

# Welcome

## Security Lessons from Verizon's Analysis of 42,068 Security Incidents

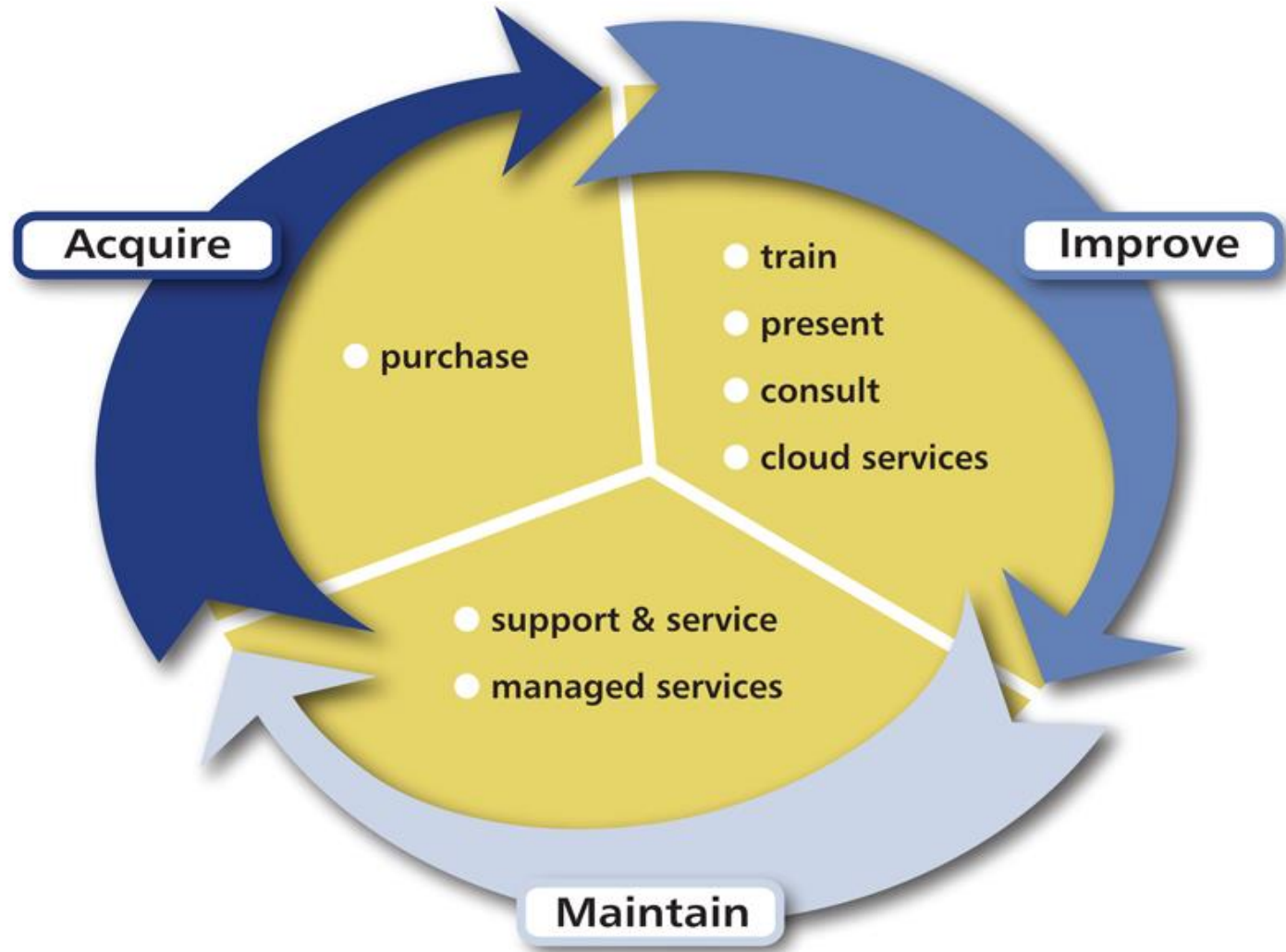
What do you hope to learn today?

Please take a moment to fill out the yellow cards.

Our presenters will review the cards to ensure we cover the topics/areas of interest.

We will collect them before we get started.

Thanks!



# Collect 'Learn Today' Cards

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# Our Management Seminar Series

- ✓ Security Lessons from Verizon's Analysis of 42,068 Security Incidents
- Learning from our 145,000 Completed IT Support Tickets and 13,750 Satisfaction Surveys
- Reducing Your IT Costs
- Evaluating Managed IT Services
- Cloud Strategy
- DR Planning
- Building a Cost Effective and Crisis Free IT Team

# Agenda

- Your security agenda
- Report basics
- Breach trends
- Incident classification patterns
- Gartner's insource/outsource recommendation
- Possible actions

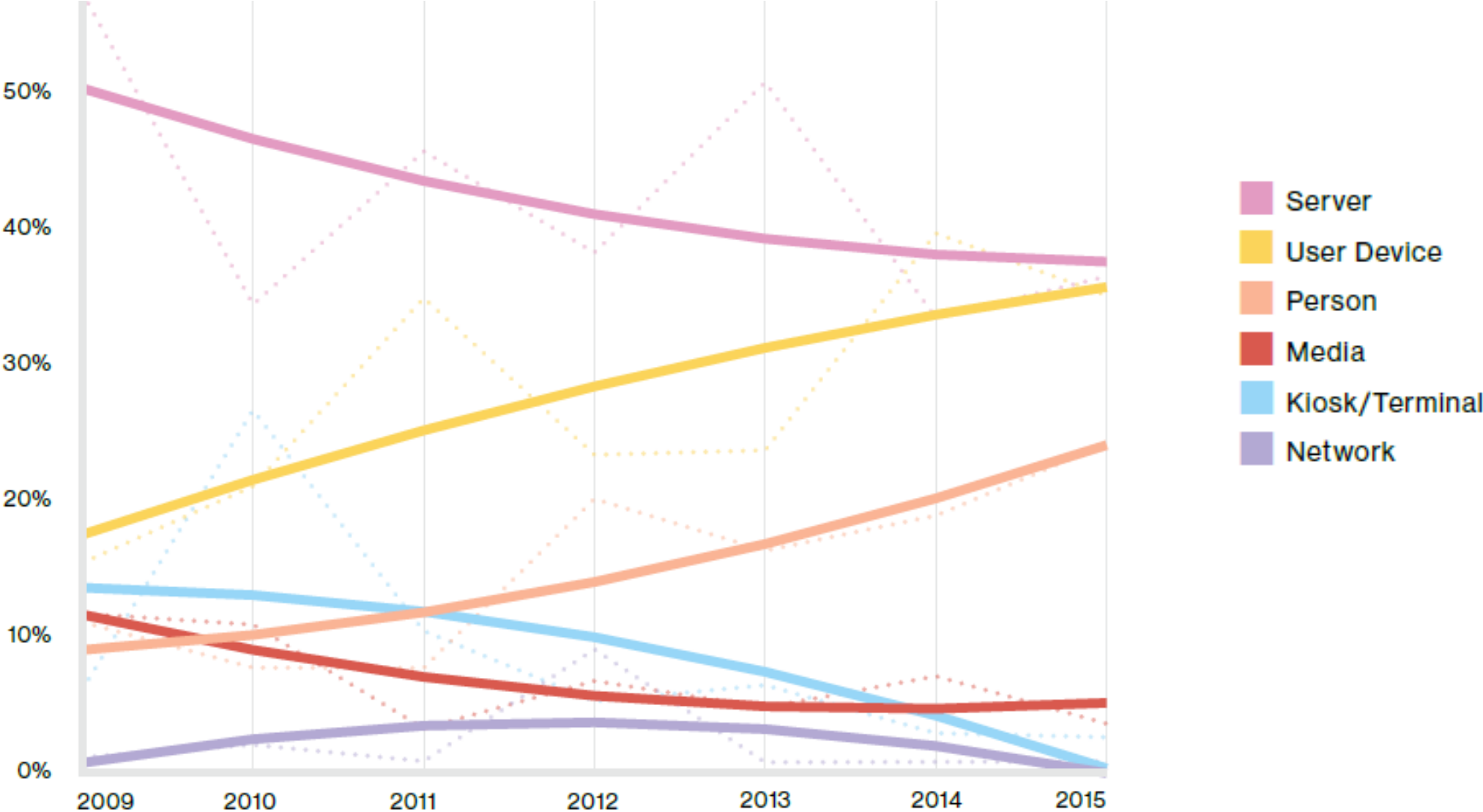
# Verizon Data Breach Investigations Report

- 62 organizations contribute world-wide
  - From Akamai to Homeland Security
- Lists threats, vulnerabilities and actions leading to security incidents and data breaches
- Categorized by industry using NAICS codes
- 10<sup>th</sup> year

# Secondary Attacks Prevalent

- 70% of attacks with known motives involve a secondary victim
- Servers compromised for denial-of service (DoS) attacks, hosting malware or for phishing site

