixeriusdso-team1.azurewebsites.net

- Adjust "team1" to your own team.

Breaking down the lab

- Run:

```
$ docker-compose -f docker-compose-v3.yml \
  down
```

- ... or <ctrl><c> on the running instances.

2. Lab: More E2E testing

Cypress

- For now, this lab does not work on ARM / *aarch64.*
- Cypress is another Unit and E2E testing tool.
  - Cases are written in JavaScript.

- The Juice Shop team write their tests in Cypress.
  - See the "*test/cypress/*" dir in our Git repo.

Running the tests

- Make sure JuiceShop is running locally.
- Then run:

```
$ cd ~/Team1JS
$ npx cypress run --config video=false
```

Running the tests

- With a GUI you can watch the browser.
- You can create a video by setting "video" to true.
  - They appear in "cypress/videos" in the repo.

```
$ cd ~/Team1JS
$ npx cypress run --config video=true
```

Cypress in the pipeline

- It's nicer if we don't have to bog our PC down.

- Let's run Cypress tests in the pipeline.
  - Sample code: pipeline-step1b-build-test-run.yml

- Test results can be published even nicer.

5. Lab: Software Comp. Analysis

Different security tests

- Software composition
- Secrets Detection
- SAST, static analysis of code
- DAST, dynamic analysis of running app
- Pen-testing
- ... and more.

NPM and OSV

- We will use two different tools to test SCA.
  - The "NPM" built-in audit option,
  - The Open Source Vuln DB scanner.

- Many alternatives are possible.
  - Snyk is popular.

NPM audit

- As developer you can run this locally:

```
$ cd ~/Team1JS

$ npm audit
```

NPM audit

- Azure DevOps needs a specific setup (source).
- Can be done with the NPM plugin, or with Bash.
- Runs the NPM built-in SCA checks.

- Sample code is available: pipeline-step2-SCA.yml

OSV Scanner

- As developer you can run this locally:

```
$ cd ~/Team1JS
$ npm install        # Already done, right?

$ docker run --rm -it -v ${PWD}:/src \
ghcr.io/google/osv-scanner \
-L /src/package-lock.json
```

OSV Scanner

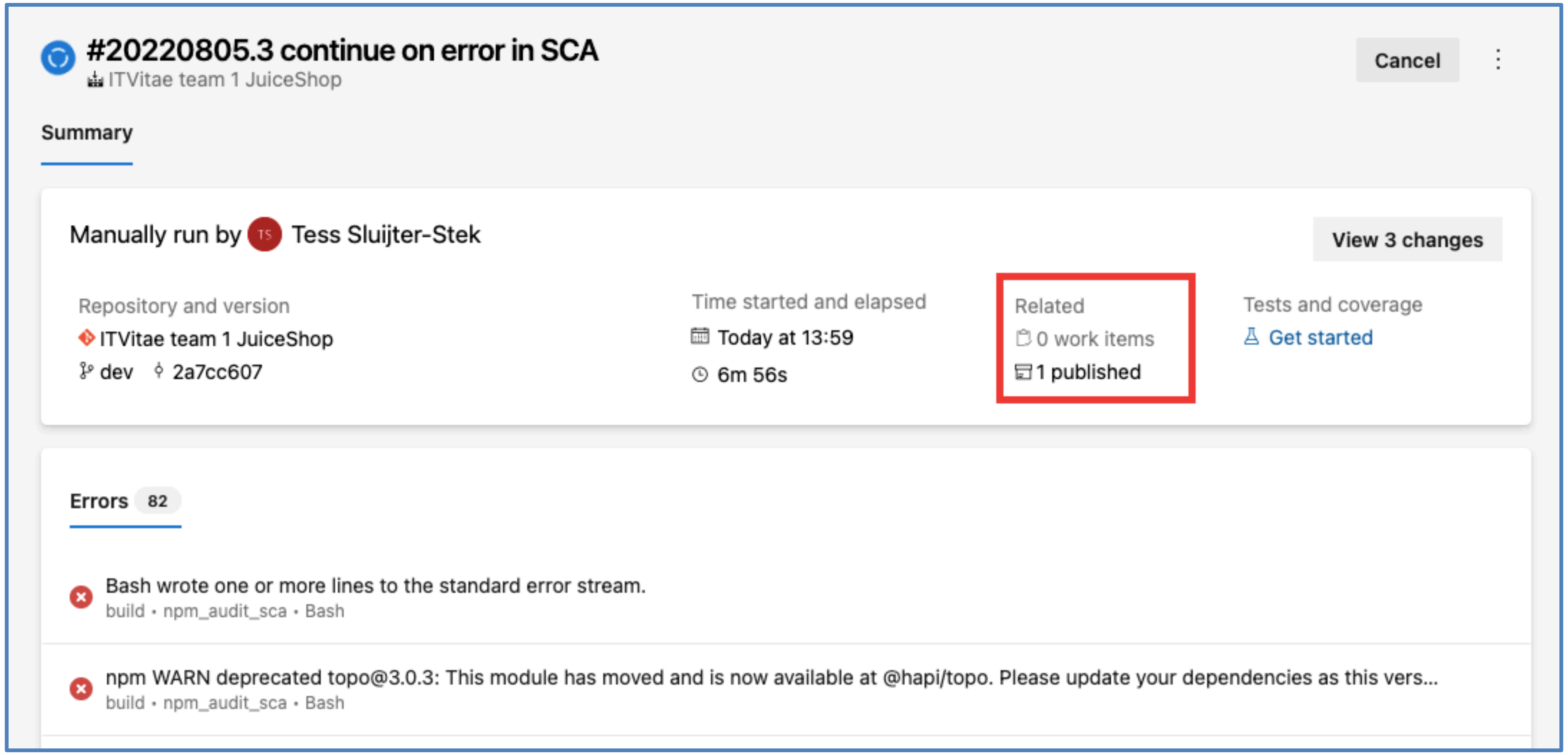
- Does not use the NPM built-in scanner.
  - Can be used as a standalone binary, or via Docker.
  - We can run the Docker-based scan in the pipeline.

