Maliciously monetizing AppSec “Features”

It’s all about the $money

Or Katz – Principal Security Researcher Akamai

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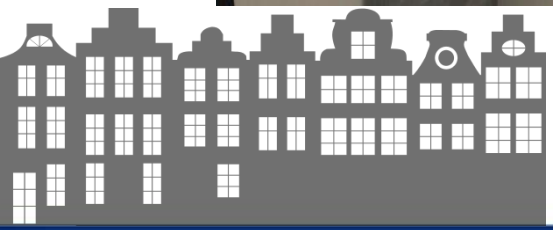
And Then the Red Phone Started Ringing…



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Looking Into the Data

Single HTTP Request

Open Redirect

What does it mean?

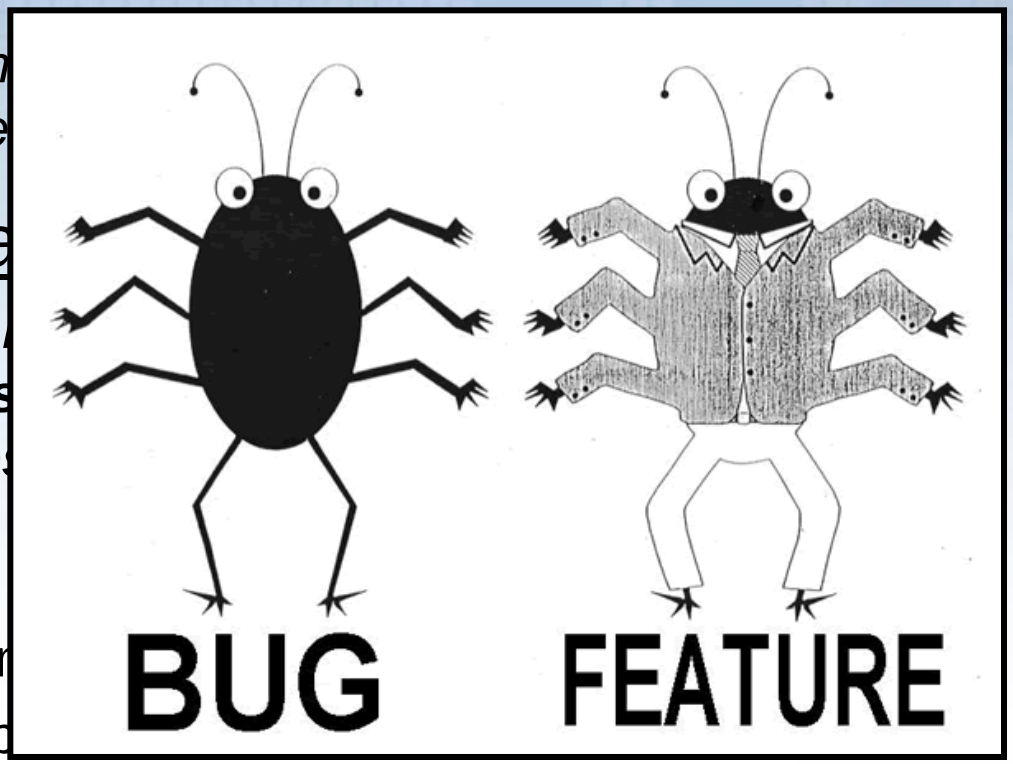
cwe.mitre.org: "A web application specifies a link to an external site

How it is being used ma

*OWASP Top 10: "Such redirects trick victims into **disclosing pass** Unsafe forwards may allow **acce***

Severity/Impact?

