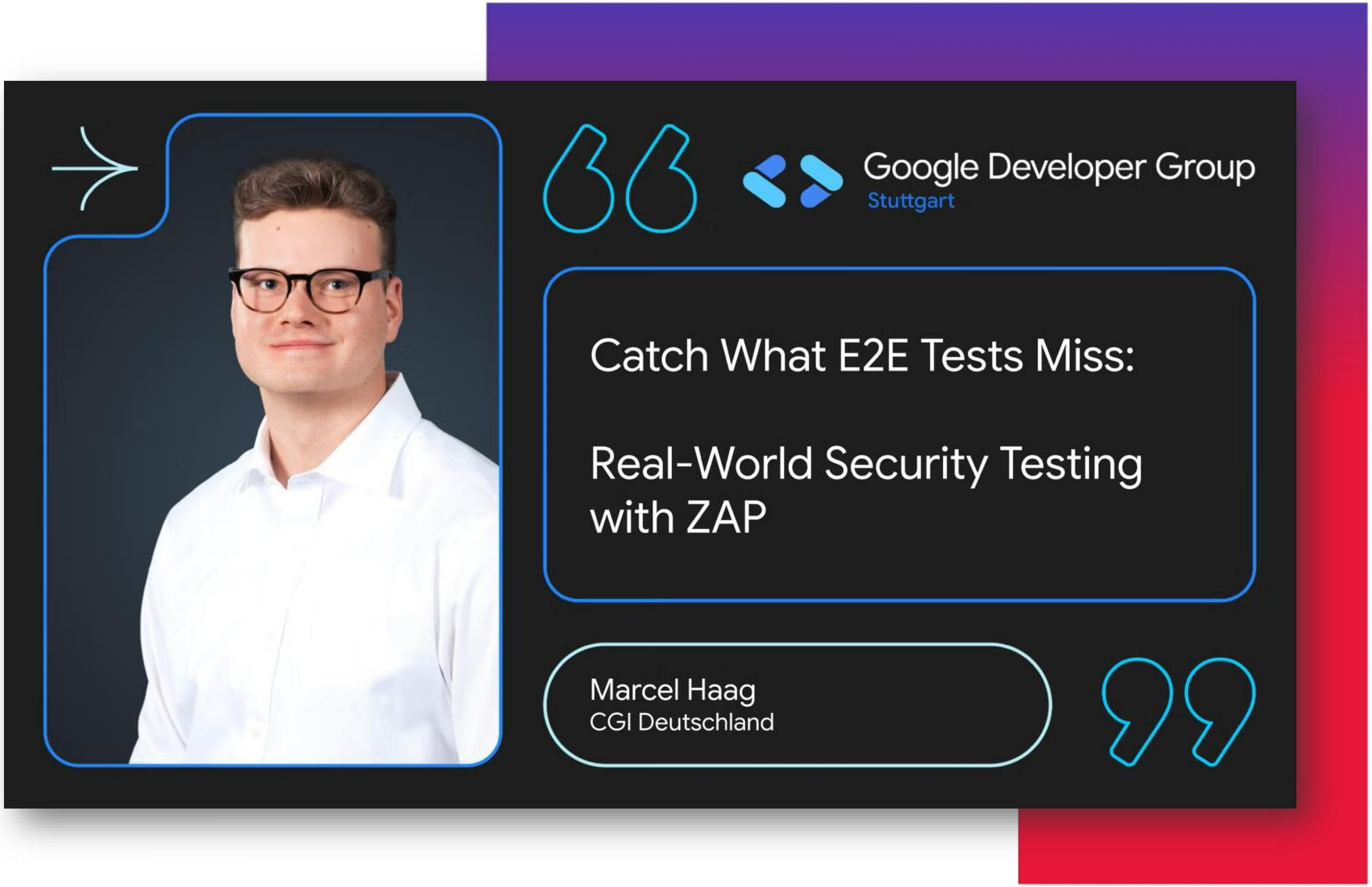
Event

Security Meetup:

Catching Vulnerabilities & AI-Driven DevSecOps

Google Developer Group
Stuttgart

22 January 2026



Google Developer Group
Stuttgart

Catch What E2E Tests Miss:

