

Twenty Years of OWASP Top 10



Open Worldwide Application Security Project
Top 10 of Web Application Risks
2003-2025

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OWASP Top 10



Open *Worldwide* Application Security Project

founded 2001

name changed from Web to Worldwide in 2024

Best (only?) known for **Top 10 of Web Application Risks**

The Top 10 is

- **great for awareness**
- **a great first step in improving security**

but...

- **only a first step**
- **not a 'standard' (unlike OWASP ASVS)**

Other Top Ns

- OWASP Top 10 for LMM Applications & GenAI
- OWASP Mobile Top 10
- OWASP API Top 10
- OWASP Kubernetes Top 10
- ...



Top Ns by other organisations:

- CWE Top 25 Software Weaknesses, annually since 2019
- CWE Top 25 Hardware Weaknesses, since 2021



2025 edition of OWASP Top 10

1. Broken Access Control

2. Security Misconfiguration

3. Software Supply Chain Failures 

4. Cryptographic Failures

5. Injection

6. Insecure Design

7. Authentication Failures

8. Software & Data Integrity Failures

9. Logging & Alerting Failures 

10. Mishandling Exceptional Conditions

8 categories based on data,
2 based on community survey 

Honourable mentions:

- Lack of application resilience
- Memory corruption
- AI-assisted coding

4. Injection Attacks

CWE-89	SQL Injection	CWE-20	Improper Input Validation
CWE-79	Cross-site Scripting (XSS)	CWE-116	Improper Encoding or Escaping of Output
CWE-77	Command Injection	CWE-115	Misinterpretation of Output
CWE-78	OS Command Injection	CWE-112	Missing XML Validation
CWE-90	LDAP Injection	CWE-129	Improper Validation of Array Index
CWE-98	PHP Remote File Inclusion	CWE-470	Unsafe Reflection
CWE-91	XML Injection	CWE-493	Public Variable Without Final Modifier
CWE-88	Argument Injection	CWE-500	Public Static Field Not Marked Final
CWE-93	CRLF Injection	CWE-610	Externally Controlled Reference to a Resource in Another Sphere
CWE-643	XPath Injection	...	
CWE-94	Code Injection	...	
CWE-96	Static Code Injection	...	
CWE-95	Eval Injection		
CWE-97	Server-Side Includes (SSI)		
CWE-99	Resource Injection		
CWE-917	Expression Language Injection		
CWE-113	HTTP Response Splitting		
CWE-74	Improper Neutralization of Special Elements Used by a Downstream Component ('Injection')		
CWE-76	Improper Neutralization of Equivalent Special Elements		
CWE-83	Improper Neutralization of Script in Attributes in a Web Page		
CWE-86	Improper Neutralization of Invalid Characters in Identifiers in Web Pages		
CWE-644	Improper Neutralization of HTTP Headers for Scripting Syntax		
CWE-159	Improper Handling of Invalid Use of Special Elements		

Path traversal attacks are included in Broken Access Control

6. Insecure Design

Access control

- CWE-362 Race Condition
- CWE-266 Incorrect Privilege Assignment
- CWE-269 Improper Privilege Management
- CWE-286 Incorrect User Management

Misc.

- CWE-602 Client-Side Enforcement of Security
- CWE-501 Trust Boundary Violation
- CWE-653 Insufficient Compartmentalization
- CWE-656 Reliance on Security Through Obscurity
- CWE-657 Violation of Secure Design Principles
- CWE-693 Protection Mechanism Failure
- CWE-799 Improper Control of Interaction Frequency
- CWE-841 Improper Enforcement of Behavioral Workflow
- CWE-1125 Excessive Attack Surface

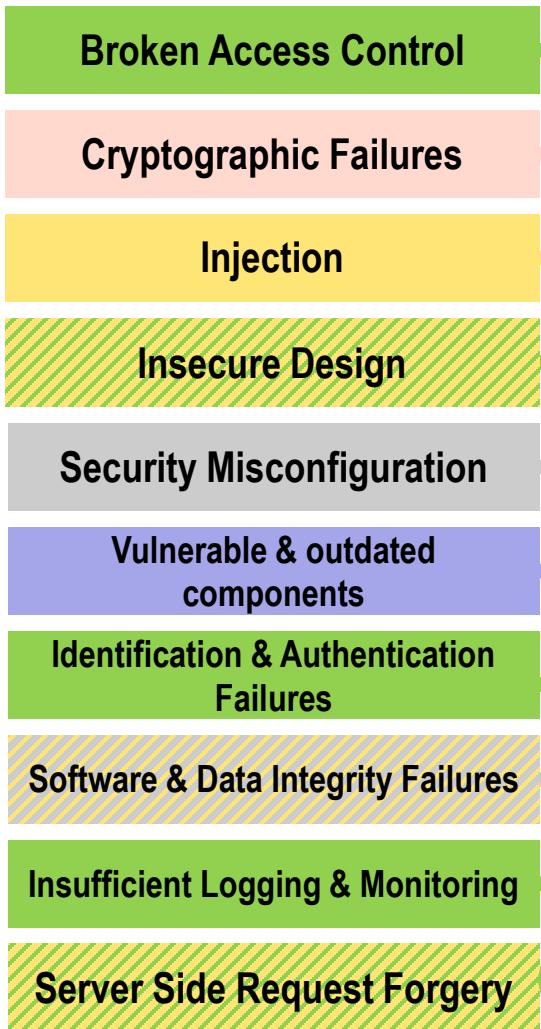
Information leakage

- CWE-256 Unprotected Storage of Credentials
- CWE-312 Cleartext Storage of Sensitive Info
- CWE-313 Cleartext Storage in a File or on Disk
- CWE-316 Cleartext Storage of Sensitive Info in Memory
- CWE-522 Insufficiently Protected Credentials
- CWE-419 Unprotected Primary Channel
- CWE-525 Use of Web Browser Cache for Sensitive Info
- CWE-311 Missing Encryption of Sensitive Data
- CWE-539 Use of Persistent Cookies for Sensitive Info
- CWE-598 GET Requests With Sensitive Query Strings

