Top40 cache

Compared to LRU and LFU

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Research Question

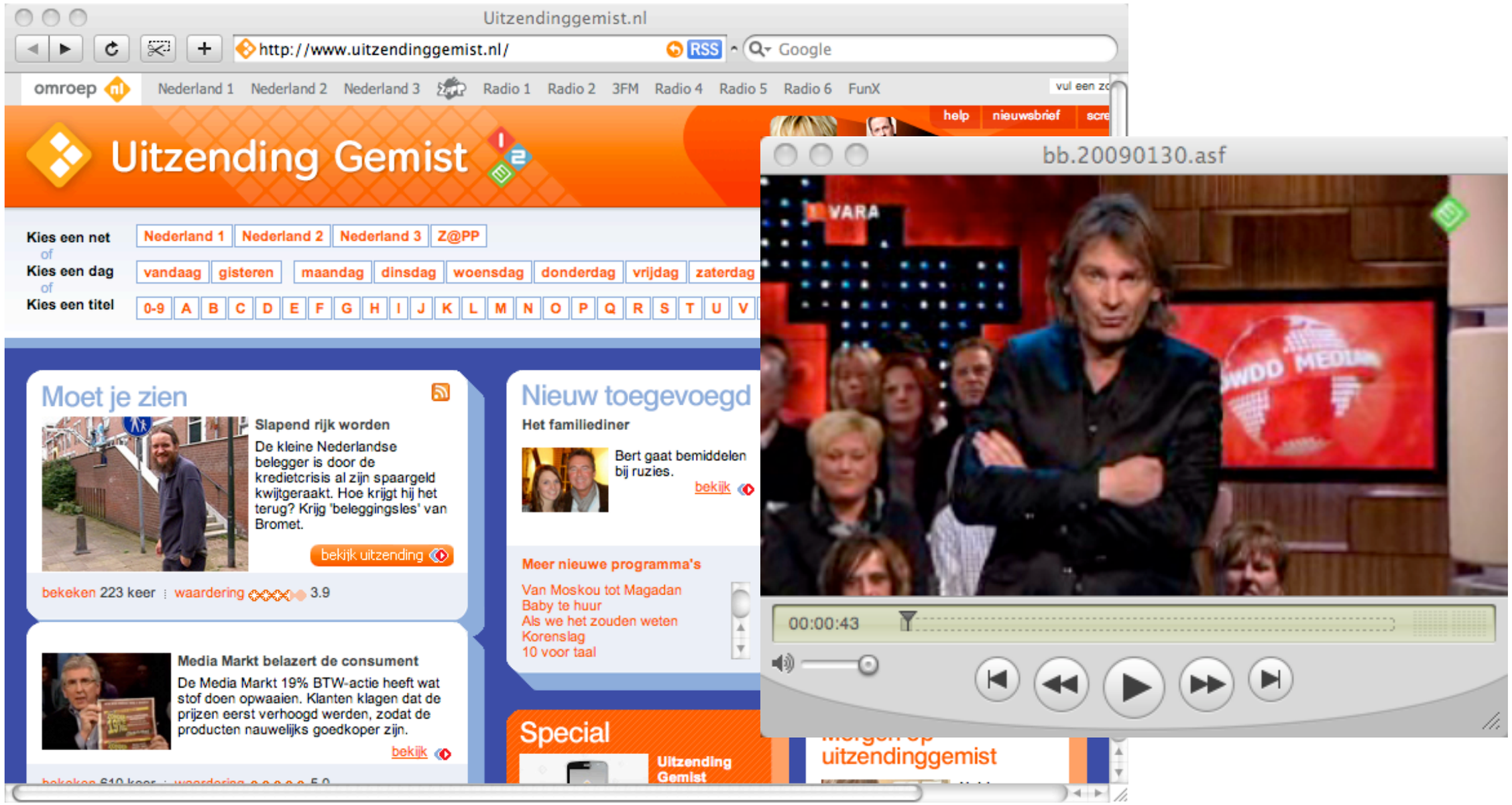
\begin{quotation}

How does the by NPO-ICT created and used cache algorithm compares to other cache algorithms in the same environment.

