Looking Back at Three Years of Targeted Attacks

Lessons Learned on the Attackers' Behaviors and Victims' Profiles

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3. Victims Profiles: Organizations and Individuals
4. Conclusions and Lessons Learned

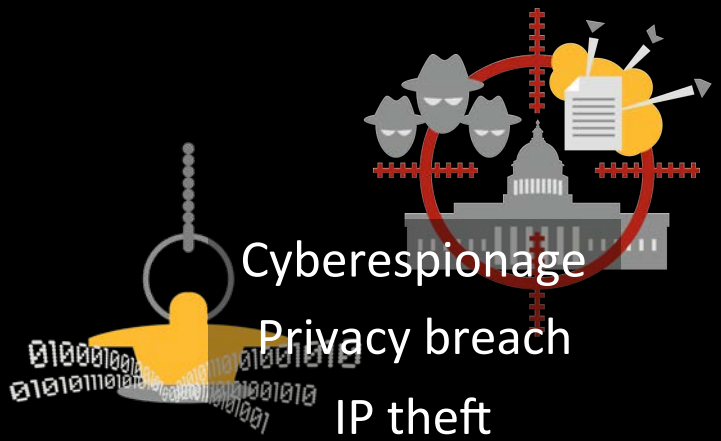
Introduction

Targeted Attacks – Symantec TRIAGE methodology

Characteristics of Targeted Attacks

Targeted

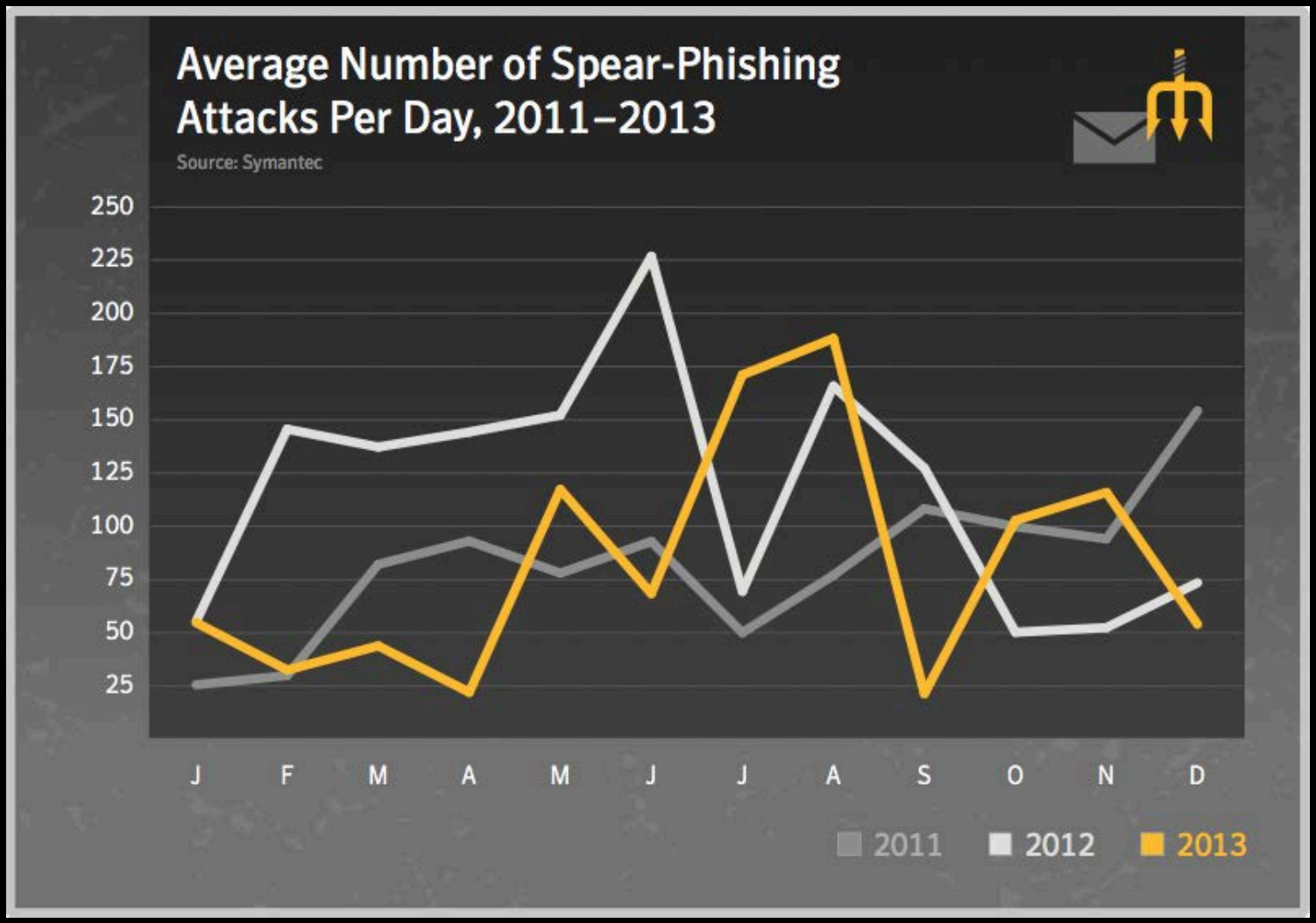
- Attack relevant to interests of recipient
- Low copy number
- Tailored malware, often embedded in weaponized documents
- Obscure business model



Non-targeted

- No regard to recipient
- High volume
- Common malware, often based on exploit kits
- Clear revenue stream

Targeted Attacks – 2011-2013



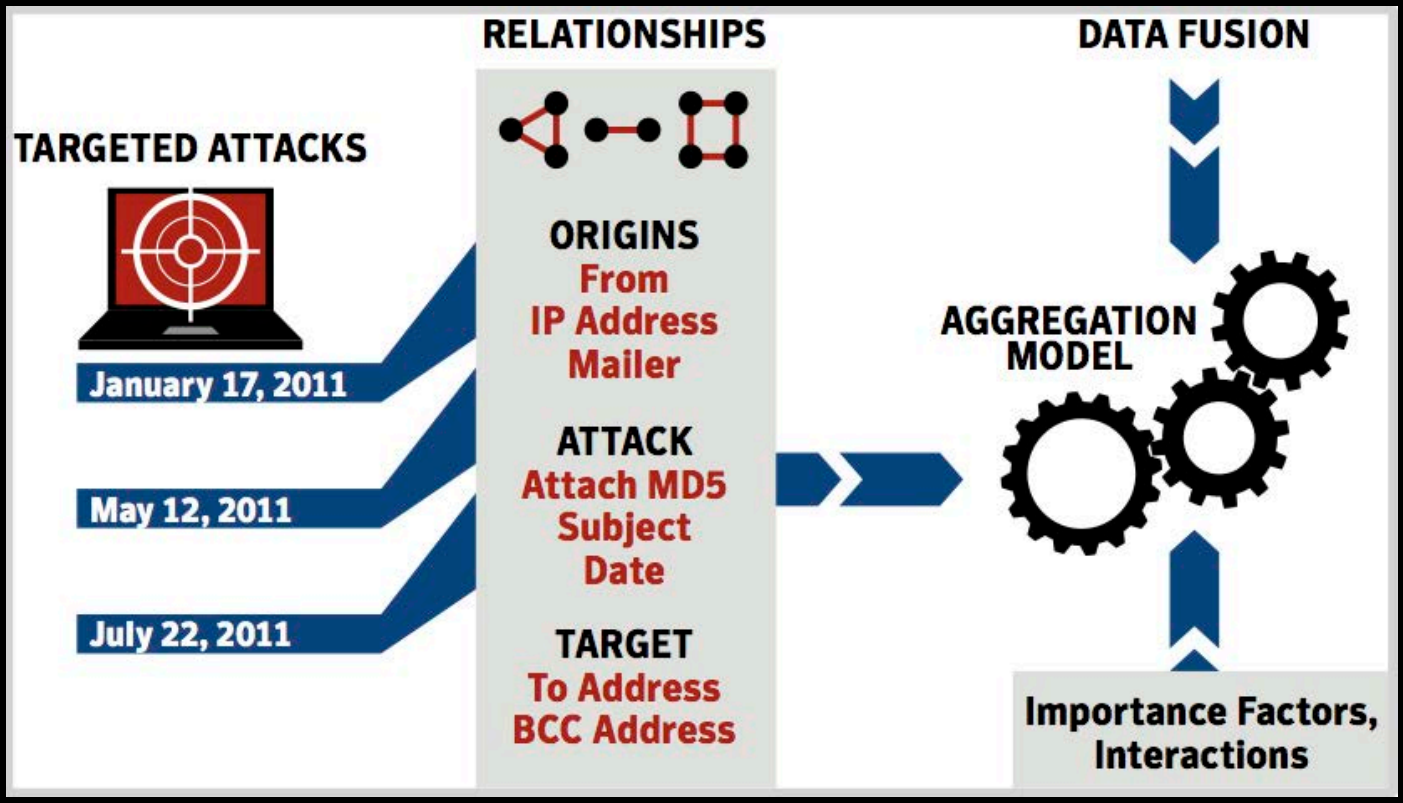
Data Set

Spear Phishing Emails

- **SKEPTIC** (and a combination of various filters/analyzers) used to block targeted attacks sent to Symantec.cloud customers
- Data set: over 100K attack emails blocked between 2011 → 2013
- Every email attachment was further analyzed:
  - AV Signatures from most common AV engines
  - Dynamic analysis: file and registry activities, network activity
- IP addresses of attackers mapped to geographical location
- Targeted recipients and domains mapped to industry sectors
  - Based on the SIC taxonomy