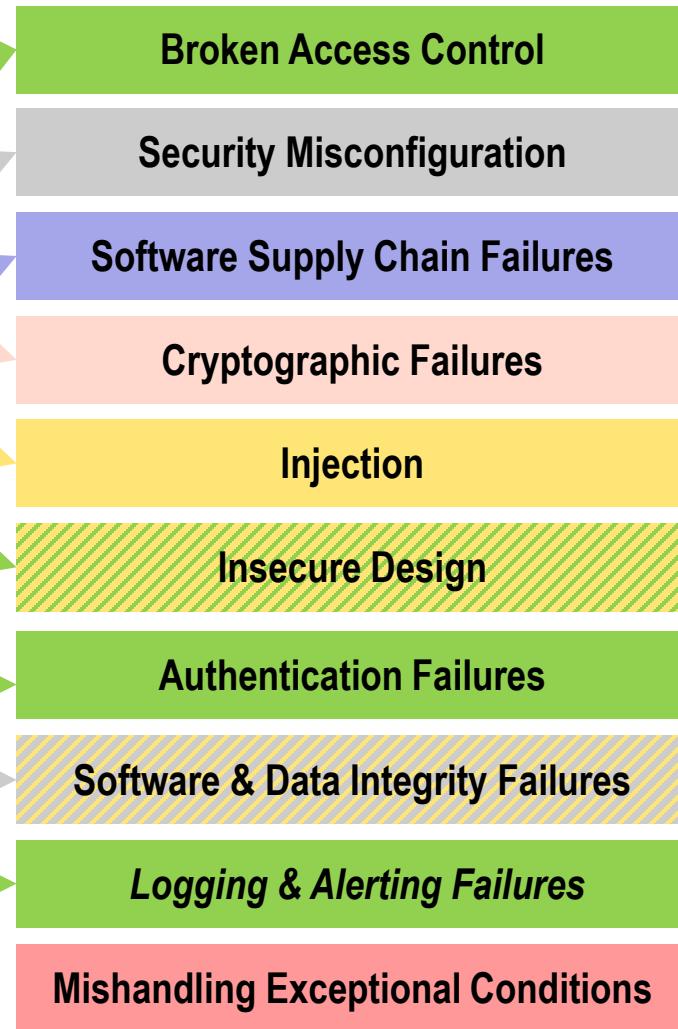
UI

- CWE-451 UI Misrepresentation of Critical Information
- CWE-1021 Improper Restriction of Rendered UI Layers
- CWE-1022 Untrusted Link with window.opener Access
- Input handling
 - CWE-183 Permissive List of Allowed Inputs
 - CWE-434 Upload of File with Dangerous Type
 - CWE-436 Interpretation Conflict
 - CWE-444 HTTP Request Smuggling
- CWE-73 External Control of File Name or Path
- CWE-642 External Control of Critical State Data
- CWE-646 Reliance on File Name or Extension of External File
- CWE-807 Reliance on Untrusted Inputs in Security Decision
- CWE-454 External Initialization of Trusted Variables or Data Stores
- CWE-472 External Control of Assumed-Immutable Web Parameter
- CWE-676 Use of Potentially Dangerous Function
- CWE-382 J2EE Bad Practices: Use of System.exit()
- CWE-628 Function Call with Incorrectly Specified Arguments

