OWASP BUCHAREST
APPSEC CONFERENCE
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The OWASP Foundation
http://www.owasp.org

N different strategies to automate OWASP ZAP

The OWASP Zed Attack Proxy

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Agenda

- Application Security Program Challenges
- Lightning Introduction to ZAP
- The ZAP API
- The N ways of Automating ZAP
- Scripting for ZAP
- Tips for CI / CD and Case Studies

The problems

- Most developers know very little about security
- Most companies have very few application security folks
- Security testing is done late in the application development lifecycle (it at all is done)

Part of the Solution

- Use a security tool like ZAP in development
- In addition to security training, secure development lifecycle, threat modelling, static source code analysis, secure code reviews, professional pentesting…

What can you get out of this?

- A way to quickly evaluate your apps
- Options for more thorough scanning
- An introduction to the ZAP API

Why ZAP?

- An **easy to use** webapp pentest tool
- Completely free and **open source**
- Source code **updated** multiple **times a day**
- One of the OWASP **Flagship projects**
- Ideal for beginners, But also used by professionals

- **Powerful API** - for automated security tests

The app sec tool foundations

- **Spider** or **Crawler**
  - Gather information about what to attack
- **Passive Scan**
  - Static analysis on the gathered information (HTTP requests and responses)
- **Active Scan**
  - Send attack (potentially harmful) payloads to exploit / confirm weakness

ZAP API demo

Headless attack!

ZAP API demo

[5 minutes]

Demo Flow:

1. Open the ZAP GUI on the right of the screen
2. Browser the API from the left portion of the screen
3. As we trigger a spider scan, it would be visible in the UI
4. Poll the Spider Status API
5. Get results from passive scan
6. Trigger an Active Scan from the API, the scanning would start and it would be evident on the ZAP UI
7. Demonstrate a Shutdown

ZAP Baseline scan

1. Quick and fast
2. No prior ZAP experience required
3. Docker is the only dependency
4. Configurable with Command line Options
5. Quickly baseline the security controls of an application or many applications (just passive scanning)

ZAP Baseline scan

Finds issues like:

- Missing / incorrect security headers
- Cookie problems
- Information / error disclosure
- Missing CSRF tokens

ZAP Baseline scan - Demo

[5 minutes]

Demo flow:

1. Pull the zap docker image
2. docker run -t owasp/zap2docker-stable

zap-baseline.py -t http://www.renthoughtsweb.com:8020

2. Interpreting the results of the baseline scan
3. Generating and Using a scan configuration file
4. Mass baseline scan

The available API Clients

1. Java
2. Python
3. DotNet
4. PHP
5. Node JS
6. GO
7. .
8. .

Automating Quick Scan - via python API client

[5 minutes]

Demo flow:

1. Start ZAP programmatically
2. Wait for ZAP to initialize
3. zap.spider.scan(targeturl)
4. Wait till zap.spider.status(scanid) is 100
5. zap.ascan.scan(target)
6. Wait till zap.ascan.status(scanid) is 100
7. zap.core.alerts()
8. zap.core.htmlreport(target)

Automating authenticated scans

1. *Create a context* in the name of the application
2. Choose the mode of *authentication* (for instance Forms Authentication)
3. Provide *Authentication information*
4. Spider
5. Scan
6. Extract Results

