Incident Response and Cyber Governance

Using the Verizon Data Breach Investigations Report 2023 and the CIS Controls v8

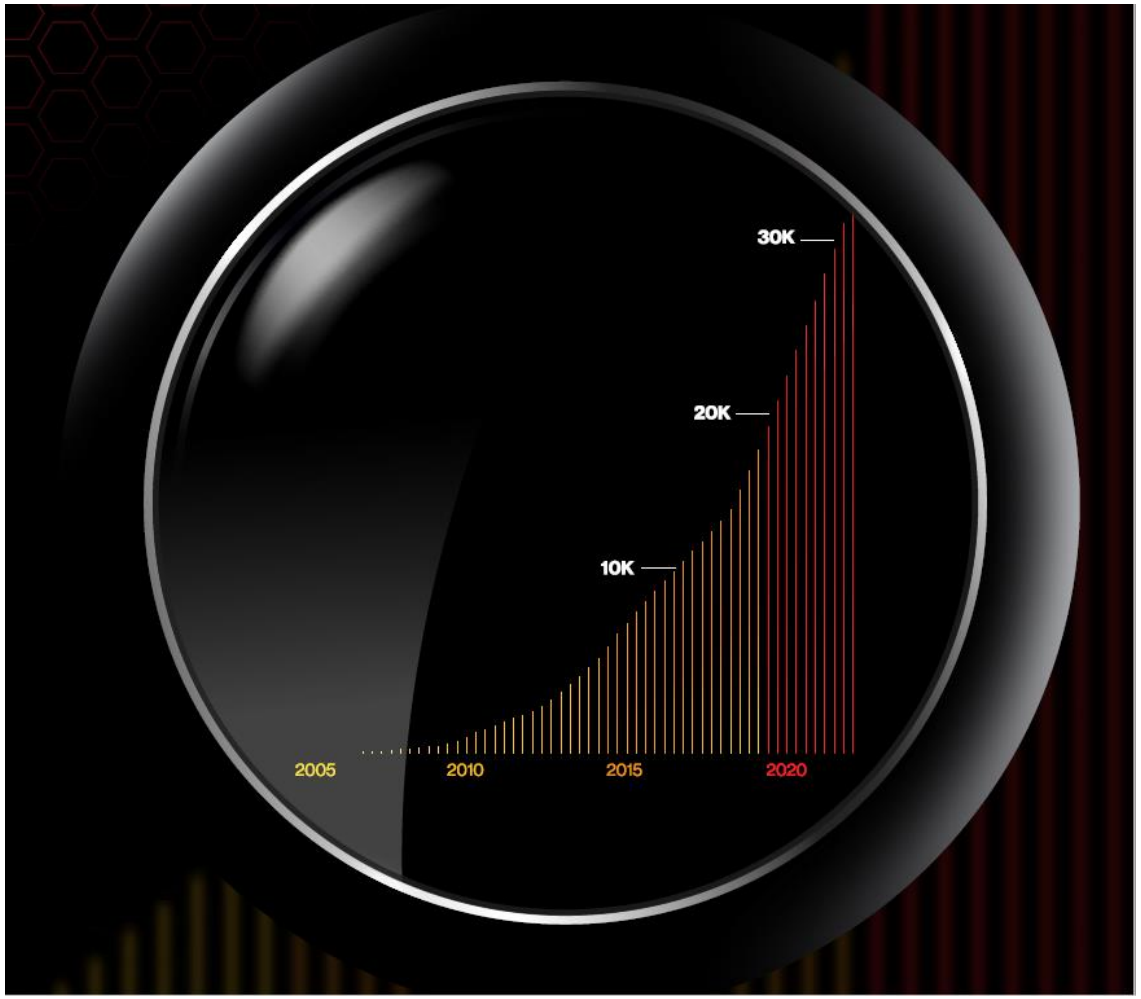
Digital Forensics and Incident Response

Verizon 2023 Data Breach Investigations Report (16th Edition)

- The DBIR was created to provide a place for security practitioners to look for data-driven, **real-world views** on cybercrime.
- This data informs us of the **steps we should take** to protect ourselves.
- The report is used to **increase awareness** of the tactics attackers are likely to use against organisations in your industry.
- It is also used as a tool to encourage executives to **support security initiatives and illustrate to employees** the importance of security and how they can help.

Verizon Data Breach Investigations Report (16th Edition)

- 16,312 security incidents that compromised the integrity, confidentiality or availability of an information asset.
- 5,199 breaches that resulted in the confirmed disclosure of data to an unauthorised party.
- *Total Set*
  - *953,894 incidents*
  - *254,968 breaches*



