Caching Emulation for the Edgecast CDN

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ABSTRACT
One of the core tasks in operating a Content Delivery Network is caching requested content for content providers. In order to ensure that our caching systems are well optimized, we are constantly exploring alternative caching techniques that involve a rich variety of optimizations and adjustments to our caching policies and structures. In order to rapidly develop and test such improvements, we have developed a caching emulator, the Edgecast Caching Emulator (ECE), to allow us to freely experiment with various techniques. Rather than simulating user behavior, the emulator allows us to re-play access logs of real client behavior through alternative techniques and examine caching system performance with alternative caching policies. The ECE further keeps track of important metrics such as hit rate, disk writes, disk reads, original traffic, among many others.

1 INTRODUCTION
Content Delivery Networks (CDNs) have enabled a significant increase in the scale of Internet content delivery. In particular, they deliver large volumes of traffic to globally distributed groups of end users on behalf of content providers. In order to do so efficiently, these CDNs employ large and complex caching systems which allow content to be stored and delivered from geographically distributed Points of Presence (PoPs).

The Edgecast CDN is a global, multi-tenant, commercial CDN [1], Edgecast features over 125 Points of Presence (PoPs) distributed globally, with over 3,000 interconnects, providing a total global egress capacity of over 49 Tbps. Edgecast provides CDN services for thousands of customers whose content includes live video streaming, static website contents, large software updates, dynamic site content, among many others. This diversity of customer profiles, and consequently client access behaviors, means that solutions which may work well for some customers may induce pathological behavior in others.

In order to address these complex interactions, while still making improvements to the performance fo the Edgecast caching systems, we implement a mechanism for exploring the impact of new caching algorithms and techniques. In particular, this mechanism consumes real data and allows us to evaluate the impacts of such changes on our core performance metrics, before we implement and deploy such systems in production.

2 THE CACHING EMULATOR
The Edgecast Caching Emulator (ECE) is designed to provide insight into the behavior of arbitrary caching policies that we may want to implement in the production CDN. The core idea of the system is that it provides important cache metrics for a given set of access behaviors – which will be given by real behavior observed from CDN access logs.

REFERENCES