→ The enriched dataset was fed to TRIAGE for multi-dimensional clustering analysis and campaign/threat group identification

Going from isolated attacks to coordinated campaigns (attribution)

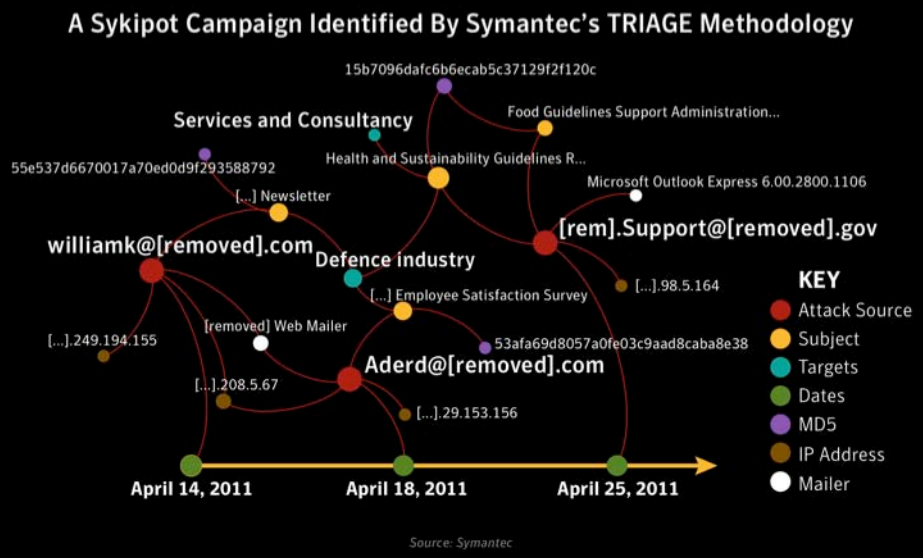


Symantec TRIAGE technology:
identifies attack campaigns performed by various threat groups

An Attack Campaign

A series of emails that:

- Show clear evidence that the subject and target has been deliberately selected.
- Contain at least 3 or 4 strong correlations to other emails, such as the topic, sender address, recipient domain, source IP address, etc.
- Are sent on the same day or across multiple days.



A Sykipot campaign (2011)

Typical Use case:

Bottom-up Forensics Analysis

- **Start from specific IOC's:**
  - **MD5**: 78c3d73e2e2bba6d8811c5dc39edd600
  - Zero-day exploit: **CVE-2012-0779**
  - **C&C**: 126.19.84.7

→ **Any previously identified campaign associated to one of these IOC's ?**

  - Find and visualize all related attacks (campaign analysis)
  - Quickly identify which "threat group" is likely behind these attacks

- **Other way around:**
  - **CommentCrew** is presumably linked to following IOC's:
    - **MD5**: e1117ec1ea73b6da7f2c051464ad9197
    - **C&C**: 50.115.140.211
    - **Exploit**: CVE-2012-0754.B

  → Can we identify an attack campaign associated to these IOC's ?

Why TRIAGE Analytics?

Intelligence Extraction and Attack Investigation

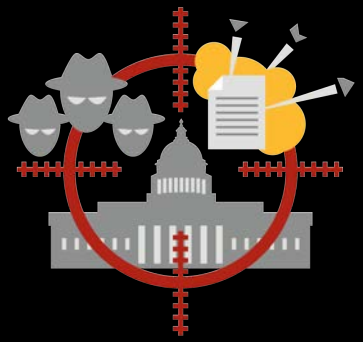
- Identify groups of attacks related to the same campaign, likely orchestrated by a specific "threat group"
- Correlate indicators across data sets, enterprises, geographies, industry sectors, etc
- Determine the patterns and behaviors of the intruders, i.e., their tactics, techniques, and procedures (TTP's)
- Find "how" they operate, rather than "what" they do
- Challenge: Intrusions sourced by the same attackers (group) may have varying degrees of correlation (md5, IP, from/to domains, attachments, etc)

Typical challenge addressed by TRIAGE

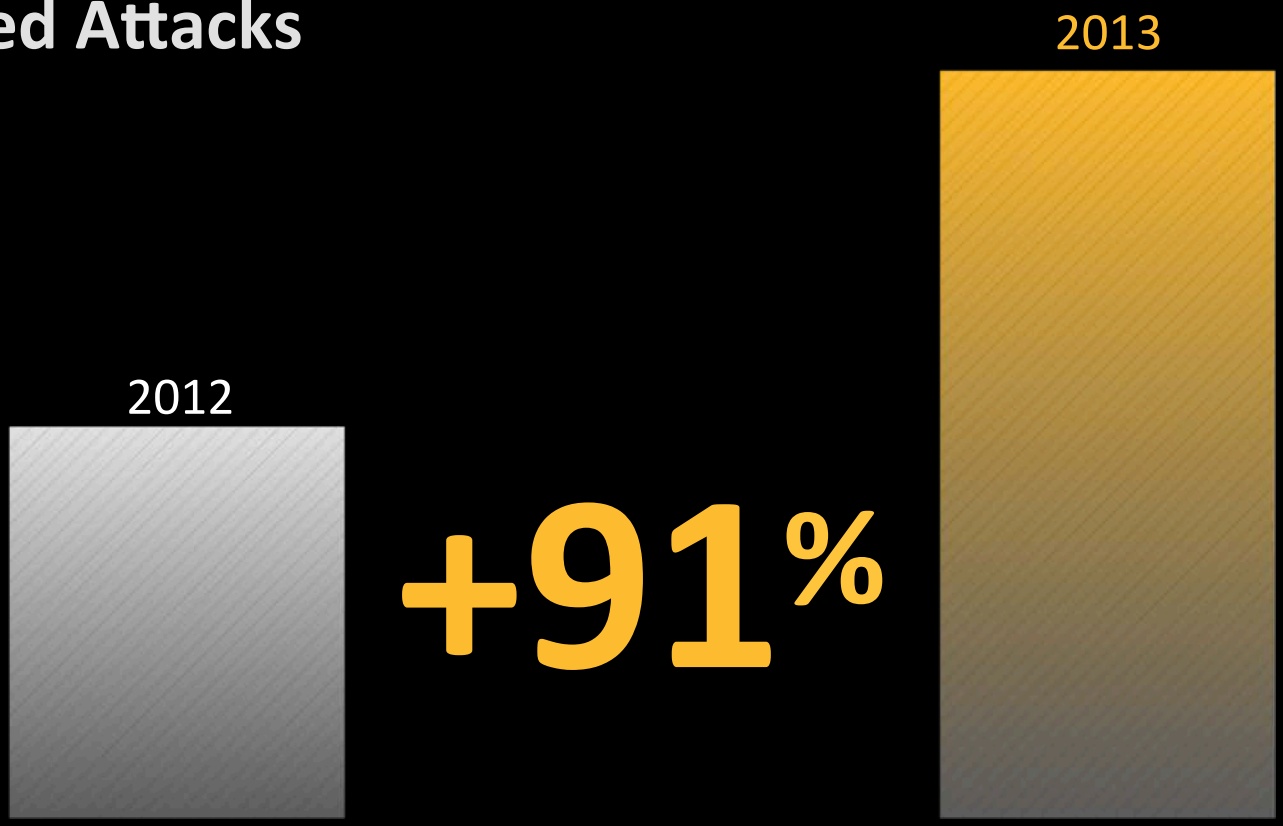
Identify Commonalities and Overlapping Indicators

Phase	Email feature	Intrusion 1	Intrusion 2	Intrusion 3
Reconnaissance	Recipient	[user1]@org1.gov.uk	[user2]@org2.gov.uk	[user3]@org2.gov.uk
Weaponization	Attach_name	Global Pulse Project***.pdf		Agenda – G20***.pdf
	Attach MD5	dd2ed3f7dead4a[***]		2e36081dd7f62e[***]
Delivery	Date	2011-05-13	2011-05-14	2011-07-02
	From addr.	[Att1]@gmail.com	[Att2]@gmail.com	
	Sender IP	74.125.83.***		74.125.82.***
	Subject	FW:Project Document	Project Document	G20 Ds Finance Key Info – Paris July 2011
	Email body	[body1]		[body2]
Exploitation	AV signature	CVE-2011-0611.C		
Persistence	C&C domains	www.webserver.***		[N/A]