verizon.com/dbir

What Verizon Found – Key Statistics

- **74%** of all breaches include the human element

  Error, Privilege Misuse, stolen credentials or Social Engineering

- **50%** of all Social Engineering incidents used pretexting

  An invented scenario that tricks someone, that may result in a breach

- **24%** of all breaches involved ransomware

  Maliciously encrypting data and demanding a ransom to return or unlock it

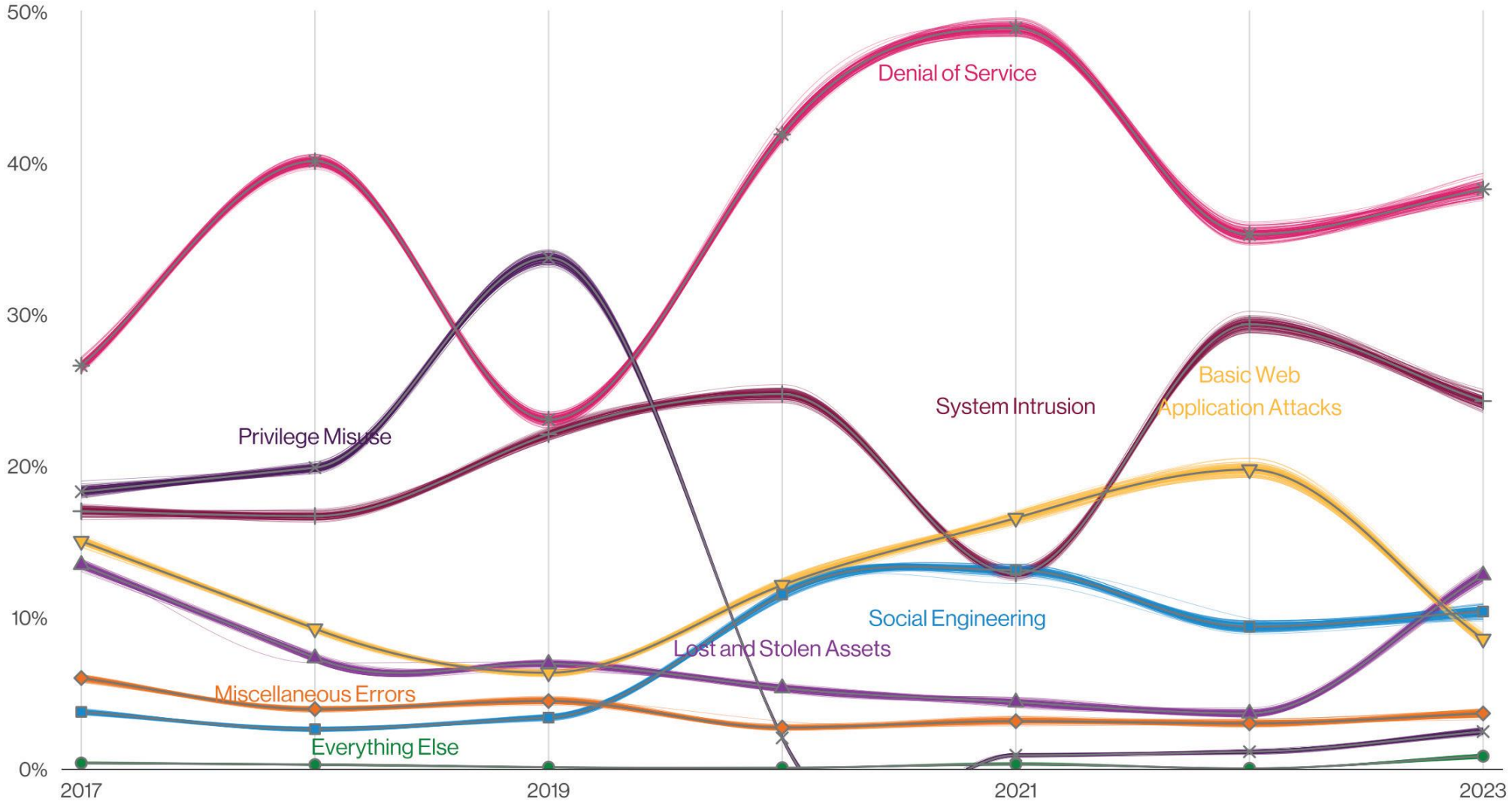
- **19%** involved internal actors

  Intentional and unintentional harm through misuse and simple human errors

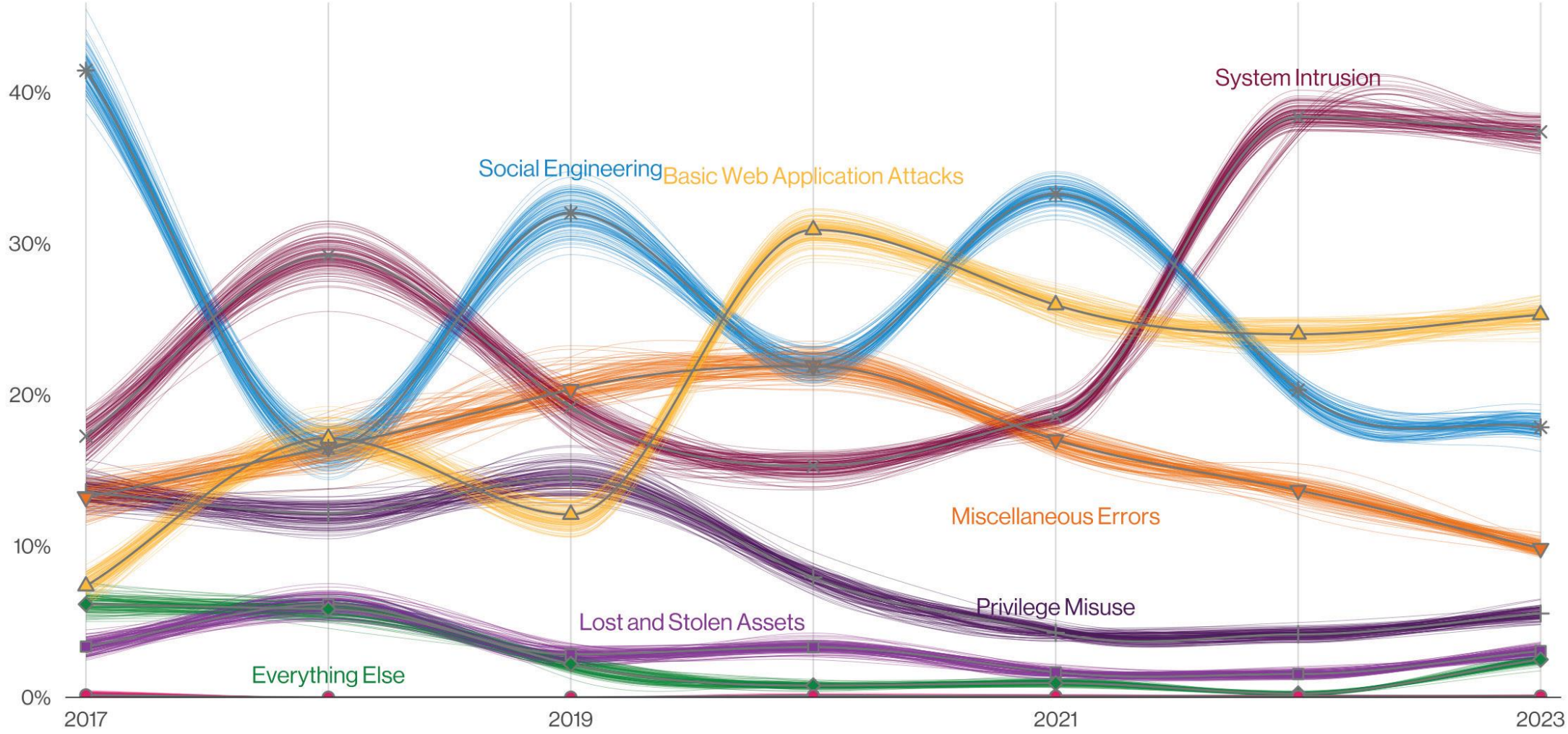
- **95%** of breaches are financially driven

