Testing, Detection and Possible solutions for the BufferBloat Phenomenon

Juan S. Catalán Olmos

Universidad Técnica Federico Santa María

Computer Science Department

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Motivation

Lets think of a network as a road system where everyone drives at the maximum speed. When the road gets full, there are only two choices: crash into other cars, or get off the road and wait until things get better. The former isn't as disastrous on a network as it would be in real life: losing packets in the middle of a communication session isn't a big deal. But making a packet wait for a short time is usually better than "dropping" it and having to wait for a retransmission.[iv]

Preliminary Thoughts

Study Cases

- Real Time Applications
- Live Steaming
- Online Gaming

Problem Definition

Unnecessary latency and poor system performance.

The Culprit

Bufferbloat, the existence of excessively large and frequently full buffers inside the network.

Long delays from bufferbloat are frequently attributed incorrectly to network congestion, and this misinterpretation of the problem leads to the wrong solutions being proposed.

Objectives

General

- To explain the *BufferBloat* phenomenon, and explain the impact that it could have over the lantecy and throughtput in Internet.
- To detect the presence by a empirical mesure of the latency and throughput in a TCP/IP based networks.
- To propose possible solutions in the implementation of a network where the existence of excessively large and frequently full buffers are detected, by mesuring and modeling the effects.

Objectives

Specific

- To select or develop appropriate test to be able to prove the existence of *Bufferbloat*.
- To test and differentiate the possible cause of the excesive latency and throughput in a TCP/IP LAN and proof how much is generated by the *Bufferbloat* or by a miss-configuration.
- To propose a possible configuration of the TCP parameters in a Linux based machine or an algorithm that can help to minimize the phenomenon.

Diagnosing

BufferBloat's existence is pretty easy to figure out; identifying which hop is the current curlpit is harder.

Theoretical

- RFC 793,2001,896,879,...
- ACM - SIGCOMM
- Others

Experiential

- ICSI Netalyzer
- Smokeping
- Wireshark

Workflow

Activity	Duration (weeks)
Definition and understanding of the key concepts related with the *BufferBloat* phenomenon	3
Research and develop the state of art of the *BufferBloat* phenomenon and the related technologies	4
To develop and apply different kind of tests to detect the existence of the phenomenon	5
To mount and test different TCP configurations in a linux machine and OpenWRT router.	4
Analysis of results and search of possible solutions	5
Final review and corrections	3
TOTAL	24

References

i.- *Bufferbloat: Dark Buffers in the Internet*
Author: Jim Gettys, Kathleen Nichols
Published: Queue vol. 9, no. 11, November 29, 2011

ii.- *BufferBloat: What's Wrong with the Internet?*
Published: Queue vol. 9, no. 12, December 7, 2011

iii.- *jg's Ramblings*
Author: Jim Gettys
`http://gettys.wordpress.com/`

iv.- *Understanding bufferbloat and the network buffer arms race*
`http://arstechnica.com/tech-policy/news/2011/01/understanding-bufferbloat-and-the-network-buffer-arms-rac ars`

v.- *BufferBloat*
`http://www.bufferbloat.net/`

The End (?)

Questions $->$ `www.google.com`