Targeted Attack Intelligence

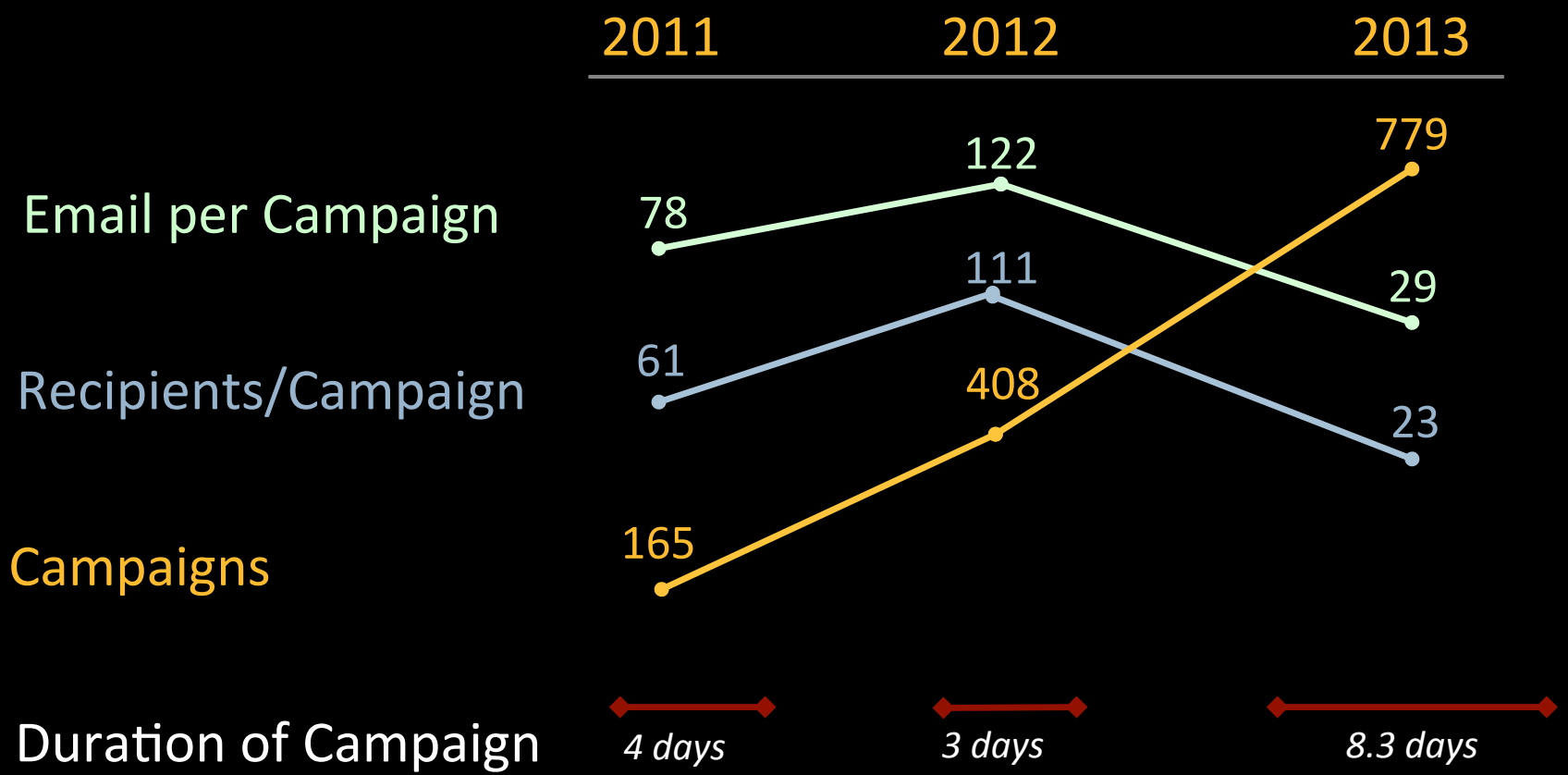


Targeted Attacks

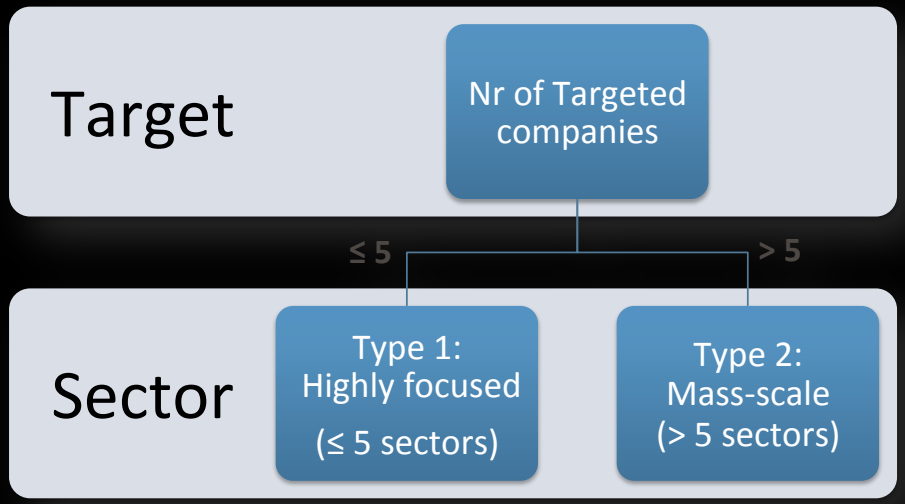


Increase in targeted attack campaigns

Targeted Attack Campaigns



Focused versus Large-scale campaigns

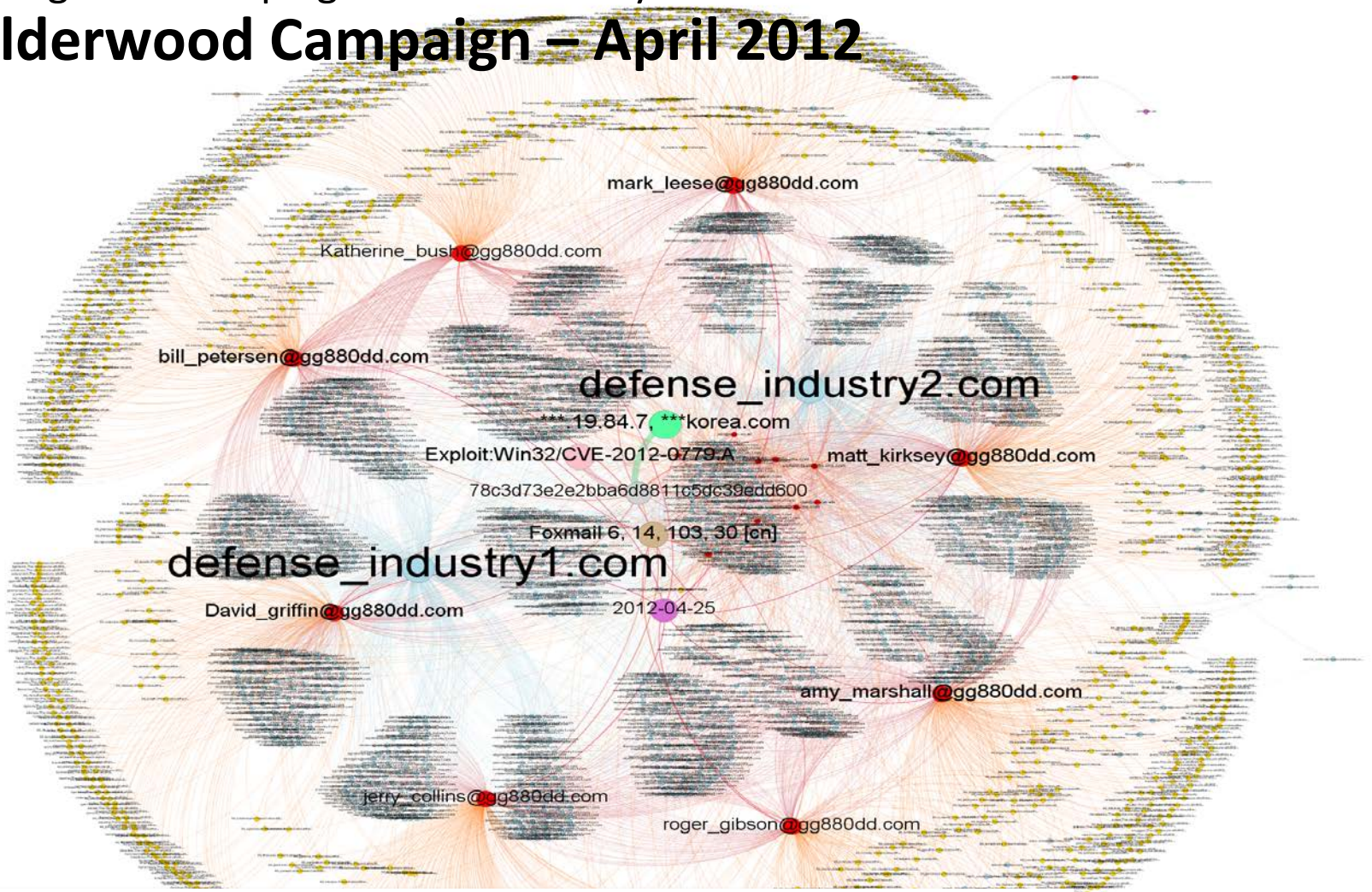


Type 1: More focused campaigns : **68 %**

Type 2: Mass-scale (MOTA): **32 %**

"Targeted" campaign does not always mean small in size!