- OWASP Top 10: A10, Impact r
- cwe.mitre.org likelihood of exp



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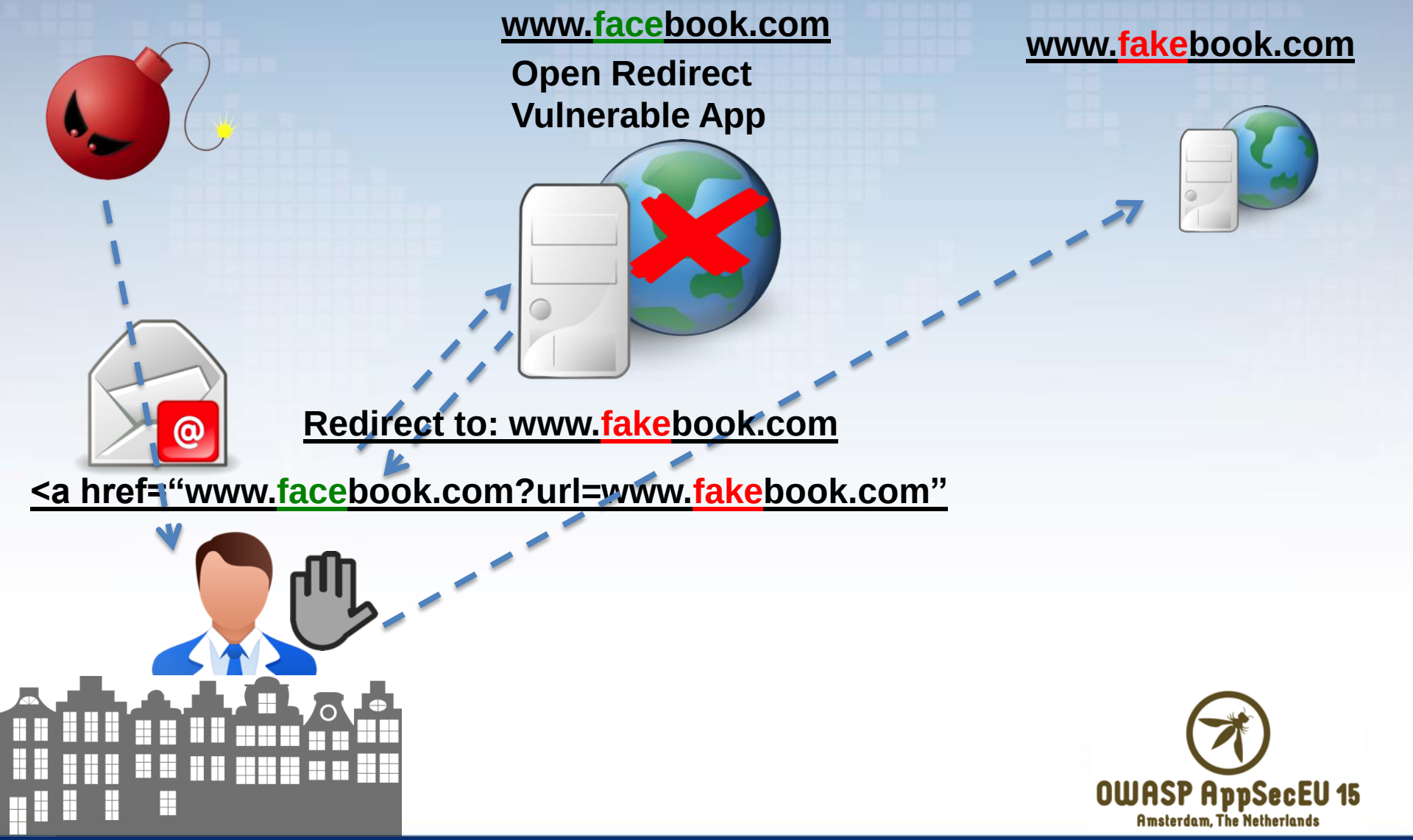
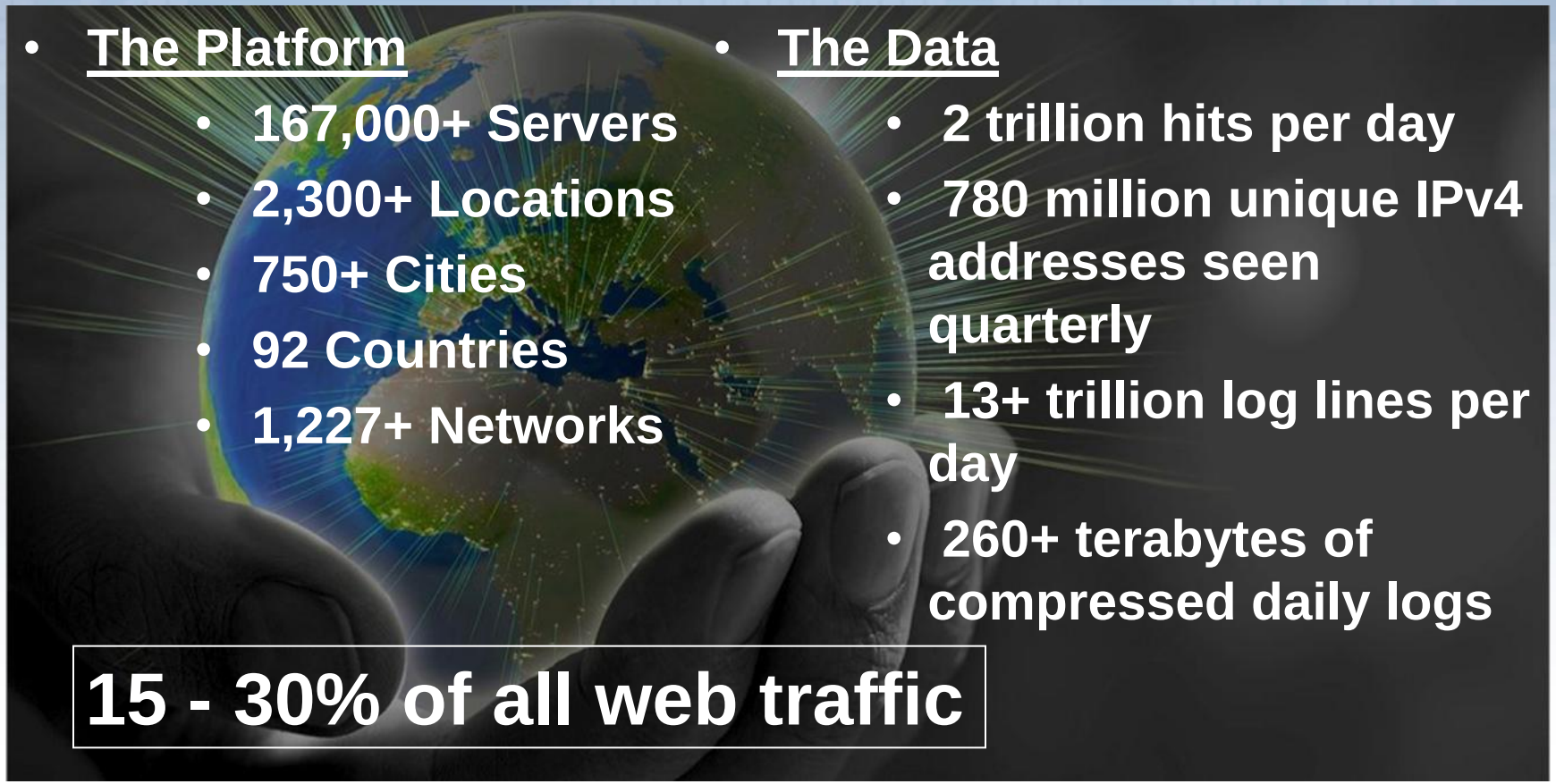
Phishing with Open Redirect



