

Study the effects of ads in loading of Web pages

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Problem Statement

Advertising networks are an important part of publishers' business plans.

Modern rich websites contain many ads in different formats which overall impacts on page load time.

The page load time has a direct correlation with customer satisfaction.

Approach

WebPagetest is used for measuring and analyzing the performance of web pages.

Developer Interfaces (**Restful APIs** and Batch Libraries) and flexible environment options are available for retrieving useful **performance metrics**.

The **EasyList** provide filter lists containing sets of rules for Adblock.

Processed General advert blocking filters for individual request urls substring match.

- Integrated processed Easylist on top of WebPagetest wrapper to block urls.
- Evaluation using different performance metrics.

WebPagetest Metrics

Page-level Metrics:

First Byte
Start Render
Load Time
Visually Complete
Fully Loaded

Request-level Metrics:

Document complete and Fully loaded (time, requests and bytes)
Breakdown of Resource MIME types (requests, bytes)
Redirect and Fully loaded (requests, time for mobile)

- Evaluation using 500 top alexa websites (all upto 25th and each 25th website upto 500th websites).
- Comparison of Page-level and Request-level metrics with and without adblock for different environment settings.

Environment Settings

Browsers: Chrome, Firefox (remote)

First View - Test using browser with cache and cookies cleared out (similar to first-time visitor experience).

Environment: Desktop, Mobile with Cable connection

Mobile - only with Chrome

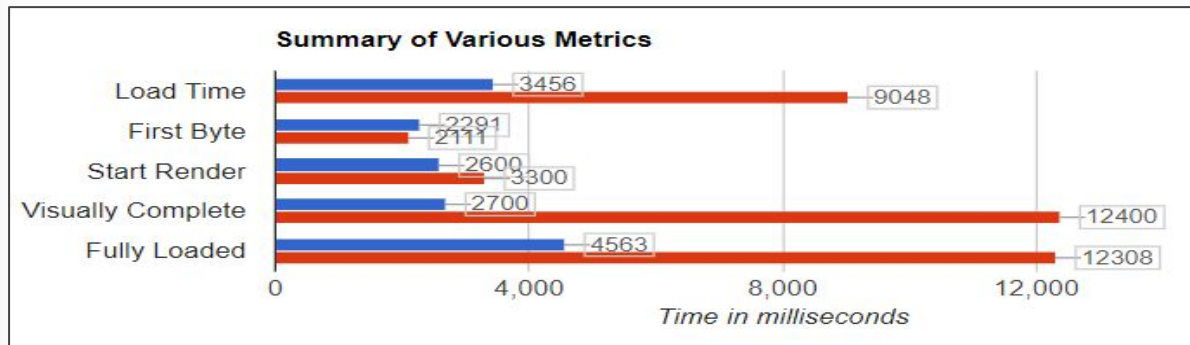
Adblock: Processed and Parsed General advert blocking EasyList filters

Code Environment: node.js with ejs, scripts in python

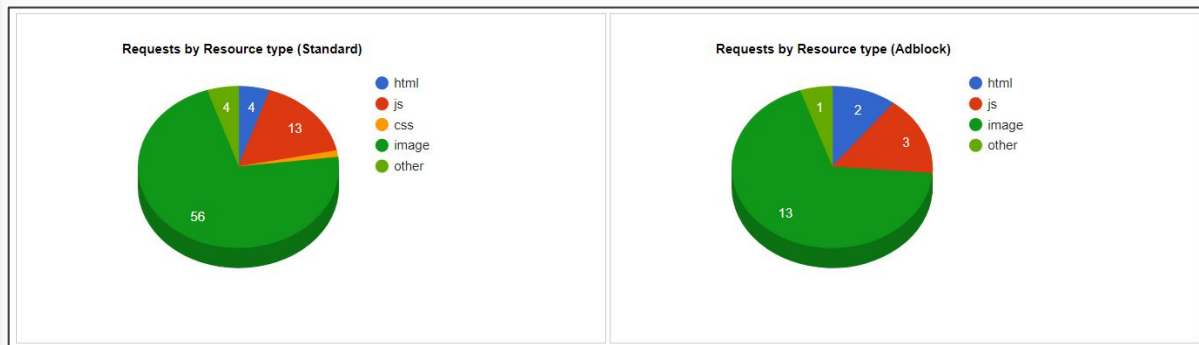
Evaluation & Results

Comparison of Desktop (Chrome) webpage with and without Adblock

- Page load time reduces with adblock (almost by 3 times)
- Significant difference in total number of requests and bytes.
- Significant difference in breakdown of individual resource MIME type.



