

A. Global Cybersecurity Landscape

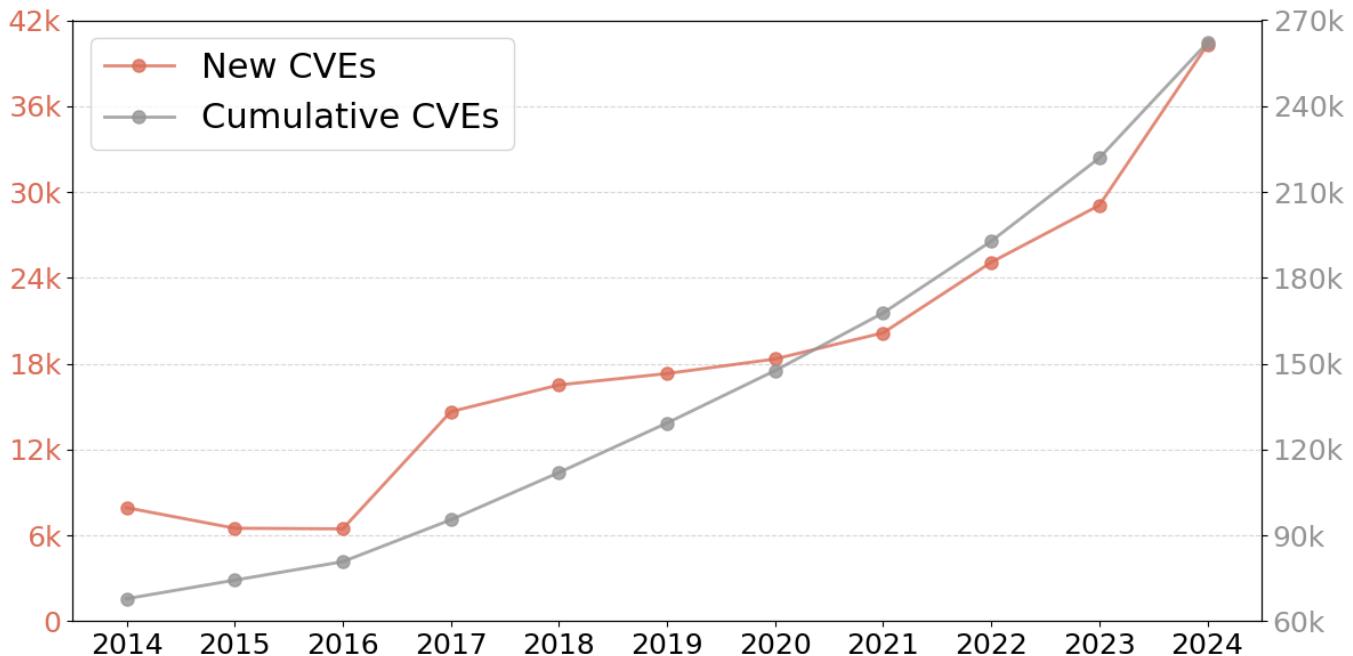
In recent years, the global cybersecurity ecosystem has been facing unprecedented challenges of complexity and dynamism. We conduct an in-depth analysis of over 200 annual reports on cybersecurity or IR, and draw the following observations, with detailed data disclosed at our anonymous GitHub [21].

(1) Expanding Attack Surface and Rising Vulnerabilities.