Real-World Security Testing with ZAP

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CGI
22.01.2026

Agenda

1 Introduction: Testing Pyramid & DevSecOps Tooling

2 Why E2E Tests are not enough

3 Introducing DAST in the SDLC

4 ZAP - *One Proxy to attack them all*

5 CI/CD Integration with GitHub Actions + **Demo**

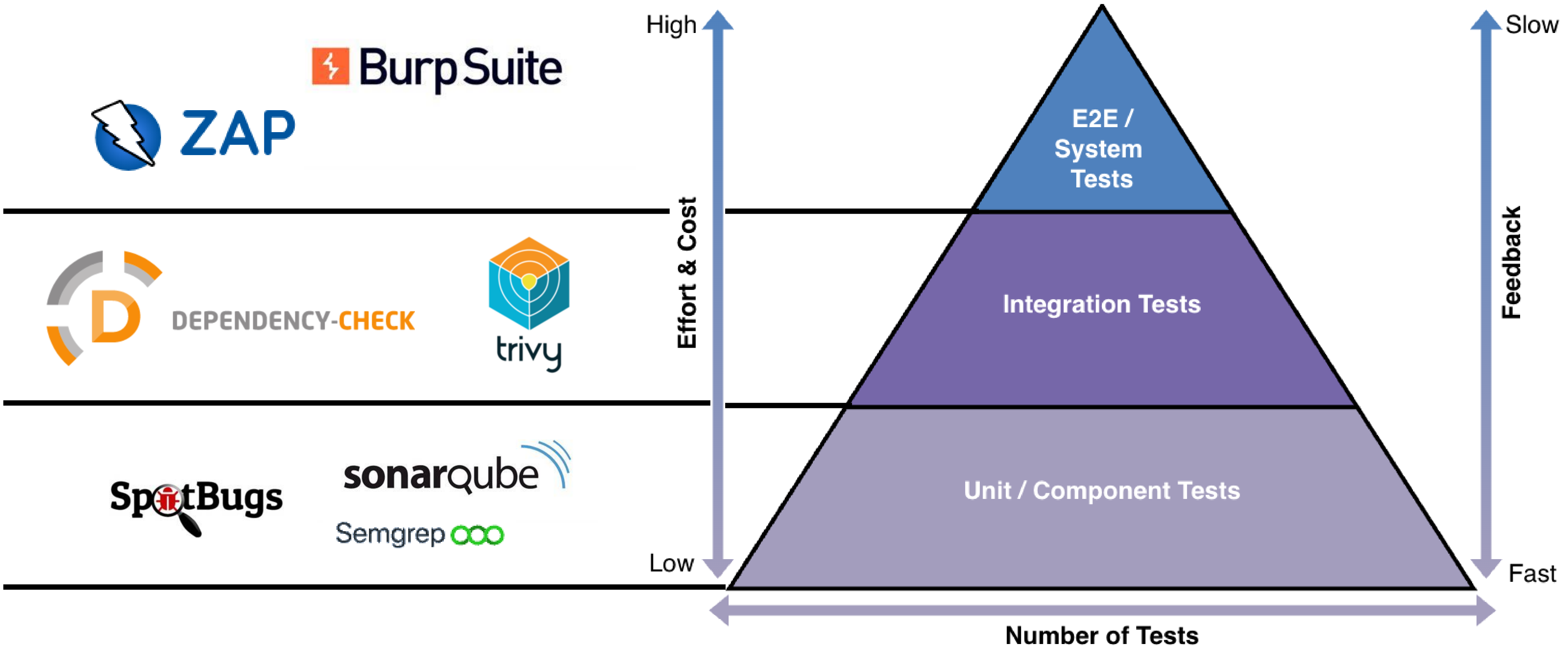
6 Bonus: Pipeline Hardening

Introduction

Testing Pyramid
& DevSecOps Tooling

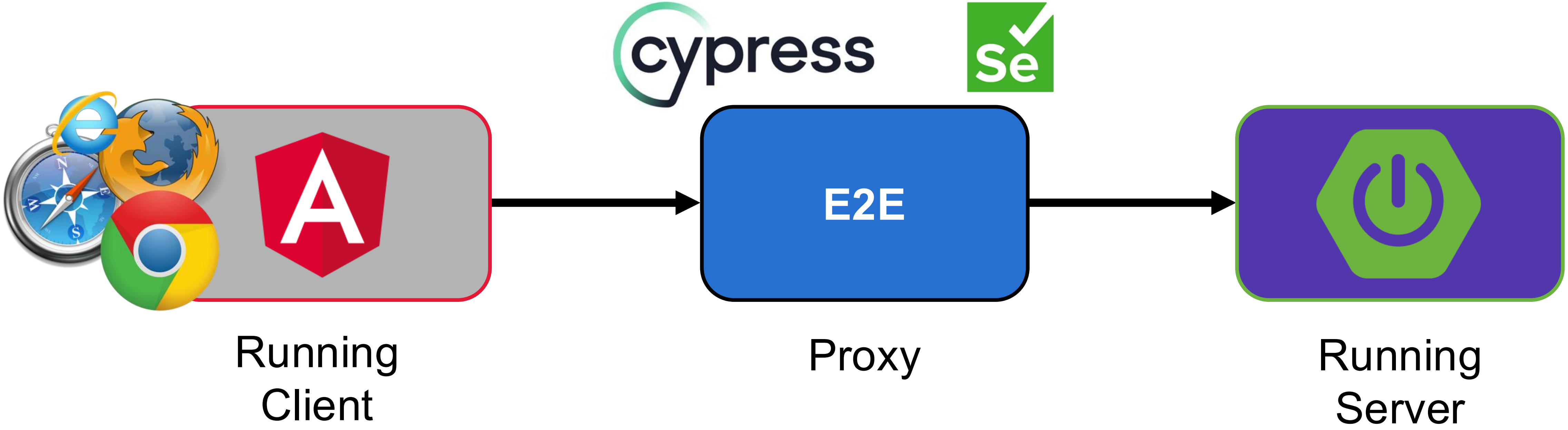
DevSecOps Tooling

Testing Pyramid



Why E2E Tests are not enough

End-to-End Testing (E2E)



E2E Tests

Does

- ✓ validate real user journeys
- ✓ verify system integration
- ✓ test expected behaviour
- ✓ use known inputs

Doesn‘t do

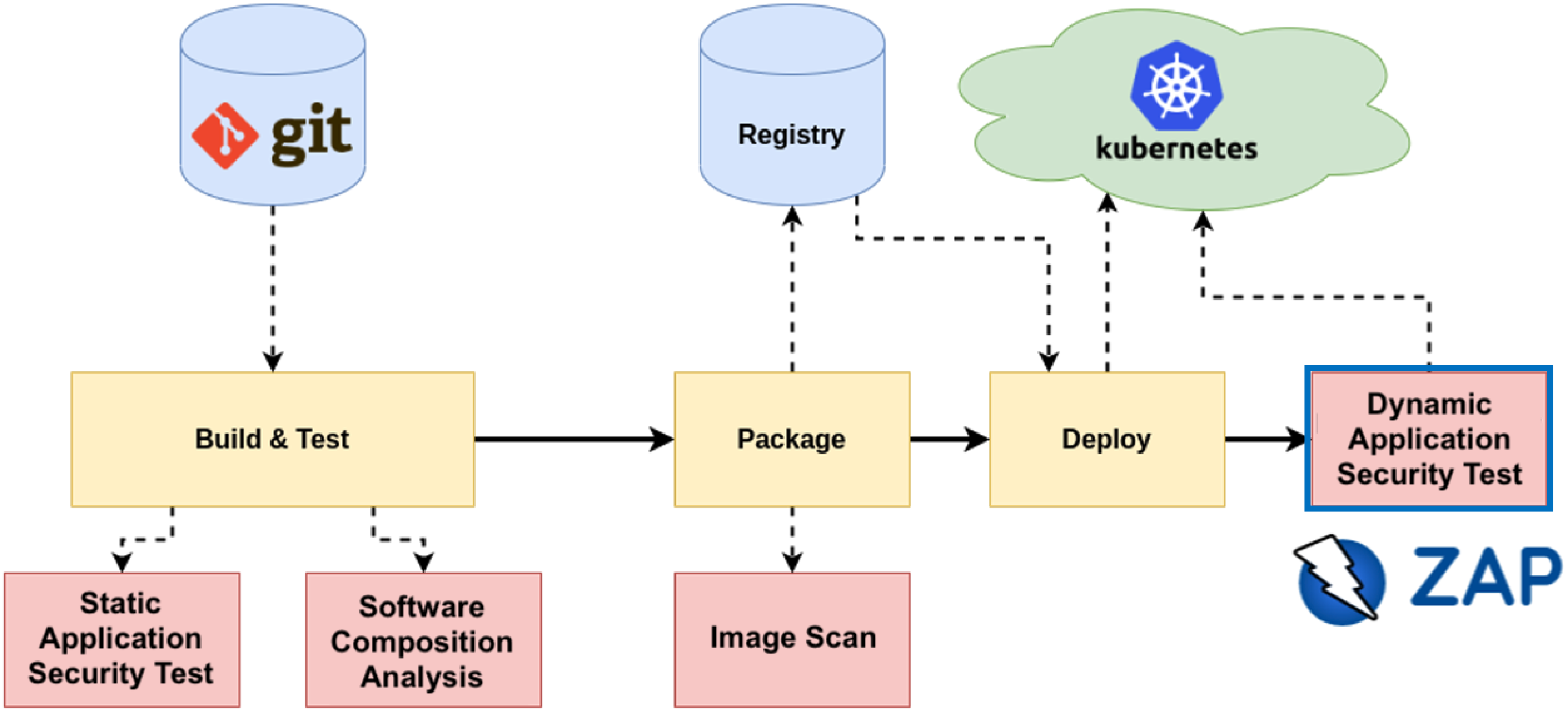
- fuzzing of inputs
- enumerate endpoints
- abuse auth logic
- chain attacks

Can a user sign up / login, and complete a purchase?