- Sample code is available: *pipeline-step2-SCA.yml*

See: Using OWASP Dependency Check

Reports

- After the run, the reports should be downloadable.



#20220805.3 continue on error in SCA

ITVitae team 1 JuiceShop

Manually run by TS Tess Sluijter-Stek

Repository and version
ITVitae team 1 JuiceShop
dev 2a7cc607

Time started and elapsed
Today at 13:59
6m 56s

Related
0 work items
1 published

Tests and coverage
Get started

Errors 82

Bash wrote one or more lines to the standard error stream.
build • npm_audit_sca • Bash

npm WARN deprecated topo@3.0.3: This module has moved and is now available at @hapi/topo. Please update your dependencies as this vers...
build • npm_audit_sca • Bash

Any differences?

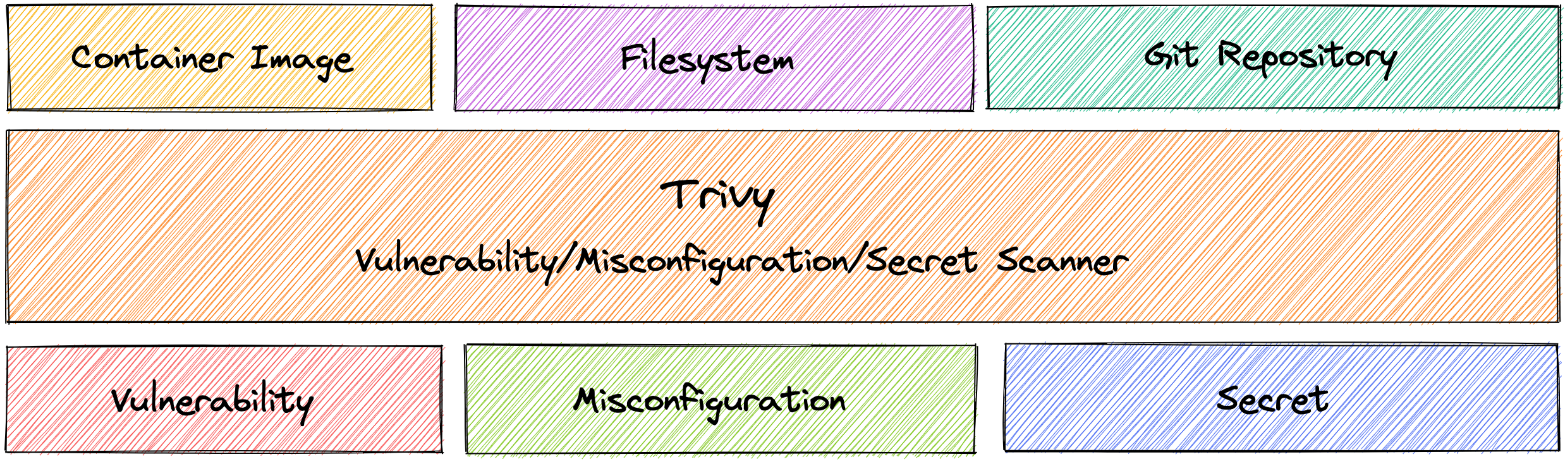
- OSV scans many languages and platforms.
- Both offer JSON and other output formats,
- Both offer flexible configuration.

- There is no single, right choice.