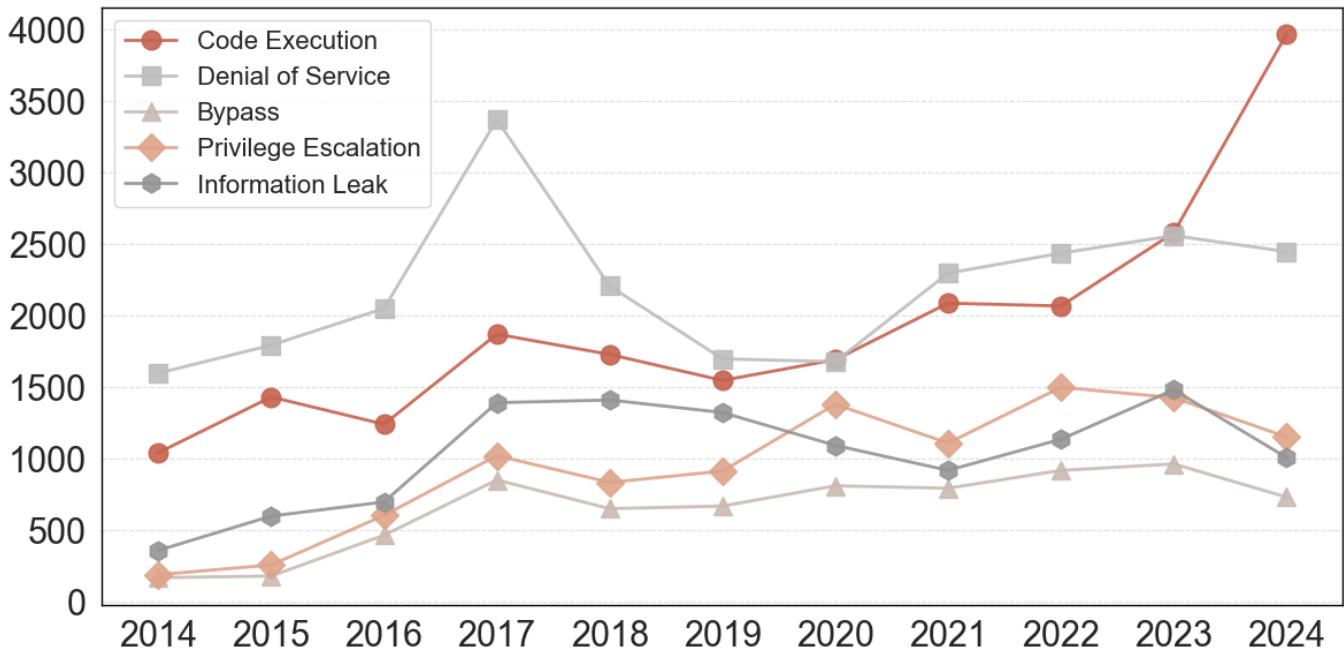
The growing complexity and interconnectivity of software systems continuously expand the attack surface, increasing the number and severity of vulnerabilities. Per National Vulnerability Database (NVD) data, published Common Vulnerabilities and Exposures (CVEs) surged from 7,928 (2014) to 40,287 (2024), showing an exponential rise. The cumulative CVE count grew from under 70,000 to over 262,000 in a decade.

(2) Diversification of Vulnerability Types and Cybersecurity Incidents.

These vulnerabilities are not confined to a single exploitation technique but exhibit highly diversified and specialized characteristics. A major concern is that the proportion of high-risk vulnerabilities has risen sharply.



(a) CVE Trends (2014-2024).



(b) Vulnerabilities by Impact Types (2014-2024).

Fig. 7: Overview of CVEs (2014-2024).

(3) Prominence of Industry and Scenario Specificity.

Attacks on critical sectors like finance, government, education, and healthcare are increasing in frequency and sophistication, as shown by Check Point [22] from 2020 to 2023. Industry-tailored attack patterns

are increasingly sophisticated.