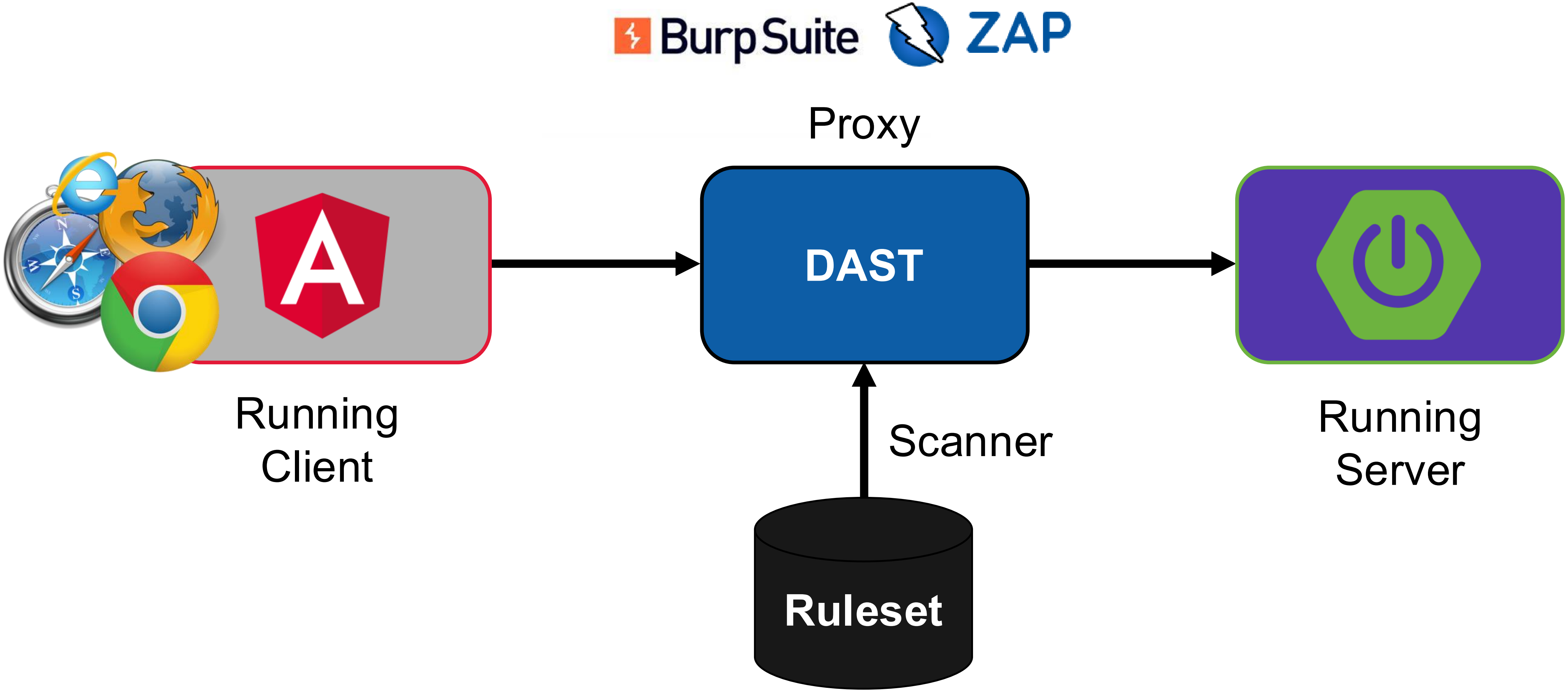
Can an attacker use an user flow to manipulate the checkout process and gain unintended benefits?

Introducing DAST in the SDLC

ZAP in CI-/CD-Pipeline

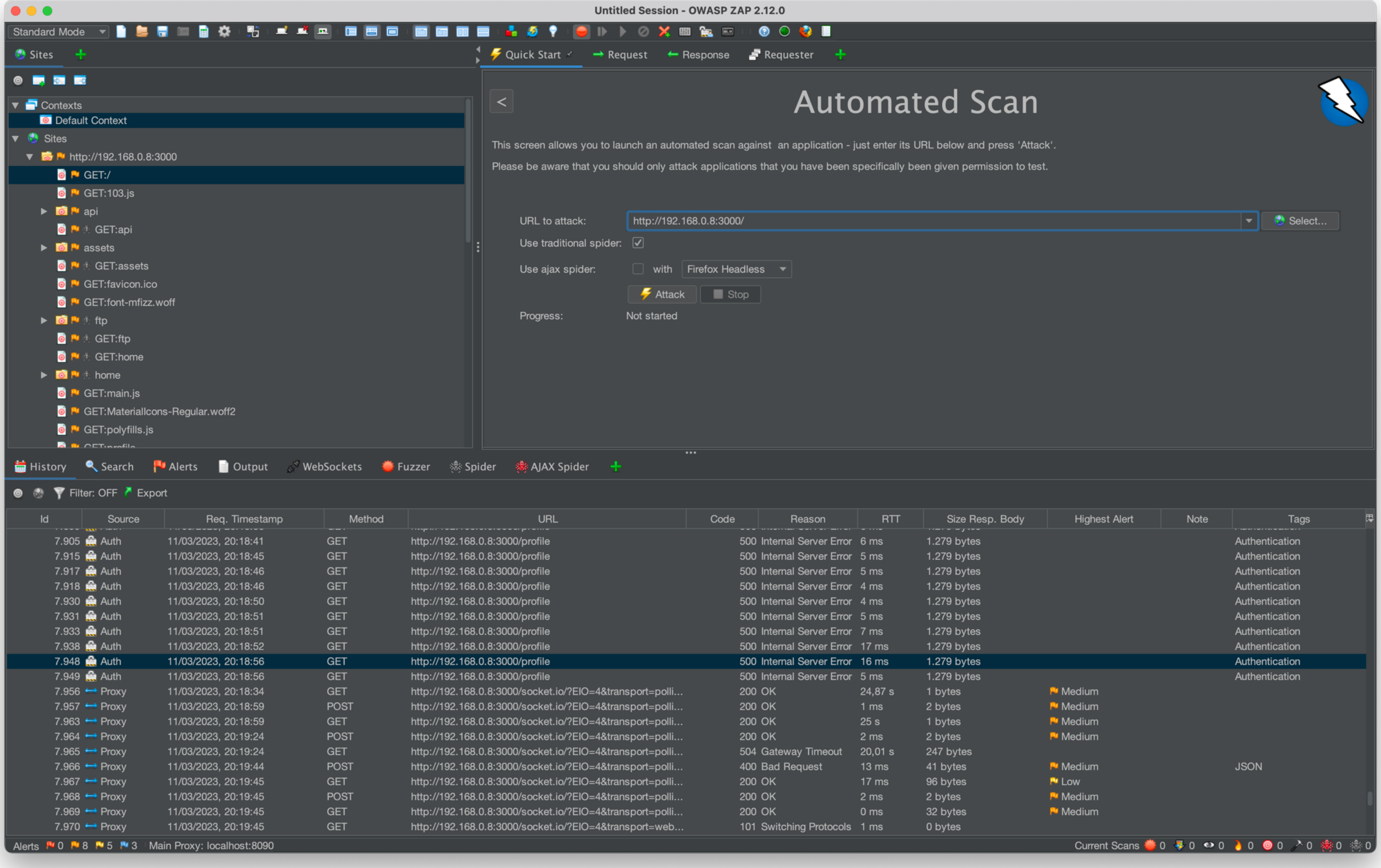

git
Registry
kubernetes
Build & Test
Package
Deploy
Dynamic Application Security Test
Static Application Security Test
Software Composition Analysis
Image Scan
ZAP

Dynamic Application Security Testing (DAST)



ZAP
- One Proxy to attack them all

Zed Attack Proxy (ZAP)



Automated Scan

This screen allows you to launch an automated scan against an application - just enter its URL below and press 'Attack'.