Automating Authenticated Scan
- Demo via Dot Net API Client

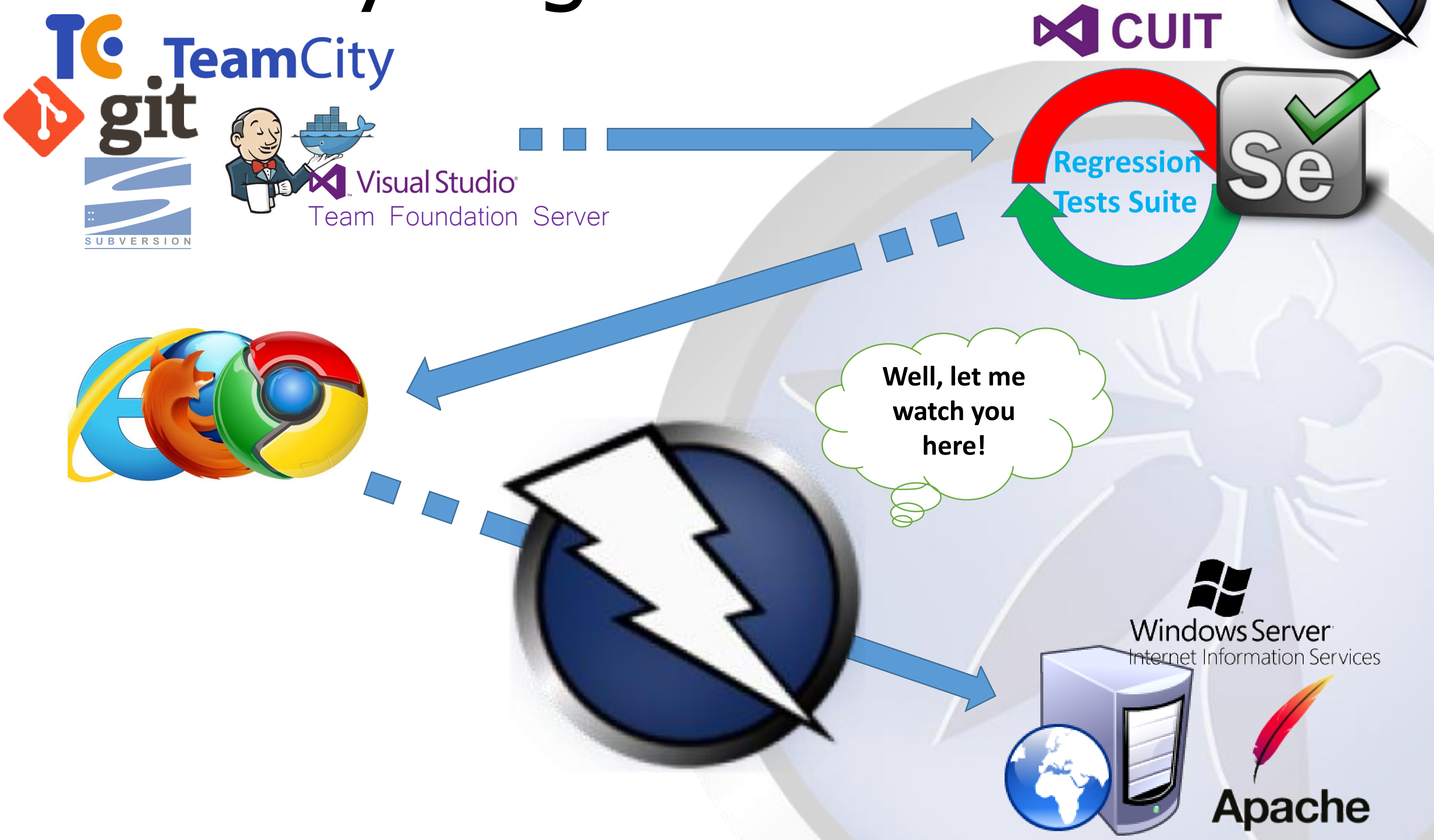
Authenticated Scan Demo

[5 minutes]

Demo flow:

1. Start ZAP programmatically
2. Wait for ZAP to initialize
3. api.context.newContext
4. api.context.includeInContext
5. api.users.newUser
6. api.forcedUser.setForcedUser
7. api.forcedUser.setForcedUserModeEnabled
8. api.spider.scan
9. api.ascan.scan
10. api.core.htmlreport