■ With Adblock
■ Without Adblock



Statistics for page: www.flipkart.com

file:///C:/Users/reddy/Downloads/Network/FCN/FCN/flipkart_web.html

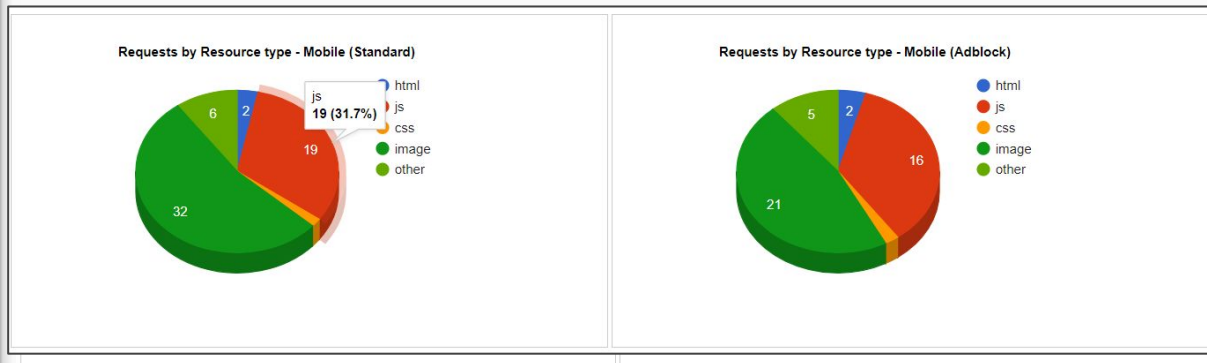
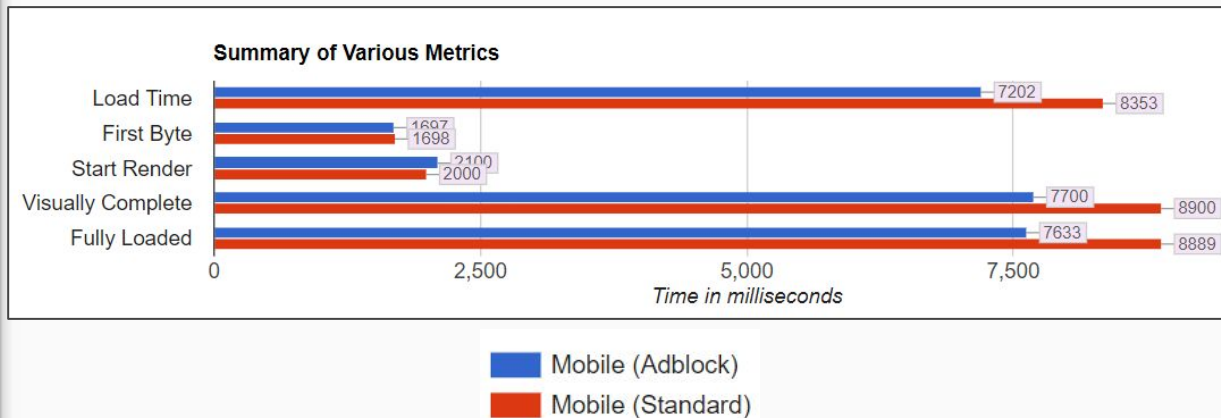
Evaluation & Results

Comparison of Mobile (Chrome) webpage with and without Adblock

- Page load time reduces with adblock (almost by 1.2 times)

(Still not as much reduction in PLT as with desktop browser)

- No significant differences in total number of requests and bytes.
- No significant difference in breakdown of individual resource MIME types.