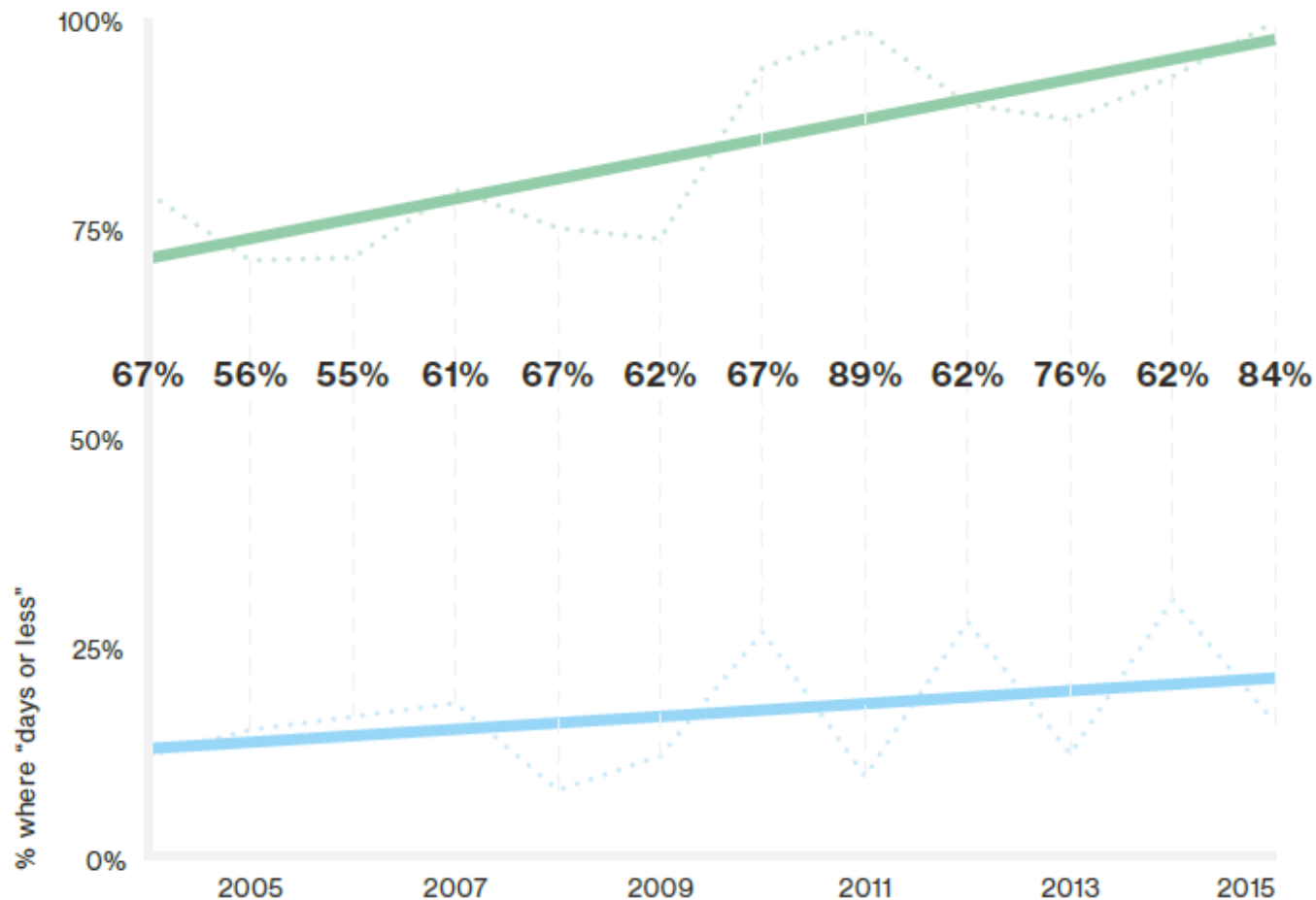
# Percentage of Breaches per Asset Category





# Breach Discovery “Detection Deficit”

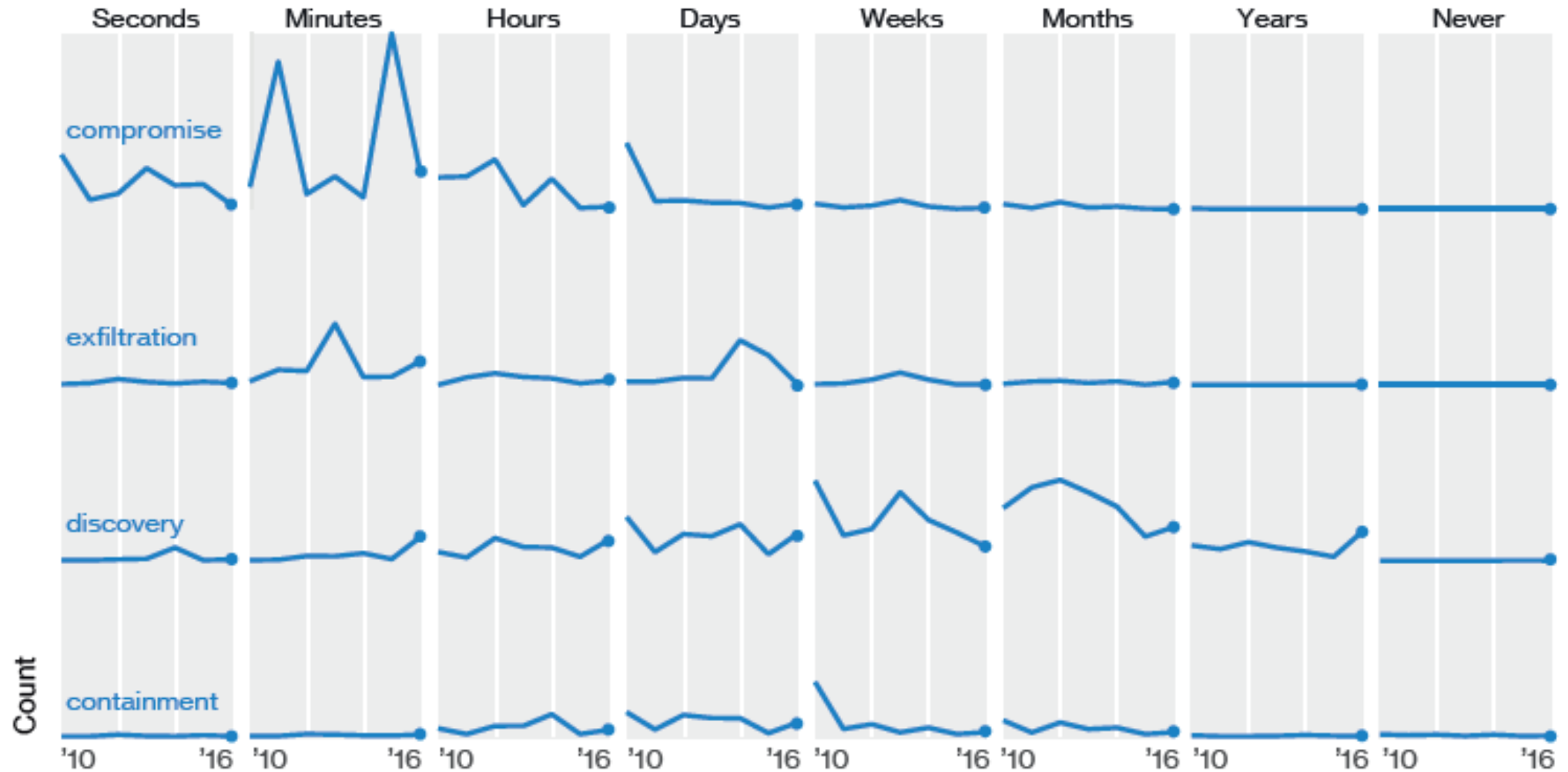
compares how often attackers compromised a victim in days or less (green) with how often defenders detected compromises in same time frame (blue).



**60%**

IN 60% OF CASES,  
ATTACKERS ARE ABLE  
TO COMPROMISE AN  
ORGANIZATION  
WITHIN MINUTES.