The Akamai Intelligent Platform



- **The Platform**
  - 167,000+ Servers
  - 2,300+ Locations
  - 750+ Cities
  - 92 Countries
  - 1,227+ Networks
- **The Data**
  - 2 trillion hits per day
  - 780 million unique IPv4 addresses seen quarterly
  - 13+ trillion log lines per day
  - 260+ terabytes of compressed daily logs

15 - 30% of all web traffic

Step #1 - Attacker's Activity

Same attacker to vulnerable page

Redirection to **1732** different domains

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Step #2 – Attack Activity

Excessive Access to vulnerable page

Originated from **1026** IP Addresses

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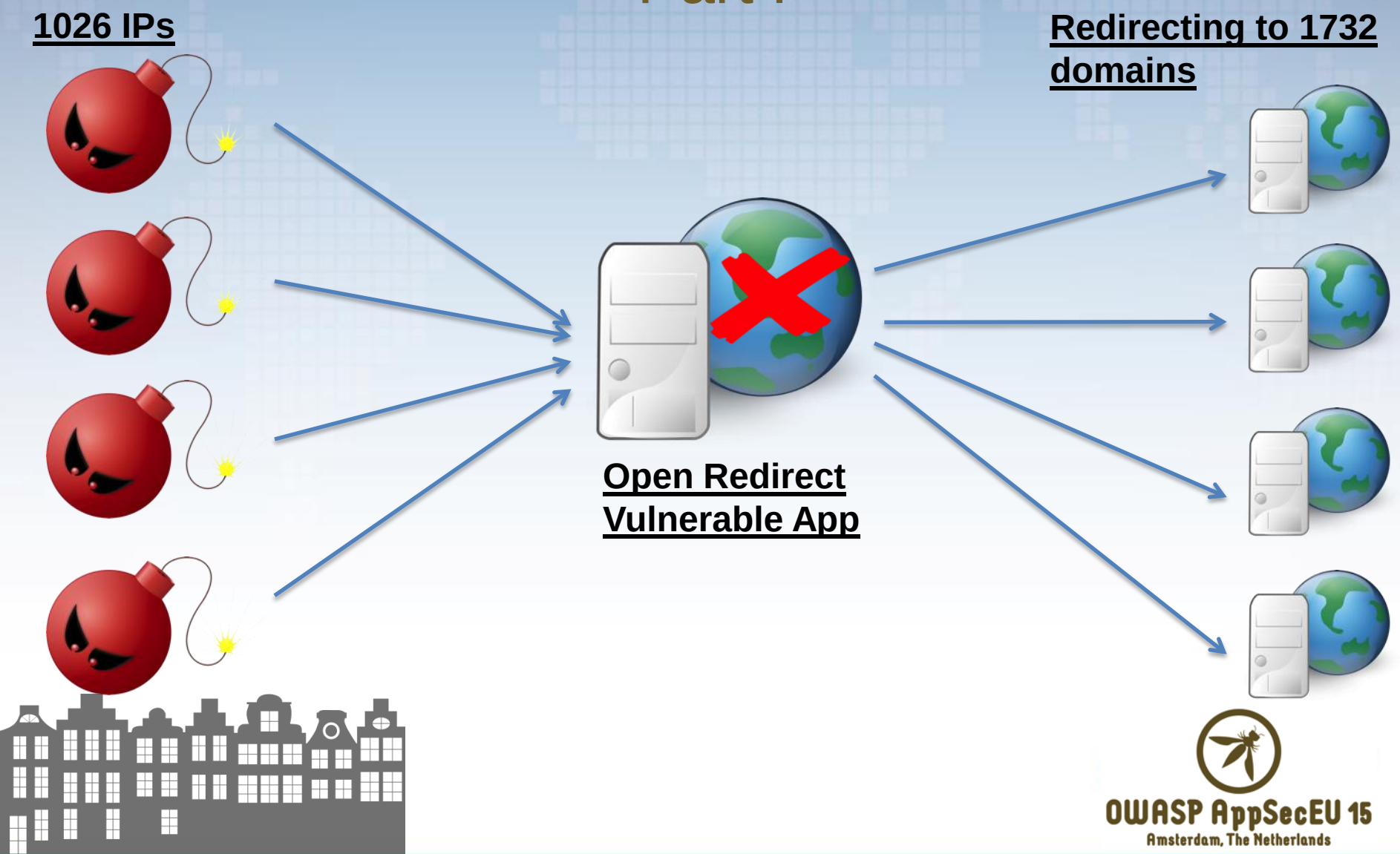
What Have We Seen So Far