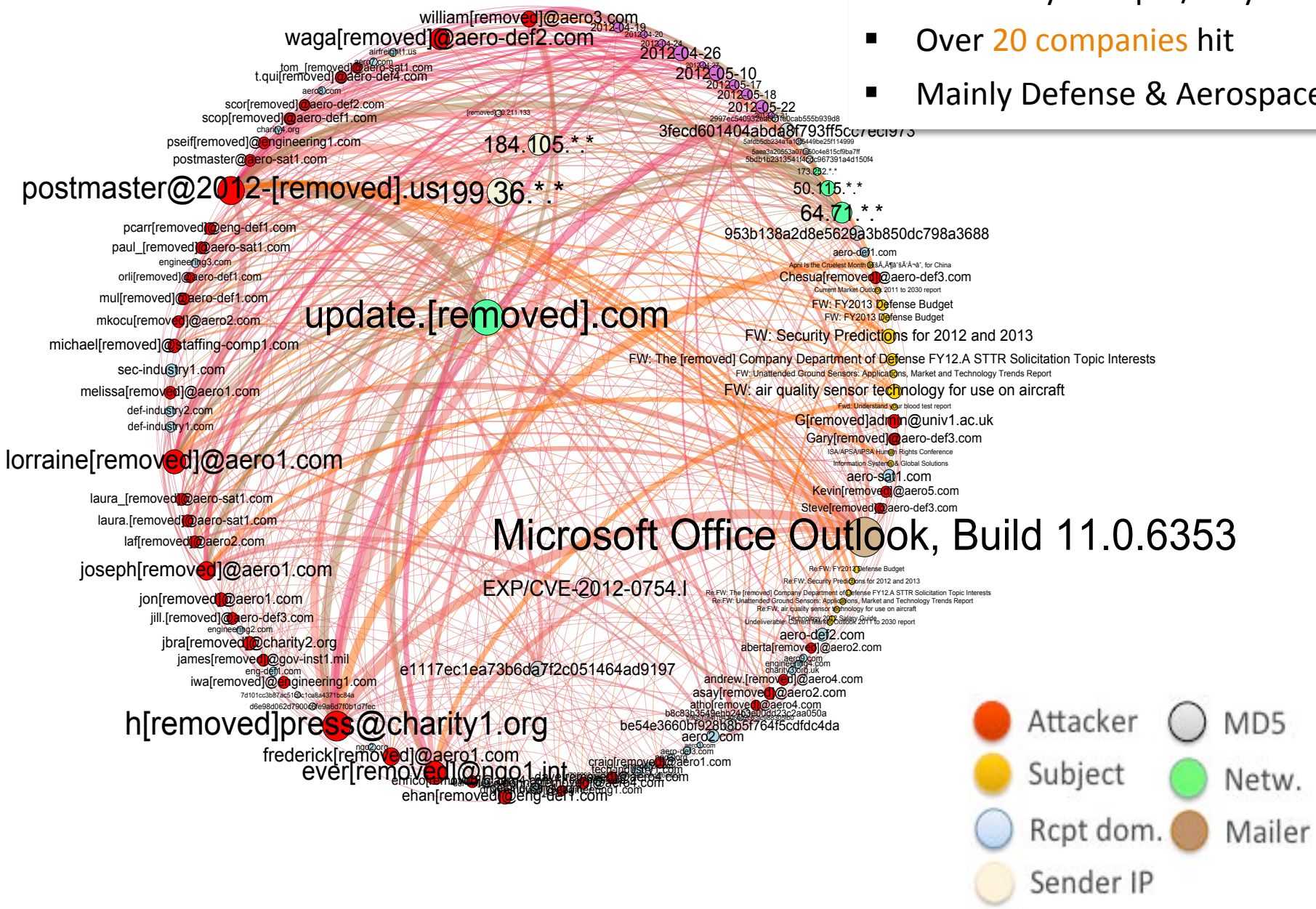
Elderwood Campaign – April 2012



- An Elderwood Campaign that used "gg880dd.com" accounts
- Over 1,800 attacks on **April 25, 2012**
- Exploits CVE-2012-0779 (**disclosed May 5, 2012**)
- Was targeting only 2 large Defense/Manufacturing industries

APT1/CommentCrew - CVE-2012-0754/0158

- 1200+ attacks
- On 10 days in April/May
- Over 20 companies hit
- Mainly Defense & Aerospace

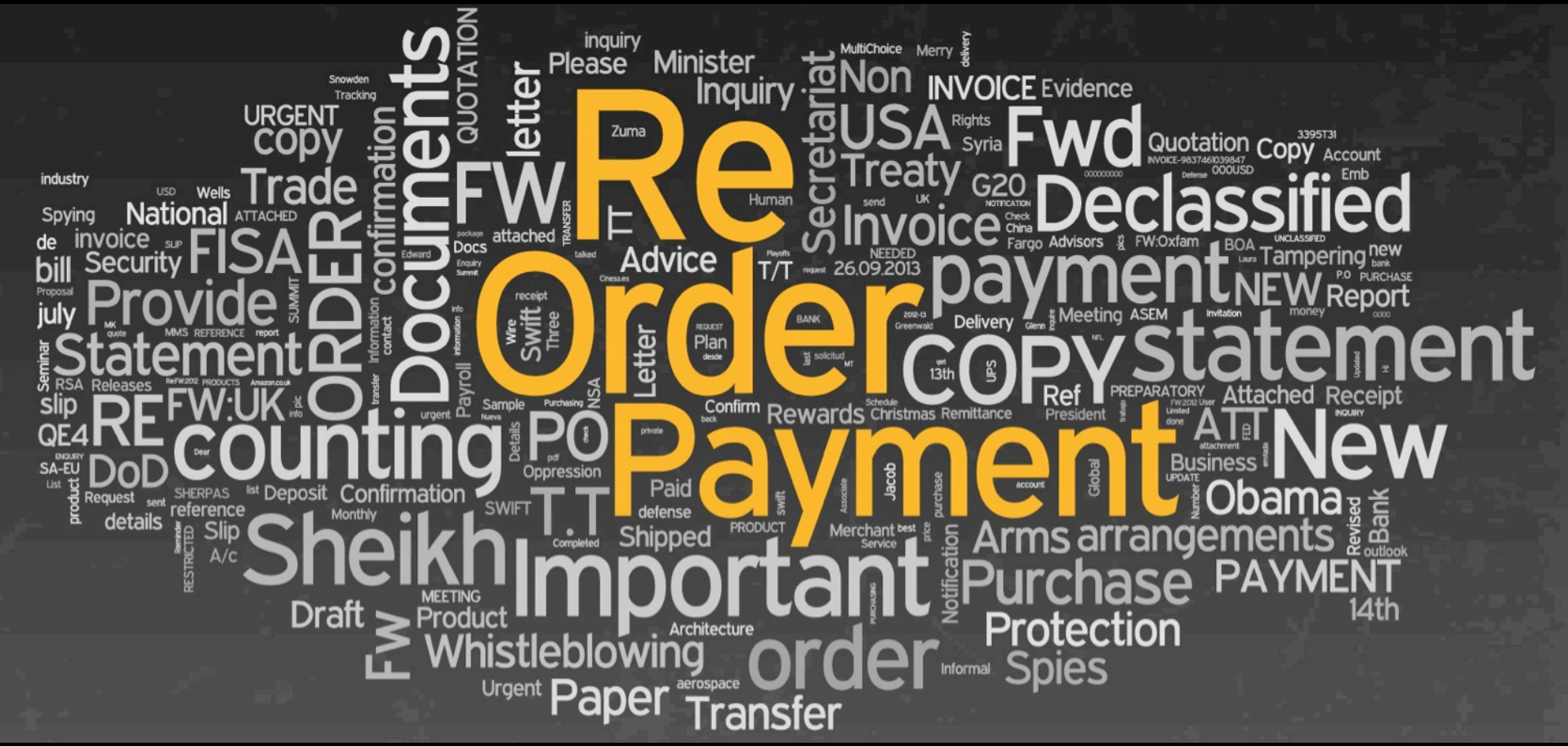


Doc types

Executable type	2013	2012
.exe	31.3%	39%
.scr	18.4%	2%
.doc	7.9%	34%
.pdf	5.3%	11%
.class	4.7%	<1%
.jpg	3.8%	<1%
.dmp	2.7%	1%
.dll	1.8%	1%
.au3	1.7%	<1%
.xls	1.2%	5%

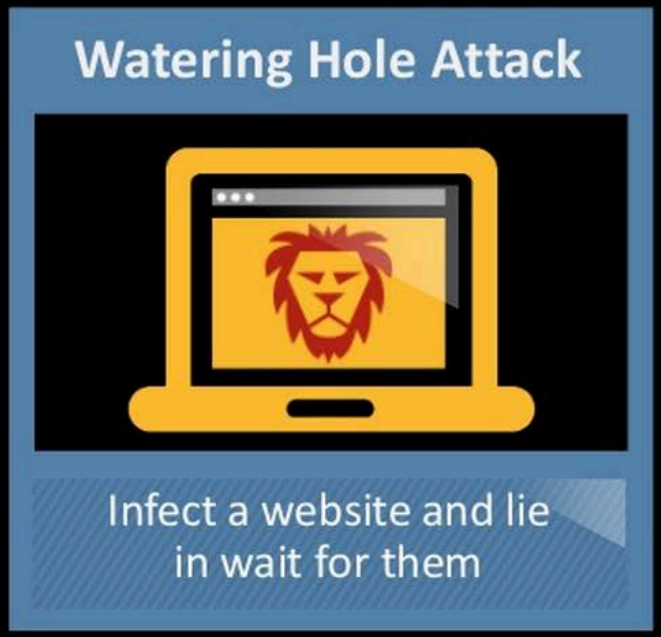
- More than 50 percent of email attachments used in spear phishing attacks were executable files in 2013.
- Microsoft Word and PDF documents are both used regularly, making up 7.9 and 5.3 percent of attachments, respectively. However, these are both down from 2012.
- Java .class files also made up 4.7 percent of email attachments used in spear phishing attacks.

Email Topics Used in Targeted Attacks



- Most frequently occurring words used in targeted spear-phishing email attacks throughout 2013.

