Reading Between the Lines

An Extensive Evaluation of the Security and Privacy Implications of EPUB Reading Systems

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Nowadays, billions of books are digitally published based on the EPUB open technical standard. The standard's reliance on web technology translates in both a blessing and a curse, as leveraging accessible and proven web engines also implies the inheritance of their weaknesses. To shine a light on this issue, we subjected the EPUB ecosystem to a thorough evaluation.

Read our paper, published at IEEE S&P 2021

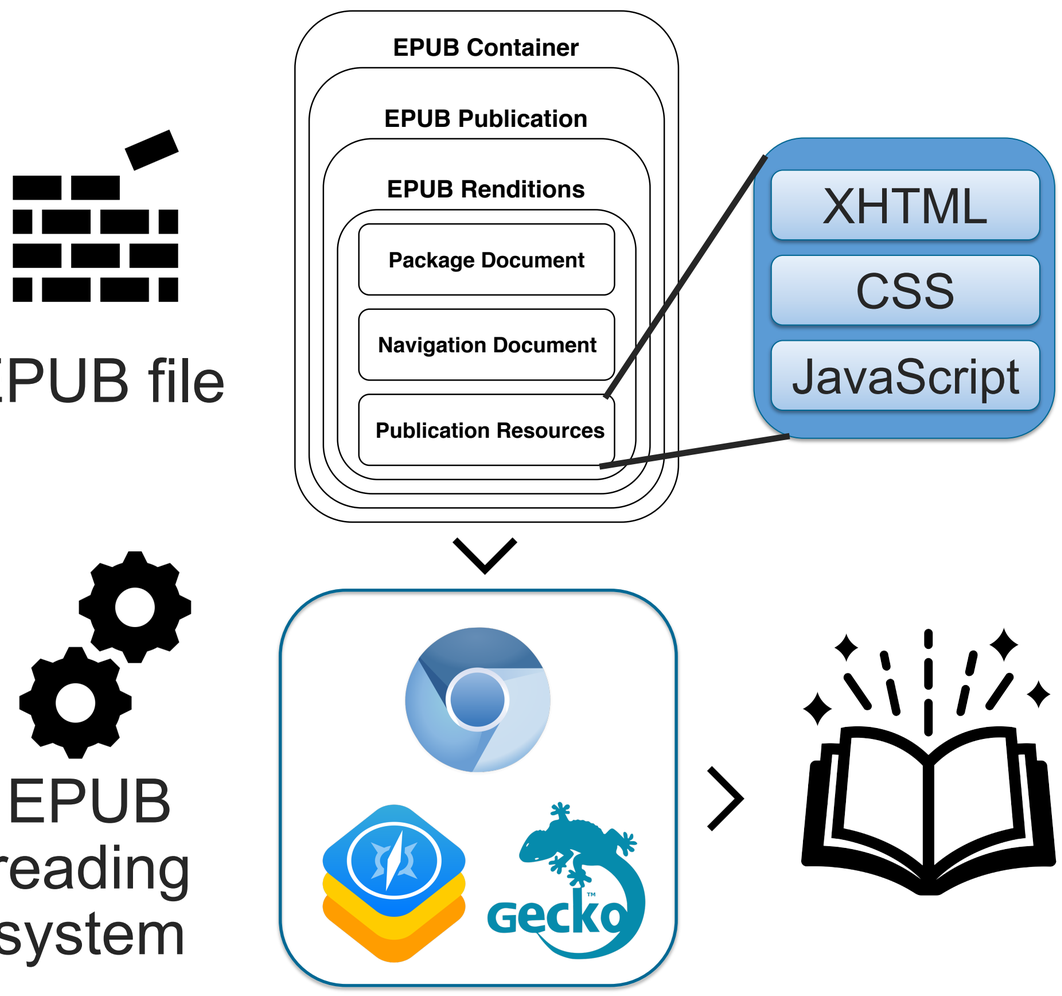
What is the state of freely available EPUB reading systems?