Part I



Step #3 – Attackers' Activity

Same attackers web applications

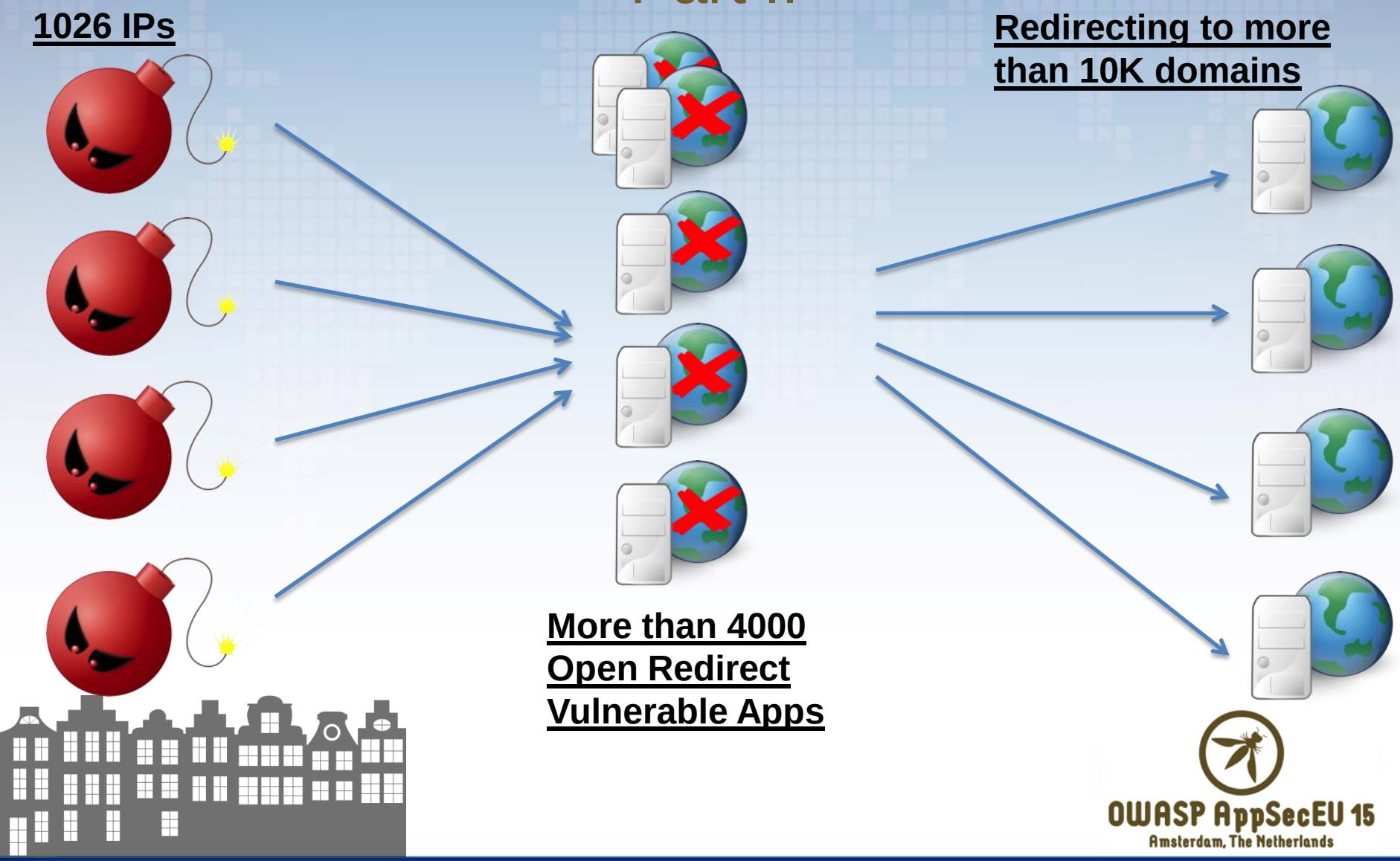
other

Abusing more than **4000** vulnerable applications

Redirecting to more than **10K** different domains

What Have We Seen So Far

Part II



Step #4 – Attackers' Common Denominator

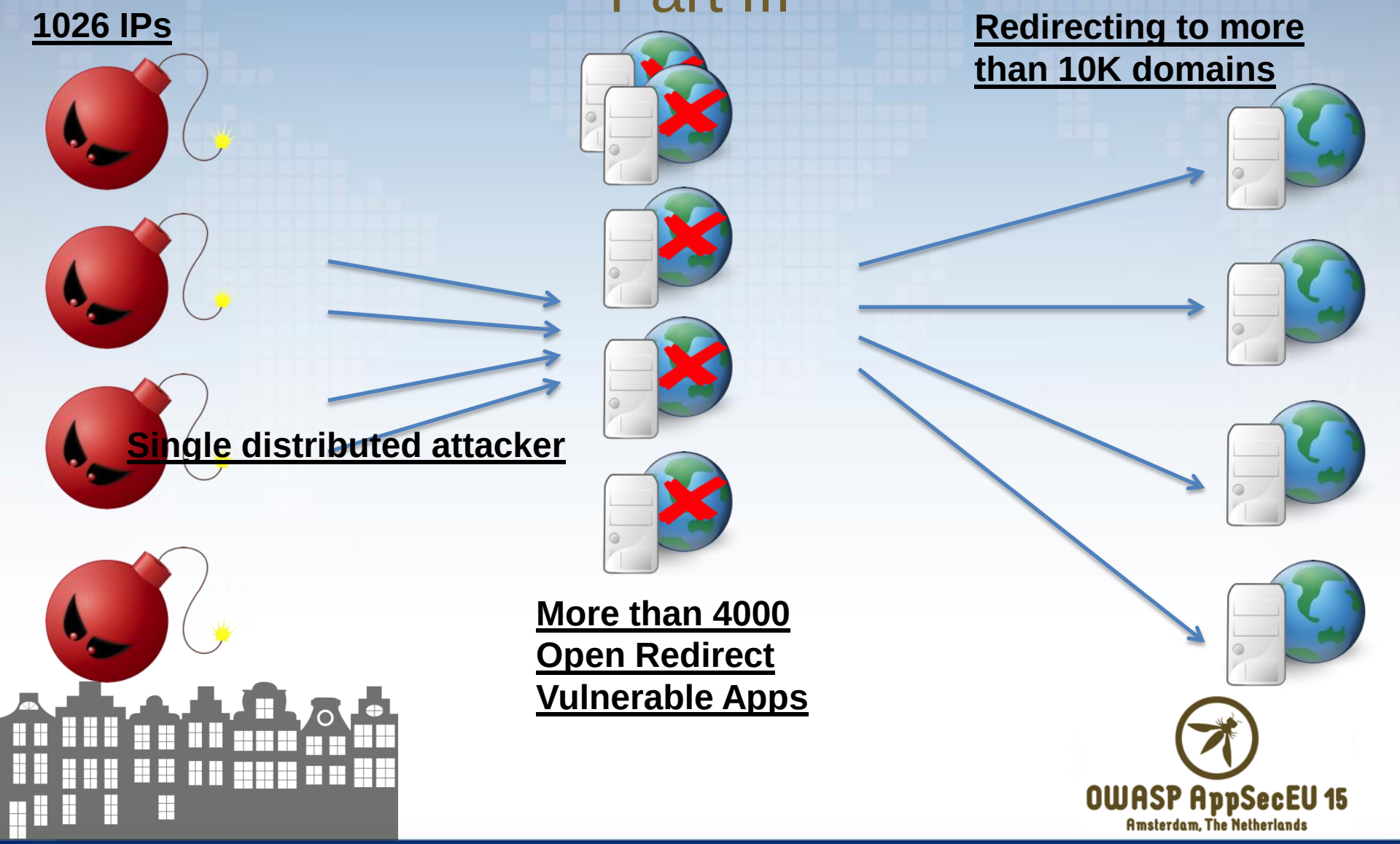
Same User-Agent header value

Opera/9.80 (Windows NT 6.2; Win64; x64) Presto/2.12.388 Version/12.16

1026 IP Addresses → Controlled by same attacker

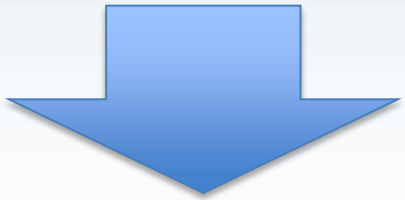
What Have We Seen So Far

Part III



Step #5 – Security Data Intelligence

- 10K domains – legitimate applications
- 1K IP address - ~40% are proxies
- 4K vulnerable apps – among them Fortune1000 companies



