Experimental study on round trip times of web applications

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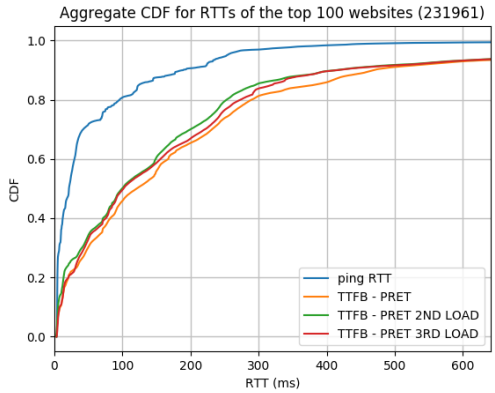

Fig. 1. Example figure

***Abstract*—Replace by concrete abstract.**

I. Introduction

Introduction.
Figure 1 is an example figure.

II. Related work

Related work.

III. Methodology

Collection of data was conducted using two Python libraries: pyping and PycURL. Pyping is a pure Python ICMP ping implementation [1]. PycURL is a Python interface to libcurl, which is a client-side URL transfer library. PycURL allows one to fetch various objects identified by a URL: in our case, objects corresponding to the URLs of various websites hosted on servers across the world [2].

First, we wanted to calculate the Round Trip Time (RTT) as measured by a calculation involving, at the highest level, a website's pretransfer time and time to first byte (TTFB): the RTT was calculated as the pretransfer time subtracted from the TTFB, both of which were obtained with PycURL. To do this, it is as simple as creating a new Curl Object from PycURL, setting the relevant options; i.e. the name of the website and the FOLLOWLOCATION to 1. Setting the FOLLOWLOCATION to 1 tells the library to follow any Location: header that the server sends as part of a HTTP header in a 3xx response. The Location: header can specify a relative or an absolute URL to follow. The library will issue another request for the new URL and follow new Location: headers all the way until no more such headers are returned [3].

The next calculation we wanted to observe is the RTT on the second load of a website. This calculation has the same equation of RTT as described above, except with the appropriate second load of the pretransfer time and TTFB. In order to measure this, we took advantage of PycURL allowing for reuse of Curl Objects: one only needs to reset the relevant options identically to the first load and can then perform on the Curl Object. This process was repeated to calculate the RTT on the third load.

Finally, to get an ICMP ping time, it is as simple as using the ping function of pyping on a specified website's hostname.

The above network data; i.e. ICMP ping time and RTT of first, second, and third loads, were collected for a list of some of the most popular websites around the world at the time of writing this paper. A cron job was used to automate this collection of data to achieve a large sample size to analyze.

Data were plotted using the matplotlib library. In our analysis, we observed both aggregate data and site-specific data.

IV. Evaluation

Evaluation.

V. Conclusions

Conclusions.

References

[1] M. D. Cowles. pyping 0.0.5. [Online]. Available: https://pypi.python.org/pypi/pyping/
[2] (2016, Dec) Pycurl 7.43.0.1. [Online]. Available: http://pycurl.io/
[3] Curlopt˙followlocation explained. [Online]. Available: https://curl.haxx.se/libcurl/c/CURLOPT_FOLLOWLOCATION.html