  It's (almost) always about the money

Patterns over time in incidents



Patterns over time in breaches



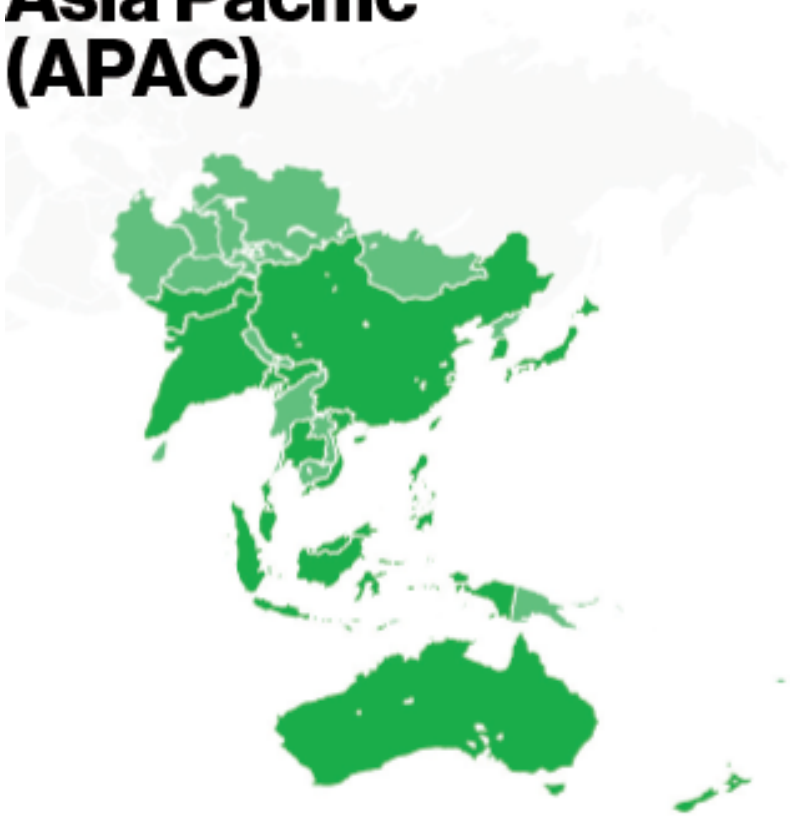
What Verizon Found – By Industry

	Incidents	Breaches
• Education	x 8	x 4
• Finance	x 35	x 9
• Healthcare	x 8	x 7
• Professional	x 26	x 8
• Public Administration	x 36	x 6
• Retail	x 9	x 4

	Incidents	Breaches
Industry	Total	Total
Total	16,312	5,199
Accommodation (72)	254	68
Administrative (56)	38	32
Agriculture (11)	66	33
Construction (23)	87	66
Education (61)	496	238
Entertainment (71)	432	93
Finance (52)	1,829	477
Healthcare (62)	522	433
Information (51)	2,105	380
Management (55)	9	9
Manufacturing (31–33)	1,814	259
Mining (21)	25	13
Other Services (81)	143	100
Professional (54)	1,396	421
Public Administration (92)	3,270	582
Real Estate (53)	83	59
Retail (44–45)	404	191
Transportation (48–49)	349	106
Utilities (22)	117	33
Wholesale Trade (42)	96	53
Unknown	2,777	1,553