Security Regression Testing



Integrating with Selenium Test cases
- Demo via Java API Client

Selenium Integration Demo

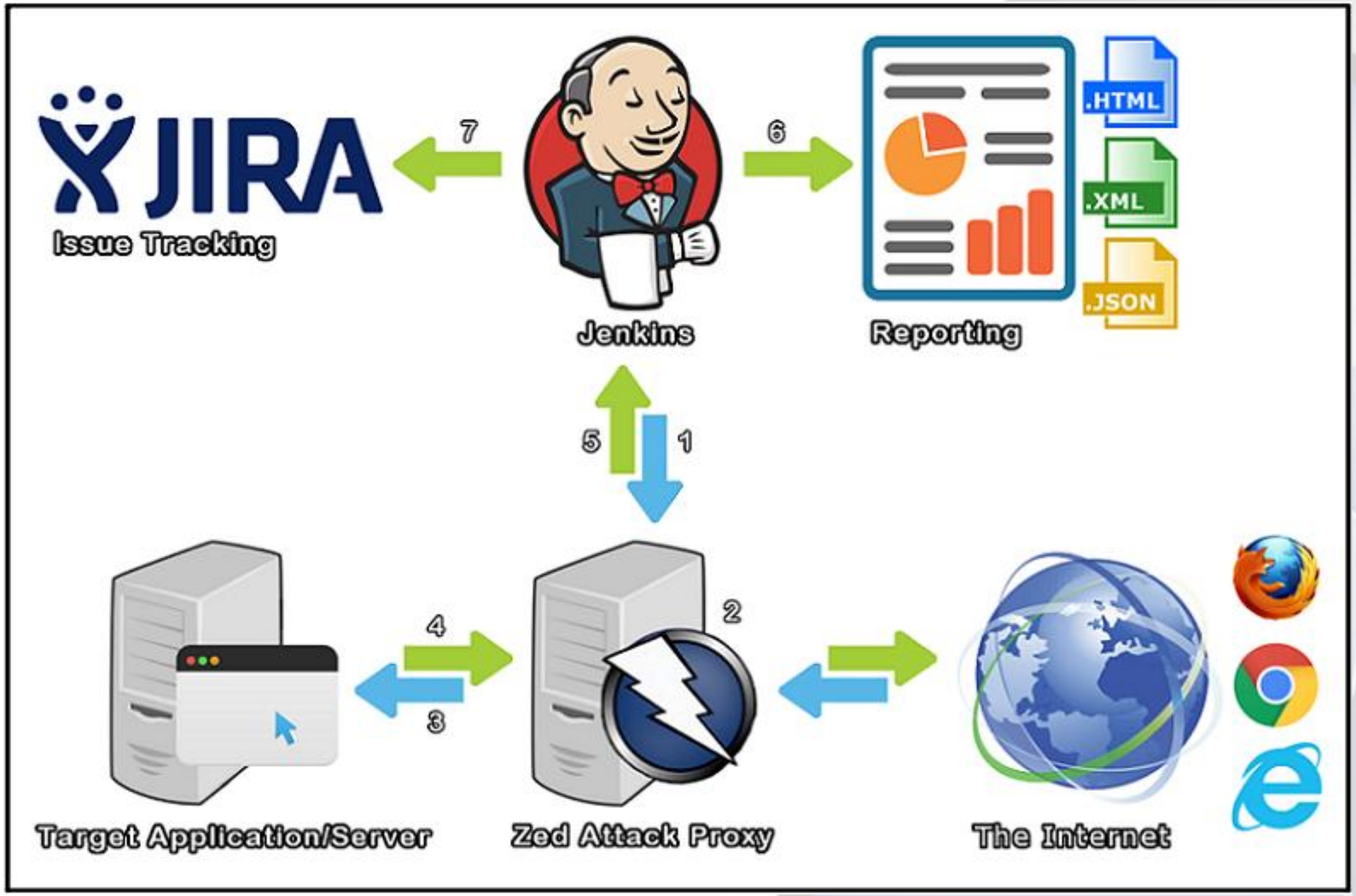
[5 minutes]

Demo flow:

1. Start ZAP programmatically
2. Wait for ZAP to initialize
3. Set up Selenium web driver with proxy settings
4. Run the selenium test cases
5. api.spider.scan
6. api.ascan.scan
7. api.core.htmlreport

A recorded quick demo - https://vimeo.com/222238217

Official Jenkins plugin



Tips from the field for CI / CD Integration

1. Tune the scan policies for faster scans
2. Option to fail the on Critical Security Control failure
3. Secure HTTP headers check is trivial yet highly useful
4. Timed passive scans (baseline scan) on Continuous Integration
5. Deep Scan on nightly builds

Scripting for ZAP

Script things that are not supported out of the box
Script for automating regular VAPT activities
Script to modify request and responses
.. And much more

Quick Demo – ZEST scripting

Demo flow:

1. Add a new ZEST Script
2. Add a ZEST Replace to add must-validate to the Cache-Control HTTP Response Header

Quick Demo – ZEST Security Regression Scripting

Demo flow:

1. Demonstrate an Open Redirect Flaw
2. Add a ZEST Script
3. Add an Assert to ensure the Application doesn’t redirect to other domains

Quick Demo – Python scripting

1. Find insecure HTTP verbs on server

Useful cmdline options

- Turn off db recovery (speeds things up)

```
-config database.recoverylog=false
```

- Update all add-ons

```
-addonupdate
```

- Run without the UI

```
-daemon
```

- Listen on a specified host and port

```
-host 127.0.0.1 –port 7070
```

- Setting the API key

```
-config api.key=j8WdOEq8dhwWE24VGDsreP
```

- Disable API key ***in a safe environment***

```
-config api.disablekey=true
```

ZAP – Need Help?

ZAP user group - https://groups.google.com/forum/#!forum/zaproxy-users

ZAP Evangelists - https://github.com/zaproxy/zaproxy/wiki/ZapEvangelists

ZAP Developers group - https://groups.google.com/forum/#!forum/zaproxy-develop

ZAP - Get Involved

Use the tool

Recommend

Write Add-ons

Write Scanners / Scripts

Report bugs

Conclusion

- Consider security at all stages of development cycle
- OWASP ZAP is ideal for automating security tests
- It is also a great way to learn about security

"Man is a tool-using animal. Without tools he is nothing, with *"right set of"* tools he is all"

Any Questions?

http://www.owasp.org/index.php/ZAP