# Timespan of breach events over time

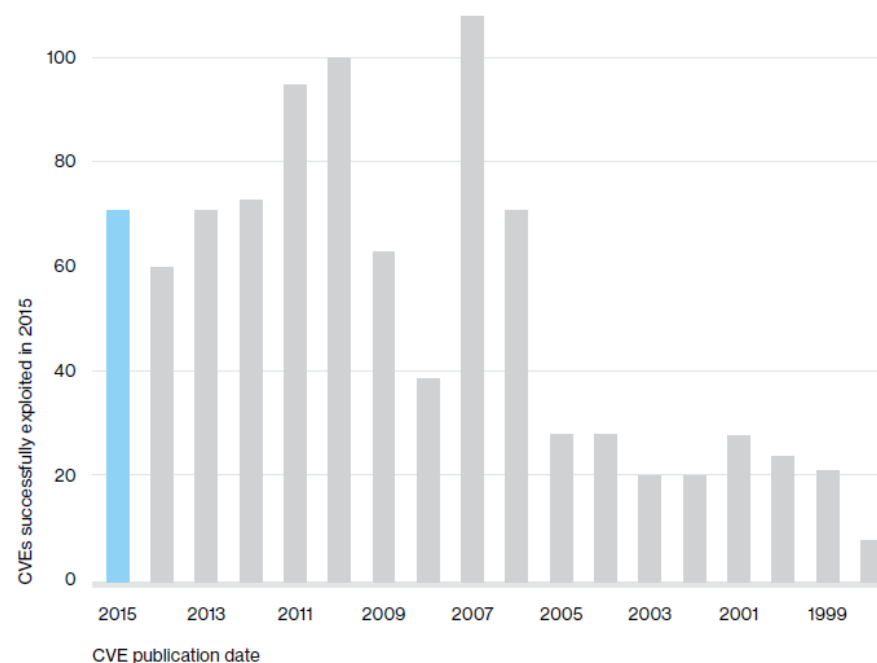


# Sharing Threat Information

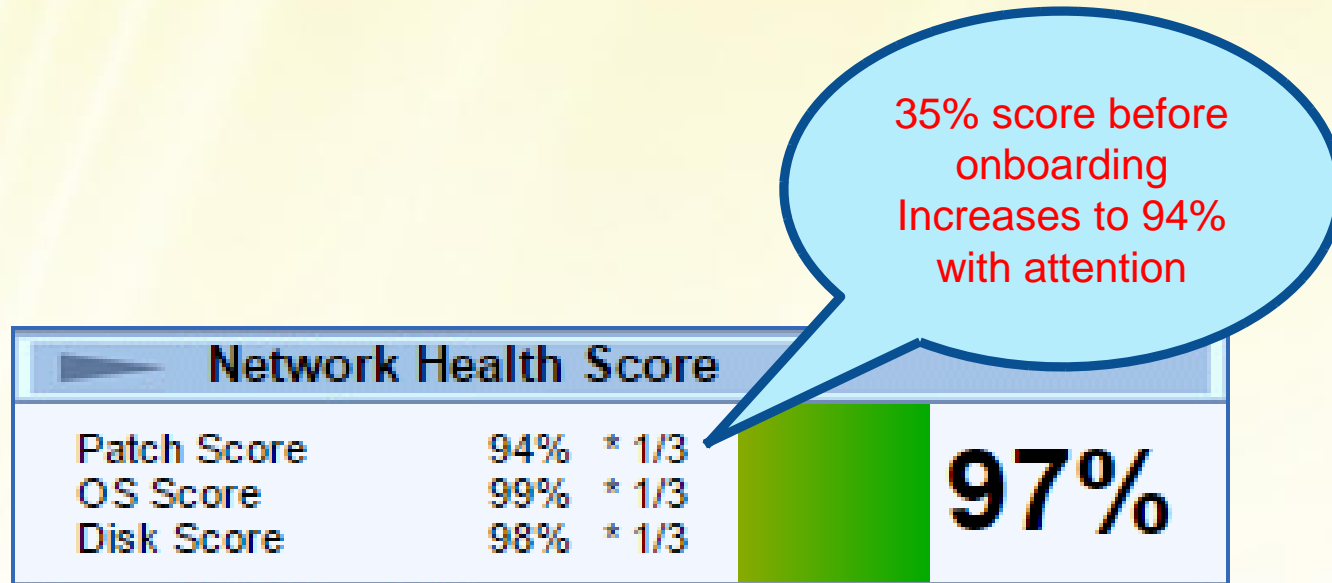
- How fast intelligence needs to be shared
  - 75% of attacks spread from Victim 0 to Victim 1 within 24 hours - 40% < hour
  - Most IP addresses on the block/alert list < 1 day
- Breadth of intelligence to be shared
  - Phishing infrastructure is 9K domains and 50K URLs monthly

# Vulnerabilities

- Vast majority of exploited vulnerabilities compromised  $>$  year after publication
- Patch broadly and consistently - more effective than urgently patching at release



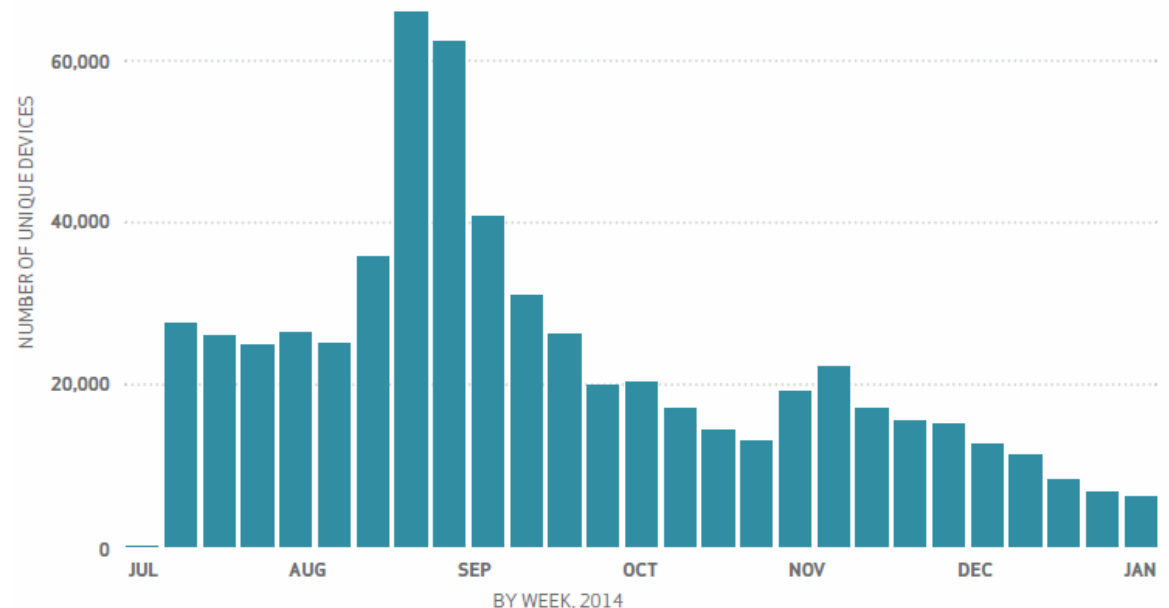
# Action - Performance Reporting



# Mobile

- Android wins at malicious activity (96%)
  - iOS activity mainly failed Android exploits!
  - Mainly annoyance and resource wasting infections
- Mobile not preferred path to breaches

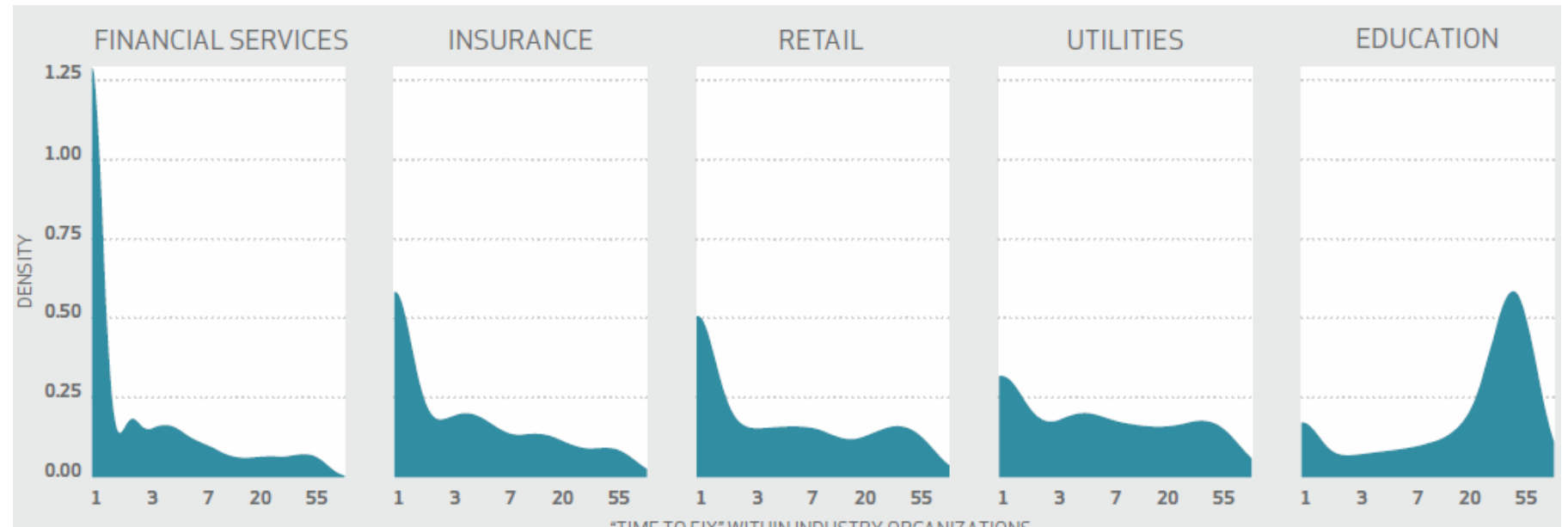
Count of all detected mobile malware infections