Please be aware that you should only attack applications that you have been specifically been given permission to test.

URL to attack: http://192.168.0.8:3000/ Select...

Use traditional spider: ☑

Use ajax spider: □ with Firefox Headless

Attack | Stop

Progress: Not started

Id	Source	Req. Timestamp	Method	URL	Code	Reason	RTT	Size Resp. Body	Highest Alert	Note	Tags
7.905	Auth	11/03/2023, 20:18:41	GET	http://192.168.0.8:3000/profile	500	Internal Server Error	6 ms	1.279 bytes			Authentication
7.915	Auth	11/03/2023, 20:18:45	GET	http://192.168.0.8:3000/profile	500	Internal Server Error	5 ms	1.279 bytes			Authentication
7.917	Auth	11/03/2023, 20:18:46	GET	http://192.168.0.8:3000/profile	500	Internal Server Error	5 ms	1.279 bytes			Authentication
7.918	Auth	11/03/2023, 20:18:46	GET	http://192.168.0.8:3000/profile	500	Internal Server Error	4 ms	1.279 bytes			Authentication
7.930	Auth	11/03/2023, 20:18:50	GET	http://192.168.0.8:3000/profile	500	Internal Server Error	4 ms	1.279 bytes			Authentication
7.931	Auth	11/03/2023, 20:18:51	GET	http://192.168.0.8:3000/profile	500	Internal Server Error	5 ms	1.279 bytes			Authentication
7.933	Auth	11/03/2023, 20:18:51	GET	http://192.168.0.8:3000/profile	500	Internal Server Error	7 ms	1.279 bytes			Authentication
7.938	Auth	11/03/2023, 20:18:52	GET	http://192.168.0.8:3000/profile	500	Internal Server Error	17 ms	1.279 bytes			Authentication
7.948	Auth	11/03/2023, 20:18:56	GET	http://192.168.0.8:3000/profile	500	Internal Server Error	16 ms	1.279 bytes			Authentication
7.949	Auth	11/03/2023, 20:18:56	GET	http://192.168.0.8:3000/profile	500	Internal Server Error	5 ms	1.279 bytes			Authentication
7.956	Proxy	11/03/2023, 20:18:34	GET	http://192.168.0.8:3000/socket.io/?EIO=4&transport=polli...	200	OK	24,87 s	1 bytes	Medium		
7.957	Proxy	11/03/2023, 20:18:59	POST	http://192.168.0.8:3000/socket.io/?EIO=4&transport=polli...	200	OK	1 ms	2 bytes	Medium		
7.963	Proxy	11/03/2023, 20:18:59	GET	http://192.168.0.8:3000/socket.io/?EIO=4&transport=polli...	200	OK	25 s	1 bytes	Medium		
7.964	Proxy	11/03/2023, 20:19:24	POST	http://192.168.0.8:3000/socket.io/?EIO=4&transport=polli...	200	OK	2 ms	2 bytes	Medium		
7.965	Proxy	11/03/2023, 20:19:24	GET	http://192.168.0.8:3000/socket.io/?EIO=4&transport=polli...	504	Gateway Timeout	20,01 s	247 bytes			
7.966	Proxy	11/03/2023, 20:19:44	POST	http://192.168.0.8:3000/socket.io/?EIO=4&transport=polli...	400	Bad Request	13 ms	41 bytes	Medium		JSON
7.967	Proxy	11/03/2023, 20:19:45	GET	http://192.168.0.8:3000/socket.io/?EIO=4&transport=polli...	200	OK	17 ms	96 bytes	Low		
7.968	Proxy	11/03/2023, 20:19:45	POST	http://192.168.0.8:3000/socket.io/?EIO=4&transport=polli...	200	OK	2 ms	2 bytes	Medium		
7.969	Proxy	11/03/2023, 20:19:45	GET	http://192.168.0.8:3000/socket.io/?EIO=4&transport=polli...	200	OK	0 ms	32 bytes	Medium		
7.970	Proxy	11/03/2023, 20:19:45	GET	http://192.168.0.8:3000/socket.io/?EIO=4&transport=web...	101	Switching Protocols	1 ms	0 bytes			

Alerts 0 8 5 3 Main Proxy: localhost:8090

Current Scans 0 0 0 0 0 0 0 0

Passive & Active Scans

Script Integration

Automation

Reporting

Spidering

Fuzzing

...

Passive Scan

Focus

- Analyzes the given page/domain
- Identifies potential vulnerabilities
- Quick scan for:
  - Vulnerable HTML tags (Sinks)
  - Missing headers
  - Misconfiguration (Cookie, CSP)

Active Scan

Focus

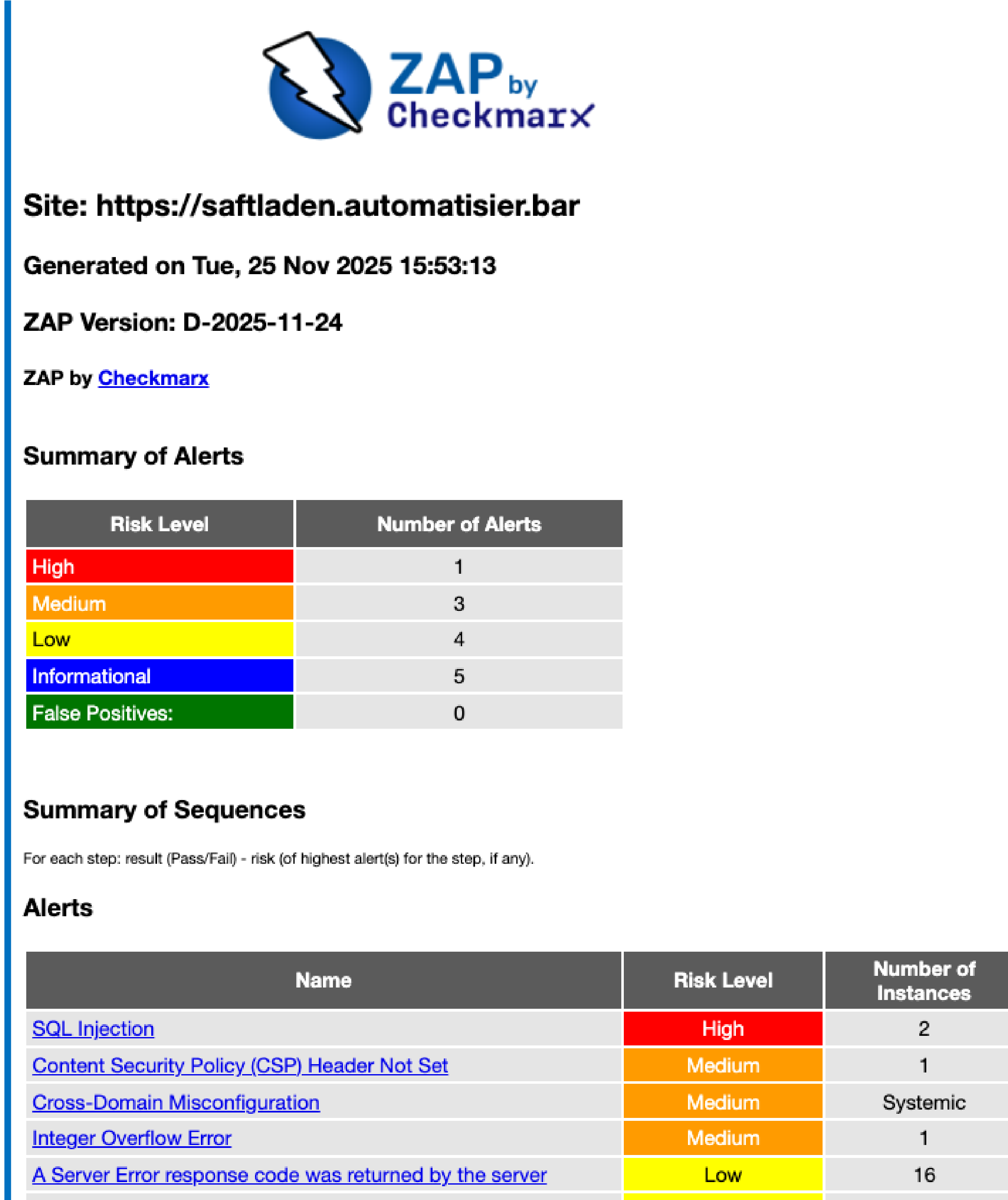
- Uses crawlers and web fuzzers
- Verifies identified vulnerabilities
- JS analysis for further vulnerabilities
- Fuzzes request bodies and parameters for:
  - Various injection attacks
    - XSS, SQLi, XXE, …
  - Other common web vulnerabilities.

