

Submission for a technical talk at the second CCNx working meeting

Title: Caching Policies for CCN Content Store

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In this second CCNx meeting, we would like to present a technical talk about our recent work on caching policies for CCN Content Store (CS), including our analytical model for multi-cache system, *modulo caching* strategy, an open source platform for testing CCNx network, and the results of simulations and evaluations. Works on CCN enable the exploitation of the caching resources of the new generation of routers (Content Routers or CR). So far, only a basic Least Recently Used (LRU) strategy implemented on every CRs has been proposed. More generally, the research community lacks methods for analyzing and evaluating caching policies (other than LRU) in generic multi-caching topologies.

In our work, we first provide a model that approximates the hit-ratios of any multi-cache topology for the Least Recently/Frequently Used (LRFU) caching policies, which consist of a spectrum of policies based on a trade-off between recency and frequency. The approximation results can be used to decide suitable policy for CR at different positions in the network topology, since the traffic received by front-end CRs (edge CRs connect directly with clients) and back-end CRs (intermediate CRs between front-end CRs and servers) has different patterns. Our experiments show that the accuracy of our multi-cache approximation model reaches 90%. Moreover, our results reveal the attractive fact that LRU outperforms other policies when they are implemented on back-end CRs near the server. In other words, LRU is suitable for the incoming traffic where the most popular requests are expunged while other policies are more efficient for front-end CRs or back-end CRs close to end users.

Then, we introduce a cooperative caching strategy called *modulo caching*. It has been designed for the treatment of large video streams with on-demand access, which becomes a majority of traffic in nowadays Internet. This caching strategy leverages on the traditional hash-based and directory-based cooperative caching schemes so as to significantly cut the caching redundancy in CRs. With such a reduction, *modulo caching* addresses the need of Internet Service Provider by halving 30% of the cross-domain traffic than the basic LRU. The evaluation is conducted on an open-source platform for CCNx. The platform allows us to automatically deploy the CCNx prototype on multiple machines and establish a CCN overlay with any network topology. Since there is no real machine implementation of CCN (*i.e.*, Linux kernel CCN stack), the platform is an efficient way to confront high-level design to real implementation.

We are interested in all topics related to CCN and will certainly attend the two days meeting.