# Malware

- Data by industry shows financial services, insurance, retail, utilities and education are leading risk sectors with varying signatures



Distribution of "time to fix" by industry vertical



# Impact

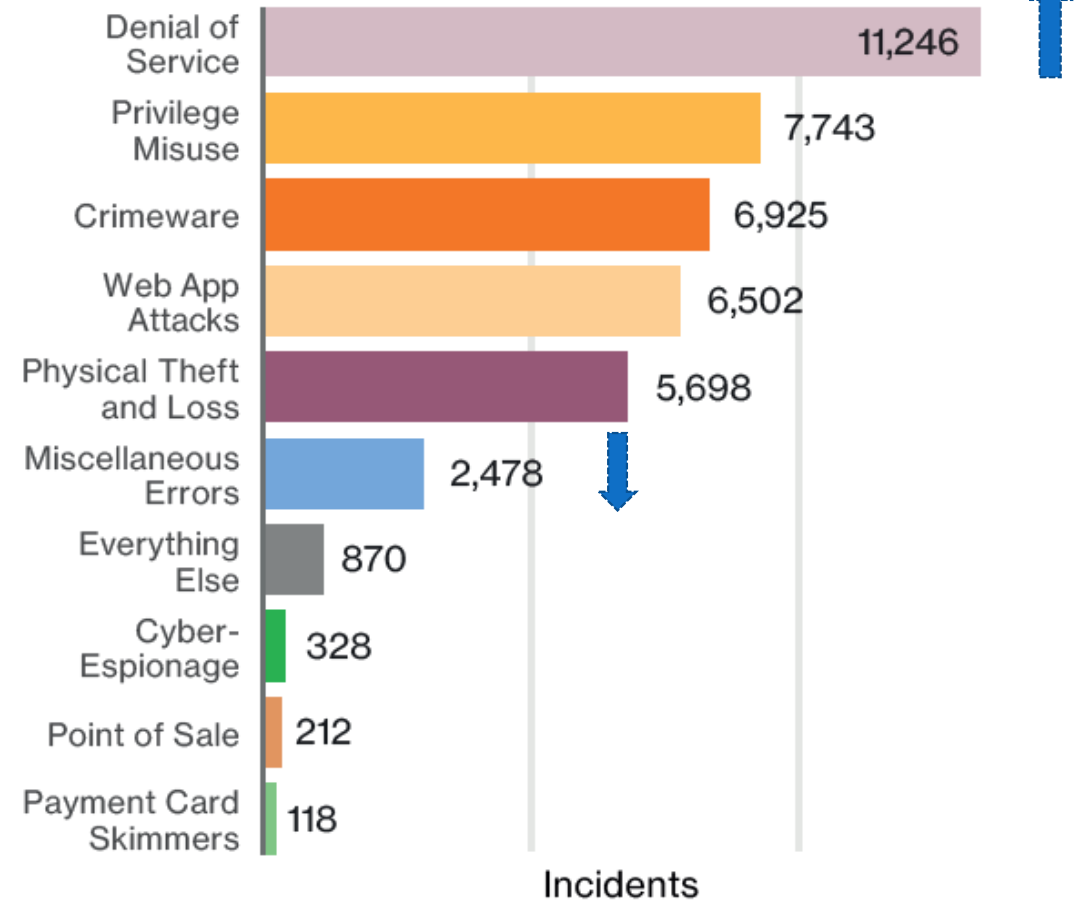
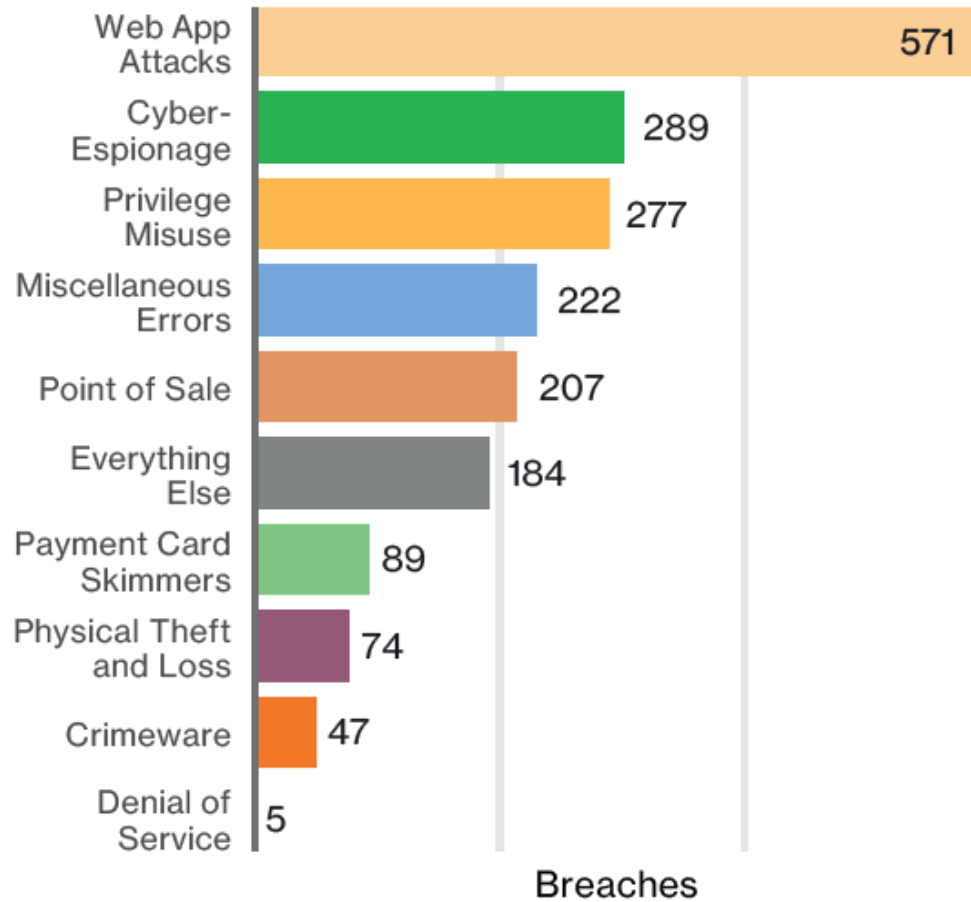
Linear cost/record moves to more statistically sound \$ ranges

RECORDS	PREDICTION (LOWER)	AVERAGE (LOWER)	EXPECTED	AVERAGE (UPPER)	PREDICTION (UPPER)
100	\$1,170	\$18,120	\$25,450	\$35,730	\$555,660
1,000	\$3,110	\$52,260	\$67,480	\$87,140	\$1,461,730
10,000	\$8,280	\$143,360	\$178,960	\$223,400	\$3,866,400
100,000	\$21,900	\$366,500	\$474,600	\$614,600	\$10,283,200
1,000,000	\$57,600	\$892,400	\$1,258,670	\$1,775,350	\$27,500,090
10,000,000	\$150,700	\$2,125,900	\$3,338,020	\$5,241,300	\$73,943,950
100,000,000	\$392,000	\$5,016,200	\$8,852,540	\$15,622,700	\$199,895,100

Ranges of  
expected loss  
by # of  
records

# Incident Classification Patterns

88% of 42K incidents covered by top 9 patterns



Frequency of incident patterns across “security incidents” (right) and “data breaches” (left)