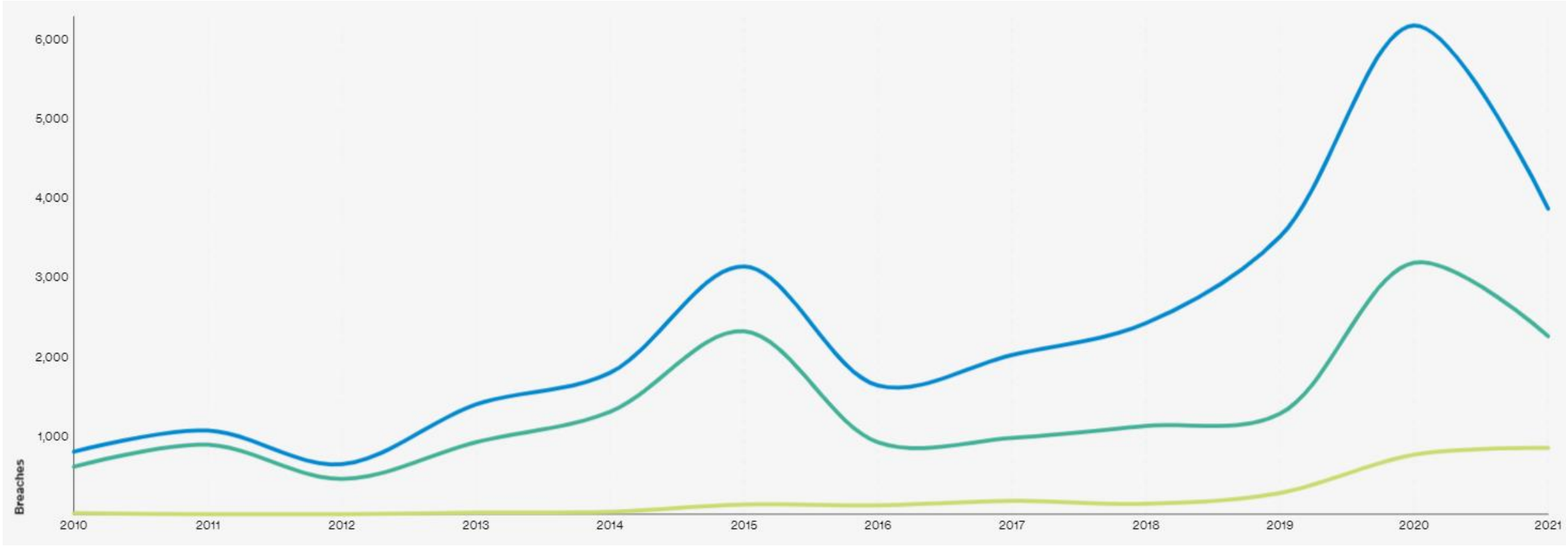
What Verizon Found – Asia Pacific Region

Asia Pacific (APAC)

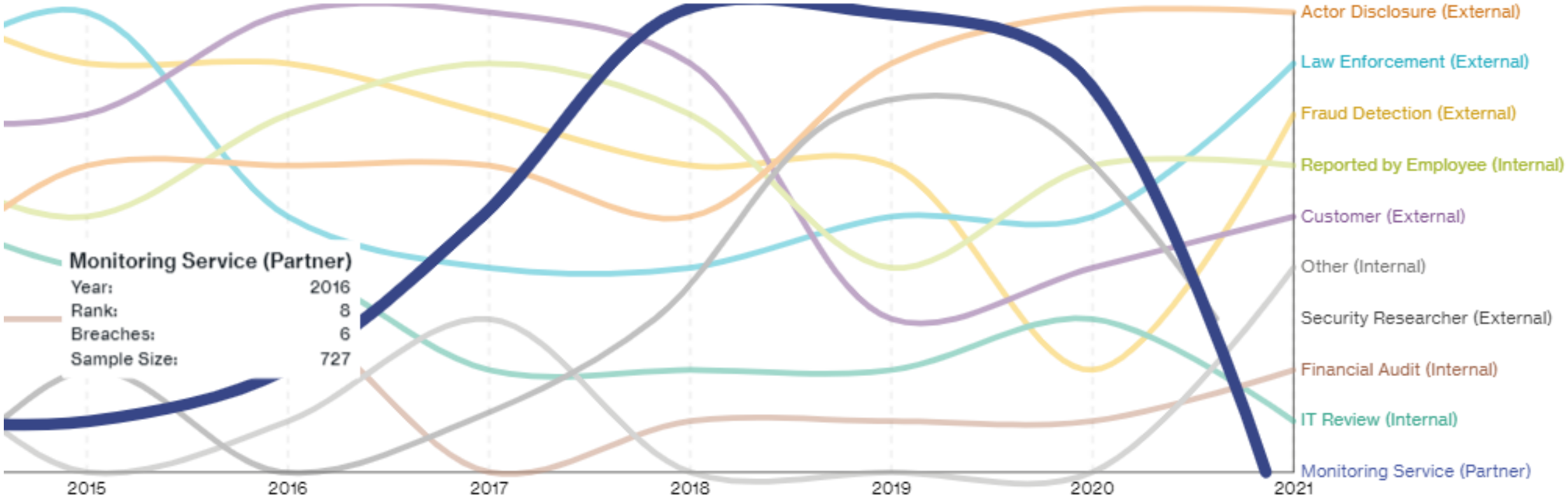


Frequency	699 incidents, 164 with confirmed data disclosure
Top patterns	Social Engineering, System Intrusion and Basic Web Application Attacks represent 93% of breaches
Threat actors	External (92%), Internal (9%), Partner (2%), Multiple (2%) (breaches)
Actor motives	Financial (61%), Espionage (39%), Convenience (2%), Grudge (2%), Secondary (1%) (breaches)
Data compromised	Internal (56%), Secrets (42%), Other (33%), Credentials (29%) (breaches)

