Top40 cache

Compared to LRU and LFU

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Research Question

\begin{quotation}
How does the by NPO-ICT created and used cache algorithm compares to other cache algorithms in the same environment.
\end{quotation}
On demand Streaming Media
NPO-ICT
Media Stream Servers

Media Streamserver(s)

>50T Storage Array
Media Stream Servers

Media Streamserver(s) -> 4GB RAM

126GB RAM

640GB SSD

>50T Storage Array
Cache control

4GB RAM → Streamcache-mgr

126GB RAM → Streamcache-mgr

640GB SSD → Streamcache-mgr

>50T Storage Array
Cache control

- 4GB RAM
- 126GB RAM
- 640GB SSD
- >50T Storage Array

Streamcache-mgr
A special cache?

- Read-Only
- Seconds
- 4 GB, 126GB and 640GB!
- Single Cache Miss is “No Problem”
- Cache Insert is expensive (copy of MB’s)
Simulation Environment

- Real Input Data (Archived)
- 11 days in January 2009 (Thu 08 - Sun 18)
- LRU and LFU written in Perl
- Cache and Storage are a Database
- Modified Streamcache-mgr © D.Snippe
Input Data

each 60 seconds

pois|68|/ceres/avro/rest/2009/AVRO_1316544/bb.20090108.asf
pois|43|/ceres/kro/rest/2009/KRO_1316814/bb.20090107.asf
pois|34|/ceres/bnn/rest/2009/POW_00212208/bb.20090108.asf
pois|27|/nos/journaal/laatstejournaalBB.wmv
“Few files requested many times”
**LRU**: Least Recently Used

When inserting a file into the cache, delete oldest file from cache

**LFU**: Least Frequently Used

When inserting a file into the cache, delete least requested file from cache

*Note*: LFU cache Aging to avoid pollution
Top40

- Heavily modified LFU
- Ignores one-time request
- A “chart” of weights
- Files only removed from cache when below threshold
- Files only inserted when above threshold (from nothing to number one)
Results 4GB   Wed-12
Results 128GB Wed-12
Results 640GB  Wed-12
Conclusion

**Hit-rate:** Top40 keeps up with LFU/LRU

**Inserts:** Top40 all-most zero, unlike LRU/LFU

Inserts are unwanted, Mediafiles are Big!

*Compared to other cache algorithms in the same environment,* Top40 is performing much better
Thanks!

NPO-ICT & Dick Snippe
Writer of streamcache-mgr and the Top40 algorithm