Report Generation

Contains

- Summary of all findings
- Finding details
  - Description
  - URL metadata
    - (HTTP method, param, etc.)
  - References (rfc)
  - CWE ID
  - Plugin ID

https://www.zaproxy.org/docs/desktop/addons/report-generation/



Site: https://saftladen.automatisier.bar

Generated on Tue, 25 Nov 2025 15:53:13

ZAP Version: D-2025-11-24

ZAP by Checkmarx

Summary of Alerts

Risk Level	Number of Alerts
High	1
Medium	3
Low	4
Informational	5
False Positives:	0

Summary of Sequences

For each step: result (Pass/Fail) - risk (of highest alert(s) for the step, if any).

Alerts

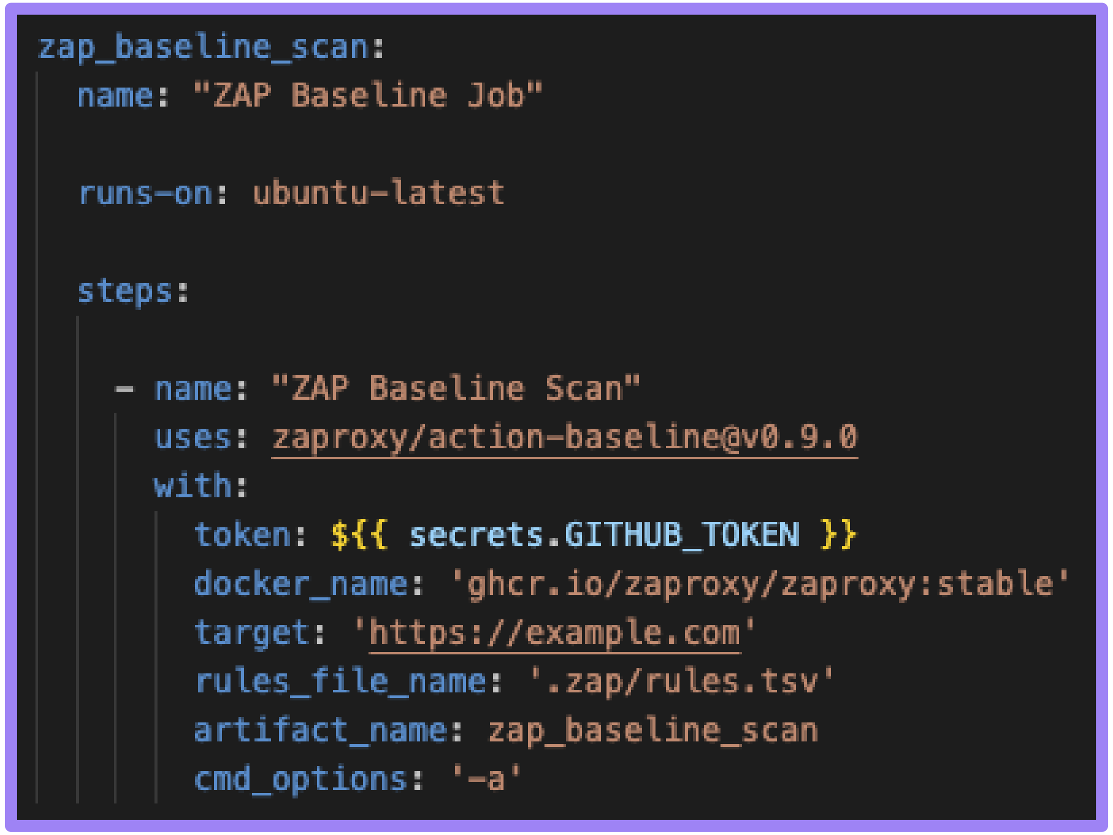
Name	Risk Level	Number of Instances
SQL Injection	High	2
Content Security Policy (CSP) Header Not Set	Medium	1
Cross-Domain Misconfiguration	Medium	Systemic
Integer Overflow Error	Medium	1
A Server Error response code was returned by the server	Low	16

CI/CD Integration
with GitHub Actions

ZAP Baseline Scan

(Passive Scan)

- Focuses on identifying potential vulnerabilities
- Designed to detect known security issues:
  - XSS Protection (Header)
  - SQL Injections
  - Path Traversal
  - HTTP Security Headers
  - Unvalidated Redirects and Forwards
  - Insecure Deserialization
  - …