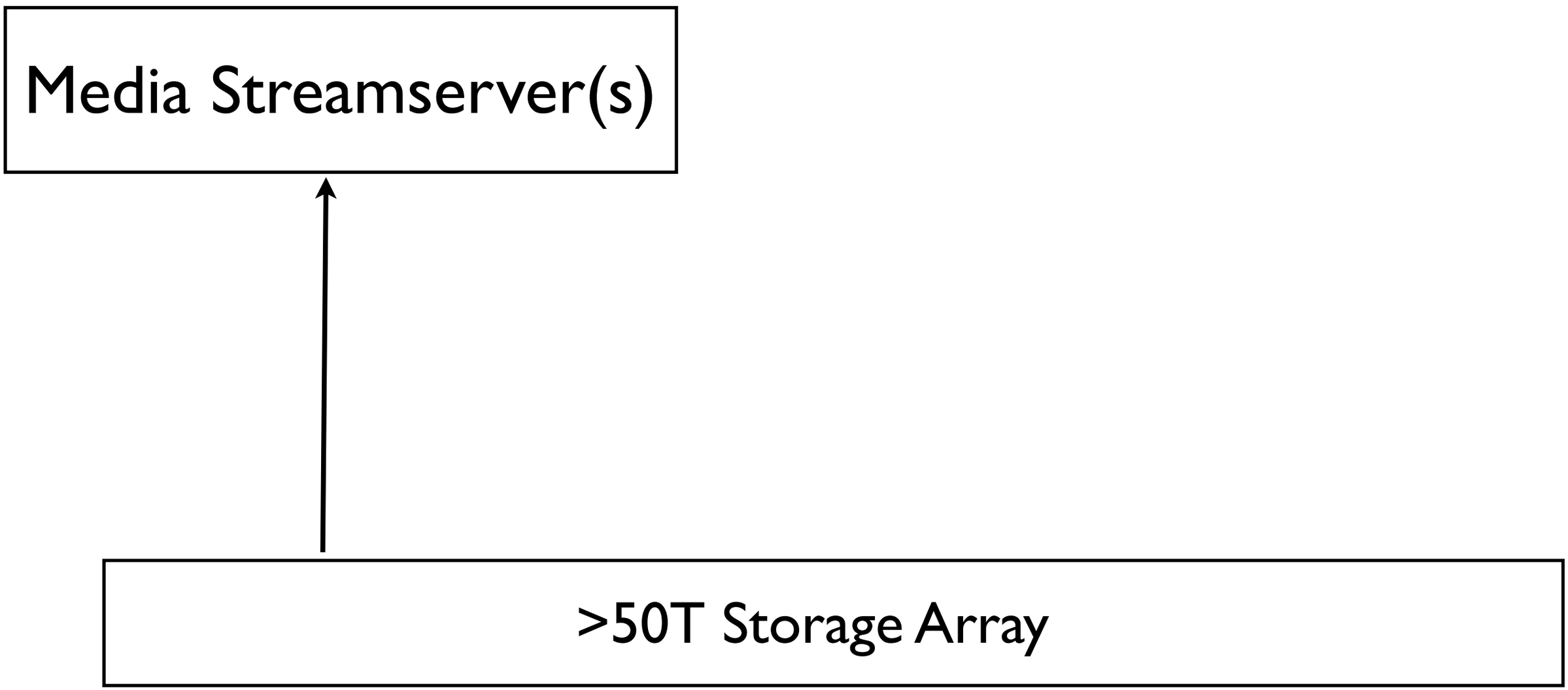
\end{quotation}

On demand Streaming Media

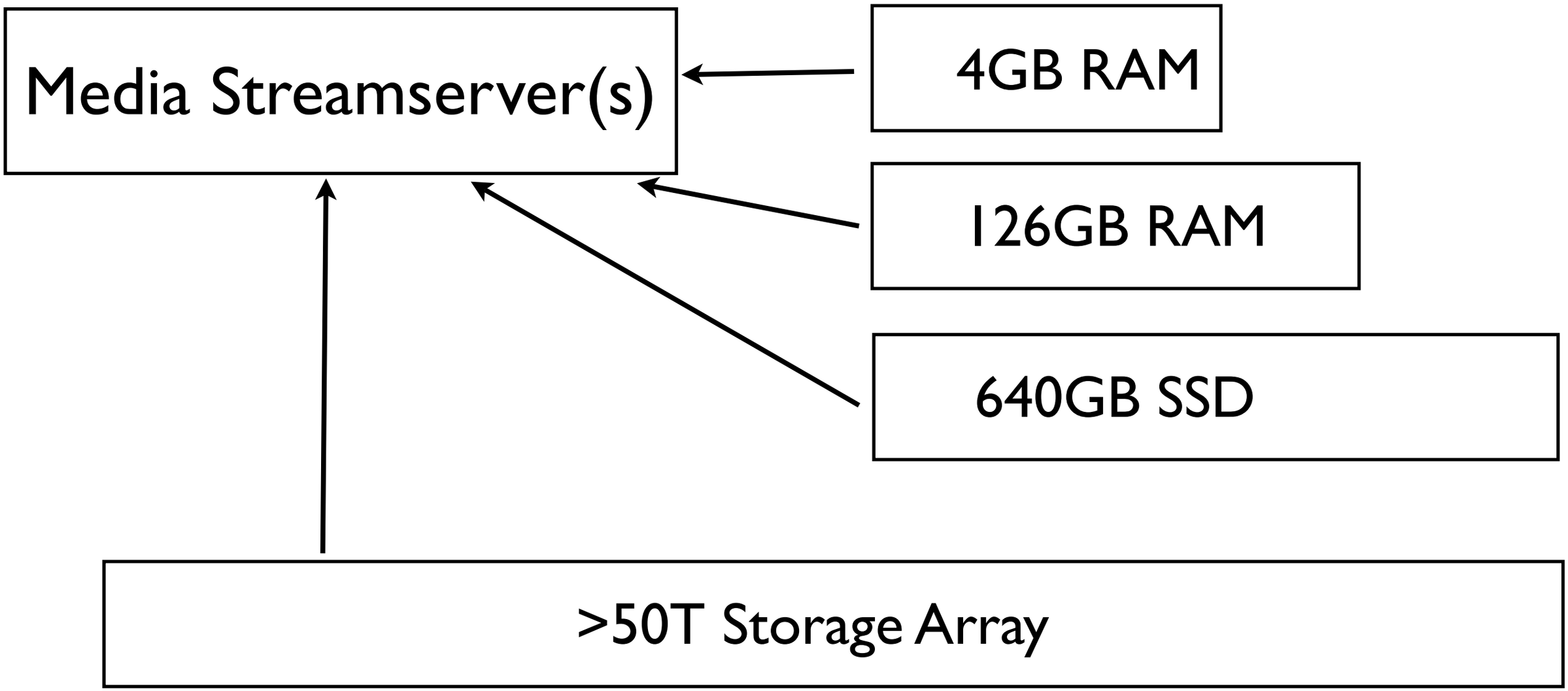