Part of Search Engine Optimization (SEO) attack

SEO Campaign – The Bigger Picture

www.HighRanked.com

www.LowRanked.com

Redirect to: www.LowRanked.com

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What We Get Out of This Story?

- Open redirect is being maliciously used beyond phishing and malware infection
- Cloud based threat intelligence is critical tool for detecting emerging threats
- Attacks scale when $money driven objectives are involved
- We need to:
  - know “How to” detect & defend against such attacks
  - look beyond OWASP Top 10

How To: Analytics

The logs will look like this:

- ::1 - - [10/May/2015:15:06:00 +0300] "GET /redirect.php?link=http://www.google.com HTTP/1.1" 200 412
- ::1 - - [10/May/2015:15:06:00 +0300] "GET /redirect.php?link=http://www.google.com HTTP/1.1" 200 412
- ::1 - - [10/May/2015:15:00:23 +0300] "GET /redirect.php?link=http://www.ShadyDomain.net/act/info.php?a%5B%5D=%3Ca+href%3Dhttp%3A%2F%2Flowscore.com%%3C%2Fa%3E HTTP/1.1" 200 461
- ::1 - - [10/May/2015:15:06:00 +0300] "GET /redirect.php?link=http://www.google.com HTTP/1.1" 200 412
- ::1 - - [10/May/2015:15:00:38 +0300] "GET /redirect.php?link=http://www.StrangeDomain.com
- /?a%5B%5D=%3Ca+href%3Dhttp%3A%2F%2Flowscore.com%2F HTTP/1.1" 200 399
- ::1 - - [10/May/2015:15:06:00 +0300] "GET /redirect.php?link=http://www.google.com HTTP/1.1" 200 412

How To: Read The Traces

Template based signature - Identify external URL parameters in your application.

Egrep ‘(..{0,10})\?=https?://[^s]/[a-zA-Z0-9.]+’ access.log

How To: Read the traces

Parameter Name	Number of unique domains
link=	8000
url=	2000
A=	0
Amount=	0
Help=	0

How To: Read The Traces

Order by accessed domains(Sort | uniq –c) - Identify your usual links, domains related to your industry and common websites.

How to: Read the traces

Domain	Counter
http://www.yourdomain.com	10000
http://www.google.com	800
http://www.strangedomain1.com	10
http://www.strangedomain2.com	5

How To: Read The Traces

Common Indicator (signature based)- A Indicator of Compromise (IoC) is the word “info.php?a[]”, due to a known SEO technique abusing it.

Grep ‘info.php?a%5b%5d’

How To: Analytics

The logs will look like this:

::1 - - [10/May/2015:15:00:23 +0300] "GET /redirect.php?link=http://www.strangedomain.com/act/

info.php?a%5B%5D

=%3Ca+href%3Dhttp%3A%2F%2Flowscore.com%2F HTTP/1.1" 200 461

How to: Read the Traces

- **Template based signature**
- **Order by accessed domains**
- **Common Indicator (signature based)**

How to: Execute Defensive Coding

- Quoting OWASP:
  - "Force[illegible]redirects to first go [illegible]ugh a page notifying use[illegible] going off of your site, a[illegible]ve them click a [illegible] confirm."
- Use a whitelist approach of valid redirect domains.
- As this is an SEO technique, disable open the access to redirect pages for robots.

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How to: Execute Defensive Coding

- Save a list of redirected domains, monitor accordingly and create a blacklist approach.
- Ensure that there are no XSS, nor HTML injections in your website.

Beyond OWASP Top 10

Few Examples:

1. Web Scraping
2. Shady Redirection/Fake products
3. DDOS Ransom

1- Web Scraping

WikiPedia: "*Web scraping (web harvesting or web data extraction) is a computer software technique of extracting information from websites.*"

In Other words, someone is harvesting application's **feature** for **financial** reasons.