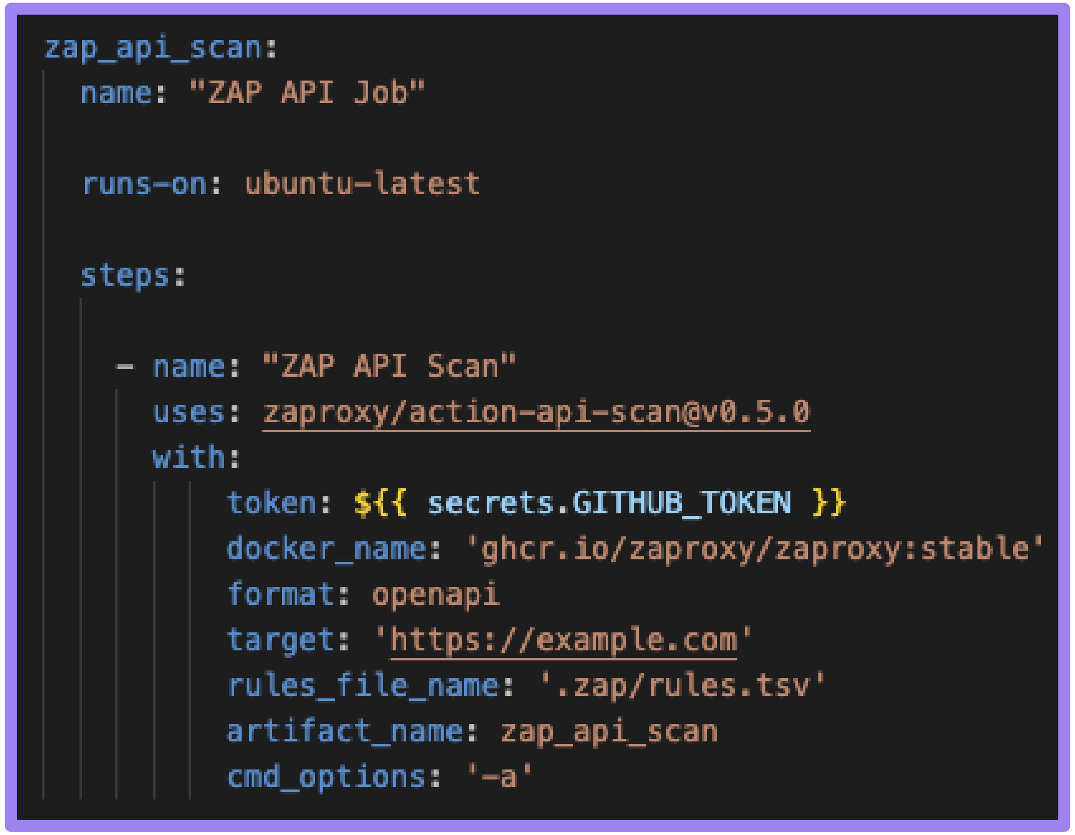


```yaml
zap_baseline_scan:
  name: "ZAP Baseline Job"

  runs-on: ubuntu-latest

  steps:

    - name: "ZAP Baseline Scan"
      uses: zaproxy/action-baseline@v0.9.0
      with:
        token: ${{ secrets.GITHUB_TOKEN }}
        docker_name: 'ghcr.io/zaproxy/zaproxy:stable'
        target: 'https://example.com'
        rules_file_name: '.zap/rules.tsv'
        artifact_name: zap_baseline_scan
        cmd_options: '-a'
```

https://www.zaproxy.org/docs/docker/baseline-scan/

ZAP API & *Full Scan* *(Active Scans)*

- Focuses on scanning RESTful APIs
- Supported formats:
  - Openapi (DEFAULT)
  - Soap
  - GraphQL
- Searches for a variety of vulnerabilities:
  - SQL Injections
  - Authentication issues
  - Insecure direct object references (IDOR)
  - Broken Access Control
  - Sensitive Operartions Without Confirmation
  - …



```
zap_api_scan:
  name: "ZAP API Job"

  runs-on: ubuntu-latest

  steps:

    - name: "ZAP API Scan"
      uses: zaproxy/action-api-scan@v0.5.0
      with:
        token: ${{ secrets.GITHUB_TOKEN }}
        docker_name: 'ghcr.io/zaproxy/zaproxy:stable'
        format: openapi
        target: 'https://example.com'
        rules_file_name: '.zap/rules.tsv'
        artifact_name: zap_api_scan
        cmd_options: '-a'
```

https://www.zaproxy.org/docs/docker/api-scan/

https://www.zaproxy.org/docs/docker/full-scan/

With Docker

Different scans types:

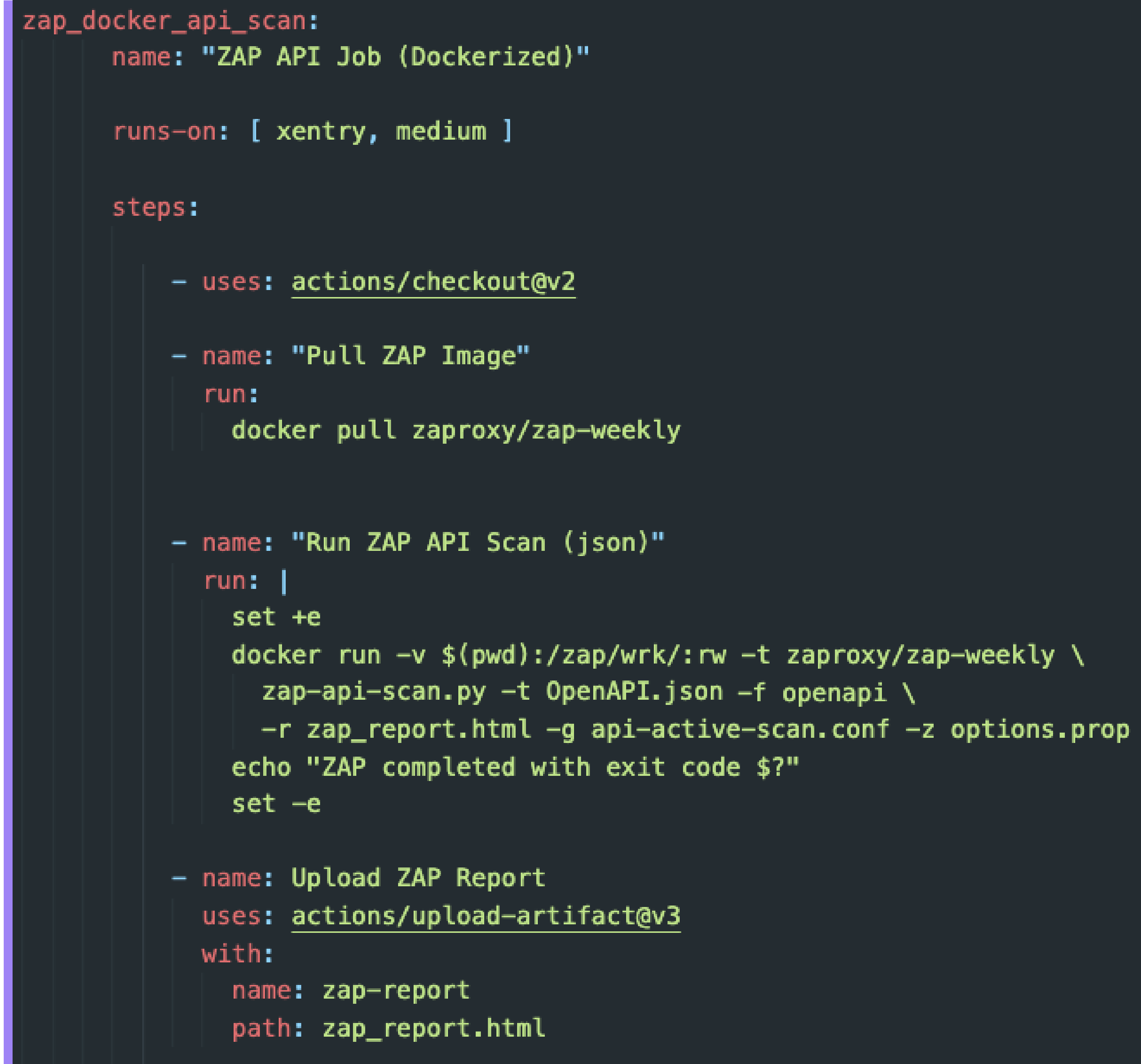
- zap-full-scan.py
- zap-baseline.py
- zap-api-scan.py