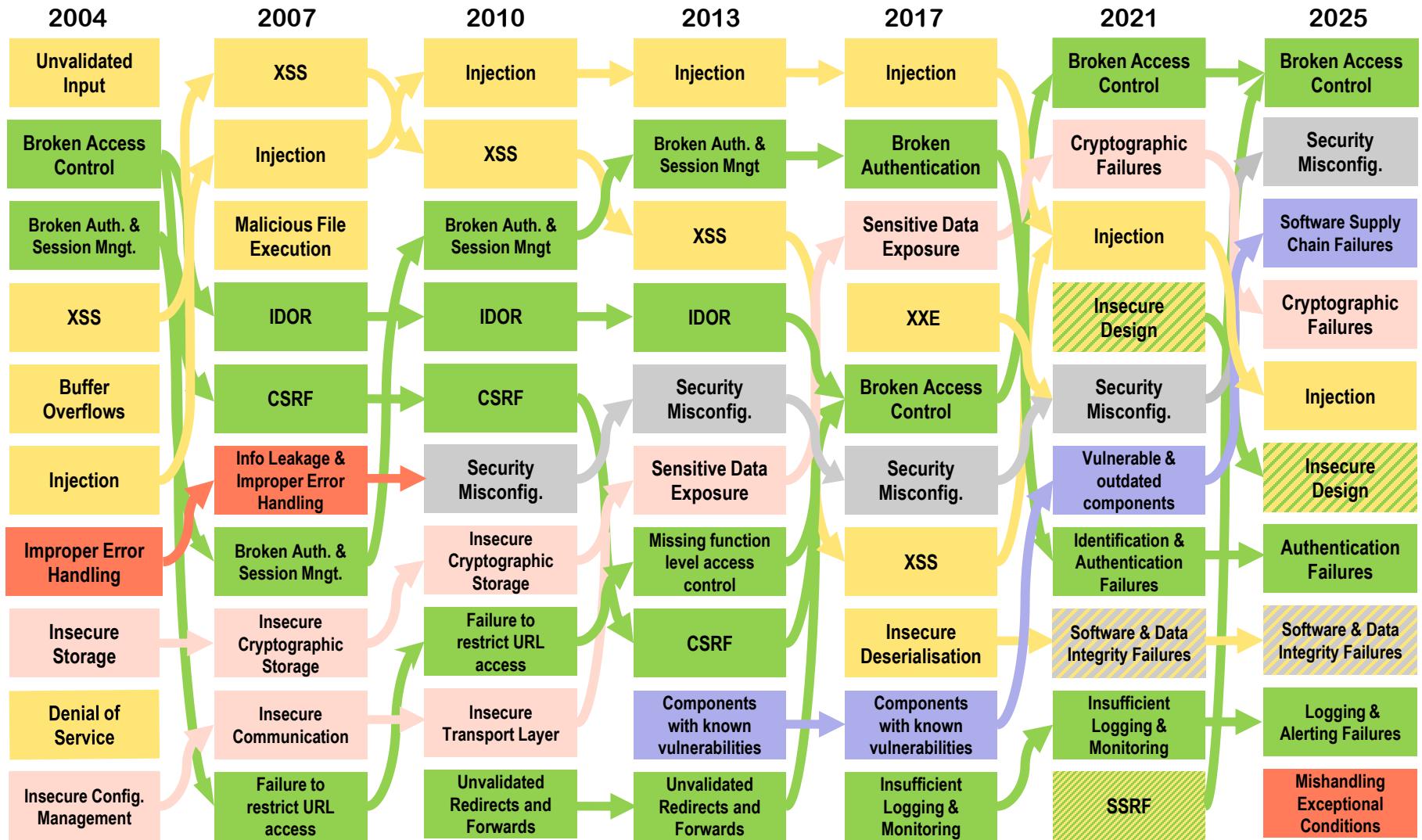
2021



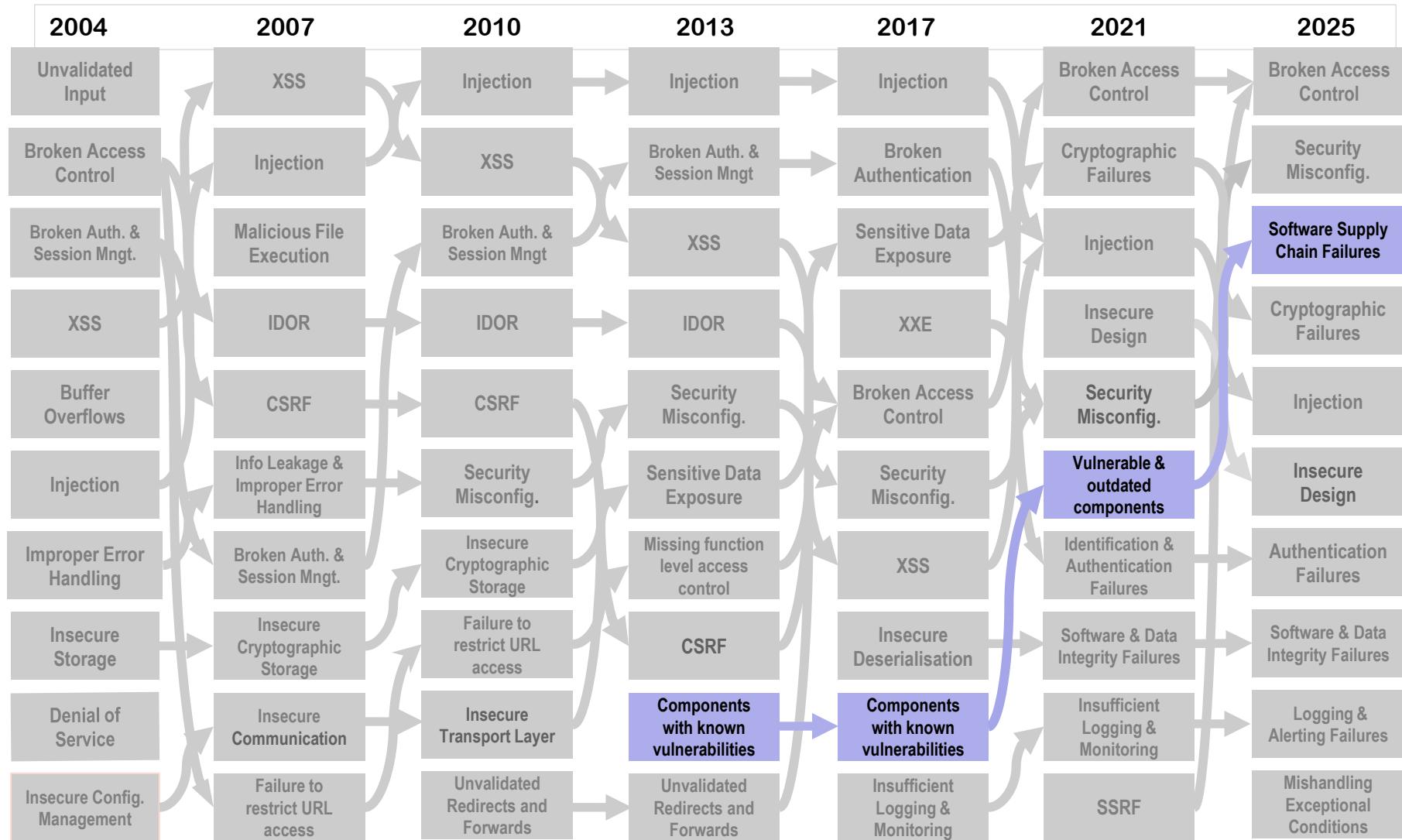
2025



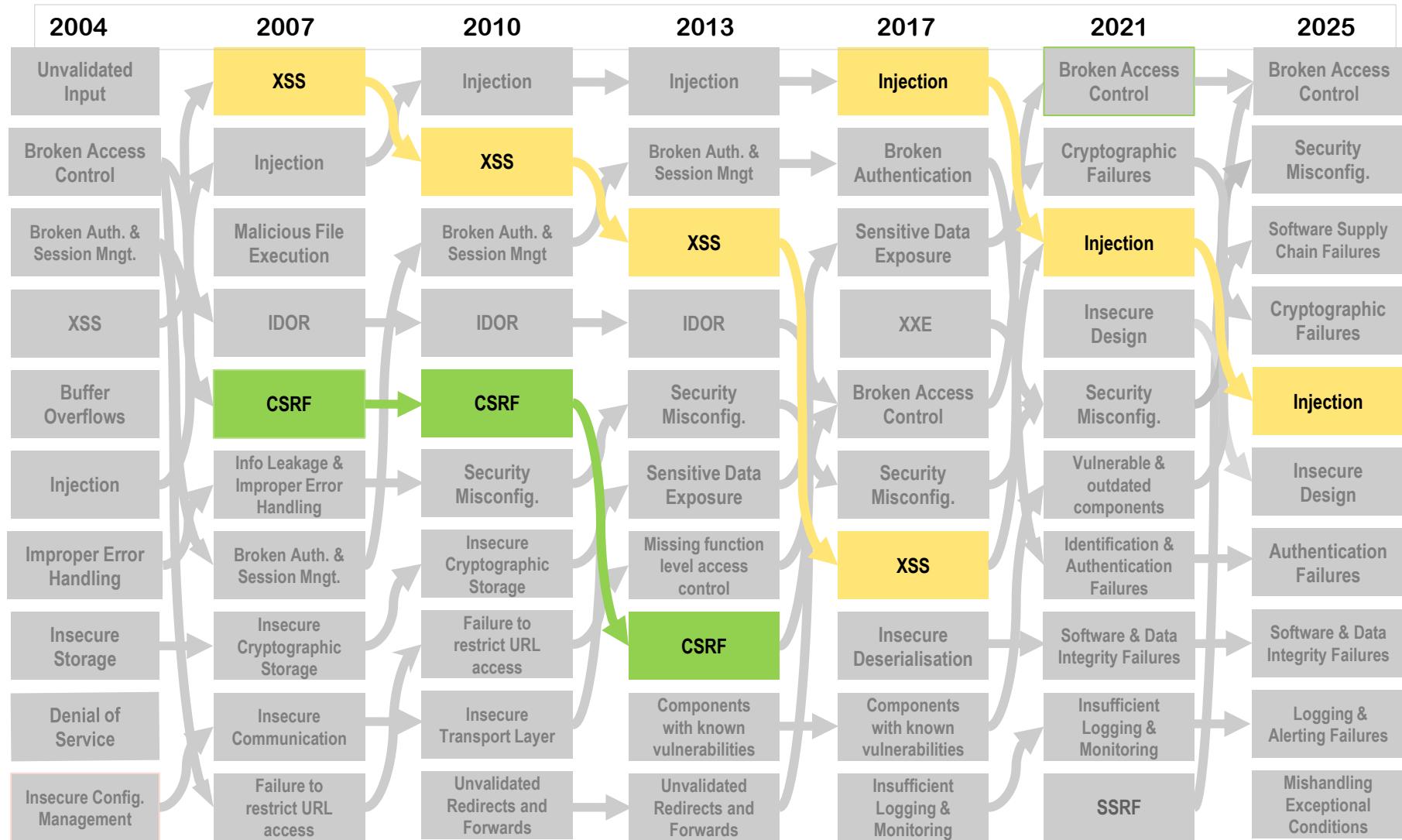
Evolution of the OWASP Top 10



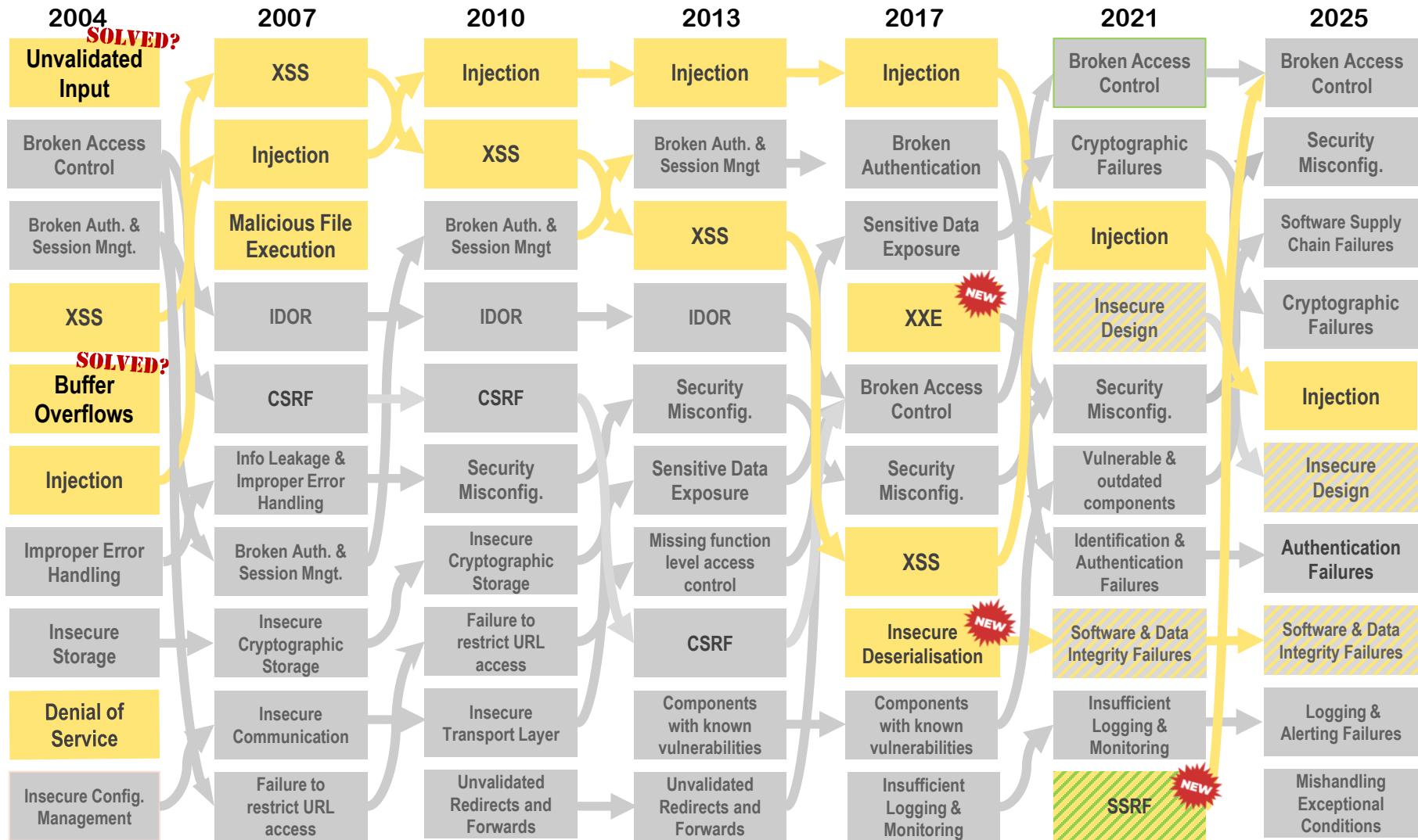
Upwards trends



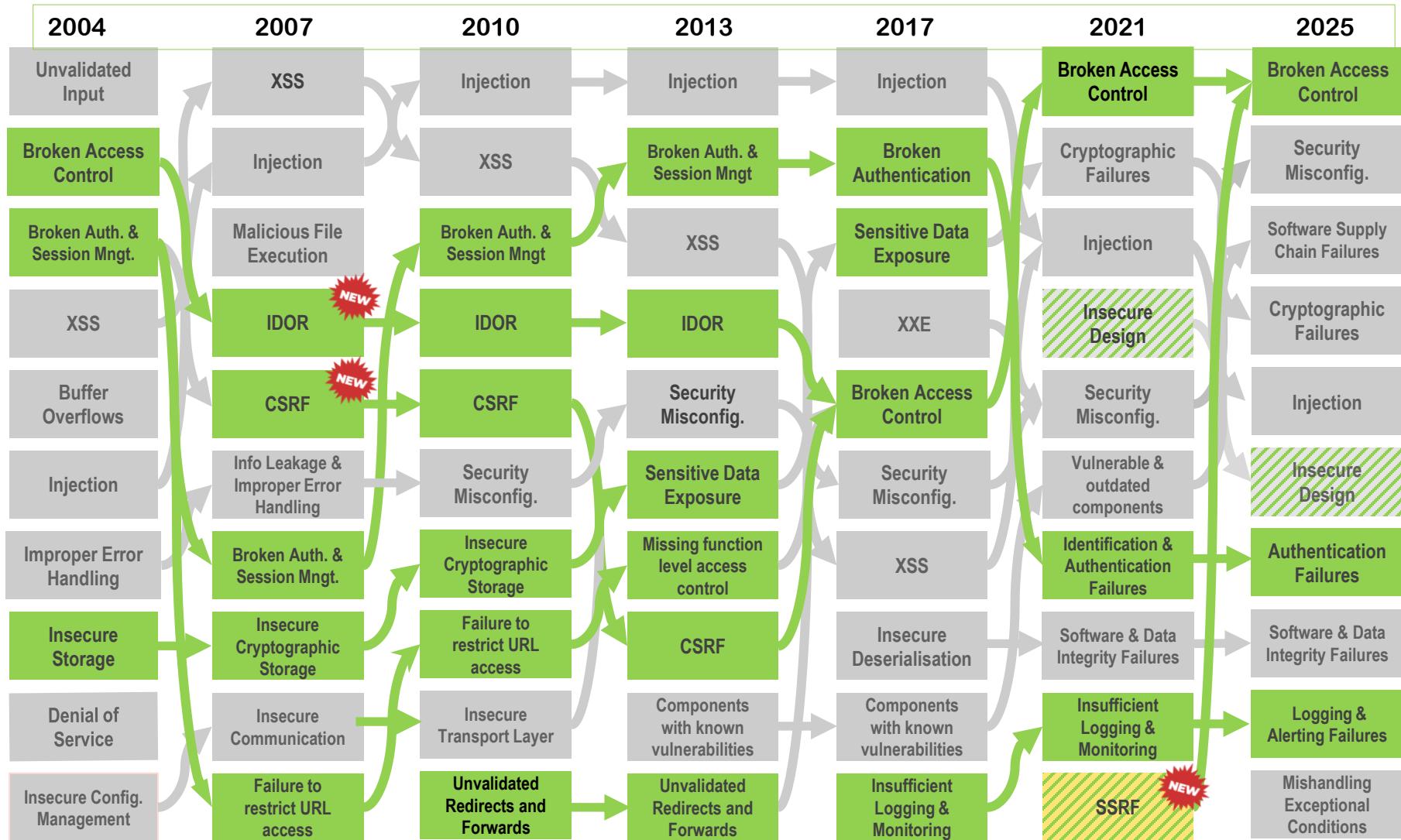
Downward trends



All issues due to input handling



All issues due to access control





2025 CWE Top 25 – based on CVE data

1 Cross-Site Scripting	14 Stack-based Buffer overflow
2 SQL Injection	15 Deserialization of Untrusted Data
3 Client-side Request Forgery (CSRF)	16 Heap-based Buffer Overflow