“Watering Hole” Attacks (2012-2013)



- Targeted Attacks predominantly start as spear phishing attacks
- In 2012, Watering Hole Attacks emerged (popularized by the Elderwood Gang)

Effectiveness of Watering Hole Attacks

Watering Hole Attack in 2012

Infected 500 Companies

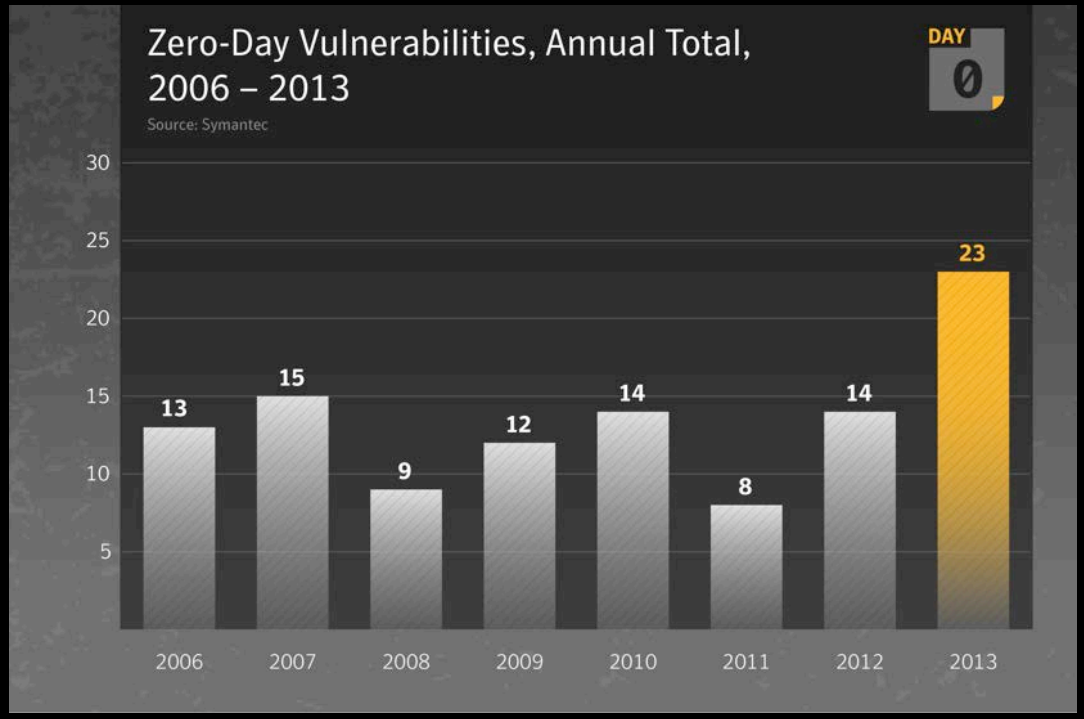
All Within 24 Hours

- Watering Hole attacks are targeted at specific groups
- Can capture a large number of victims in a very short time

Example of Watering Hole Attack

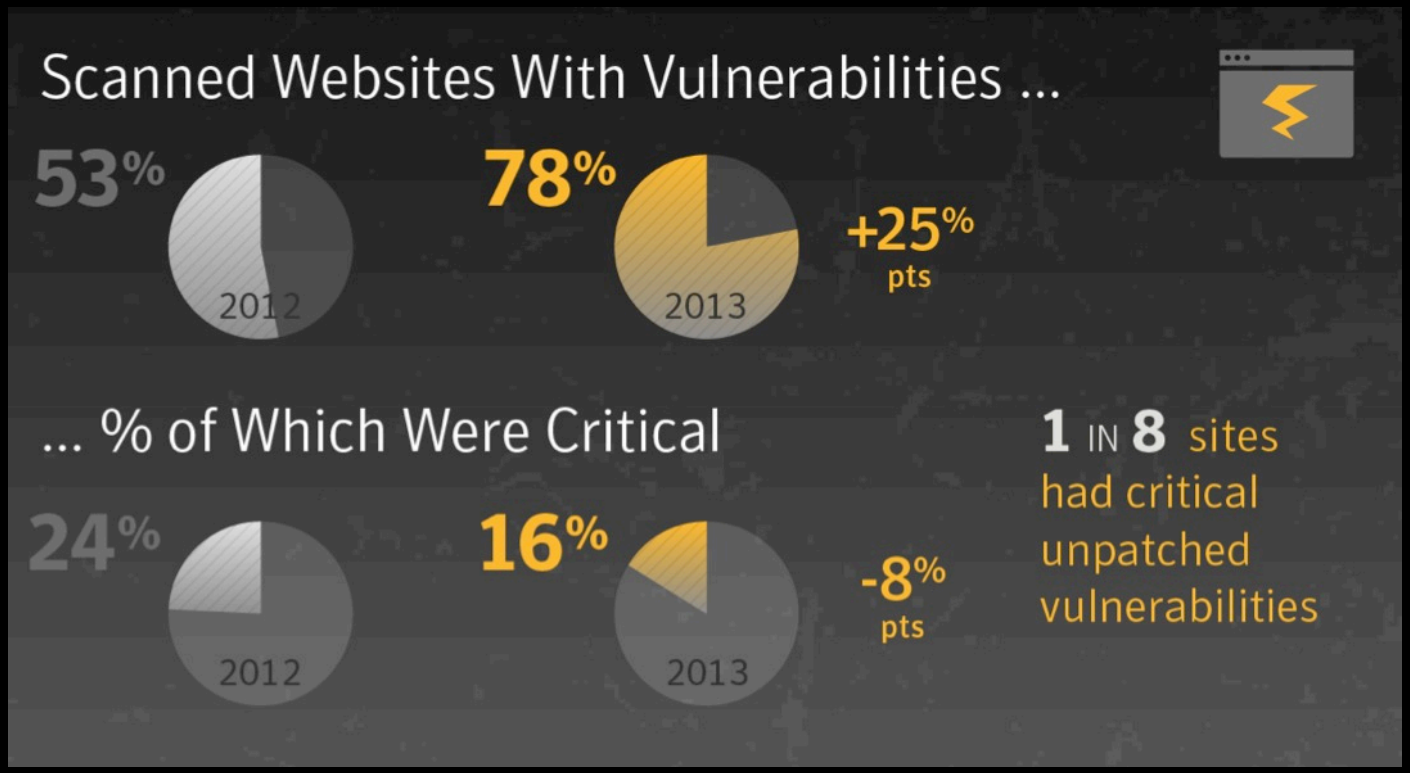
- In 2013 this type of attack will become widely used
- Several high profile companies fell victim to just such an attack

Relationship with Vulnerabilities



- There were a total of 23 zero-day vulnerabilities discovered in 2013. This is up from 14 in 2012.
- There have been more zero-day vulnerabilities discovered in 2013 than in any year since Symantec began tracking them, and more than the past two years combined.

Relationship with Vulnerabilities

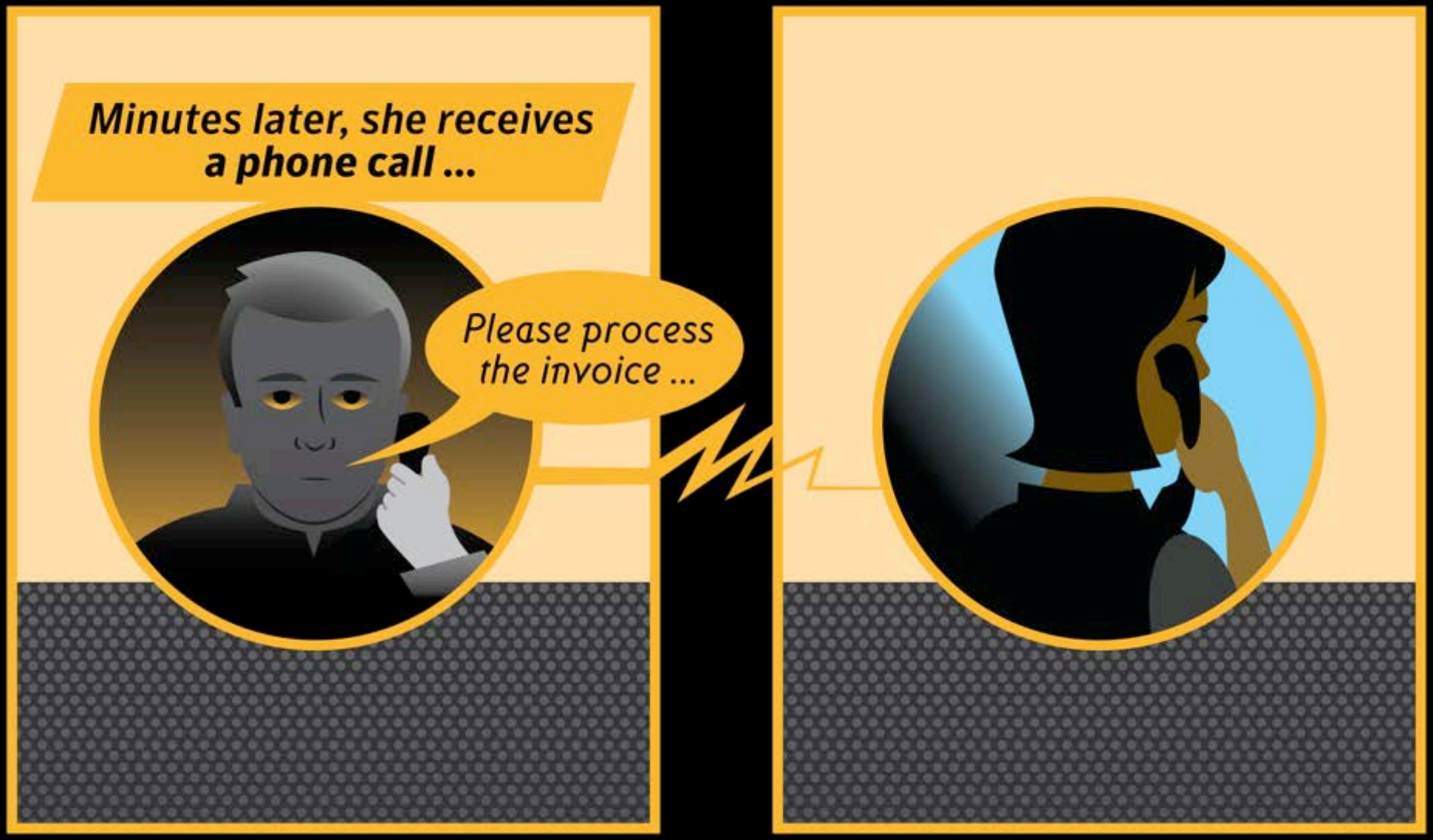


Spear-phishing campaigns are becoming more aggressive …

The "Francophoned" attack campaign

(April 2013)