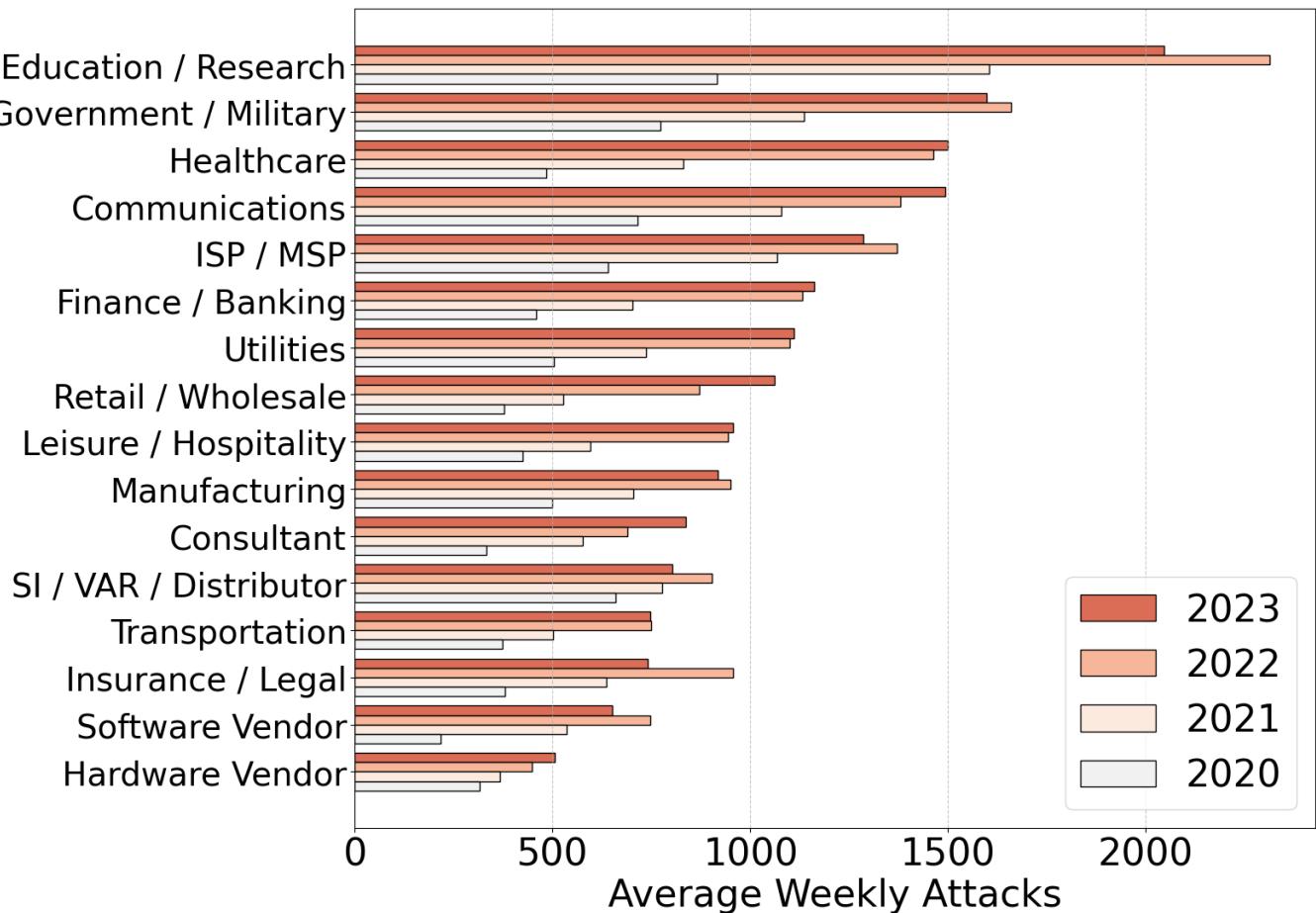


Fig. 8: Average Weekly Attacks per Organization by Industry (2020-2023).

(4) Comprehensive Upgrade of Cybersecurity Requirements.

IR studies reveal evolving threats, with Unit 42 [23] data (2021–2023) highlighting ransomware, business email compromise (BEC), network intrusions, and web breaches as primary concerns. Attackers' yearly tactical shifts increase IR teams' workload and error risks. Kaspersky [24] links attack vectors to economic losses, data breaches, service disruptions, and ethical issues.