4 Missing Authorization	17 Incorrect Authorization
5 Out-of-bounds Write	18 Improper Input Validation
6 Path Traversal	19 Improper Access Control
7 Use After Free	20 Exposing Info to Unauthorized User
8 Out-of-bounds Read	21 Missing Authentication
9 OS Command Injection	22 Server-Side Request Forgery (SSRF)
10 Code Injection	23 Command Injection
11 Classic Buffer Overflow	24 Authorization Bypass with User-Controlled Key
12 Upload of Dangerous File	25 Allocation of Resources without Throttling
13 NULL pointer deference	

This ranking is based on [frequency](#) (# CVEs)

The OWASP Top 10 is based on [incidence](#) (# applications) & [impact](#)

OWASP Top 10

Broken Access Control
Security Misconfiguration
Software Supply Chain Failures
Cryptographic Failures
Injection
Insecure Design
Authentication Failures
Software & Data Integrity Failures
Logging & Alerting Failures
Mishandling Exceptional Conditions

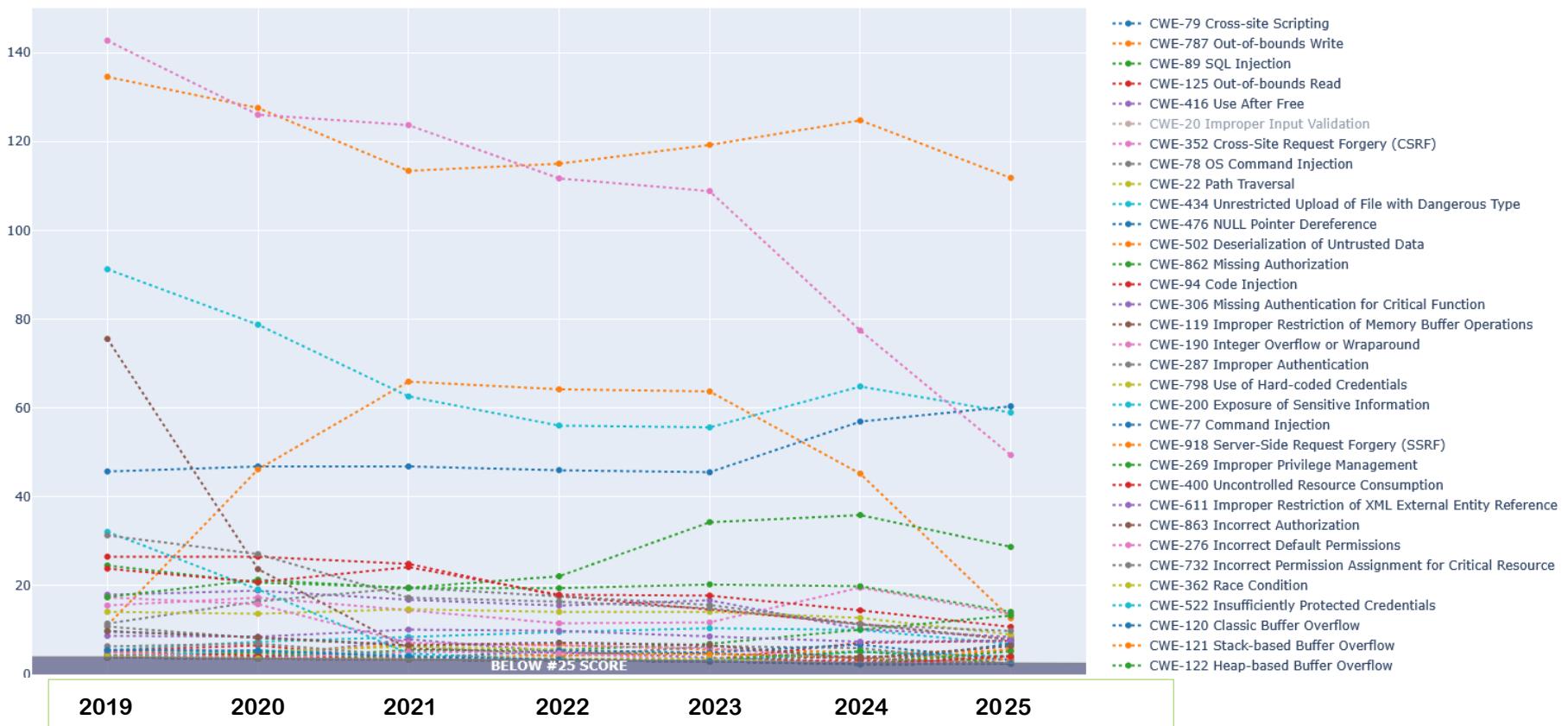
Big difference, due to

1. looking at **incidence** vs **frequency**
2. some flaws not showing up as CVEs