# Industry Comparison

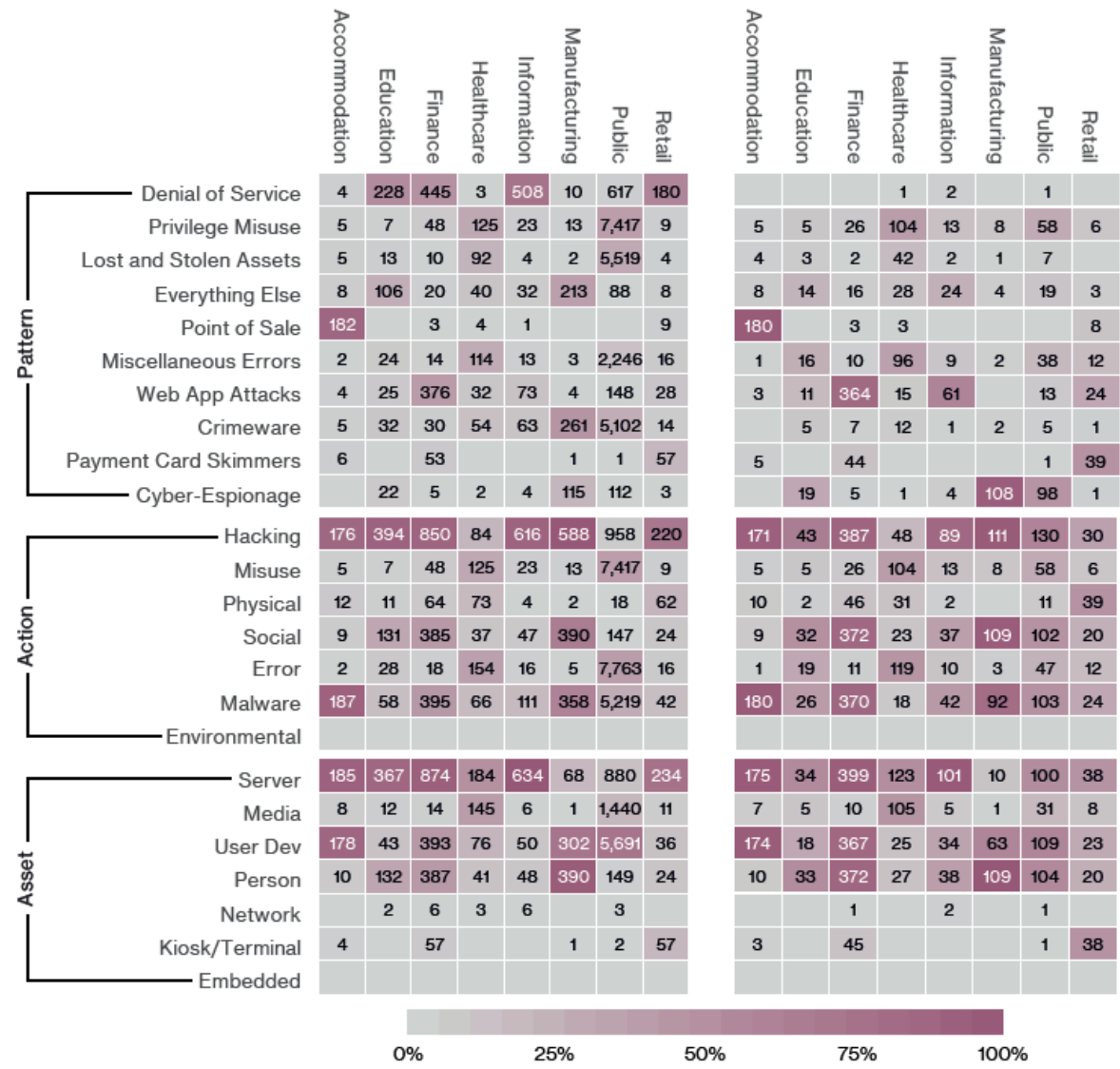


Figure 9: Industry comparison (left: all security incidents, right: breaches only)

# Accommodation and Food Services

Frequency	96% External, 4% Internal (breaches)
Top 3 patterns	Point of Sale Intrusions, Everything Else and Privilege Misuse represent 96% of all data breaches within Accommodation
Threat actors	96% External, 4% Internal (breaches)
Actor motives	99% Financial, <1% Grudge (breaches)
Data compromised	96% Payment, 2% Personal, 1% Credentials
Summary	This vertical was dominated by POS breaches. Most of them are opportunistic and financially motivated and involve primarily malware and hacking threat actions. Time-to-compromise is quick but time-to-discovery and containment remains in the months category. Fraud detection is increasing compared to previous years.

Decrease malware installation (94% of breaches)

No default passwords

Only allow connections from whitelisted IPs to POS network

Patch promptly and consistently

# Educational Services

Frequency	455 incidents, 73 with confirmed data disclosure
Top 3 patterns	Cyber-Espionage, Miscellaneous Errors and Everything Else represent 67% of all data breaches within Education
Threat actors	71% External, 30% Internal, 3% Partner (breaches)
Actor motives	45% Financial, 43% Espionage, 9% Fun (breaches)
Data compromised	56% Personal, 27% Secrets, 8% Credentials
Summary	This section will focus on confirmed data breaches, but Education remains a consistent target of Denial of Service (DoS) attacks also. 2016 results reflect a substantial increase in the number of espionage-related breaches.

# Educational Services Threat Categories

Hacking

- using stolen credentials against web applications

Social

- Phishing via email

# Educational Services Top Actions

- Train employees and students on security awareness and encourage reporting of suspicious activity such as phishing or pretexting attacks
- Develop response plan and practice disaster and recovery plans to prepare for unreasonably high traffic

# Financial and Insurance

Frequency	998 Incidents, 471 with confirmed data disclosure
Top 3 patterns	Denial of Service, Web Application Attacks and Payment Card Skimming represent 88% of all security incidents within Financial Services
Threat actors	94% External, 6% Internal, <1% Partner (all incidents)
Actor motives	96% Financial, 1% Espionage (all incidents)
Data compromised	71% Credentials, 12% Payment, 9% Personal
Summary	DoS attacks were the most common incident type. Confirmed data breaches were often associated with banking Trojans stealing and reusing customer passwords, along with ATM skimming operations.



# Financial and Insurance Threat Categories

(After removing ATM skimming, DoS, and botnets)

## Privilege Misuse

- Accessing systems to fraudulently transfer money
- Using customer information for identity theft

# Financial and Insurance Top Actions

- Train users on security awareness and encourage reporting of suspicious activity
- Have a DoS mitigation service and know the service scope
- Periodically monitor employee activities. Give permissions only if needed and disable accounts immediately at exit.

# Healthcare

Frequency	458 incidents, 296 with confirmed data disclosure
Top 3 patterns	Privilege Misuse, Miscellaneous Errors and Physical Theft and Loss represent 80% of breaches within Healthcare
Threat actors	32% External, 68% Internal, 6% Partner (breaches)
Actor motives	64% Financial, 23% Fun, 7% Grudge (breaches)
Data compromised	69% Medical, 33% Personal, 4% Payment
Summary	Healthcare has the unenviable task of balancing protection of large amounts of personal and medical data with the need for quick access to practitioners. Internal actors are well represented with employees accessing patient data out of curiosity, or to commit identity fraud.

# Top Healthcare Threat Categories (80%)

Misdelivery

- J. Tinker's discharge papers to J. Evers

Disposal  
Error

- X-rays accidentally end up in landfills

Asset loss

- Doctors losing laptops

# Healthcare Top Actions

- Process to prevent errors (*Checklist Manifesto*)
- Disposal policy for PII including monitoring
- Encrypt mobile devices to limit impact of lost assets

# Information

Frequency	717 incidents, 113 with confirmed data disclosure
Top 3 patterns	Denial of Service, Web Application Attacks and Crimeware represent 90% of all security incidents within Information
Threat actors	97% External, 3% Internal (all incidents)
Actor motives	75% Financial, 18% Fun/Ideology/Grudge, 6% Espionage (all incidents)
Data compromised	56% Credentials, 45% Personal, 6% Internal
Summary	Both incidents and breaches within the information sector have a strong association with internet-facing web servers.

# Top Information Threat Categories

Hacking

- Stolen Credentials, backdoor/C2, SQLi

Malware

- Spyware/keylogger, export data/C2

# Information Top Actions

- Implement 2FA for admin access to web apps and data stores
- Extend strong authentication to app users
- Develop DDoS response plan within BC and DR plans
- Patch server software (OS, web applications, plug-ins)



# Manufacturing

Frequency	620 incidents, 124 with confirmed data disclosure
Top 3 patterns	Cyber-Espionage, Privilege Misuse and Everything Else represent 96% of breaches within Manufacturing
Threat actors	93% External , 7% Internal (breaches)
Actor motives	94% Espionage, 6% Financial (breaches)
Data compromised	91% Secrets, 4% Internal, 4% Personal
Summary	Gains in strategic advantage via espionage-related actions comprise the majority of breaches within this industry. Most are conducted by state-affiliated actors, but instances of internal espionage pilfering trade secrets are present as well.

# Top Manufacturing Threat Categories

Cyber-  
Espionage

- Stealing IP for competitive advantage

# Manufacturing Top Actions

- Sensitive data is separated with need to know access
- Train employees against phishing and easy ways to report suspicious emails
- Monitor internal network, devices and applications
  - Accounts monitoring
  - Audit log monitoring
  - IDS monitoring
- DLP

# Public Administration

Frequency	21,239 incidents, 239 with confirmed data disclosure
Top 3 patterns	Cyber-Espionage, Privilege Misuse and Miscellaneous Errors represent 81% of breaches within Public Administration 
Threat actors	62% External, 40% Internal, 4% Multiple parties, 2% Partner (breaches)
Actor motives	64% Espionage, 20% Financial, 13% Fun/Ideology/Grudge (breaches)
Data compromised	41% Personal, 41% Secrets, 14% Credentials, 9% Medical
Summary	Almost one half of attacks resulting in confirmed data disclosure are state-affiliated. Timeline for breach to discovery is over 50% in the “years” category.