NPO-ICT



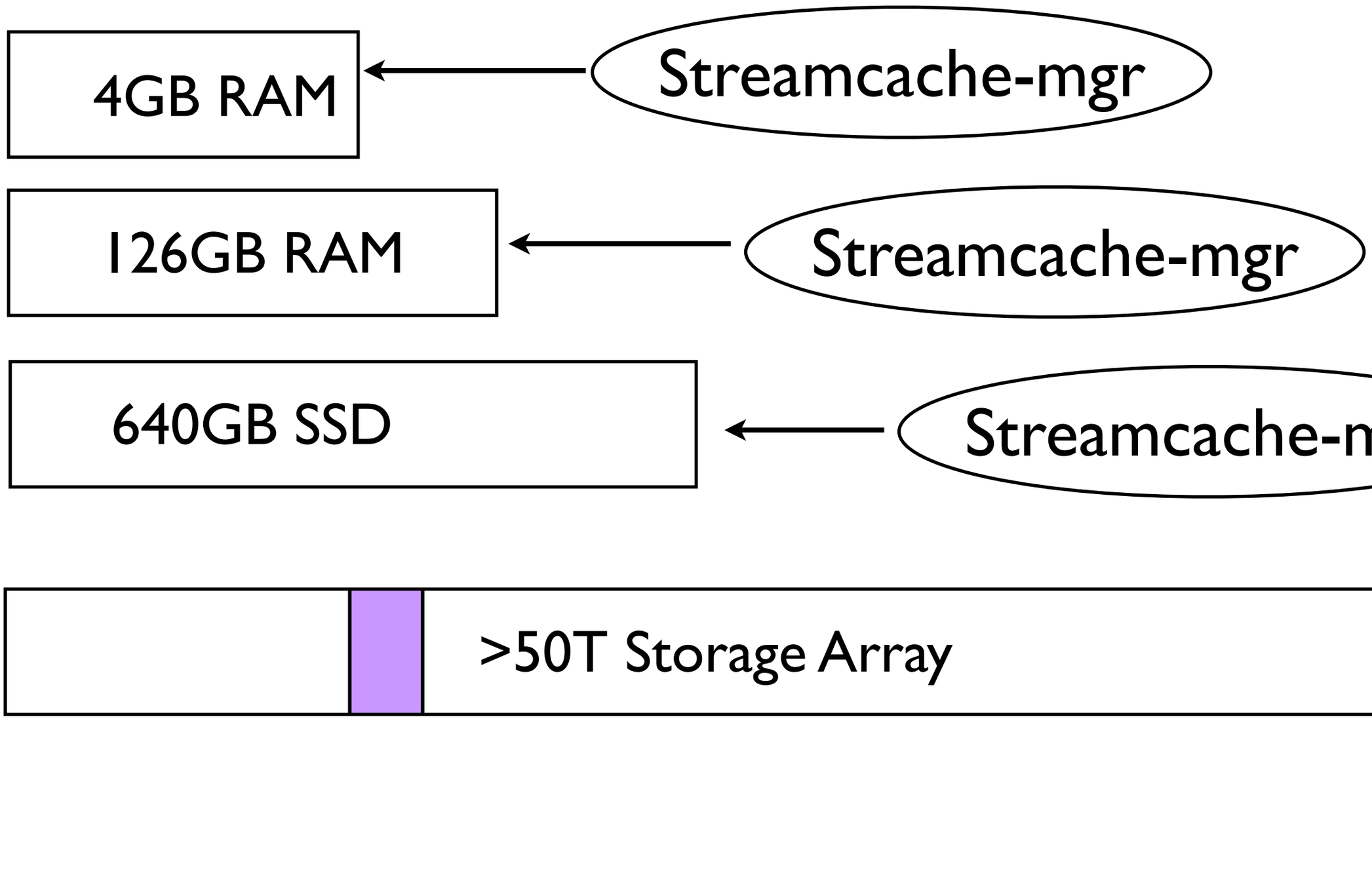
Media Stream Servers



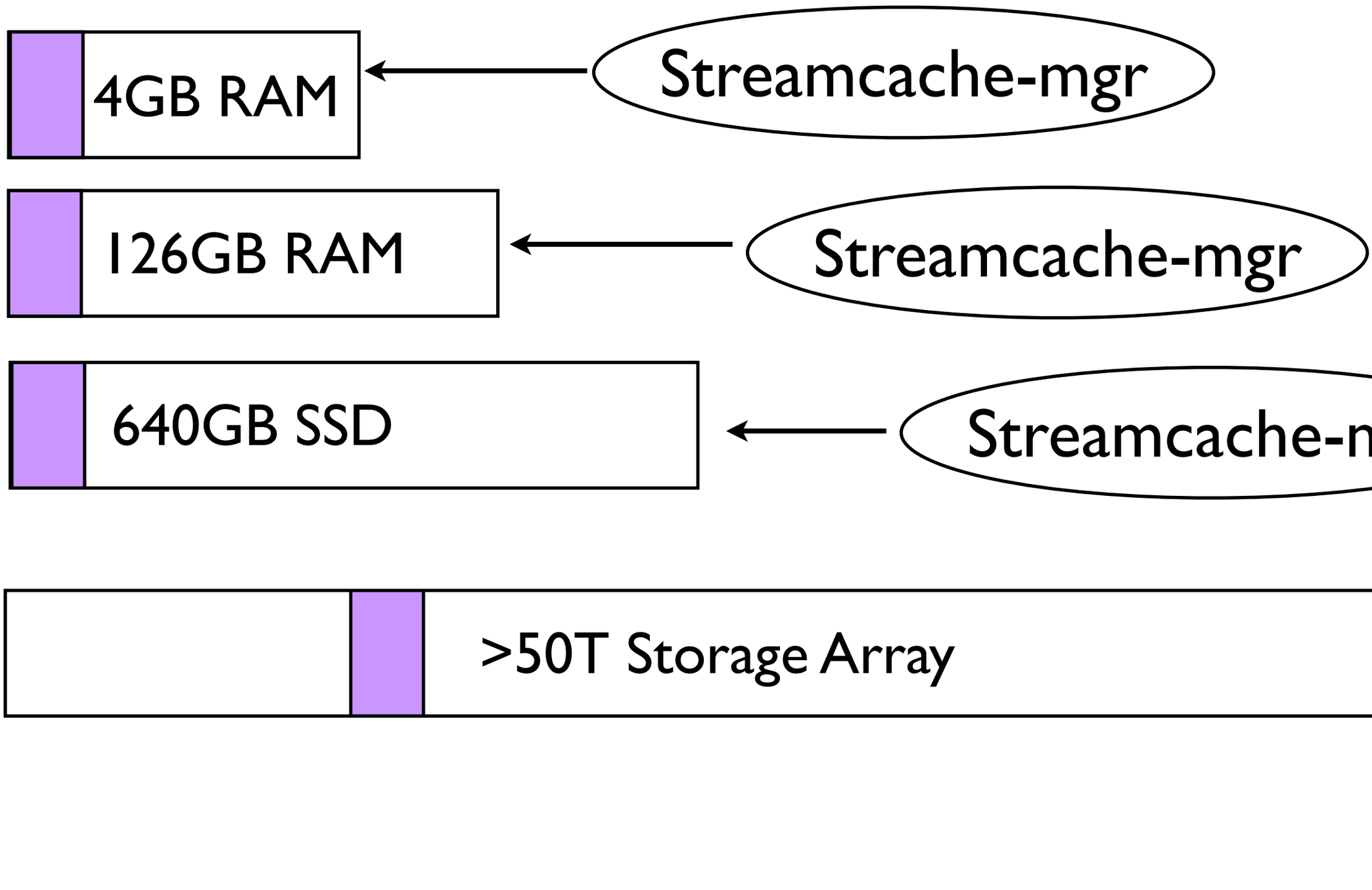