vs 2025 CWE Top 25

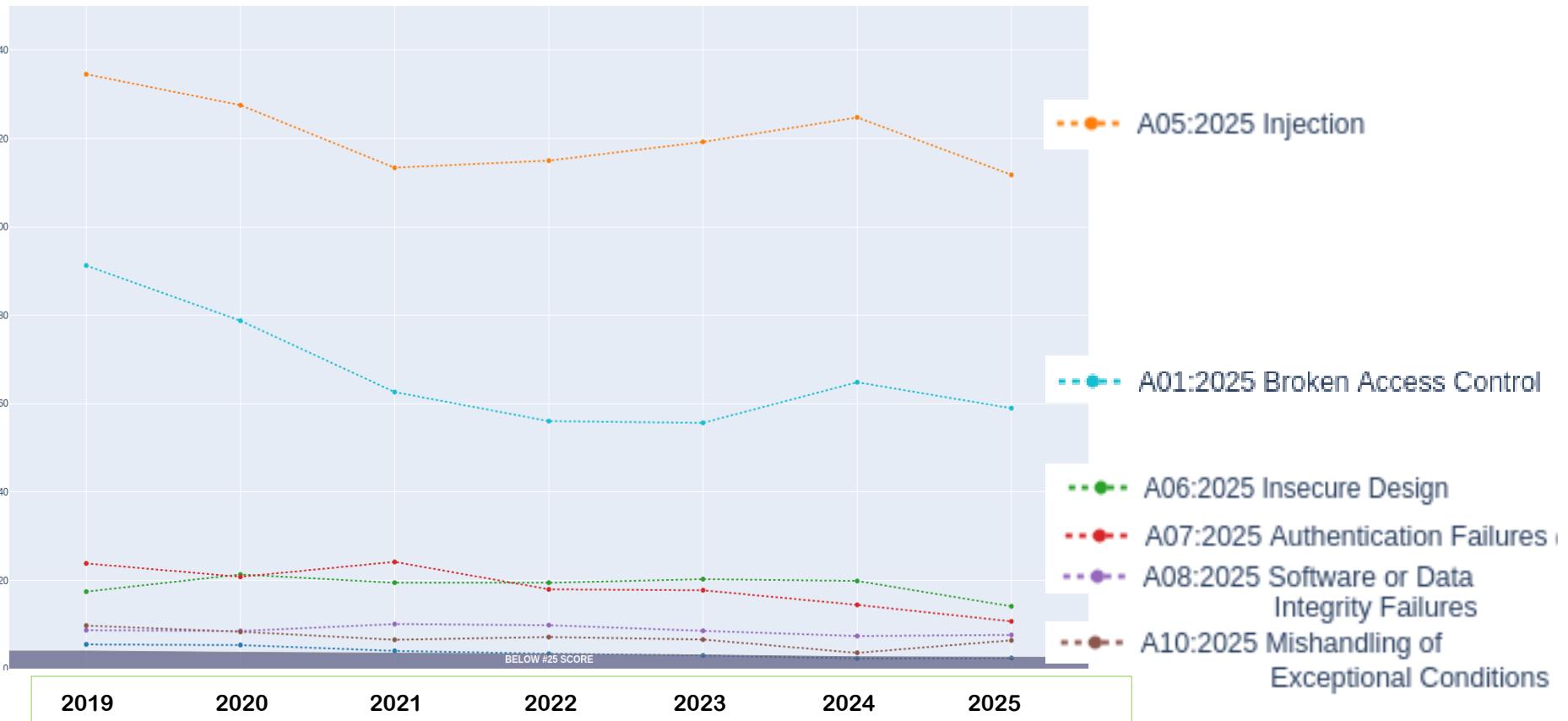
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CWE Top 25 trends (i.e. CVE trends)

