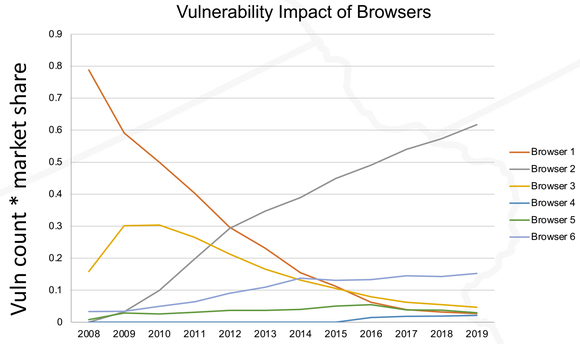
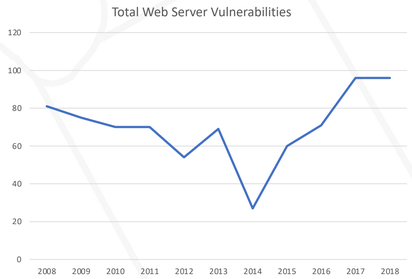
Vulnerability Trends in Web Servers and Browsers

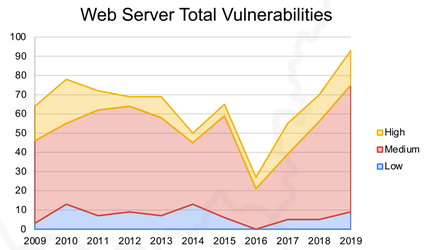
M S Raunak[1], D. Richard Kuhn[2], Richie Kogut[1], Raghu Kacker[2]

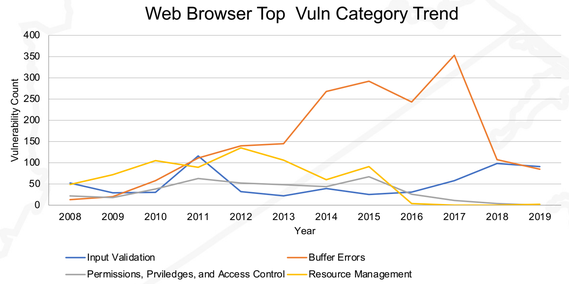
[1] Loyola University Maryland, [2] National Institute of Standards and Technology

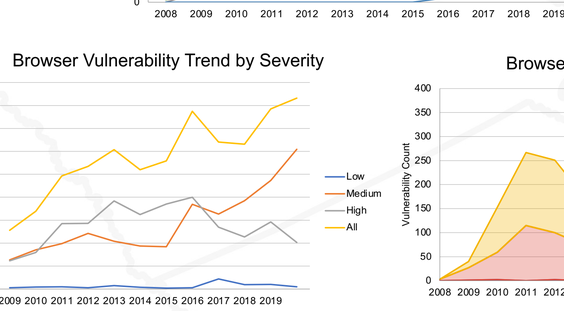
- NVD Data 2008-2019 (11 years)
- Vulnerability trends in web browsers and web servers and their impact on users.
- Are web browsers and servers becoming more secure over time as vulnerabilities are discovered and programmers become more experienced?
- What trends exist in vulnerability types of web browser and web server applications?
- *To avoid appearing to be endorsing or disapproving of any application, we have made the browsers and servers anonymous in our graphs and analysis.*

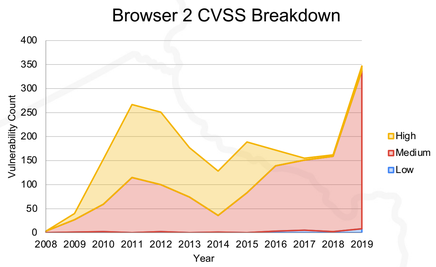


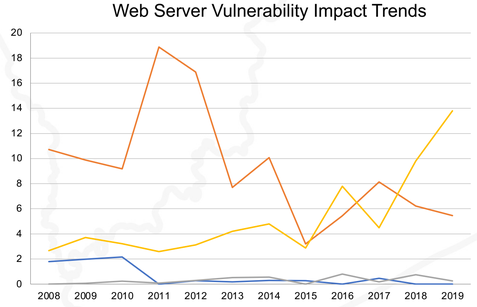


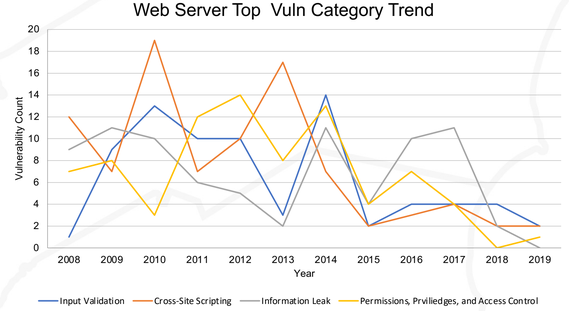












- Impact is calculated by multiplying raw vulnerability counts and market share of browsers
- Browser 2 has been growing in both market share as well as vulnerability counts over analyzed period
- However, high severity vulnerabilities have not been increasingPresence of low and medium vulnerabilities does not appear to deter consumers
- like low and medium severity vulnerabilities

- In general web servers have far fewer vulnerabilities reported compared to web browsers
- We looked at top three web servers by market share and our 4th category included other servers
- There was a downtrend until 2016 and since then the number of reported vulnerabilities is increasing. However, the increase is driven by Server 4, which is the “other” category
- Most known and well-established web servers continue to see fewer vulnerabilities being reported over the analyzed period
- Unlike browsers, web servers are not seeing a proportional reduction of high-severity vulnerabilities

- For web Browsers, Buffer Errors dominated the vulnerability category till 2017 and have been coming down over 2018-2019
- The overall trend is downward for all Four top categories of web server vulnerabilities, which is encouraging

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