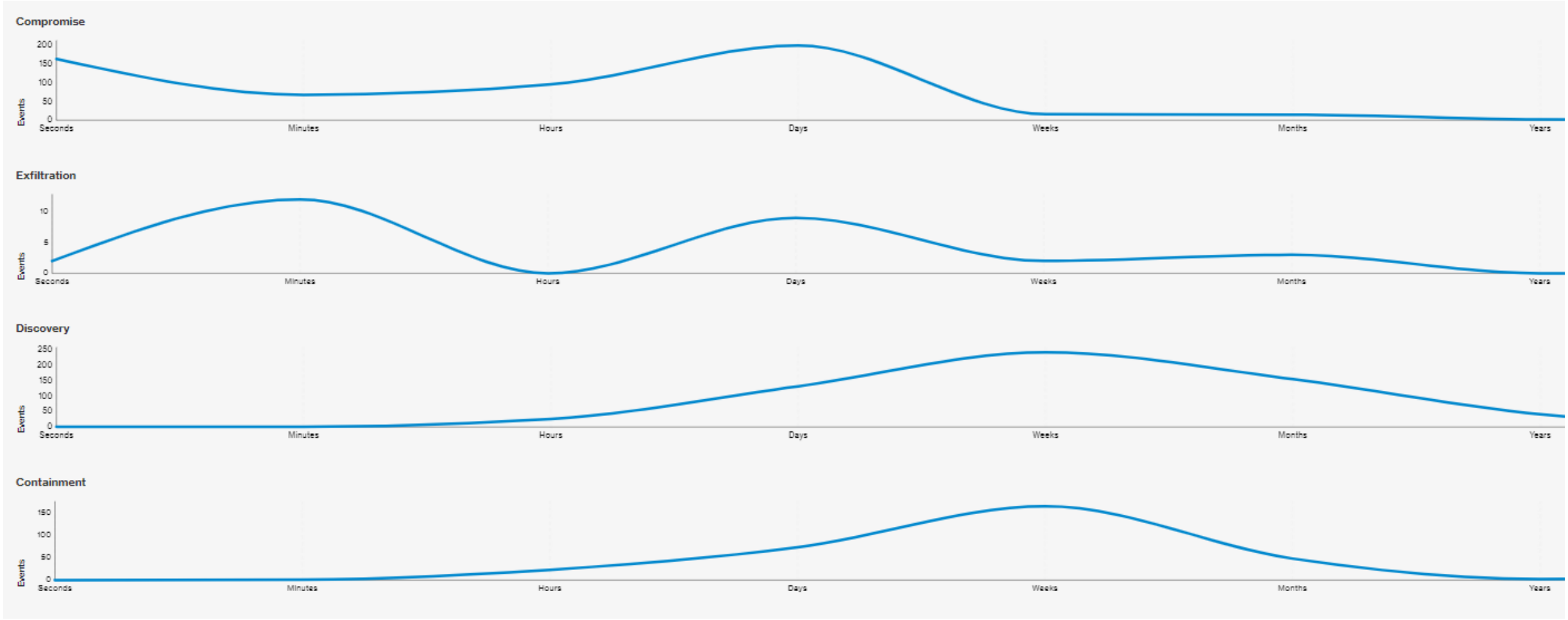
What Verizon Found - Breach Trends (15th Edition)



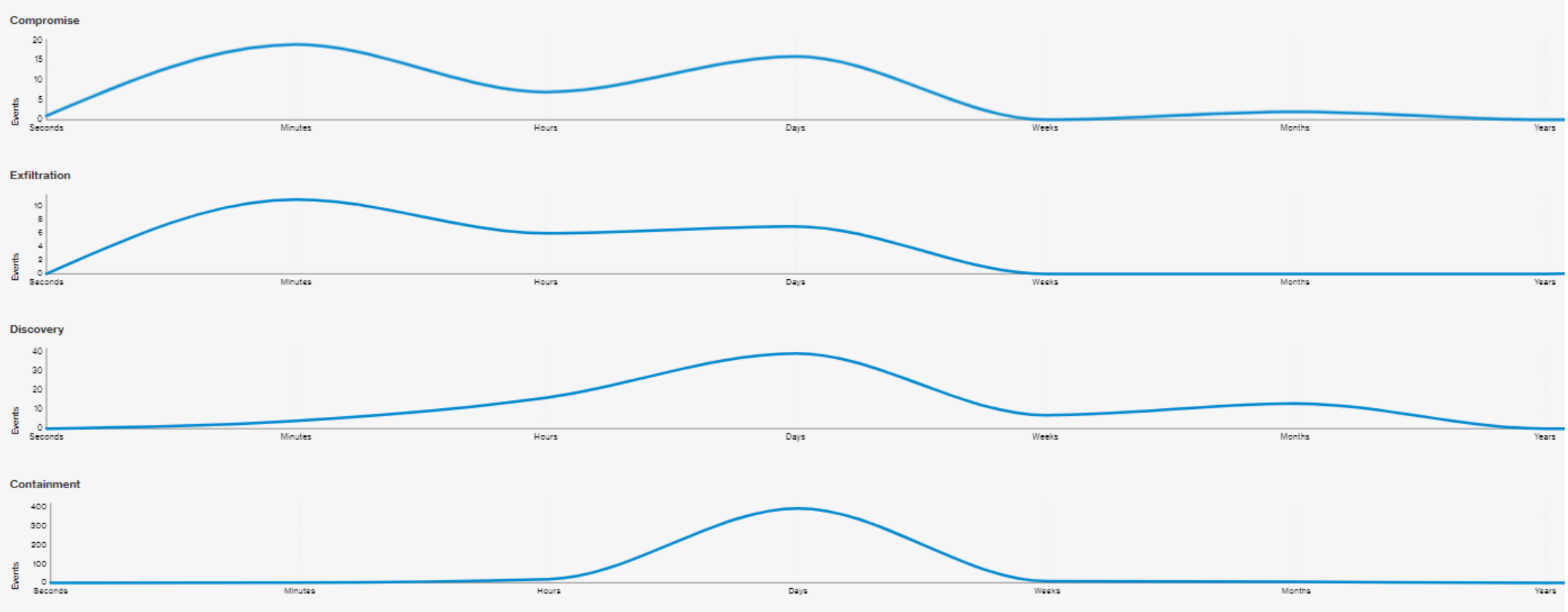
Discovery Methods Used Over Time (15th Edition)



Response Time For Breach Events – 2010 (15th Edition)



Response Time For Breach Events – 2021 (15th Edition)