6. SCA for container images

Trivy: another SCA approach

- Trivy is a cool tool, with lots of functionality!
  - Container images, configs, secrets, deps and libs



See: [Trivy documentation]

Trivy

- As developer you can run this locally.
  - Here we use the public image, for demonstration.
  - Normally you use your own image.

```
$ docker run aquasec/trivy \
image bkimminich/juice-shop:v15.0.0
```

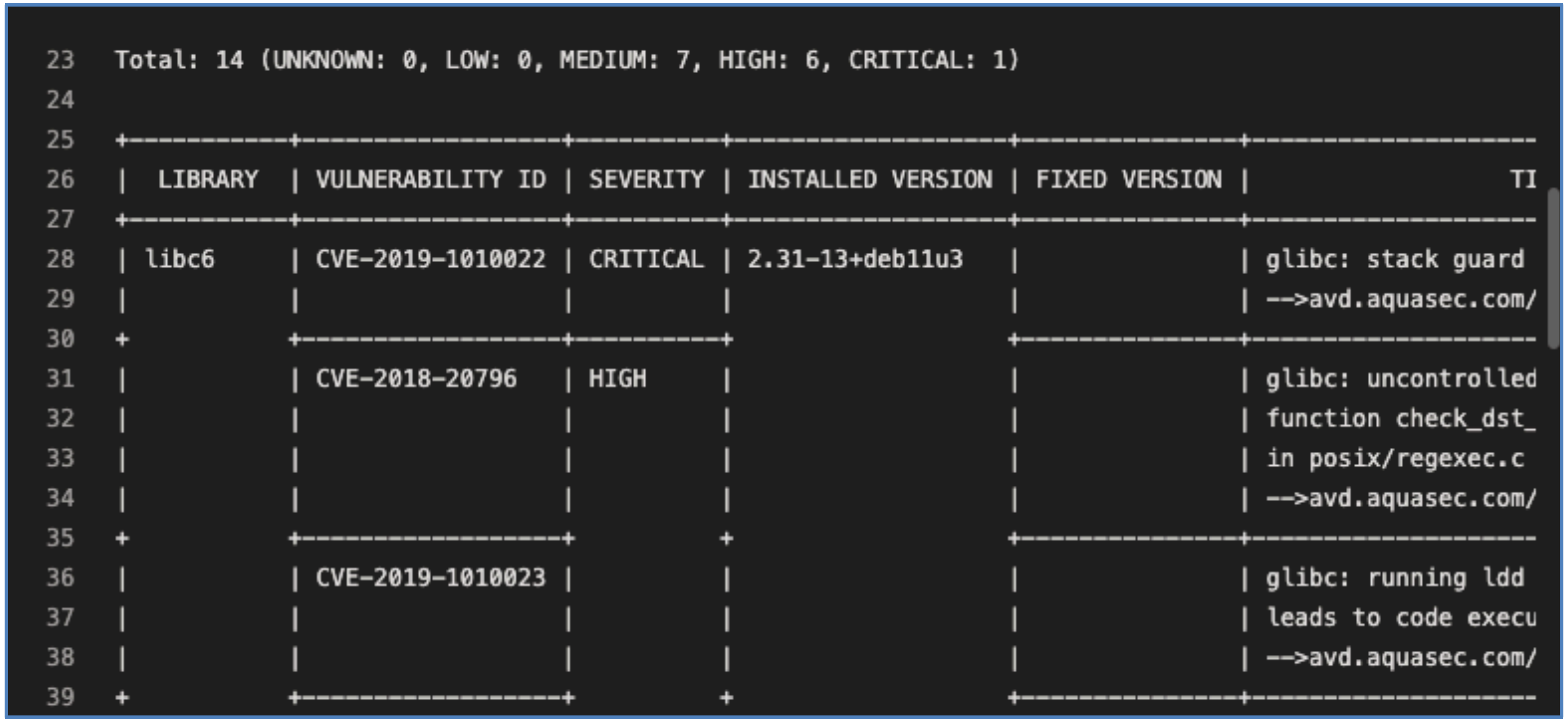
Adding Trivy

- Trivy can scan local directories, but also
  - Container images, local or on a repository.

- There's a sample pipeline: pipeline-step3-trivy.yml

Reports

- The sample makes JSON, but there's also tables.