Web Scraping

Web Scraper

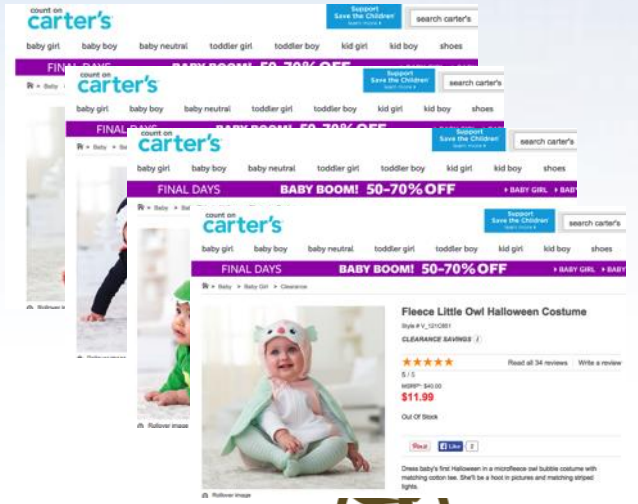
Targeted Application

GET /Catalog.php?pageId=1111

GET /Catalog.php?pageId=1112

GET /Catalog.php?pageId=1113

GET /Catalog.php?pageId=1114



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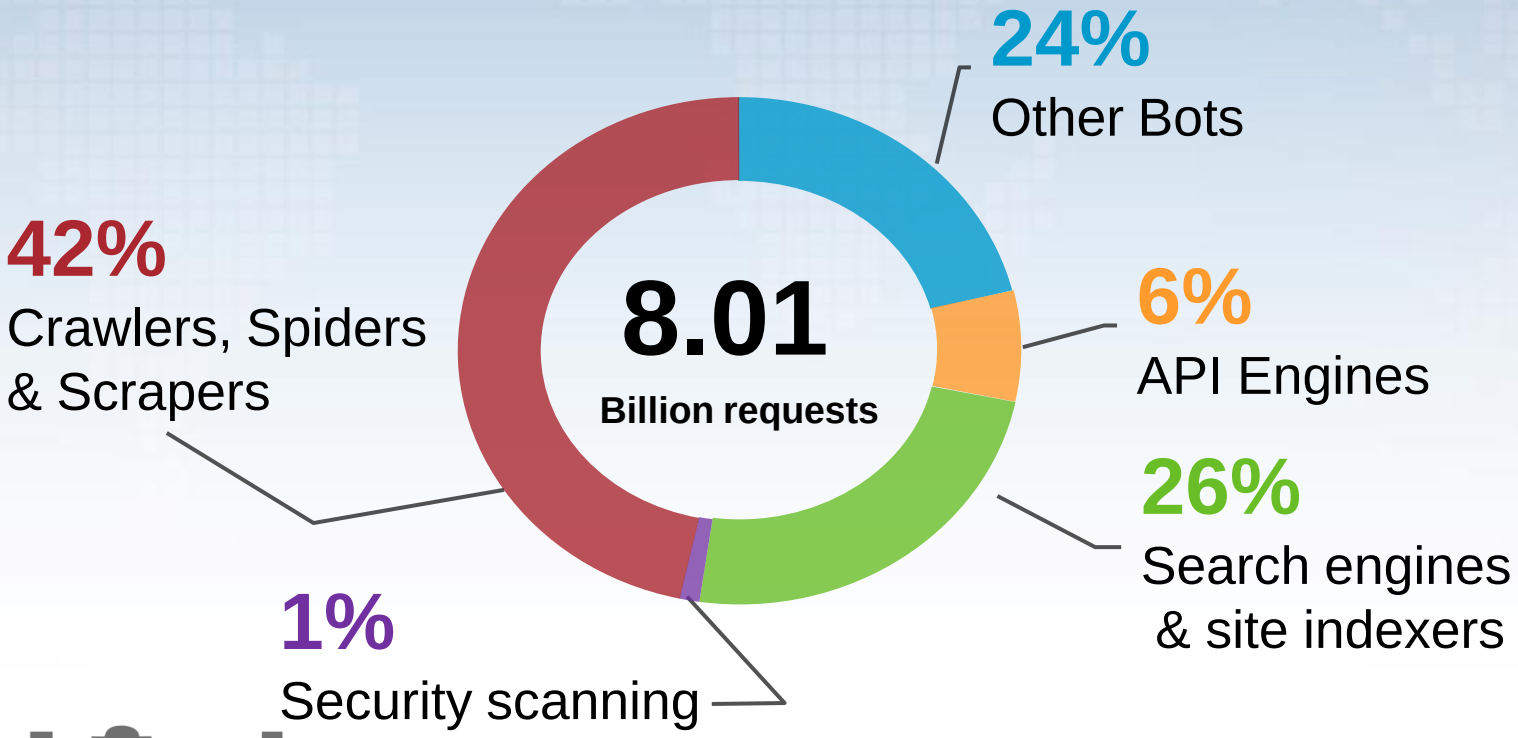
Web Scraping In The Wild

Analyzing 24 hours of data, 85,475,034,620 requests

Out of it 9.4% are Bots → 8.01 Billion



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How Web Scraping Attack Scale