Cyber Governance

NIST Cyber Security Framework

Completed Framework Example

Function	1 Identify	2 Protect	3 Detect	4 Respond	5 Recover	Current Profile	Target Profile	Risk Gap
Cat.01 - Asset Management (ID.AM)	2.7					2.7	3	- 0.3
Cat.02 - Business Environment (ID.BE)	3.8					3.8	4	- 0.2
Cat.03 - Governance (ID.GV)	2.3					2.3	3	- 0.8
Cat.04 - Risk Assessment (ID.RA)	2.7					2.7	3	- 0.3
Cat.05 - Risk Management Strategy (ID.RM)	2.7					2.7	4	- 1.3
Cat.06 - Supply Chain Risk Management (ID.SC)	2.2					2.2	3	- 0.8
Cat.07 - Identity Management, Authentication and Access Control (PR.AC)		3.1				3.1	4	- 0.9
Cat.08 - Awareness and Training (PR.AT)		2.8				2.8	3	- 0.2
Cat.09 - Data Security (PR.DS)		3.3				3.3	4	- 0.8
Cat.10 - Information Protection Processes and Procedures (PR.IP)		3.3				3.3	4	- 0.8
Cat.11 - Maintenance (PR.MA)		3.5				3.5	4	- 0.5
Cat.12 - Protective Technology (PR.PT)		3.2				3.2	4	- 0.8
Cat.13 - Anomalies and Events (DE.AE)			2.6			2.6	4	- 1.4
Cat.14 - Security Continuous Monitoring (DE.CM)			2.4			2.4	3	- 0.6
Cat.15 - Detection Processes (DE.DP)			3.0			3.0	3	-
Cat.16 - Response Planning (RS.RP)				4.0		4.0	4	-
Cat.17 - Communications (RS.CO)				3.6		3.6	4	- 0.4
Cat.18 - Analysis (RS.AN)				2.6		2.6	3	- 0.4
Cat.19 - Mitigation (RS.MI)				2.7		2.7	3	- 0.3
Cat.20 - Improvements (RS.IM)				3.5		3.5	4	- 0.5
Cat.21 - Recovery Planning (RC.RP)					3.0	3.0	3	-
Cat.22 - Improvements (RC.IM)					3.5	3.5	4	- 0.5
Cat.23 - Communications (RC.CO)					3.0	3.0	3	-
Grand Total	2.7	3.2	2.6	3.1	3.2	3.0	3.5	- 0.5

CIS Controls

CIS Controls

IG1 is the definition of basic cyber hygiene and represents a minimum standard of information security for all enterprises. IG1 assists enterprises with limited cybersecurity expertise thwart general, non-targeted attacks.

56
Cyber defense Safeguards

IG2 assists enterprises managing IT infrastructure of multiple departments with differing risk profiles. IG2 aims to help enterprises cope with increased operational complexity.

74
Additional cyber defense Safeguards

IG3 assists enterprises with IT security experts secure sensitive and confidential data. IG3 aims to prevent and/or lessen the impact of sophisticated attacks.

23
Additional cyber defense Safeguards

Total Safeguards **153**

CIS Controls

Number	Control/Safeguard	IG1	IG2	IG3
01	**Inventory and Control of Enterprise Assets**			
1.1	Establish and Maintain Detailed Enterprise Asset Inventory	●	●	●
1.2	Address Unauthorized Assets	●	●	●
1.3	Utilize an Active Discovery Tool		●	●
1.4	Use Dynamic Host Configuration Protocol (DHCP) Logging to Update Enterprise Asset Inventory		●	●
1.5	Use a Passive Asset Discovery Tool			●
02	**Inventory and Control of Software Assets**			
2.1	Establish and Maintain a Software Inventory	●	●	●
2.2	Ensure Authorized Software is Currently Supported	●	●	●
2.3	Address Unauthorized Software	●	●	●
2.4	Utilize Automated Software Inventory Tools		●	●
2.5	Allowlist Authorized Software		●	●
2.6	Allowlist Authorized Libraries		●	●
2.7	Allowlist Authorized Scripts			●
03	**Data Protection**			
3.1	Establish and Maintain a Data Management Process	●	●	●
3.2	Establish and Maintain a Data Inventory	●	●	●
3.3	Configure Data Access Control Lists	●	●	●
3.4	Enforce Data Retention	●	●	●
3.5	Securely Dispose of Data	●	●	●
3.6	Encrypt Data on End-User Devices	●	●	●
3.7	Establish and Maintain a Data Classification Scheme		●	●
3.8	Document Data Flows		●	●
3.9	Encrypt Data on Removable Media		●	●
3.10	Encrypt Sensitive Data in Transit		●	●
3.11	Encrypt Sensitive Data at Rest		●	●
3.12	Segment Data Processing and Storage Based on Sensitivity		●	●
3.13	Deploy a Data Loss Prevention Solution			●
3.14	Log Sensitive Data Access			●

Number	Control/Safeguard	IG1	IG2	IG3
04	**Secure Configuration of Enterprise Assets and Software**			
4.1	Establish and Maintain a Secure Configuration Process	●	●	●
4.2	Establish and Maintain a Secure Configuration Process for Network Infrastructure	●	●	●
4.3	Configure Automatic Session Locking on Enterprise Assets	●	●	●
4.4	Implement and Manage a Firewall on Servers	●	●	●
4.5	Implement and Manage a Firewall on End-User Devices	●	●	●
4.6	Securely Manage Enterprise Assets and Software	●	●	●
4.7	Manage Default Accounts on Enterprise Assets and Software	●	●	●
4.8	Uninstall or Disable Unnecessary Services on Enterprise Assets and Software		●	●
4.9	Configure Trusted DNS Servers on Enterprise Assets		●	●
4.10	Enforce Automatic Device Lockout on Portable End-User Devices		●	●
4.11	Enforce Remote Wipe Capability on Portable End-User Devices		●	●
4.12	Separate Enterprise Workspaces on Mobile End-User Devices			●
05	**Account Management**			
5.1	Establish and Maintain an Inventory of Accounts	●	●	●
5.2	Use Unique Passwords	●	●	●
5.3	Disable Dormant Accounts	●	●	●
5.4	Restrict Administrator Privileges to Dedicated Administrator Accounts	●	●	●
5.5	Establish and Maintain an Inventory of Service Accounts		●	●
5.6	Centralize Account Management		●	●
06	**Access Control Management**			
6.1	Establish an Access Granting Process	●	●	●
6.2	Establish an Access Revoking Process	●	●	●
6.3	Require MFA for Externally-Exposed Applications	●	●	●
6.4	Require MFA for Remote Network Access	●	●	●
6.5	Require MFA for Administrative Access	●	●	●
6.6	Establish and Maintain an Inventory of Authentication and Authorization Systems		●	●
6.7	Centralize Access Control		●	●
6.8	Define and Maintain Role-Based Access Control			●