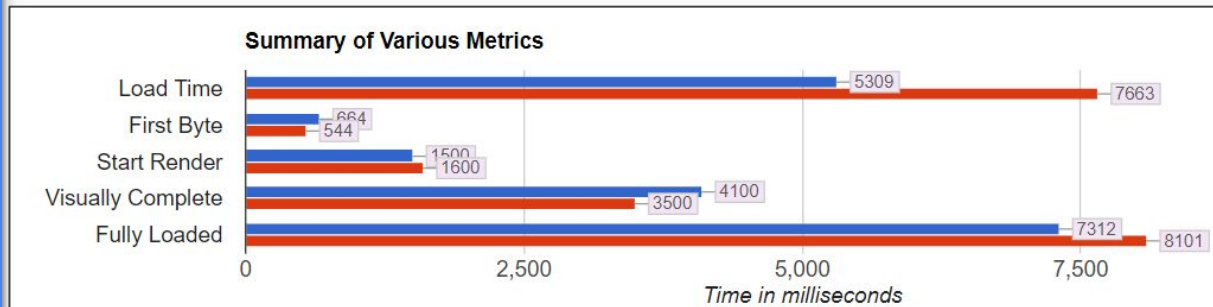
Statistics for page: www.flipkart.com

file:///C:/Users/reddy/Downloads/Network/FCN/FCN/Mobile%20Ad-Non%20Ad%20Comparisons/fli
pkart_mobile.html

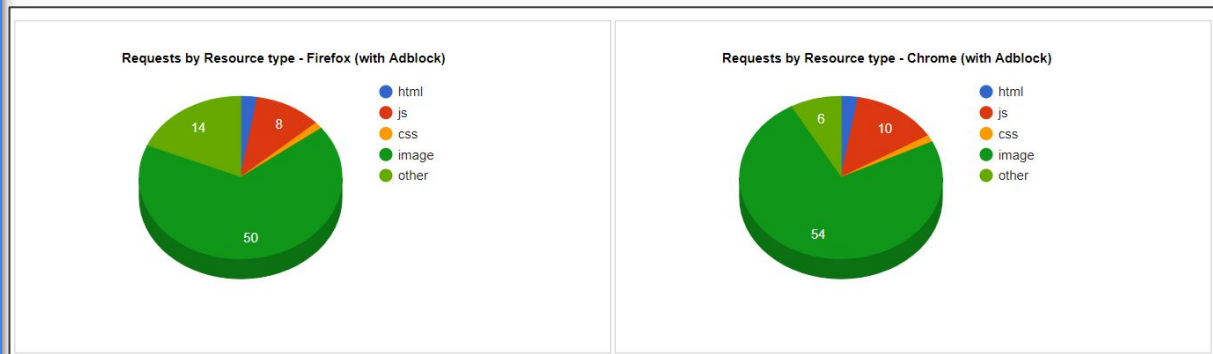
Evaluation & Results

Comparison of Browsers (Chrome and Firefox) with Adblock

- In experiment, Chrome loaded page almost 1.5 times faster.
- No significant differences in total number of requests and bytes.
- No significant differences in the breakdown of resource types.



■ Chrome (with Adblock)
■ Firefox (with Adblock)



Statistics for page: <https://news.google.com>

file:///C:/Users/reddy/Downloads/Network/FCN/FCN/Browser%20Comparisons%20with%20Adblock/news_chrome_firefox.html

Evaluation & Results

- CDF of Fully loaded Page time:

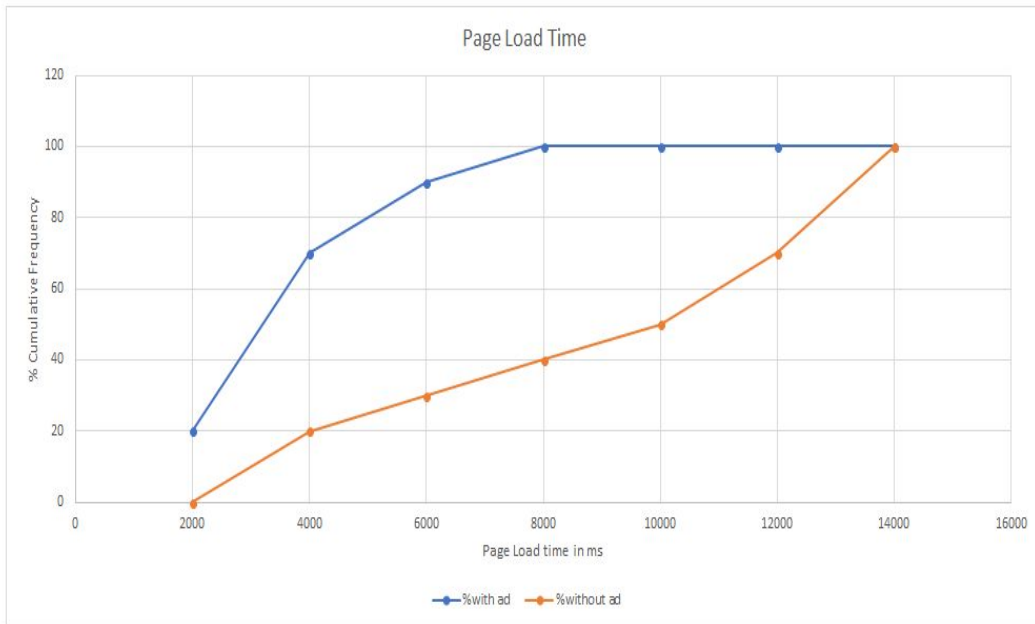
In Median case,

- ~10s without adblock
- ~3s with adblock

99th Percentile,

- ~14s without adblock
- ~8s with adblock

- Almost 2.5 times more time to load page completely with ads.



Evaluation & Results

- CDF of Number of url requests:

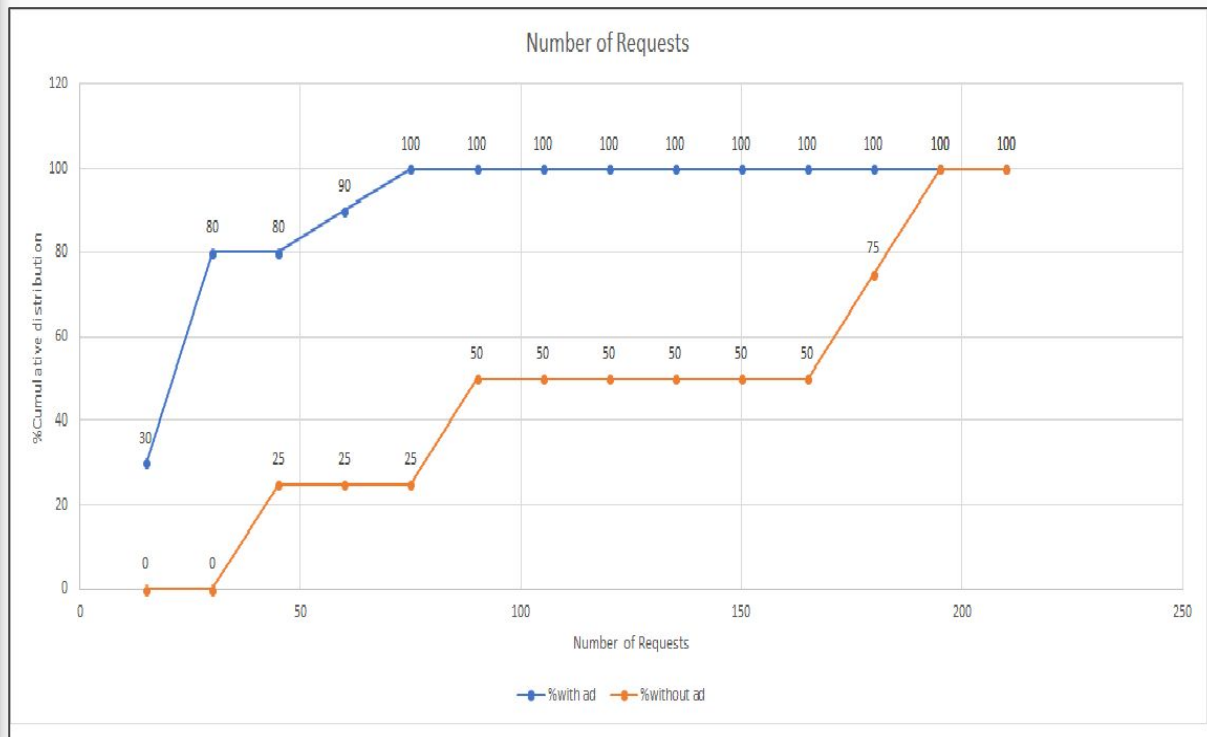
In Median case,

- 125 without adblock
- 30 with adblock

75h Percentile,

- 175 without adblock
- 40 with adblock

- 4 times more requests fetched with ads.



Evaluation & Results

- CDF of Number of bytes downloaded:

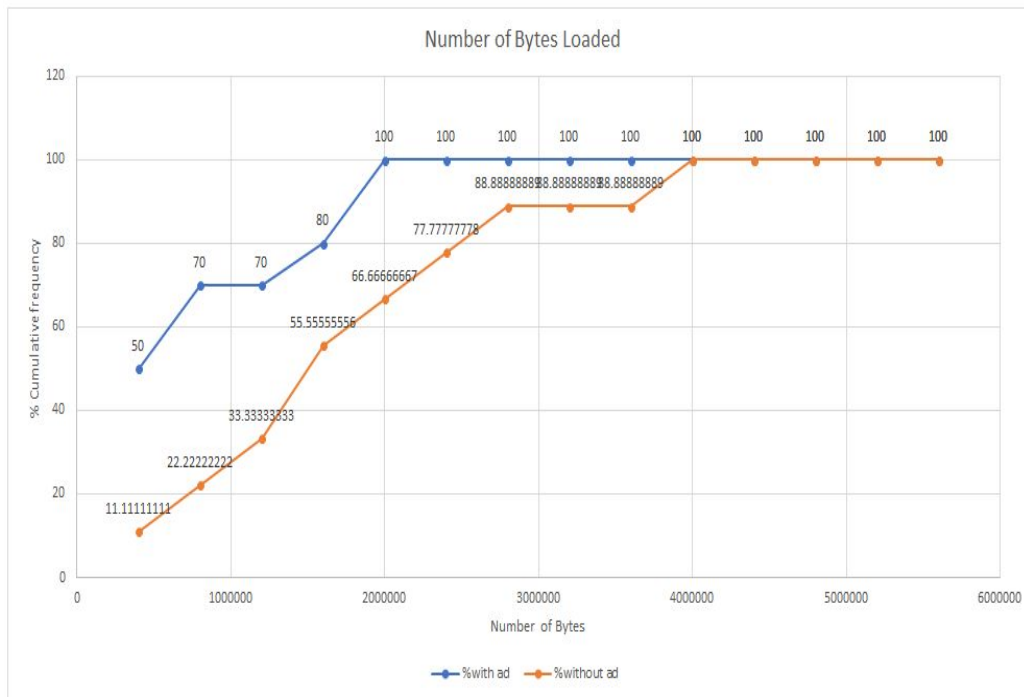
In Median case,

- 1500 KB without adblock
- 500 KB with adblock

90h Percentile,

- 3500 KB without adblock
- 1600 KB with adblock

- Almost 2.5 times more content downloaded with ads.



Summary

Significant impact of ads for desktop browsers but not much with mobile browser.

No surprising results !!

Code Repo and References

Code base & Results:

<https://github.com/yash199/FCN-CSE-512-Project>

Report:

<https://docs.google.com/document/d/1ChrsTYzJJypmHPTVCx6zvPb5qp4u4USmoFakrHywU6l/>

References:

<https://sites.google.com/a/webpagetest.org/docs/advanced-features/webpagetest-restful-apis>

https://github.com/easylist/easylist/blob/master/easylist/easylist_general_block.txt

<https://adblockplus.org/filter-cheatsheet>

Thank You