- Attackers are using headless browser to evade detection (scapy, PhantomJS)
- Using Proxies and Botnet to obfuscate Identity and to load-balance traffic
- Utilize attacks by scraping industry segments

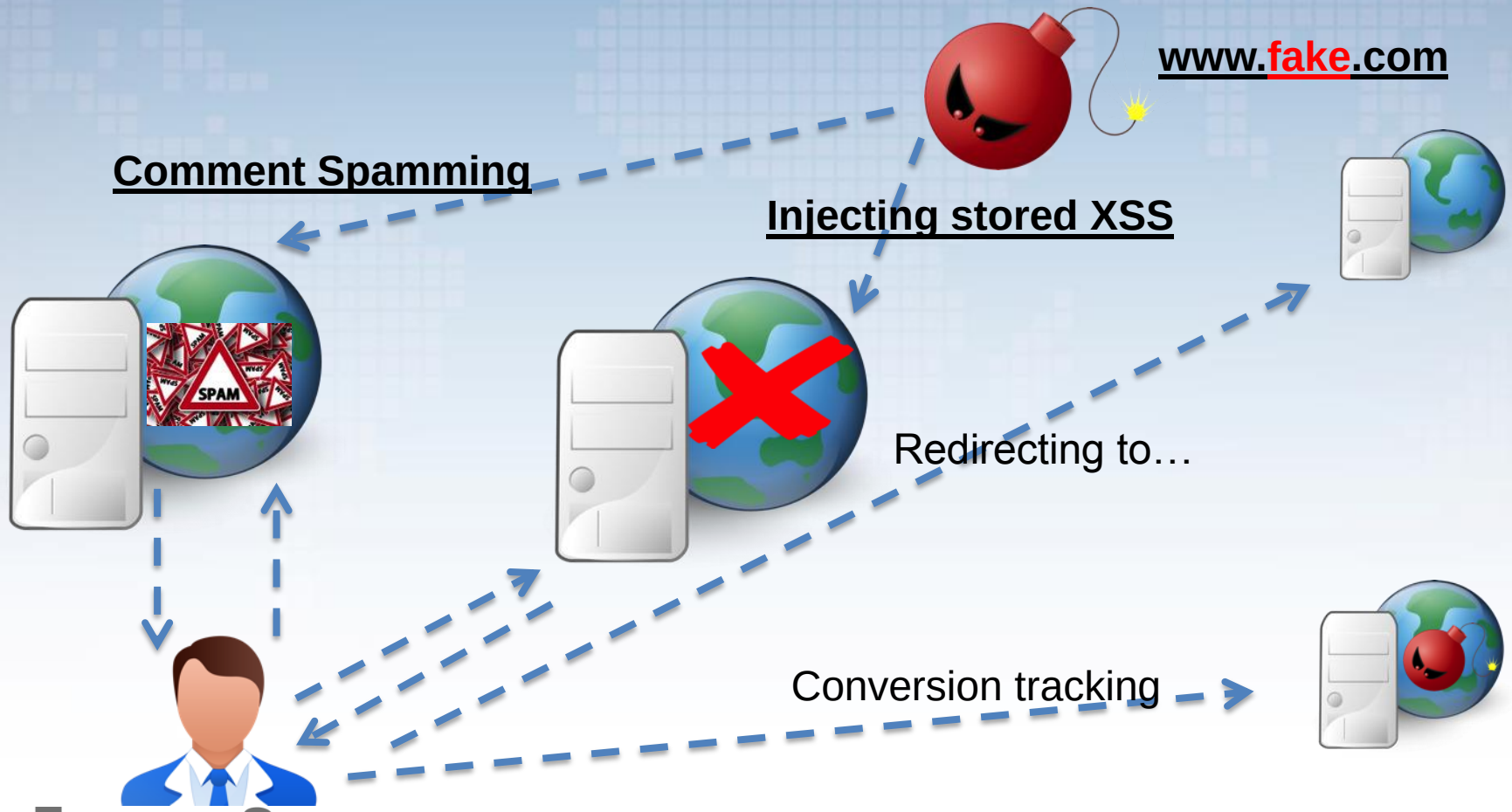
2- Shady Redirection

A phishing attack in which attacker will be redirected to a fake products shop.

What is so special?

- Attack vector that combines several attack techniques such as: stored XSS, comment spamming
- “Conversion” tracking

Phishing with Open Redirect



3- DDOS Ransom

"I have a DDoS army ready to attack. Pay $300 in 24 hours or I will crash your website again. Good day!"

Not paying

You will be DDOS'ed

Paying

become a victim for life (paying protection $money)

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Summary

- Yep, It is all about the $money
- When attackers objective is money driven attack scale
- Known attacking techniques are being used for new attacking vectors
- Known attacking techniques are being re-branded and monetized
- Call for action – moving beyond OWASP Top 10

Q&A

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Or Katz - @*or_katz*