Options:

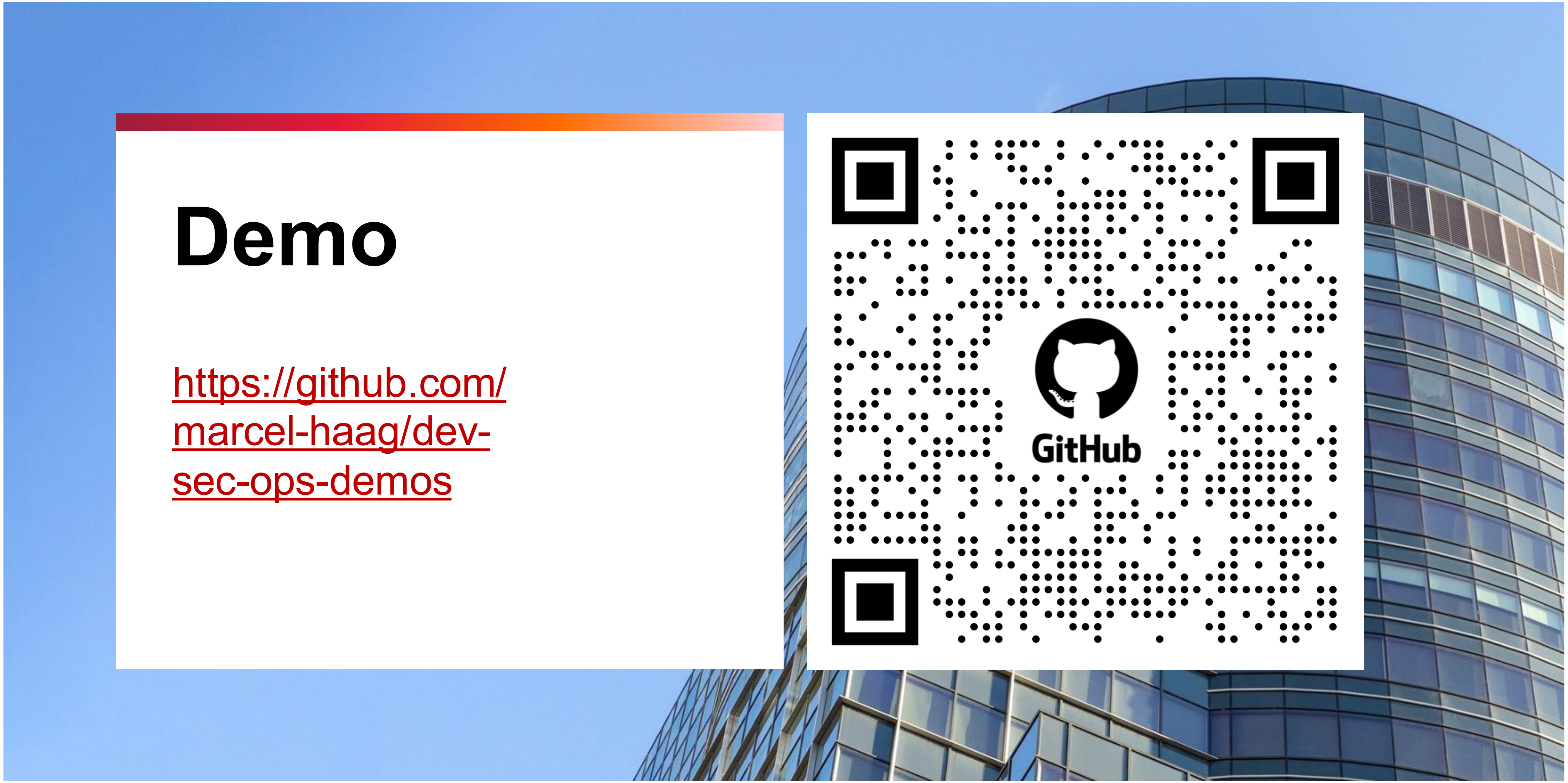
-t	target domains / APIs
-f	file format
-r	report file
-g	config for the context
-z	set options (e.g. Auth header)

https://www.zaproxy.org/docs/docker/about/

https://deepwiki.com/zaproxy/zaproxy/5.1-scan-rules



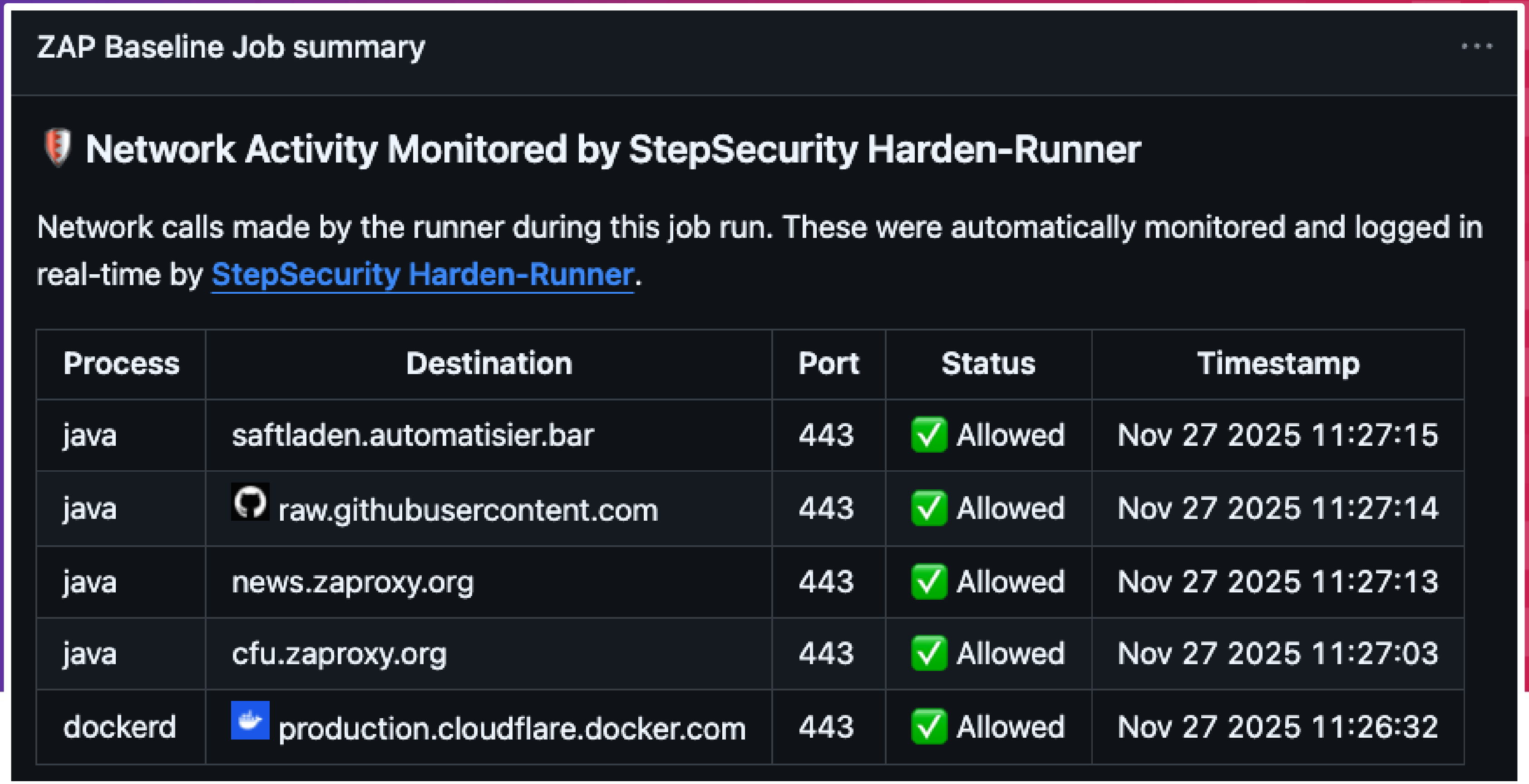
```
zap_docker_api_scan:
   name: "ZAP API Job (Dockerized)"

   runs-on: [ xentry, medium ]

   steps:

     - uses: actions/checkout@v2

     - name: "Pull ZAP Image"
       run:
         docker pull zaproxy/zap-weekly


     - name: "Run ZAP API Scan (json)"
       run: |
         set +e
         docker run -v $(pwd):/zap/wrk/:rw -t zaproxy/zap-weekly \
          zap-api-scan.py -t OpenAPI.json -f openapi \
          -r zap_report.html -g api-active-scan.conf -z options.prop
         echo "ZAP completed with exit code $?"
         set -e

     - name: Upload ZAP Report
       uses: actions/upload-artifact@v3
       with:
         name: zap-report
         path: zap_report.html
```



