

# Starting a Security Program on a Shoestring

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Five years in information security

Twenty-five years in software development

Borland, Netscape, Webridge, Softsource, Complí, WebMD



**Borland**

complí 

**WebMD**<sup>®</sup>  
health services

# Goals

Gaining security knowledge

Managing application vulnerabilities

Empowering QA to learn and lead

Driving security into team processes

Creating a culture of security and quality

# The Problem

- Small team
- Web application
- Desire to address security
- No resources
- Minimal security expertise



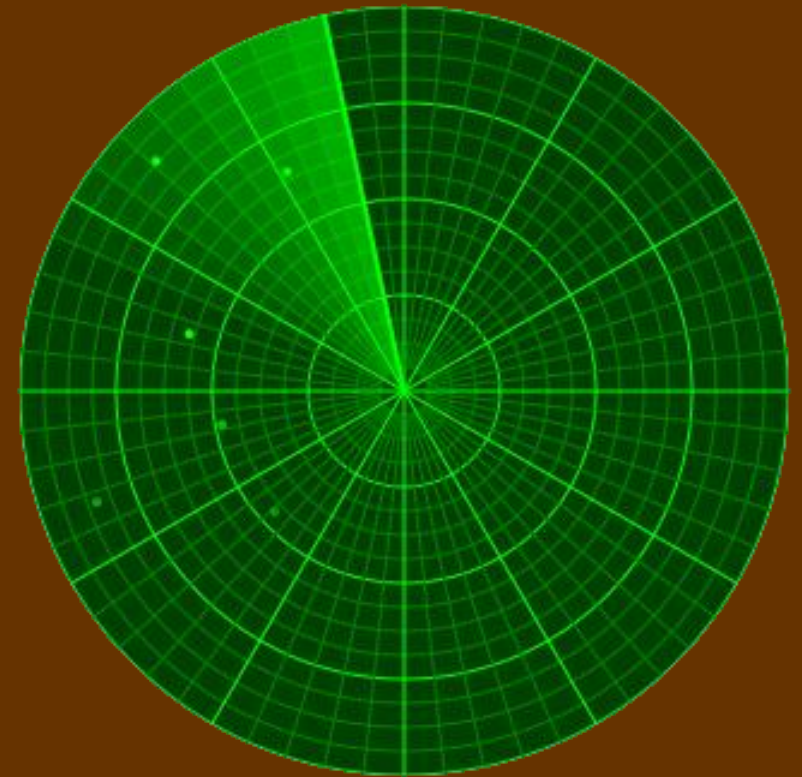
# Two Approaches to the Problem



# What is a Vulnerability Scanner?

Software that examines your product and identifies flaws or weaknesses that might let someone perform unwanted actions.

But what exactly does it look at?



# Types of Vulnerability Scanners

Type	Target	Findings
Network	Infrastructure	Config and patching
Static (SAST)	Source code	Programming logic
Composition	Third-party libraries	Known vulnerabilities
Dynamic (DAST)	Running application	Flaws in web pages

# Which Scanner Should I Choose?

Product	Free	Last Release	Active	General Purpose
Arachni	Yes	2017	No	Yes
Brakeman	Yes	2019	Yes	No
Grabber	Yes	2013	No	Yes
Grendel-Scan	Yes	2012	No	Yes
IronWasp	Yes	2015	No	Yes
OWASP ZAP	Yes	2019	Yes	Yes
RatProxy	Yes	2009	No	Yes
Scan My Server	Freemium	2019	Yes	Yes
Skipfish	Yes	2012	No	Yes
SQLMap	Yes	2019	Yes	No
Vega	Yes	2016	No	Yes
W3af	Yes	2019	Yes	Yes
Wapiti	Yes	2019	Yes	Yes
Watcher	Yes	2017	No	Yes
WATOBO	Yes	2017	No	Yes
WebScarab	Yes	2011	No	No
Wfuzz	Yes	2019	Yes	No



# Basic Criteria for DAST Selection

- Is free
- Is actively maintained
- Detects a range of vulnerabilities
- Produces useful reports
- Integrates with build process

# Finalists

Product	Last Release	Notes
Arachni	2017	Out of date library dependencies
OWASP ZAP	2019	Thriving community
Scan My Server	2019	Limited to scanning one domain once a week
W3af	2019	Out of date library dependencies
Wapiti	2019	Limited set of vulnerabilities

# The Winner



ZAP

OWASP Zed Attack Proxy

# What Does a Scanner Tell You?

Generic Details	Page-Specific Details
Vulnerability Name	URL
Description	GET/POST
Risk Level	Parameter
Standard Defense	Attack String
CWE ID	Evidence String
Reference(s)	Full HTTP Request/Response