# Top Public Administration Threat Categories

Cyber-  
Espionage

- Other governments want to know our thinking

Privilege  
Misuse

- Police officer accesses criminal databases inappropriately

# Public Administration Top Actions

- Know sensitive data, where it resides, who has access rights and who does access
- DLP and data egress logging
- Understand type of threat actor most interested in your data

# Retail

Frequency	326 incidents, 93 with confirmed data disclosure
Top 3 patterns	Denial of Service, Web Application Attacks and Payment Card Skimming represent 81% of all security incidents within Retail
Threat actors	92% External, 7% Internal, <1% Partner (incidents)
Actor motives	96% Financial, 2% Espionage, 2% Curiosity (incidents)
Data compromised	57% Payment, 27% Personal, 17% Credentials
Summary	Online retailers are consistent targets of DoS attacks, and POS environments continue to be compromised for financial motivations.

# Top Retail Threat Categories

Denial of  
Service

- 80% of web attacks

Web  
application  
attacks

- Hacking using stolen credentials from phishing attacks

Payment  
card  
skimmers

- Inside gas pump and ATMs



# Retail Top Actions

- Denial of service mitigation plans
- Keep critical assets on a separate network
- Implement strong passwords with 2FA especially for remote access into payment processing networks

# Social Attacks

Frequency	1,616 incidents, 828 with confirmed data disclosure
Top 3 patterns	Web Applications Attacks, Cyber-Espionage and Everything Else represent 96% of all security breaches involving social attacks
Threat actors	99% External, 1% Internal, <1% Partner (breaches)
Actor motives	66% Financial, 33% Espionage, <1% Grudge (breaches)
Data compromised	61% Credentials, 32% Secrets, 8% Personal
Summary	Social attacks were utilized in 43% of all breaches in this year's dataset. Almost all phishing attacks that led to a breach were followed with some form of malware, and 28% of phishing breaches were targeted. Phishing is the most common social tactic in our dataset (93% of social incidents).

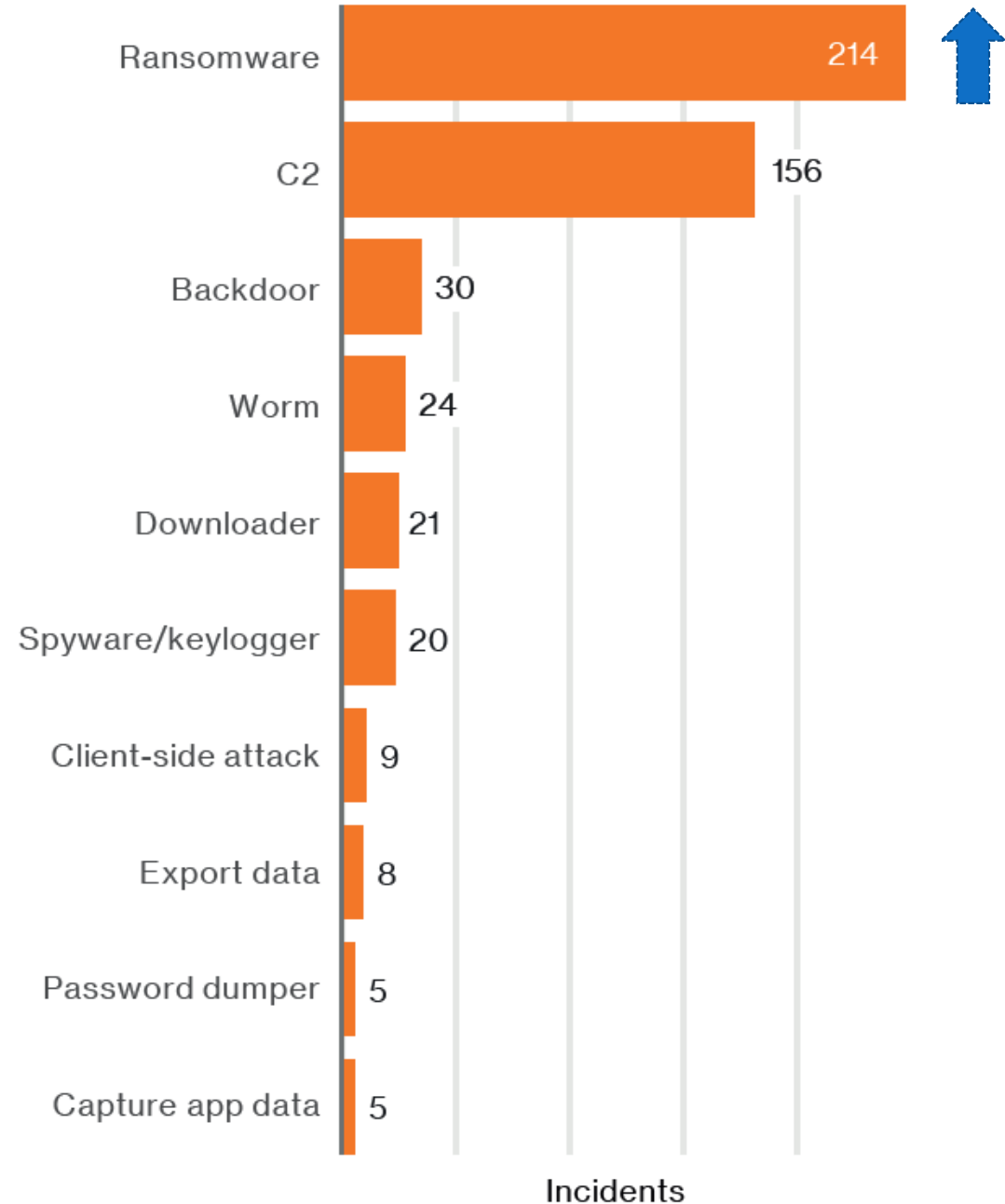
# Phishing

- 30% opened phishing email - 12% of total click attachment - 7.3% of users were successfully phished
- 15% of those who fell victim twice - 3% clicked > twice - <1% clicked > three times
- Many sent as steady campaign – just 10 e-mails yield > 90% chance one person opens attachment
- Median time to click attachment = 3.7 min

# Crimeware

= malware not associated with patterns like cyber espionage or POS intrusions

Variety of malware within Crimeware pattern



# Ransomware

- Ransomware attacks not counted as breaches because typically data loss cannot be confirmed.
  - HHS given guidance that ransomware should be reported as a breach – now 72% of malware incidents in Healthcare
- From 22<sup>nd</sup> → 5<sup>th</sup> most common malware in 2014
- Social actions, notably phishing moving from 8% → 21% of incidents in 2016
  - Emails often targeted at job functions - HR and accounting