CIS Controls

Number	Control/Safeguard	IG1	IG2	IG3
07	**Continuous Vulnerability Management**			
7.1	Establish and Maintain a Vulnerability Management Process	●	●	●
7.2	Establish and Maintain a Remediation Process	●	●	●
7.3	Perform Automated Operating System Patch Management	●	●	●
7.4	Perform Automated Application Patch Management	●	●	●
7.5	Perform Automated Vulnerability Scans of Internal Enterprise Assets		●	●
7.6	Perform Automated Vulnerability Scans of Externally-Exposed Enterprise Assets		●	●
7.7	Remediate Detected Vulnerabilities		●	●
08	**Audit Log Management**			
8.1	Establish and Maintain an Audit Log Management Process	●	●	●
8.2	Collect Audit Logs	●	●	●
8.3	Ensure Adequate Audit Log Storage	●	●	●
8.4	Standardize Time Synchronization		●	●
8.5	Collect Detailed Audit Logs		●	●
8.6	Collect DNS Query Audit Logs		●	●
8.7	Collect URL Request Audit Logs		●	●
8.8	Collect Command-Line Audit Logs		●	●
8.9	Centralize Audit Logs		●	●
8.10	Retain Audit Logs		●	●
8.11	Conduct Audit Log Reviews		●	●
8.12	Collect Service Provider Logs			●
09	**Email and Web Browser Protections**			
9.1	Ensure Use of Only Fully Supported Browsers and Email Clients	●	●	●
9.2	Use DNS Filtering Services	●	●	●
9.3	Maintain and Enforce Network-Based URL Filters		●	●
9.4	Restrict Unnecessary or Unauthorized Browser and Email Client Extensions		●	●
9.5	Implement DMARC		●	●
9.6	Block Unnecessary File Types		●	●
9.7	Deploy and Maintain Email Server Anti-Malware Protections			●

Number	Control/Safeguard	IG1	IG2	IG3
10	**Malware Defenses**			
10.1	Deploy and Maintain Anti-Malware Software	●	●	●
10.2	Configure Automatic Anti-Malware Signature Updates	●	●	●
10.3	Disable Autorun and Autoplay for Removable Media	●	●	●
10.4	Configure Automatic Anti-Malware Scanning of Removable Media		●	●
10.5	Enable Anti-Exploitation Features		●	●
10.6	Centrally Manage Anti-Malware Software		●	●
10.7	Use Behavior-Based Anti-Malware Software		●	●
11	**Data Recovery**			
11.1	Establish and Maintain a Data Recovery Process	●	●	●
11.2	Perform Automated Backups	●	●	●
11.3	Protect Recovery Data	●	●	●
11.4	Establish and Maintain an Isolated Instance of Recovery Data	●	●	●
11.5	Test Data Recovery		●	●
12	**Network Infrastructure Management**			
12.1	Ensure Network Infrastructure is Up-to-Date	●	●	●
12.2	Establish and Maintain a Secure Network Architecture		●	●
12.3	Securely Manage Network Infrastructure		●	●
12.4	Establish and Maintain Architecture Diagram(s)		●	●
12.5	Centralize Network Authentication, Authorization, and Auditing (AAA)		●	●
12.6	Use of Secure Network Management and Communication Protocols		●	●
12.7	Ensure Remote Devices Utilize a VPN and are Connecting to an Enterprise's AAA Infrastructure		●	●
12.8	Establish and Maintain Dedicated Computing Resources for All Administrative Work			●

CIS Controls

Number	Control/Safeguard	IG1	IG2	IG3
13	**Network Monitoring and Defense**			
13.1	Centralize Security Event Alerting		●	●
13.2	Deploy a Host-Based Intrusion Detection Solution		●	●
13.3	Deploy a Network Intrusion Detection Solution		●	●
13.4	Perform Traffic Filtering Between Network Segments		●	●
13.5	Manage Access Control for Remote Assets		●	●
13.6	Collect Network Traffic Flow Logs		●	●
13.7	Deploy a Host-Based Intrusion Prevention Solution			●
13.8	Deploy a Network Intrusion Prevention Solution			●
13.9	Deploy Port-Level Access Control			●
13.10	Perform Application Layer Filtering			●
13.11	Tune Security Event Alerting Thresholds			●
14	**Security Awareness and Skills Training**			
14.1	Establish and Maintain a Security Awareness Program	●	●	●
14.2	Train Workforce Members to Recognize Social Engineering Attacks	●	●	●
14.3	Train Workforce Members on Authentication Best Practices	●	●	●
14.4	Train Workforce on Data Handling Best Practices	●	●	●
14.5	Train Workforce Members on Causes of Unintentional Data Exposure	●	●	●
14.6	Train Workforce Members on Recognizing and Reporting Security Incidents	●	●	●
14.7	Train Workforce on How to Identify and Report if Their Enterprise Assets are Missing Security Updates	●	●	●
14.8	Train Workforce on the Dangers of Connecting to and Transmitting Enterprise Data Over Insecure Networks	●	●	●
14.9	Conduct Role-Specific Security Awareness and Skills Training		●	●
15	**Service Provider Management**			
15.1	Establish and Maintain an Inventory of Service Providers	●	●	●
15.2	Establish and Maintain a Service Provider Management Policy		●	●
15.3	Classify Service Providers		●	●
15.4	Ensure Service Provider Contracts Include Security Requirements		●	●
15.5	Assess Service Providers			●
15.6	Monitor Service Providers			●
15.7	Securely Decommission Service Providers			●