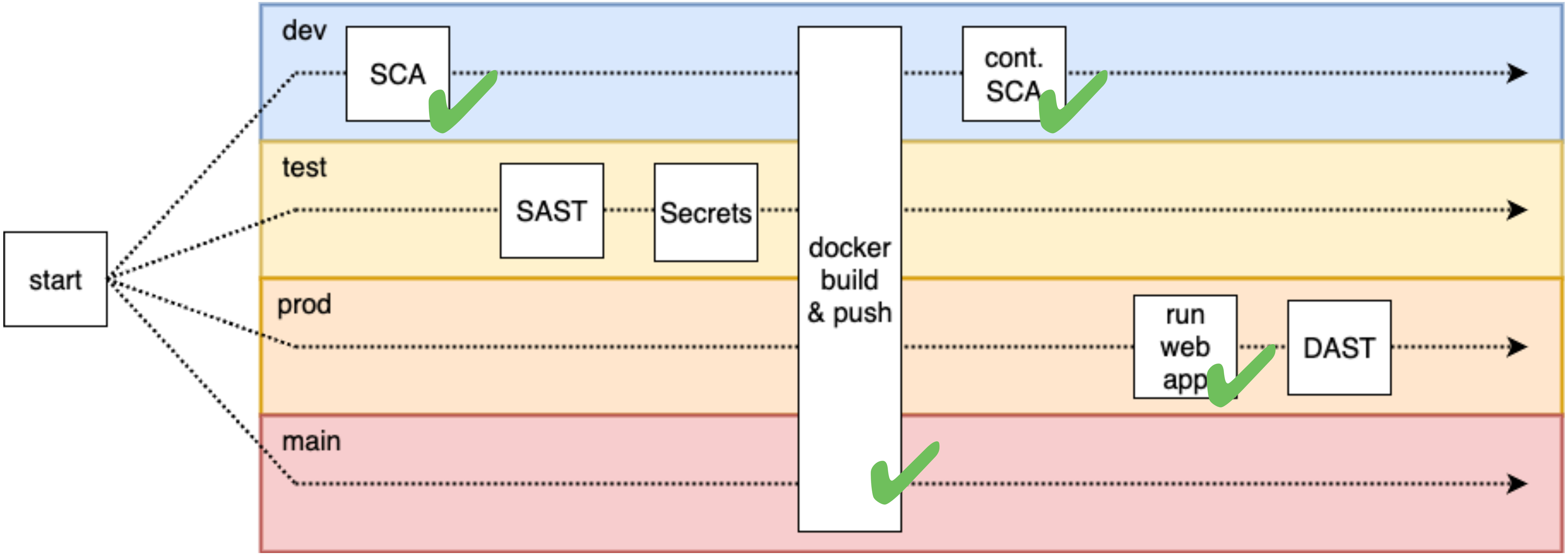
```
Total: 14 (UNKNOWN: 0, LOW: 0, MEDIUM: 7, HIGH: 6, CRITICAL: 1)

+-----------+------------------+----------+-------------------+---------------+--------------------
|  LIBRARY  | VULNERABILITY ID | SEVERITY | INSTALLED VERSION | FIXED VERSION |                  TI
+-----------+------------------+----------+-------------------+---------------+--------------------
| libc6     | CVE-2019-1010022 | CRITICAL | 2.31-13+deb11u3   |               | glibc: stack guard
|           |                  |          |                   |               | -->avd.aquasec.com/
+           +------------------+----------+                   +---------------+--------------------
|           | CVE-2018-20796   | HIGH     |                   |               | glibc: uncontrolled
|           |                  |          |                   |               | function check_dst_
|           |                  |          |                   |               | in posix/regexec.c
|           |                  |          |                   |               | -->avd.aquasec.com/
+           +------------------+          +                   +---------------+--------------------
|           | CVE-2019-1010023 |          |                   |               | glibc: running ldd
|           |                  |          |                   |               | leads to code execu
|           |                  |          |                   |               | -->avd.aquasec.com/
+           +------------------+          +                   +---------------+--------------------
```

Checkpoint!

- Does everyone have:
  - A pipeline on the "dev" branch.
  - Which runs Trivy and NPM?

- Have you tested this?

Our final pipeline goal



Our "bingo" card

DevOps	Intro	Work IRL	AzDO	SDLC	Juice!	
DevOps	Agile	Git	Virtual	Contain	CI/CD	
DevSecOps	App test	DSO	Vulns	SCA	TModel	
DevSecOps	SAST	AI / LLM	Secrets	PROD		
DevSecOps	VulnScan	Pentest	DAST	WAF		

Closing

Tomorrow

- Static Analysis Security Testing (SAST)
- Secrets detection
- Dynamic Analysis Security Testing (DAST)

Relevant reading

Topic	Book
Security and requirements	Ch 5
Code review	Ch 10
External reviews, testing and advice	Ch 12

Reference materials

Resources

- Atlassian - Types of software testing
- About Selenium
- Writing your first Selenium test script
- FIRST CVSS 3.1 Calculator
- CISA KEV catalog
- Software Composition Analysis (in-depth)
- Automate dependency updates with Renovate
- Renovate Github

Resources

- Computerphile - 'Forbidden' AI technique
- "Why developers hate information security"
- How we got hit by Shai Hulud
- [SH] compromises global software supply chain
- TARmageddon

Resources

- The threat modelling field guide
- The threat modelling manifesto
- PluralSight learning path: threat modelling
- PDSO certified threat modelling professional
- Crowd sourcing the creation of persona non-grata
- Nixu CyberBogies (PnG cards)