Overview

First we construct the network from the input file (all videos, endpoints, caches and all connections between them). Then we calculate a score that each cache gives to each of the videos. After the scoring process each cache is filled with his top rated videos.

Video Scoring

Definitions:

For any video v, cache c and endpoint e:

1. $\mathbb{E}[c]$ - the set of all endpoints connected to the cache c.
2. $R_e[v]$ - the number of requests to the video v from endpoint e.
3. $\ell(e, c)$ - the latency (in ms) of serving a video from the cache c to endpoint e.
4. $\ell(e, v)$ - the latency (in ms) of serving a video to endpoint e from the closest place that holds the video v. e.g. if the data-center lantency of e is 1000ms, video v is in caches c_1, c_2 and $\ell(e, c_1) = 150$ and $\ell(e, c_2) = 300$. then $\ell(e, v) = min\{150, 300, 1000\}$.
5. $size(v)$ - the size of the video v in megabytes.

Video score formula

The score a cache c gives to a video v is:

$$Score(c, v) = \frac{\sum_{e \in \mathbb{E}[c]} R_e[v] \cdot (\ell(e,v) - \ell(e,c))}{size(v)^2}$$