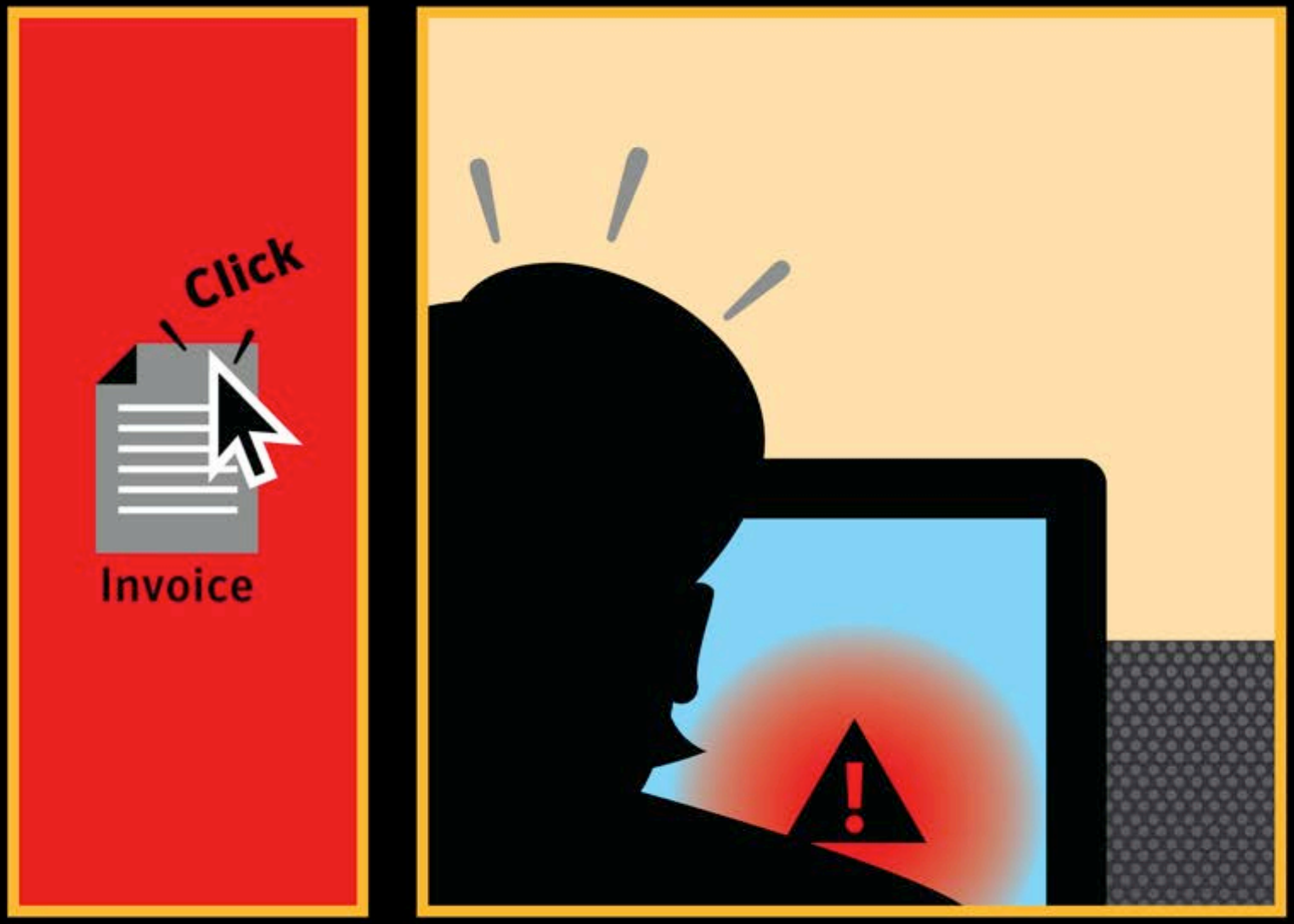
Spear-phishing campaigns are becoming more aggressive …



Attacker impersonates a high-ranked executive,

requesting the victim to open immediately the attachment …

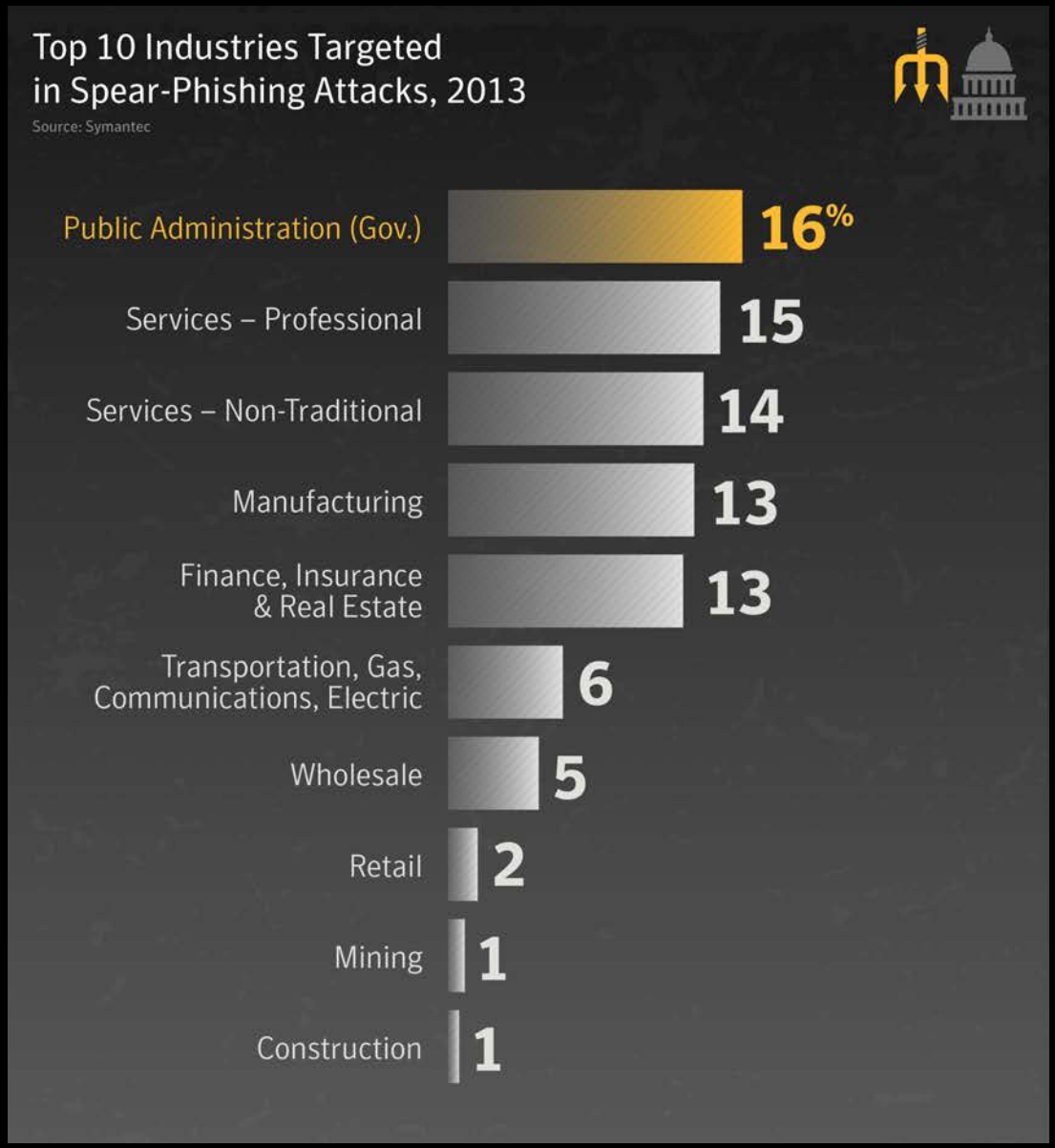
Spear-phishing campaigns are becoming more aggressive …