# Example 1: Path Traversal

Item	Description
Alert Name	Path Traversal
Description	The Path Traversal attack technique allows an attacker access to files, directories, and commands that potentially reside outside the web document root directory...
URL	<a href="http://10.133.1.4/mutillidae/index.php?page=%2Fetc%2Fpasswd">http://10.133.1.4/mutillidae/index.php?page=%2Fetc%2Fpasswd</a>
Risk	High
Parameter	Page
Attack	/etc/passwd
Evidence	root:x:0:0

# Path Traversal Attack Explained

ZAP sees this	<code>https://.../.../index.php?page=login.php</code>	Parameter = <code>page</code>
ZAP tries this	<code>https://.../.../index.php?page=/etc/passwd</code>	Attack = <code>/etc/passwd</code>
ZAP receives this	<pre>&lt;!DOCTYPE...&gt;&lt;html&gt;...&lt;body&gt;... &lt;blockquote&gt; root:x:0:0:root:/root:/bin/bash daemon:x:1:1:daemon:/usr/sbin:/...</pre>	Evidence = <code>root:x:0:0</code>

← → ↻ 🏠 🔒 https://10.133.1.4/mutilidae/index.php?page=%2Fetc%2Fpasswd ... 📄 ⭐

## OWASP Mutilidae II: Keep Calm and Pwn On

Version: 2.7.11 Security Level: 0 (Hosed) Hints: Enabled (1 - Try easier) Not Logged In

[Home](#) | [Login/Register](#) | [Toggle Hints](#) | [Show Popup Hints](#) | [Toggle Security](#) | [Enforce SSL](#) | [Reset DB](#) | [View Log](#) | [View Captured Data](#)

OWASP 2017 ▶	<pre>root:x:0:0:root:/root:/bin/bash daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin bin:x:2:2:bin:/bin:/usr/sbin /nologin sys:x:3:3:sys:/dev:/usr/sbin/nologin sync:x:4:65534:sync:/bin:/bin/sync games:x:5:60:games:/usr/games: /usr/sbin/nologin man:x:6:12:man:/var/cache/man:/usr/sbin/nologin lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin mail:x:8:8:mail:/var/mail:/usr/sbin/nologin news:x:9:9:news:/var/spool/news:/usr/sbin/nologin</pre>
OWASP 2013 ▶	
OWASP 2010 ▶	

# Example 2: SQL Injection


Item	Description
Alert Name	SQL Injection
URL	http://10.133.1.4/mutillidae/index.php?page=login.php
Risk	High
Parameter	username
Attack	brian' AND '1'='1' --
Other Info	The page results were successfully manipulated using the boolean conditions [brian' AND '1'='1' -- ] and [brian' AND '1'='2' -- ]

**Username**

**Password**

```
<input type="text" name="username" />
```

# brian' AND '1'='2' --





## OWASP Mutilidae II: Keep Calm and Pwn On

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- OWASP 2017
- OWASP 2013
- OWASP 2010
- OWASP 2007
- Web Services
- HTML 5**
- Others
- Documentation
- Resources

### Login

 **Back**    **Help Me!**

**Account does not exist**

**Please sign-in**

**Username**

**Password**

# brian' AND '1'='1' --

 **OWASP Mutillidae II: Keep Calm and Pwn On**

Version: 2.7.11   Security Level: 0 (Hosed)   Hints: Disabled (0 - I try harder)   **Logged In User: brian**