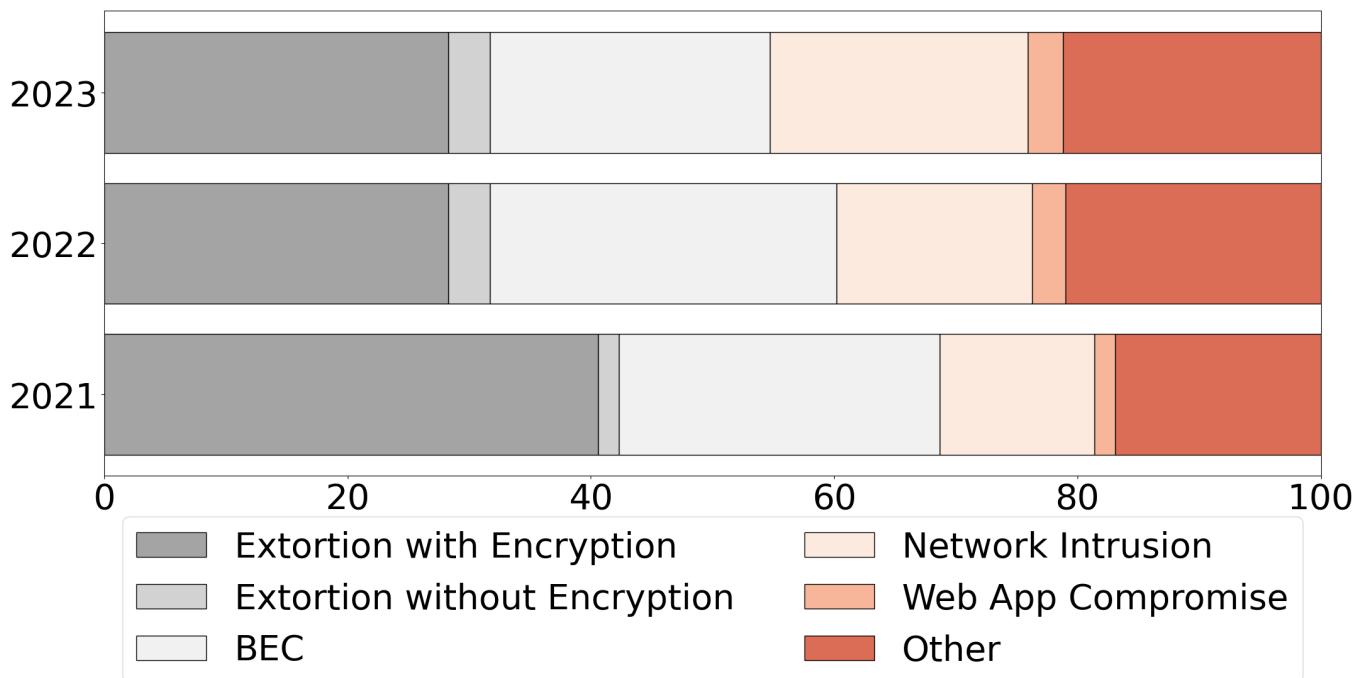


Fig. 9: Top 5 Investigation Types in Unit 42 IR Cases (2021-2023).

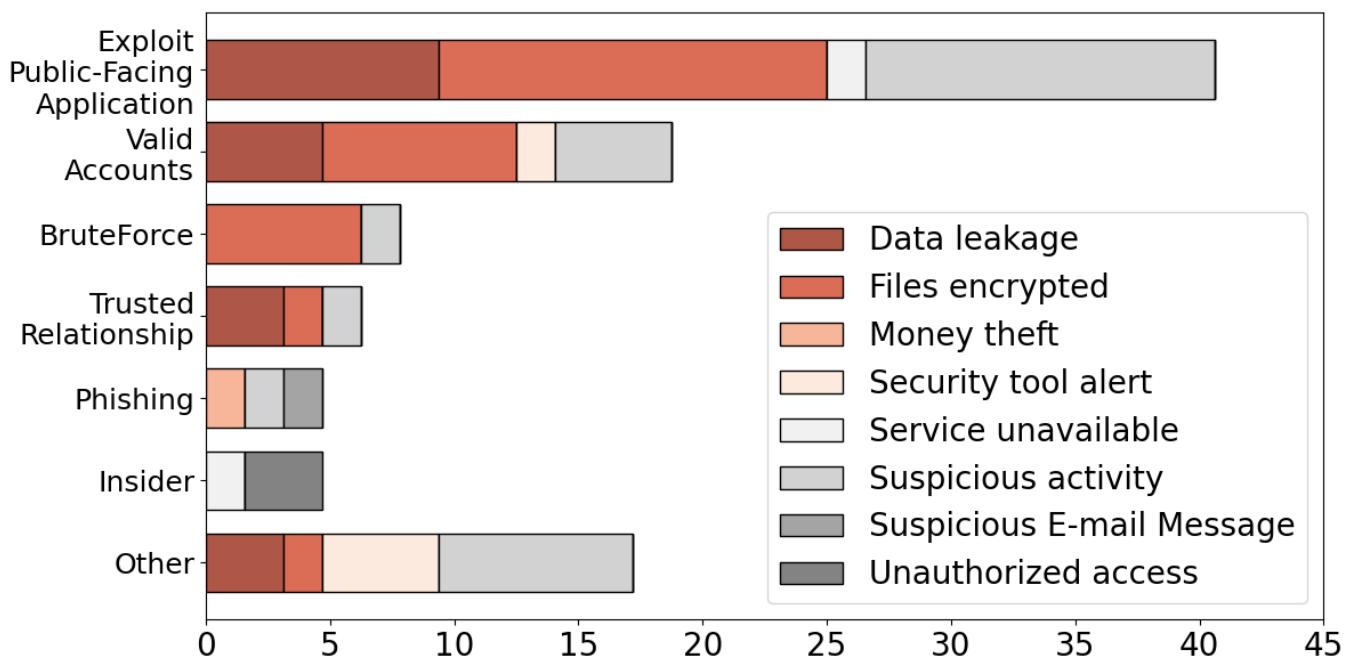


Fig. 10: Security Vulnerabilities Introduced by Various Attack Vectors.