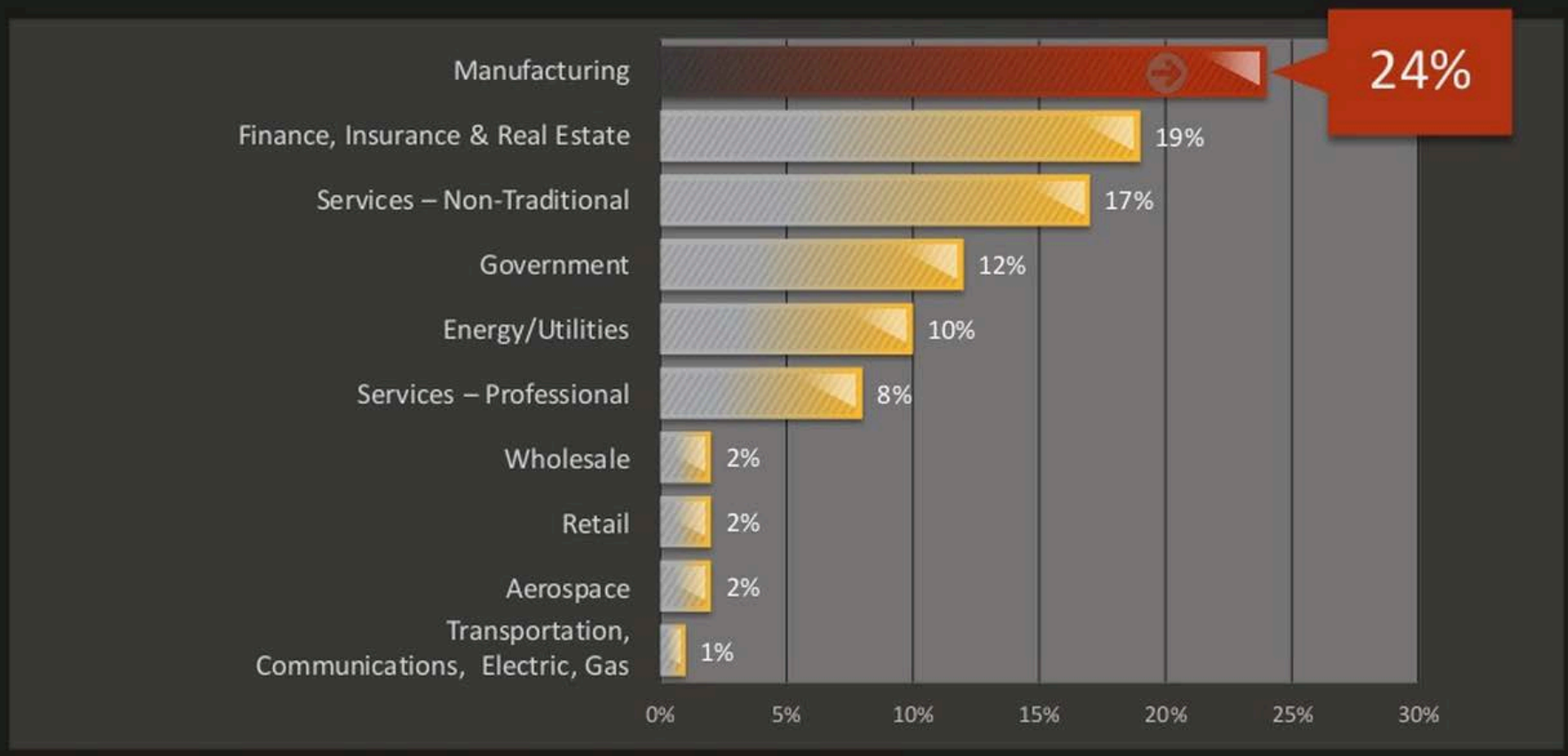
Targeted Attacks: Profiling Victims

Organizations and Individuals

Industries

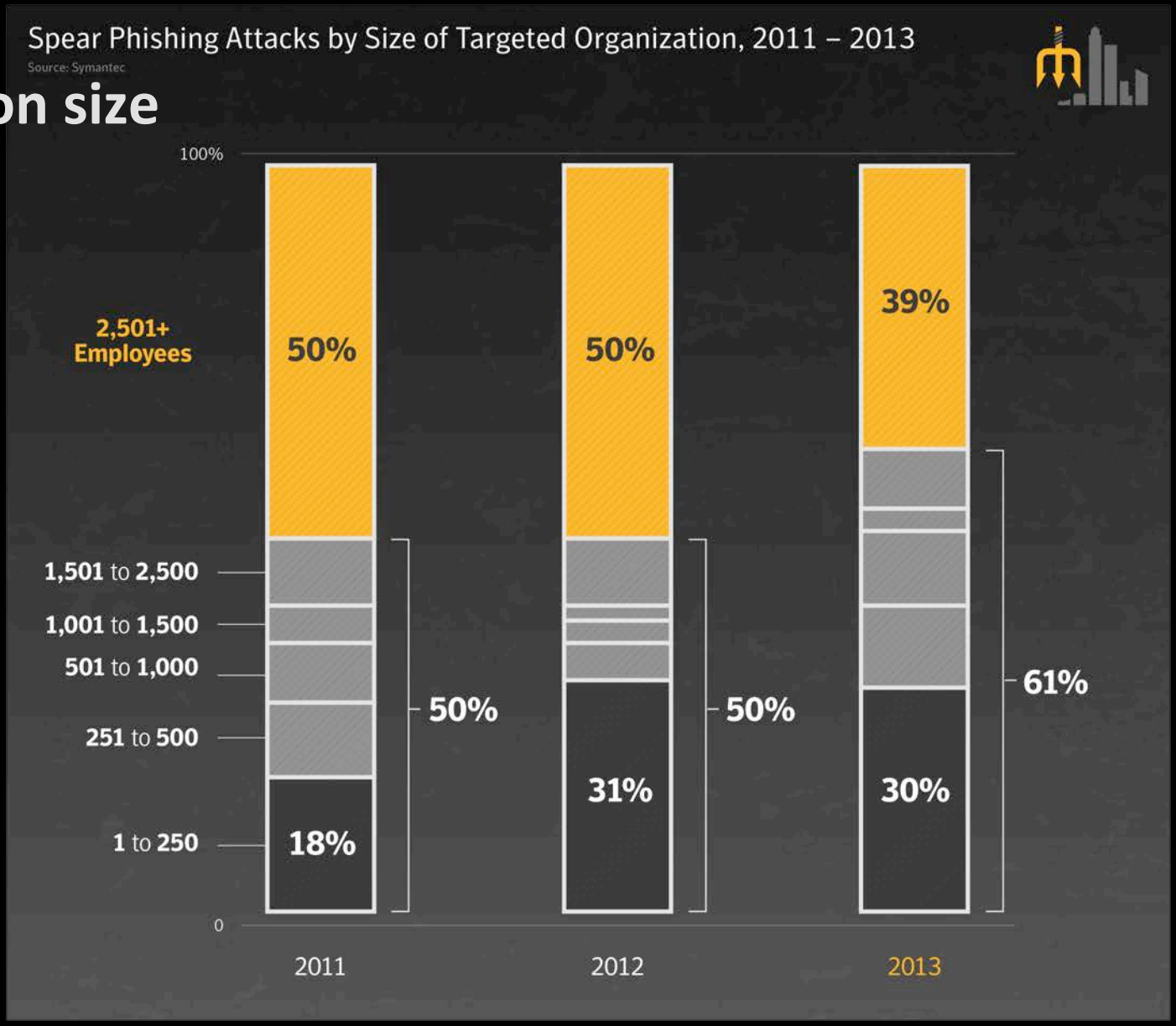

Top 10 Industries Targeted
in Spear-Phishing Attacks, 2013
Source: Symantec
Public Administration (Gov.) 16%
Services – Professional 15
Services – Non-Traditional 14
Manufacturing 13
Finance, Insurance & Real Estate 13
Transportation, Gas, Communications, Electric 6
Wholesale 5
Retail 2
Mining 1
Construction 1

Targeted Attacks by Industry in 2012



- Manufacturing moved to top position in 2012
- But all industries are targeted

Organization size



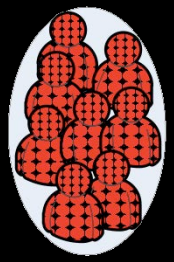
Risk Analysis

Epidemiology Concepts

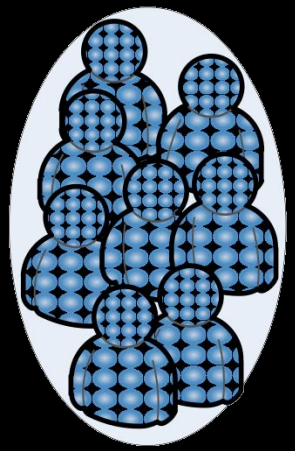
Afflicted group

Identified "Factor"

Similar population



- #subjects with factor
- #subjects without factor



- #subjects with factor
- #subjects without factor

Control group

Epidemiology Concepts

Odds Ratio (OR): Calculate strength of association of factor with "diseased" state by comparing probabilities.

