ReBBR: Reproducing BBR Evaluation Results

Luke Hsiao
Stanford University
lwhsiao@stanford.edu

Jervis Muindi
Stanford University
jmuindi@stanford.edu

ABSTRACT

This paper describes an attempt to reproduce one of the key findings from the BBR Paper by Cardwell et al. The primary result we are after is performance of BBR and CUBIC in networks link that have non-negligble packet loss. As reported in the original paper, we find that CUBIC has poor performance for loss rates above 0.1% whereas BBR is able to deal with loss much better.

1 INTRODUCTION

In this report, we attempt to validate the experimental results of "BBR: Congestion-based Congestion Control" [1]. We start by looking at the goals, motivations and results from the BBR [1] paper.

Goals What was the original paper trying to solve?

The original paper was trying to find a congestion control approach that would stay as close as possible to optimal network operating point in various network conditions. The network link is operating at the optimal point when bandwidth utilization is maximized and latency is minimized.

Motivation Why is the problem important/interesting?

This is importannt problem to tackle because traditional congestion control algorithms such as CUBIC have a tough time operating efficiently when there is non-negligible packet loss on the packet. This limitation comes from the CUBIC's use of packet loss as a signal for congestion, which can unnecesarily hinder throughput leading to poor performance.

Results What did the original authors find?

The BBR paper descibes a new form of congestion control that is based on actual congestion going in the network. The insight from the authors is that their approach estimates bottleneck bandwidth and then bottleneck latency in succession so as to be able to get as close as possible to the ideal operating point of maximum bandwidth and minimal latency.

The core finding is that BBR outperforms CUBIC for loss rates above 0.1%. Here's the a graph showing the performance comparison between BBR and CUBIC.

2 REPRODUCING BBR EVALUATION

Goal What subset of results did you choose to reproduce?

Motivation Why that particular choice?

3 PROJECT STATUS

Progress so far.

Plan Plan for the next few weeks.

REFERENCES

[1] Neal Cardwell, Yuchung Cheng, C Stephen Gunn, Soheil Hassas Yeganeh, and Van Jacobson. 2016. BBR: Congestion-Based Congestion Control. *Queue* 14, 5 (2016), 50.