Demo

https://github.com/marcel-haag/dev-sec-ops-demos

Bonus:
Pipeline Hardening



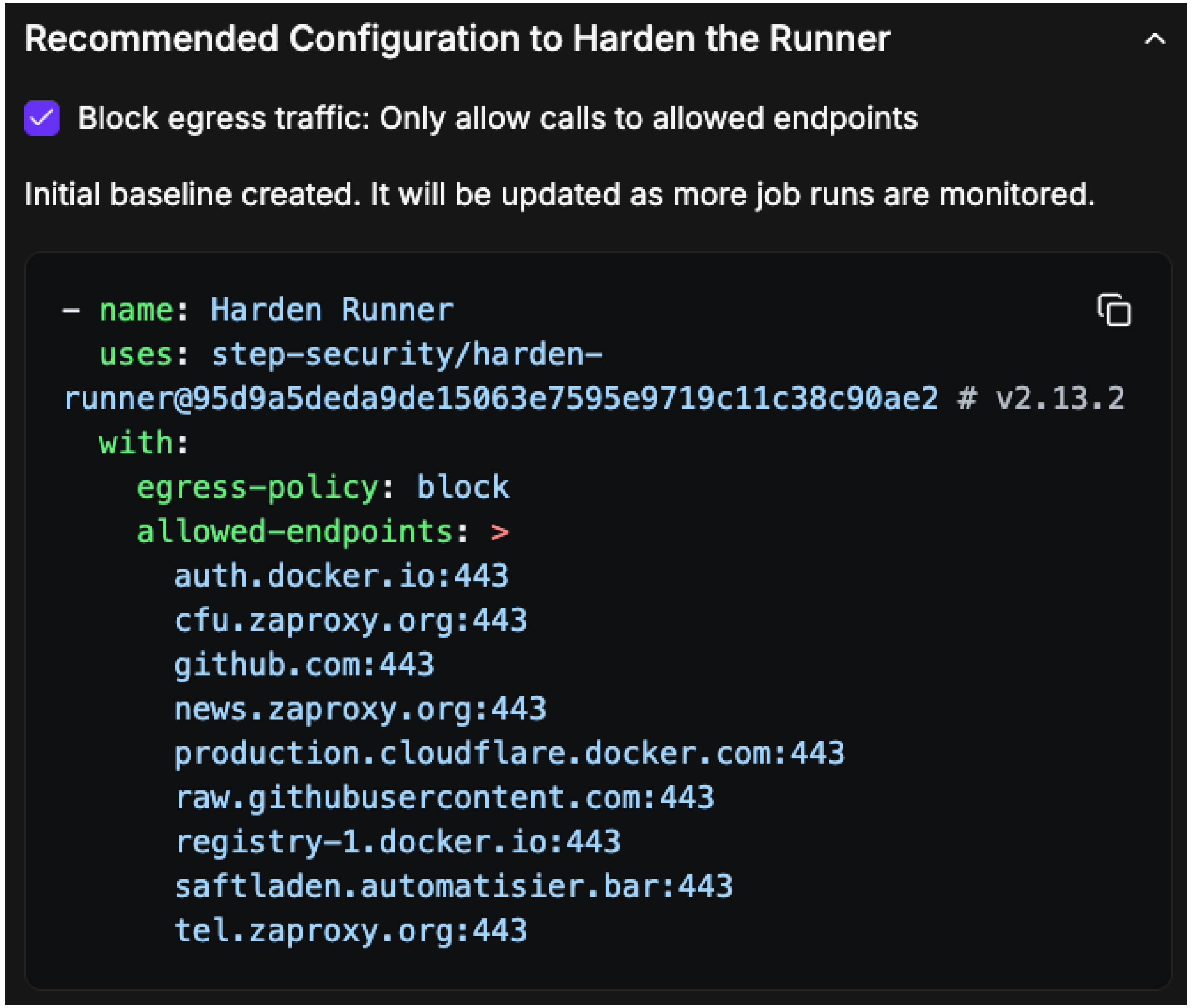
ZAP Baseline Job summary

Network Activity Monitored by StepSecurity Harden-Runner

Network calls made by the runner during this job run. These were automatically monitored and logged in real-time by StepSecurity Harden-Runner.

Process	Destination	Port	Status	Timestamp
java	saftladen.automatisier.bar	443	✅ Allowed	Nov 27 2025 11:27:15
java	raw.githubusercontent.com	443	✅ Allowed	Nov 27 2025 11:27:14
java	news.zaproxy.org	443	✅ Allowed	Nov 27 2025 11:27:13
java	cfu.zaproxy.org	443	✅ Allowed	Nov 27 2025 11:27:03
dockerd	production.cloudflare.docker.com	443	✅ Allowed	Nov 27 2025 11:26:32

Pipeline Hardening



Recommended Configuration to Harden the Runner

☑ Block egress traffic: Only allow calls to allowed endpoints

Initial baseline created. It will be updated as more job runs are monitored.

```
- name: Harden Runner
  uses: step-security/harden-
runner@95d9a5deda9de15063e7595e9719c11c38c90ae2 # v2.13.2
  with:
    egress-policy: block
    allowed-endpoints: >
      auth.docker.io:443
      cfu.zaproxy.org:443
      github.com:443
      news.zaproxy.org:443
      production.cloudflare.docker.com:443
      raw.githubusercontent.com:443
      registry-1.docker.io:443
      saftladen.automatisier.bar:443
      tel.zaproxy.org:443
```

https://docs.stepsecurity.io/harden-runner

Thank you for listening!

Questions?

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