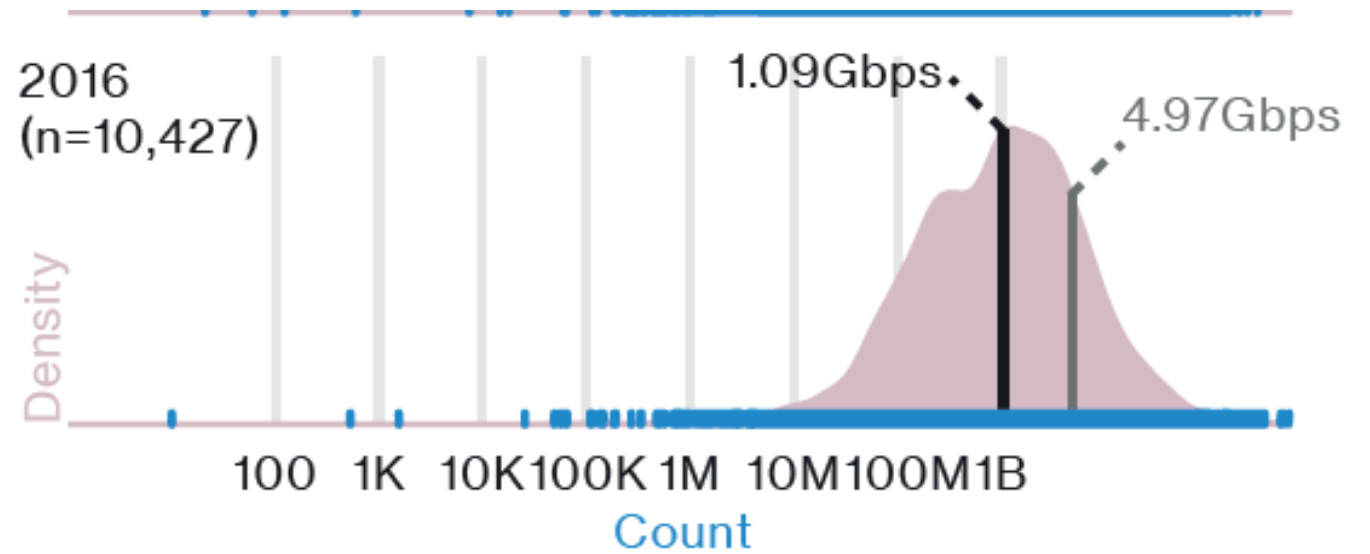
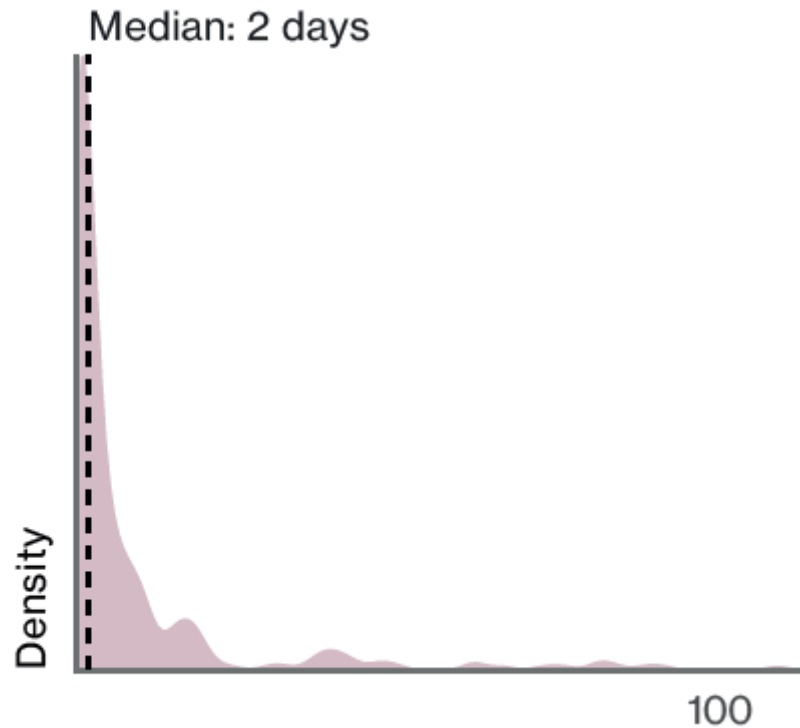
# Crimeware Top Actions

- Block executables at email gateway
- Disable macro-enabled Office docs if not needed
- Block JavaScript via email
- Keep browsers up to date
- Malware defenses
- Prioritize browser and plug-in exploitation patches

# Web App Attacks Top Actions

- Common for web servers to attack different target
- Cross-site scripting and SQL injection haven't disappeared but less favored than using credentials
- Minimize information or credentials on web server
- 2FA to slow intruders
- Patch CMS and plug-in consistently
- SQLi and input validation testing

# Distributed denial-of-service (DDoS) attacks





# DDoS Attacks Top Actions

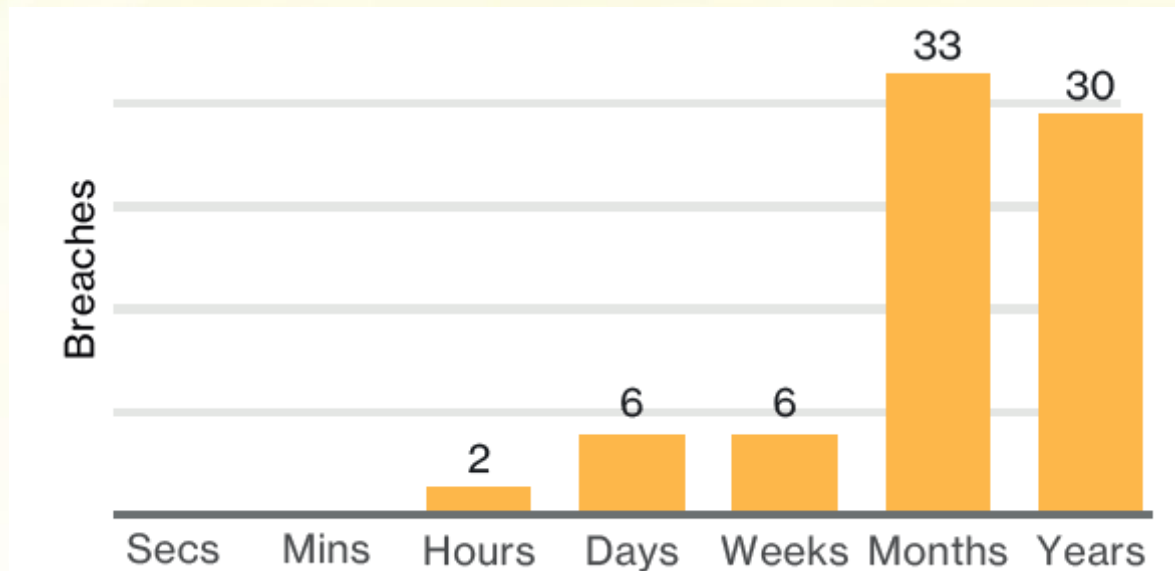
- Understanding mitigation needed is key
  - What attack length and size do you need to resist?
- Weigh business impact of not having defenses vs. cost of acquiring them

# Physical Theft/Loss

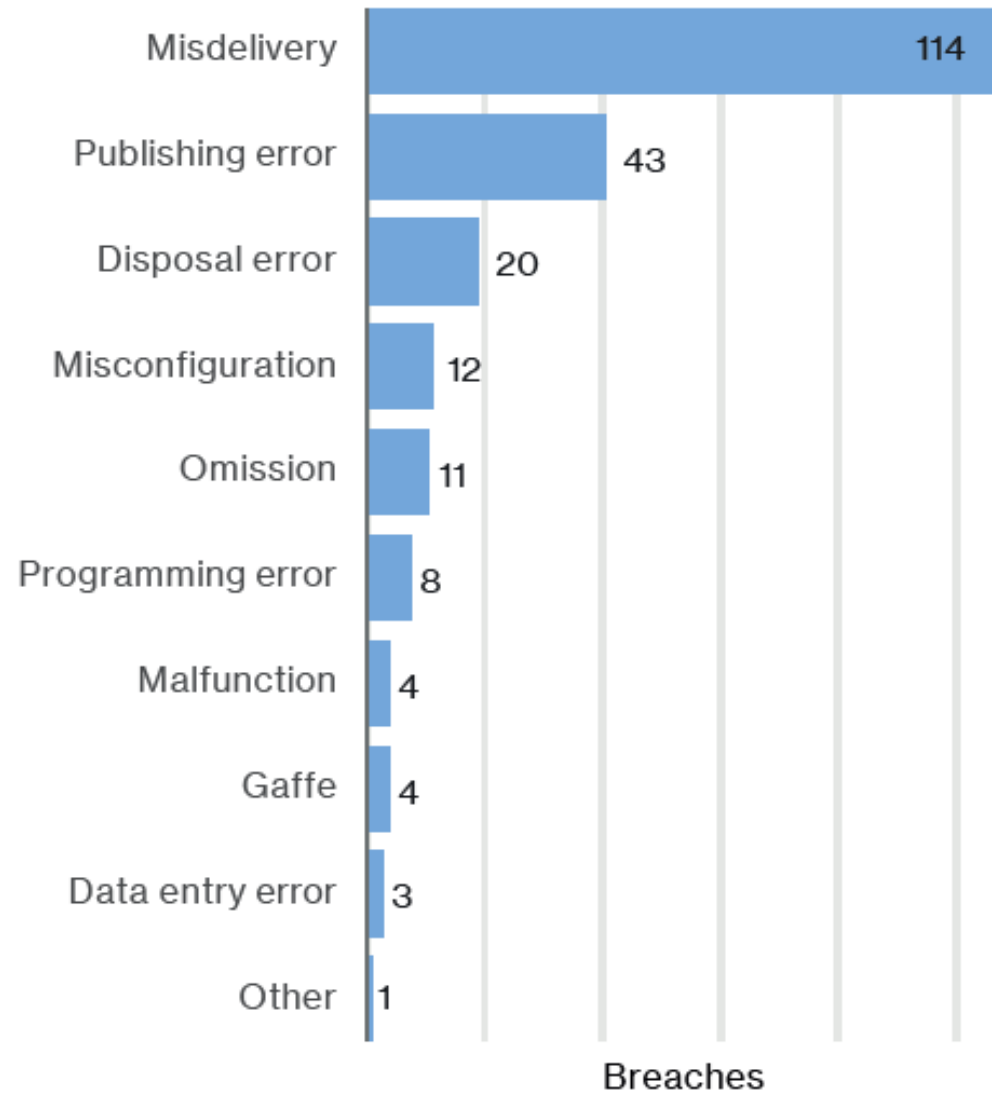
- Most theft occurred within victim's work area and secondarily employee-owned vehicles
- Asset lost >> more often than stolen
- Encrypt and centrally manage
- Paper documents can't be encrypted so handle sensitive data on a need to print basis or tokenize
- Train on data handling and monitor