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 **What Should I Do?**

 **What's New? Click Here**

 **Help Me!**

 **Listing of vulnerabilities**

 **Video Tutorials**

 **Release Announcements**

**TIP: Click *Hint and Videos* on each page**



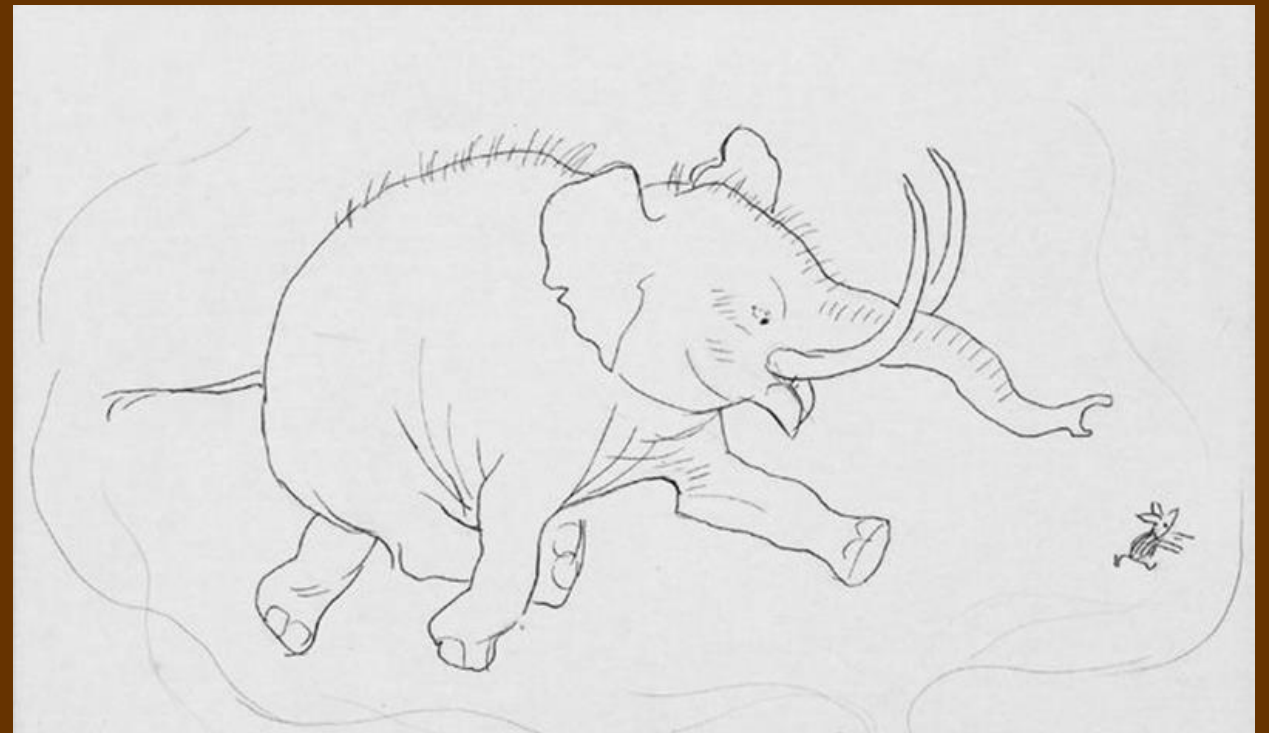


# A Note on the Scanner's Risk Level

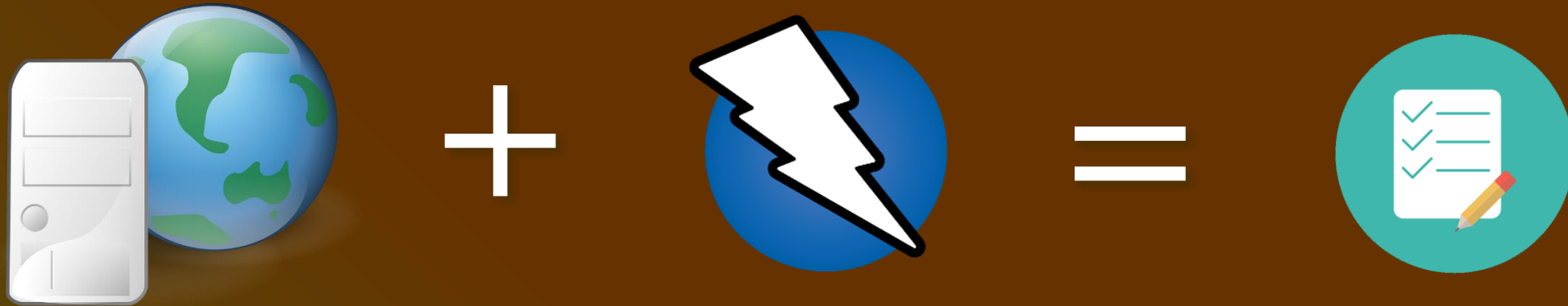
Item	Description
Alert Name	Path Traversal
Description	The Path Traversal files, directories the web document
URL	http://10.133.1
Risk	High
Parameter	Page



# False Positives



# How to Learn About a Vulnerability



# Am I Secure Now?



# Benefits of Scanning

Application vulnerabilities get fixed.

You learn about security

The team:

- learns about vulnerabilities
- becomes more aware of security
- thinks about security sooner
- designs standard defenses

# Commit to Scanning Regularly

- Who runs the scanner
  - How often
  - Who will process scanner reports
  - How quickly
- 
- Who will review progress over time
  - How often



# Other Artifacts and Practices That Might Follow

- Vulnerability management procedure
- Secure coding guidelines
- Training for new team members
- Metrics over time
- Artifacts of compliance



# A Culture of Quality and Security

## Requirements

- Privacy
- Regulations
- Compliance

## Design

- Design Review
- Threat Modeling

## Development

- Acceptance criteria
- SAST
- Code Review
- Code Guidelines

## Test

- Security Test Cases
- DAST

## Deployment

- Approvals
- Hardening

## Maintenance

- Monitoring
- Patching
- Sunsetting

# Resources

## OWASP Top 10

[https://www.owasp.org/index.php/Category:OWASP\\_Top\\_Ten\\_Project](https://www.owasp.org/index.php/Category:OWASP_Top_Ten_Project)

## Hacksplaining

<https://www.hacksplaining.com/lessons>

## DevCentral

<https://www.youtube.com/user/devcentral>

## OWASP Portland Chapter

<https://www.meetup.com/OWASP-Portland-Chapter/>



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