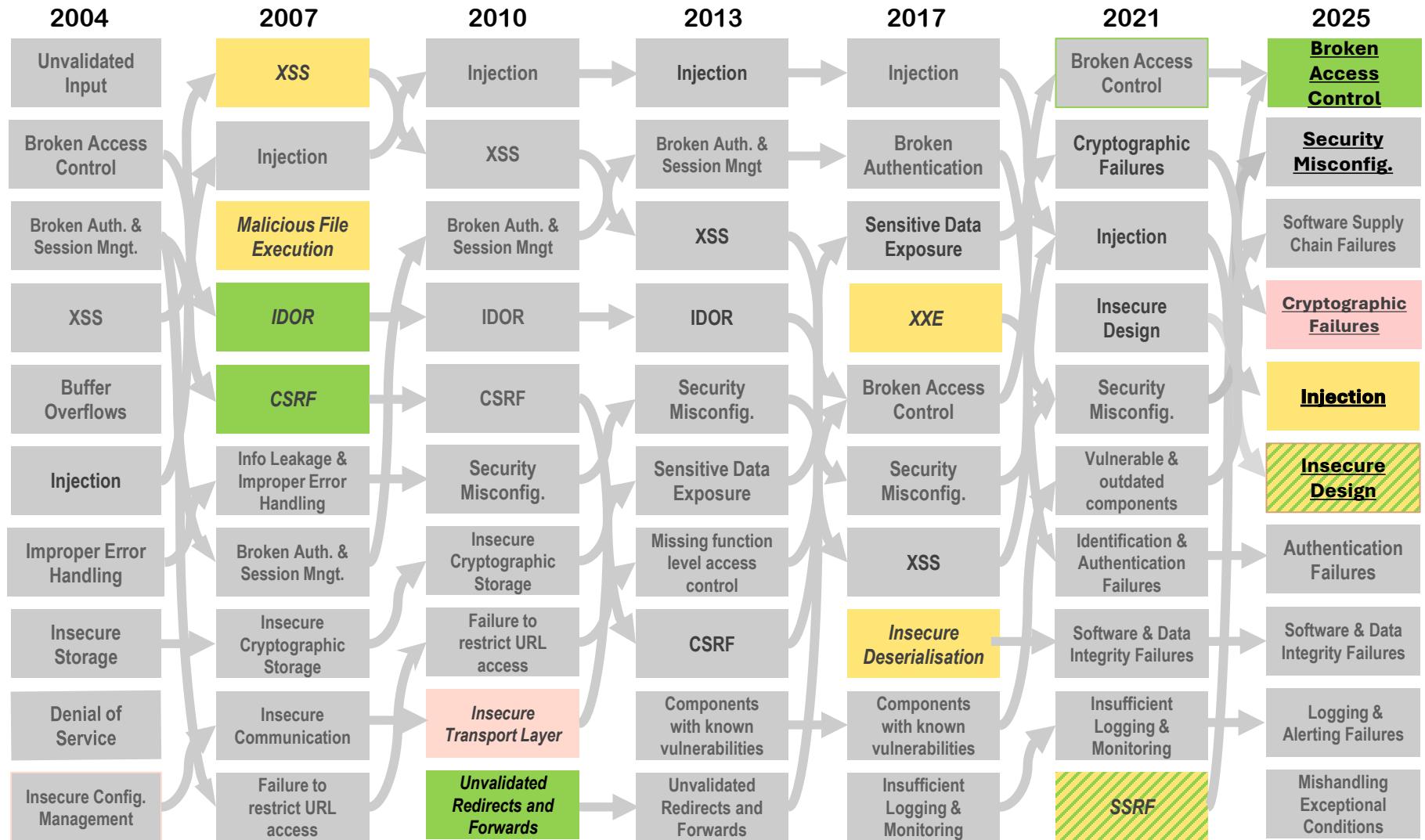


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CVE trends – aggregated in the OWASP Top 10 categories



OWASP Trend: specific → generic Bad for awareness/actionability?



4. Cryptographic Failures

(Password) Hashing

- CWE-261 Weak Encoding for Password
- CWE-328 Reversible One-Way Hash
- CWE-759 One-Way Hash without a Salt
- CWE-760 One-Way Hash with a Predictable Salt
- CWE-916 Password Hash With Insufficient Computational Effort

Key management

- CWE-321 Use of Hard-coded Cryptographic Key
- CWE-320 Key Management Errors (Prohibited)

Not using crypto

- CWE-523 Unprotected Transport of Credentials
- CWE-319 Cleartext Transmission of Sensitive Info

Logic Flaws

- CWE-296 Improper Following of a Certificate Chain
- CWE-324 Use of a Key Past its Expiration Date
- CWE-347 Improper Verification of Crypt. Signature
- CWE-322 Key Exchange without Entity Authentication
- CWE-323 Reusing a Nonce, Key Pair in Encryption
- CWE-325 Missing Required Cryptographic Step
- CWE-757 Algorithm Downgrade

Insecure crypto – i.e. real crypto failures?

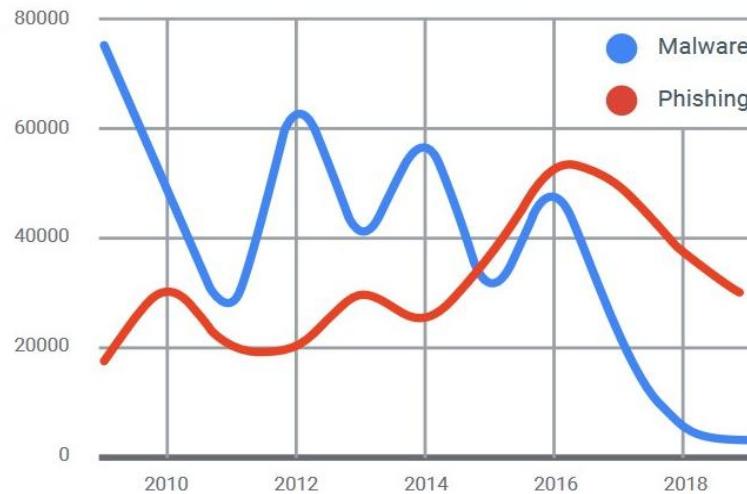
- CWE-326 Inadequate Encryption Strength
- CWE-327 Broken or Risky Cryptographic Algorithm
- CWE-780 RSA Algorithm without OAEP
- CWE-1240 Crypto Primitive with Risky Implementation

Randomness

- CWE-329 Not Using a Random IV with CBC Mode
- CWE-330 Use of Insufficiently Random Values
- CWE-331 Insufficient Entropy
- CWE-332 Insufficient Entropy in PRNG
- CWE-334 Small Space of Random Values
- CWE-335 Incorrect Usage of Seeds in PRNG
- CWE-336 Same Seed in PRNG
- CWE-337 Predictable Seed in PRNG
- CWE-338 Use of Cryptographically Weak PRNG
- CWE-1241 Use of Predictable Algorithm in RNG
- CWE-340 Generation of Predictable Numbers or Identifiers
- CWE-342 Predictable Exact Value from Previous Values

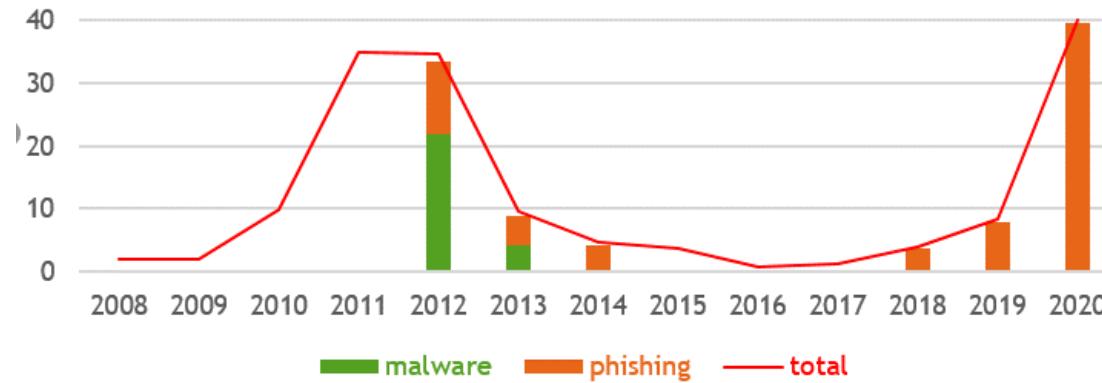
Bigger trend: software vs wetware flaws

Exploit malware vs phishing detected by Google



[Source: Safe Browsing/
Google Transparency Report]