Number	Control/Safeguard	IG1	IG2	IG3
16	**Application Software Security**			
16.1	Establish and Maintain a Secure Application Development Process		●	●
16.2	Establish and Maintain a Process to Accept and Address Software Vulnerabilities		●	●
16.3	Perform Root Cause Analysis on Security Vulnerabilities		●	●
16.4	Establish and Manage an Inventory of Third-Party Software Components		●	●
16.5	Use Up-to-Date and Trusted Third-Party Software Components		●	●
16.6	Establish and Maintain a Severity Rating System and Process for Application Vulnerabilities		●	●
16.7	Use Standard Hardening Configuration Templates for Application Infrastructure		●	●
16.8	Separate Production and Non-Production Systems		●	●
16.9	Train Developers in Application Security Concepts and Secure Coding		●	●
16.10	Apply Secure Design Principles in Application Architectures		●	●
16.11	Leverage Vetted Modules or Services for Application Security Components		●	●
16.12	Implement Code-Level Security Checks			●
16.13	Conduct Application Penetration Testing			●
16.14	Conduct Threat Modeling			●
17	**Incident Response Management**			
17.1	Designate Personnel to Manage Incident Handling	●	●	●
17.2	Establish and Maintain Contact Information for Reporting Security Incidents	●	●	●
17.3	Establish and Maintain an Enterprise Process for Reporting Incidents	●	●	●
17.4	Establish and Maintain an Incident Response Process		●	●
17.5	Assign Key Roles and Responsibilities		●	●
17.6	Define Mechanisms for Communicating During Incident Response		●	●
17.7	Conduct Routine Incident Response Exercises		●	●
17.8	Conduct Post-Incident Reviews		●	●
17.9	Establish and Maintain Security Incident Thresholds			●
18	**Penetration Testing**			
18.1	Establish and Maintain a Penetration Testing Program		●	●
18.2	Perform Periodic External Penetration Tests		●	●
18.3	Remediate Penetration Test Findings		●	●
18.4	Validate Security Measures			●
18.5	Perform Periodic Internal Penetration Tests			●

Applying Controls from Advisories

TLP: CLEAR
MS-ISAC CYBERSECURITY ADVISORY

MS-ISAC ADVISORY NUMBER:
2023-057

DATE(S) ISSUED:
06/05/2023

SUBJECT:
A Vulnerability in Google Chrome Could Allow for Arbitrary Code Execution

RECOMMENDATIONS:
We recommend the following actions be taken:

- Apply appropriate updates provided by Google to vulnerable systems immediately after appropriate testing. (**M1051: Update Software**)
  - **Safeguard 7.1: Establish and Maintain a Vulnerability Management Process**: Establish and maintain a documented vulnerability management process for enterprise assets. Review and update documentation annually, or when significant enterprise changes occur that could impact this Safeguard.
  - **Safeguard 7.4: Perform Automated Application Patch Management:** Perform application updates on enterprise assets through automated patch management on a monthly, or more frequent, basis.
  - **Safeguard 7.7: Remediate Detected Vulnerabilities:** Remediate detected vulnerabilities in software through processes and tooling on a monthly, or more frequent, basis, based on the remediation process.
  - **Safeguard 9.1: Ensure Use of Only Fully Supported Browsers and Email Clients:** Ensure only fully supported browsers and email clients are allowed to execute in the enterprise, only using the latest version of browsers and email clients provided through the vendor.
- Apply the Principle of Least Privilege to all systems and services. Run all software as a non-privileged user (one without administrative privileges) to diminish the effects of a successful attack. (**M1026: Privileged Account Management**)
  - **Safeguard 4.7: Manage Default Accounts on Enterprise Assets and Software:** Manage default accounts on enterprise assets and software, such as

Applying Controls from the lessons learned

04 Secure Configuration of Enterprise Assets and Software

4.1	Establish and Maintain a Secure Configuration Process	●
4.2	Establish and Maintain a Secure Configuration Process for Network Infrastructure	●
4.3	Configure Automatic Session Locking on Enterprise Assets	●
4.4	Implement and Manage a Firewall on Servers	●
4.5	Implement and Manage a Firewall on End-User Devices	●
4.6	Securely Manage Enterprise Assets and Software	●
4.7	Manage Default Accounts on Enterprise Assets and Software	●

06 Access Control Management

6.1	Establish an Access Granting Process	●
6.2	Establish an Access Revoking Process	●
6.3	Require MFA for Externally-Exposed Applications	●
6.4	Require MFA for Remote Network Access	●
6.5	Require MFA for Administrative Access	●

14 Security Awareness and Skills Training

14.1	Establish and Maintain a Security Awareness Program	●
14.2	Train Workforce Members to Recognize Social Engineering Attacks	●
14.3	Train Workforce Members on Authentication Best Practices	●
14.4	Train Workforce on Data Handling Best Practices	●
14.5	Train Workforce Members on Causes of Unintentional Data Exposure	●
14.6	Train Workforce Members on Recognizing and Reporting Security Incidents	●
14.7	Train Workforce on How to Identify and Report if Their Enterprise Assets are Missing Security Updates	●
14.8	Train Workforce on the Dangers of Connecting to and Transmitting Enterprise Data Over Insecure Networks	●

What services are clients engaging in?

- Cyber framework
- Cyber controls
- Incident response plans and playbooks
- Incident response control room
- Tabletop simulations
- Responding to incidents including forensics
- Incident response retainer

Thank you

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Incident Response
FORENSIC & CYBER