- Granted capabilities
- Security considerations

Are these capabilities being abused in the wild?

- Malicious EPUBs
- Tracking EPUBs

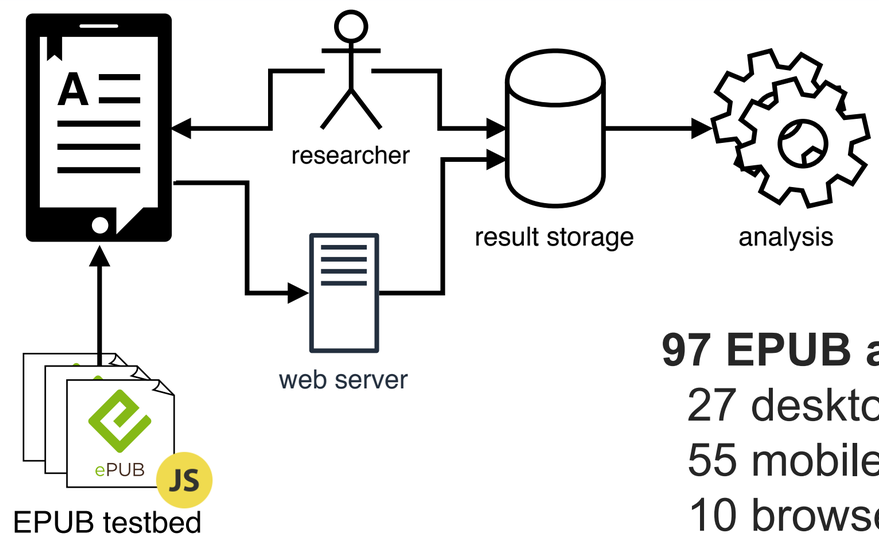
EPUB rendering



Security considerations

- User notification / consent for network activity
- Same-Origin Policy

Semi-automated EPUB evaluation testbed



97 EPUB applications
27 desktop apps
55 mobile apps
10 browser extensions
5 physical e-readers

Source code: *https://github.com/DistriNet/evil-epubs*

	Desktop	Smartphone	Browser	E-reader	Total
JavaScript execution	13 (48%)	22 (40%)	3 (30%)	1 (20%)	39 (40%)
Remote comm.	15 (56%)	20 (36%)	10 (100%)	1 (20%)	46 (47%)
Infer existence of local files	10 (37%)	6 (11%)	0	0	16 (16%)
Read content of local files	5 (19%)	3 (5%)	0	0	8 (8%)
URI handles	4 (15%)	10 (18%)	10 (100%)	0	24 (25%)
Insecure web engine	2 (7%)	0	0	1 (20%)	3 (3%)

± 50% not compliant with EPUB security considerations!

Case studies based on manual analysis

Apple Books (macOS)

Symlink validation issue
➥ Persistent DoS
➥ User information disclosure

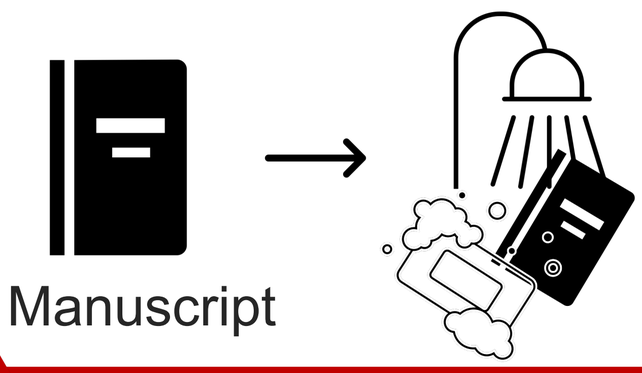
EPUBReader (Chrome, Firefox)

CSP circumvention + <all_urls> permission
➥ Universal XSS

Amazon Kindle (physical e-reader)

Input validation issue + publicly disclosed vulnerability
➥ Information leaking

Self-published EPUB sanitization



94% of EPUB self-publishing market insufficiently sanitizes!