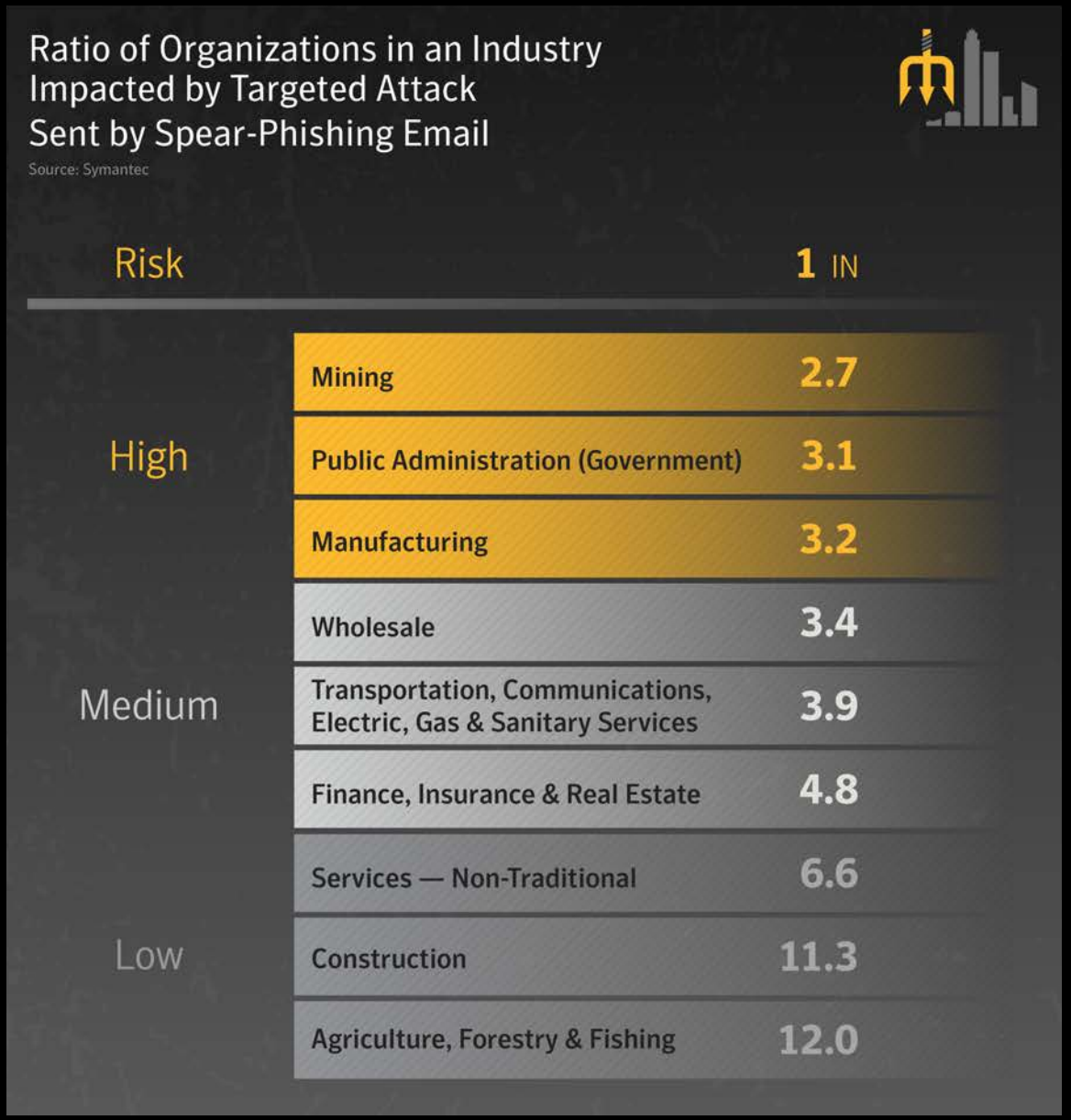
	Diseased (afflicted)	Control (unafflicted)
With risk factor	p_{11}	p_{10}
Without risk factor	p_{01}	p_{00}

$$OR = \frac{p_{11} \times p_{00}}{p_{10} \times p_{01}}$$

Odds ratio > 1 ➔ positive correlation

< 1 ➔ negative correlation

"At-Risk" Industries



“At-Risk” Organizations by Size

"At-Risk" Individuals

Based on data collected from:

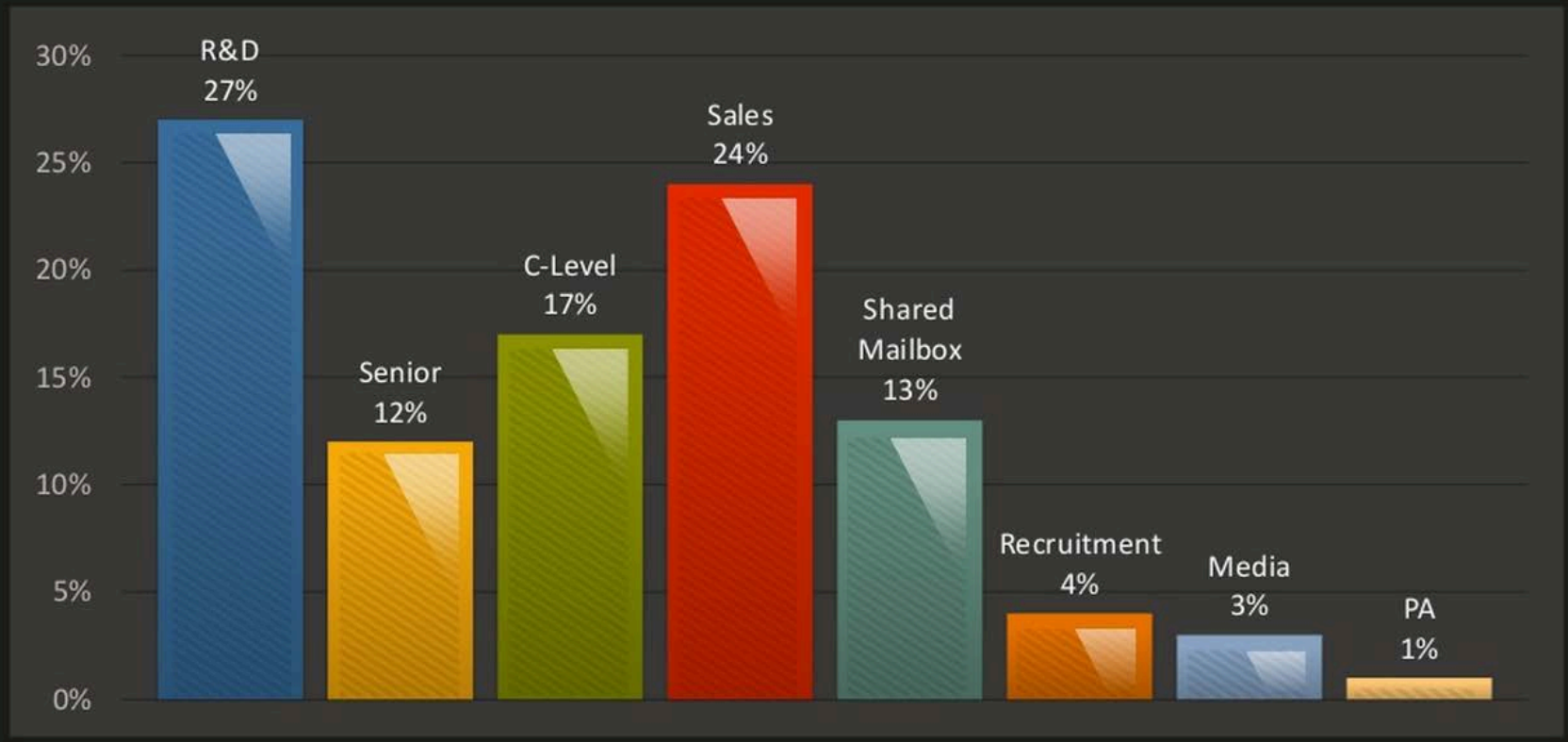
Most Likely To Be Targeted in 2013

Personal Assistant at a Large Mining company

To: JohnDoe@drillanddig.com
Subject: Re: Order Payment
From: Attacker

Please click on this executable to see your order information.

Targeted Attacks by Job Function in 2012



- Attacks may start with the ultimate target, but often look opportunistically for any entry into a company

Conclusions – Lessons Learned

Targeted Attacks – Lessons Learned

- The Number of **Targeted Attacks has steadily increased** over the last few years
- Campaigns are becoming more persistent, more diverse and widespread (sometimes even automated), more prevalent
- Increases in zero-day vulnerabilities and unpatched web sites facilitate **move to watering hole style** targeted attacks
- Most industries are at elevated risk, in particular in favorable economic markets or government-related areas, and large organisations
- **Users continue to fall for social engineering tricks** and are not applying street smarts to online activity
- Urgent need for more advanced intelligence capabilities to better defend ourselves against such attacks (moving target)

Thwarting Targeted Attacks

Security Intelligence	• Human Intelligence regarding active and anticipated attack campaigns, targeted attacks, and emerging threats
Holistic Security Monitoring	• Use full capabilities of monitoring solutions to provide full visibility into security posture and events across the entire enterprise footprint
Removable Media Device Control	• Restrict removable devices and functions to prevent malware infection
Email & Web Gateway Filtering	• Scan and monitor inbound/outbound email and web traffic and block accordingly
Data Loss Prevention	• Discover data spills of confidential information that are targeted by attackers • Detect and prevent exfiltration of confidential information that are targeted by attackers
Encryption	• Create and enforce security policies so all confidential information is encrypted
Incident Preparedness & Response	• Ensure formal Incident Response capabilities are in place and fully tested • Conduct periodic penetration tests and red-team exercises to evaluate defense and response capabilities from the perspective of an attacker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Thank you!

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2013 was the Year of the **Mega Breach**