Internet banking losses in the Netherlands



[Source: Betaalvereniging]

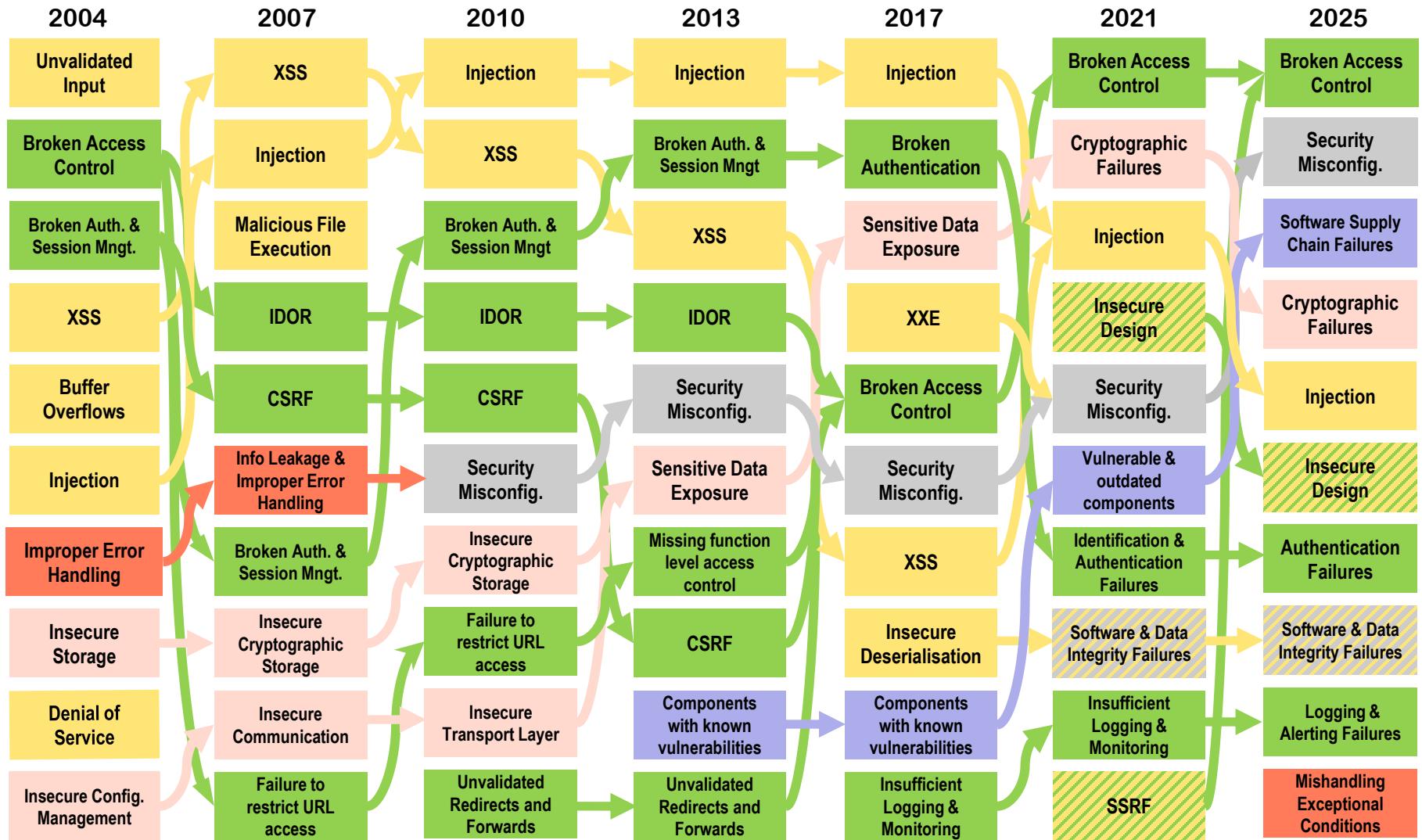
Conclusions

- Classification and ranking security vulnerabilities is a messy business
- Trends are hard to spot, but
 - Supply chain issues on the rise
 - Injection problems on decline (thanks to better platforms & APIs?) but not if you look at frequency instead of incidence
 - Misconfiguration on the rise, due to *more* platforms & APIs?
- How to maximise awareness and actionability?

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Evolution of the OWASP Top 10



8. Software & Data Integrity Failures

Input handling

- CWE-345 Insufficient Verification of Data Authenticity
- CWE-353 Missing Support for Integrity Check
- CWE-426 Untrusted Search Path
- CWE-427 Uncontrolled Search Path Element
- CWE-502 Deserialization of Untrusted Data
- CWE-565 Reliance on Cookies without Validation and Integrity Checking
- CWE-784 Reliance on Cookies without Validation and Integrity Checking
in Security Decision
- CWE-915 Improperly Controlled Modification of Dynamically-Determined
Object Attributes

Code handling/software supply chain issues

- CWE-494 Download of Code Without Integrity Check
- CWE-829 Inclusion of Functionality from Untrusted Control Sphere
- CWE-830 Inclusion of Web Functionality from an Untrusted Source
- CWE-926 Improper Export of Android Application Components

- CWE-506 Embedded Malicious Code
- CWE-509 Replicating Malicious Code (Virus or Worm)

2. Security Misconfiguration

- CWE-15 External Control of System or Configuration Setting
- CWE-16 Configuration
- CWE-260 Password in Configuration File
- CWE-547 Use of Hard-coded, Security-relevant Constants
- CWE-489 Active Debug Code
- CWE-5 J2EE Misconfiguration: Data Transmission Without Encryption
- CWE-11 ASP.NET Misconfiguration: Creating Debug Binary
- CWE-13 ASP.NET Misconfiguration: Password in Configuration File
- CWE-1174 ASP.NET Misconfiguration: Improper Model Validation

Cookies & CORS

- CWE-315 Cleartext Storage of Sensitive Information in a Cookie
- CWE-614 Sensitive Cookie in HTTPS Session Without 'Secure' Flag
- CWE-1004 Sensitive Cookie Without 'HttpOnly' Flag
- CWE-526 Exposure of Sensitive Information Through Environment Variables
- CWE-942 Permissive Cross-domain Policy with Untrusted Domains

Injection attacks

- CWE-611 Improper Restriction of XML External Entity Reference
- CWE-776 XML Entity Expansion