# Insider Misuse

- Top actions - privilege abuse for \$ gain and curiosity
- Security controls identifying employee misuse detect external attackers masquerading as privileged users



# Miscellaneous Errors



# Miscellaneous Errors

- Directly leads to loss
- Need process for discarding anything sensitive
- Use past mistakes in security training for handling, storage, delivery and disposal
- Use 2<sup>nd</sup> reviewer for publishing reviewer
- Monitor webpages for publishing errors

# Cyber-Espionage Top Actions

- Anti-malware at the email gateway
- Security awareness training
- Prioritize browser and plug-in exploitation patches
- Process to report phishing attempts with subsequent monitoring and logging
- Segment networks into zones requiring 2FA

# Payment Card Skimmer Top Actions

- Gas pump terminals increase >3X from LY
- ATM incidents down 25% from LY
- Chip and pin slowly becoming prevalent
- Monitor outdoor terminals via video and review tapes
- Check as part of routine closing/opening
- Use tamper evident controls

# Point of Sale Top Actions

- Defined by remote attacks against card transactions
- 95% of breaches with stolen credentials used vendor remote access to hack into their customer's POS environments.
- POS vendors need to strengthen authentication and limit remote access



# Everything Else

- Includes email compromises from management with wire transfer instructions requiring quick attention

From: Chris James CFO  
Sent: Thursday, April 30, 2015 11:52 AM  
To: Sam Watt, Controller  
Subject: Fwd: Transfer

## Pre-texting email

Sam,

Please process wire to the attached wire instruction accordingly. Code it to admin expenses and let me know when completed. I will send you details and invoice ASAP, you can use this email as backup for now if you need to.

Thanks,

Chris James, CFO

----- Original Message -----

Subject: Transfer  
Date: 2015-04-30 11:39 am  
From: David Jones, President  
To: Chris James, CFO  
Copy: Bruce Davidson, Owner

Chris,

See attached wire instruction for the wire as discussed. Let me know when processed.

David Jones  
President

**From:** Ray Newton

[<mailto:rnewton@syssrc.com>]

**Sent:** Thursday, April 14, 2016 10:34 AM

**To:** Melanie Magness

**Subject:** SALARY REVIEW

Hello

I need you to send me all our employees 2015 W-2 (PDF) for an immediate review. I need you to attach them and send to me now.

Thanks.



# % incidents where a CSC control is recommended

CSC	DESCRIPTION	PERCENTAGE	CATEGORY
13-7	2FA	24%	Visibility/Attribution
6-1	Patching web services	24%	Quick Win
11-5	Verify need for Internet-facing devices	7%	Visibility/Attribution
13-6	Proxy outbound traffic	7%	Visibility/Attribution
6-4	Web application testing	7%	Visibility/Attribution
16-9	User lockout after multiple failed attempts	5%	Quick Win
17-13	Block known file transfer sites	5%	Advanced
5-5	Mail attachment filtering	5%	Quick Win
11-1	Limiting ports and services	2%	Quick Win
13-10	Segregation of networks	2%	Configuration/Hygiene
16-8	Password complexity	2%	Visibility/Attribution
3-3	Restrict ability to download software	2%	Quick Win
5-1	Anti-virus	2%	Quick Win
6-8	Vet security process of vendor	2%	Configuration/Hygiene

40% of “most effective” controls are in the “Quick Win” category

# Action - Proactivity Drives Risk Reduction

The screenshot displays the Kaseya SysSRC Wiki interface. The browser address bar shows the URL: <https://kaseya.syssrc.com/vsaPres/Web20/core/KHome.aspx?firs>. The interface includes a navigation sidebar on the left with categories like Agent, Audit, Backup, Data Backup, Desktop Management, Discovery, Info Center, Mobile, Monitor, Patch Management, Policy Management, Remote Control, Security, Symantec Endpoint Protection, System, Ticketing, and Time Tracking. The main content area shows a table of endpoints with columns for System Name, Organization, Role, Prot..., Infection S..., Install St..., Content..., Last Successful Scan, Managed By, and Client Software Version. A callout bubble with a dashed border points to the row for 'SSAPP', which has a red virus icon in the Infection Status column. The text inside the bubble reads: "I know which computer has a virus!".

Machine Id	System Name	Organization	Role	Prot...	Infection S...	Install St...	Content...	Last Successful Scan	Managed By	Client Software Version
9	JOANNE-PC	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 10:10 AM (ET) SSAPP		12.1.4013.4013
10	CRMSQL-08	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/21/2014 10:38 AM (ET) SSAPP		12.1.3001.165
11	ANDERSON81	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	10/8/2013 12:00 PM (ET) SSAPP		
12	SROBINSON-NEW	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 9:55 PM (ED) SSAPP		
13	AVCONFERENCE	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 6:19 PM (ED) SSAPP		
14	DC08VM02	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 6:25 PM (ED) SSAPP		
15	TCRAIG	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 9:59 AM (ED) SSAPP		
16	MWEINSTEIN-HP	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 6:19 PM (ED) SSAPP		
17	EXCHCH10	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 6:12 PM (ED) SSAPP		
18	ELIEENTOPPING	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 6:15 PM (ED) SSAPP		
19	CORPBACKUP	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 6:28 PM (ED) SSAPP		12.1.2015.2015
20	SKLEINWIN7-PC	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 11:39 PM (ET) SSAPP		12.1.4013.4013
21	SSXEN2	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 6:12 PM (ED) SSAPP		12.1.2015.2015
22	DC12	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 6:14 PM (ED) SSAPP		12.1.2015.2015
23	HREBSTOCK-HP	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 6:11 PM (ED) SSAPP		12.1.4013.4013
24	SSAPP	SYSTEM SOURCE	Server	Enabled	✓	Installed	Out-of-date	3/28/2014 6:12 PM (ED) SSAPP		12.1.4013.4013
25	SYSSRCSQL	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 6:26 PM (ED) SSAPP		12.1.2015.2015
26	DCVM1	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/29/2014 12:02 AM (ET) SSAPP		12.1.2015.2015
27	JBENNETT2013	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 6:10 PM (ED) SSAPP		12.1.4013.4013
28	EXECSECRETAR	SYSTEM SOURCE	Endpoint	Disabled	✓	Installed	Out-of-date	9/10/2013 10:26 AM (ET) SSAPP		12.1.2015.2015
29	BOBOFFICE-NEW	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/29/2014 12:06 AM (ET) SSAPP		12.1.2015.2015
30	SYSSRCCRM-08	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/21/2014 10:39 AM (ET) SSAPP		12.1.3001.165
31	CRR707 WIN7	SYSTEM SOURCE	Endpoint	Enabled	✓	Installed	Out-of-date	3/28/2014 11:26 PM (ET) SSAPP		12.1.4013.4013

# Actionable Security Reports

- User accounts with escalated administrative privileges
- User accounts not logged in within the last 90 days
- Computers not connected to the domain in >90 days
- Computers running outdated operating systems (Server 2003 and XP)
- Proofpoint spam filtering and spooling report
- SEP risk report
- Report showing passwords not changed in 90 days
- Password policy
- Log retention policy settings
- Account lockout monitoring
- Bad password attempt monitoring
- Office 365 last logon
- Screen lock settings

# Action- Staff Entrance and Exit

Detailed procedures onboard/exit new staff efficiently

<b>EMPLOYEE EXIT CHECKLIST</b>	Standard service level agreement is 2 business hours after form submission (w/o PC handling)	
Employee Name		
Phone		
Location		
Exit Terms	<input type="checkbox"/> Termination	<input type="checkbox"/> Resignation
Exit Date/Time		Time:
Network access:	Remove user from all non-primary groups, hide from the global access list and: <input type="checkbox"/> Change network password Requested Password: <input type="checkbox"/> Delete network account effective (Deletes Mailbox in 30 days after deletion) <input type="checkbox"/> Disable network account effective <input type="checkbox"/> Delete Network Account on <a href="#">Click here to enter a date.</a>	
File Retention	<input type="checkbox"/> Retain Personal Network Directory Give access to the Personal Network Directory to: <input type="checkbox"/> Retain local My Documents folder Move My Documents folder to: Give access to the My Documents folder to	
Mailbox Handling	<input type="checkbox"/> Retain existing mailbox (available only if account is not deleted) <input type="checkbox"/> Allow Inbox to receive email <input type="checkbox"/> Give mailbox proxy rights to:	
	<input type="checkbox"/> Forward new email to:	
	Create out of office reply to alert senders with the following message: <input type="checkbox"/> Use Default (messages will be forwarded for one year from departure): Your email has been forwarded to for attention. For immediate assistance please contact      at      or email      . Thanks	
	<input type="checkbox"/> Alternate message:	
	<input type="checkbox"/> Save the mailbox as a static file (.pst) to	



# Ask About IT



# Evaluations & Door Prizes

# THANK YOU!