Media Stream Servers



Cache control



Cache control



A special cache?

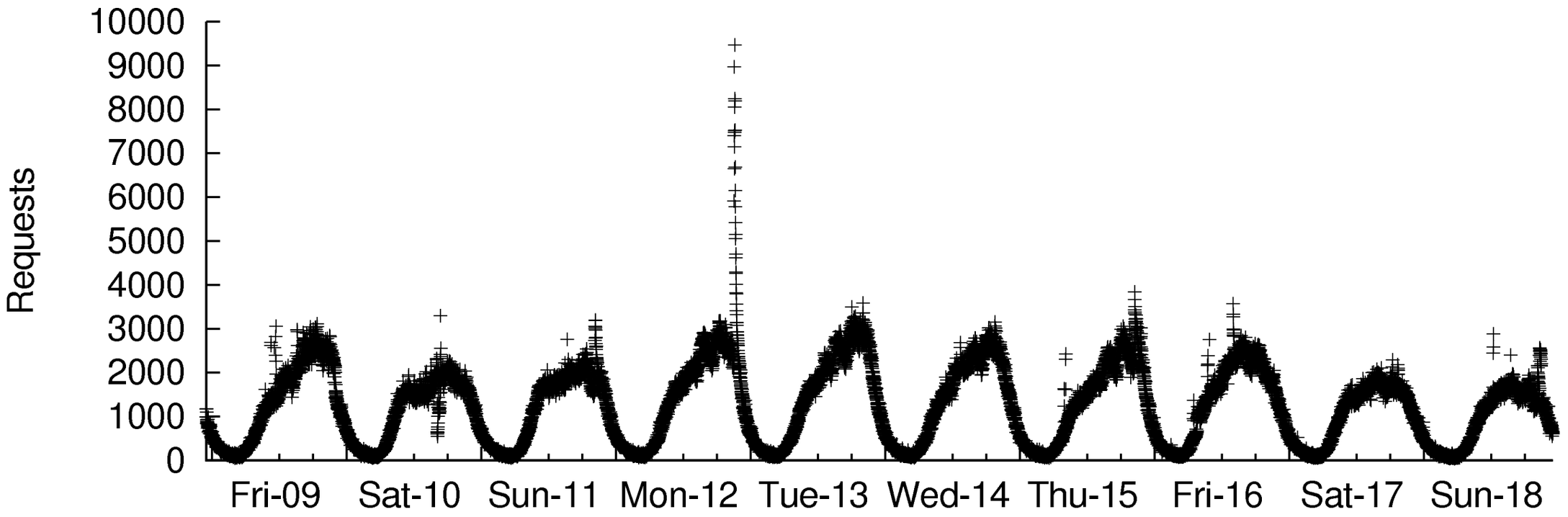
- Read-Only
- Seconds
- 4 GB, 126GB and 640GB!
- Single Cache Miss is “No Problem”
- Cache Insert is expensive (copy of MB’s)

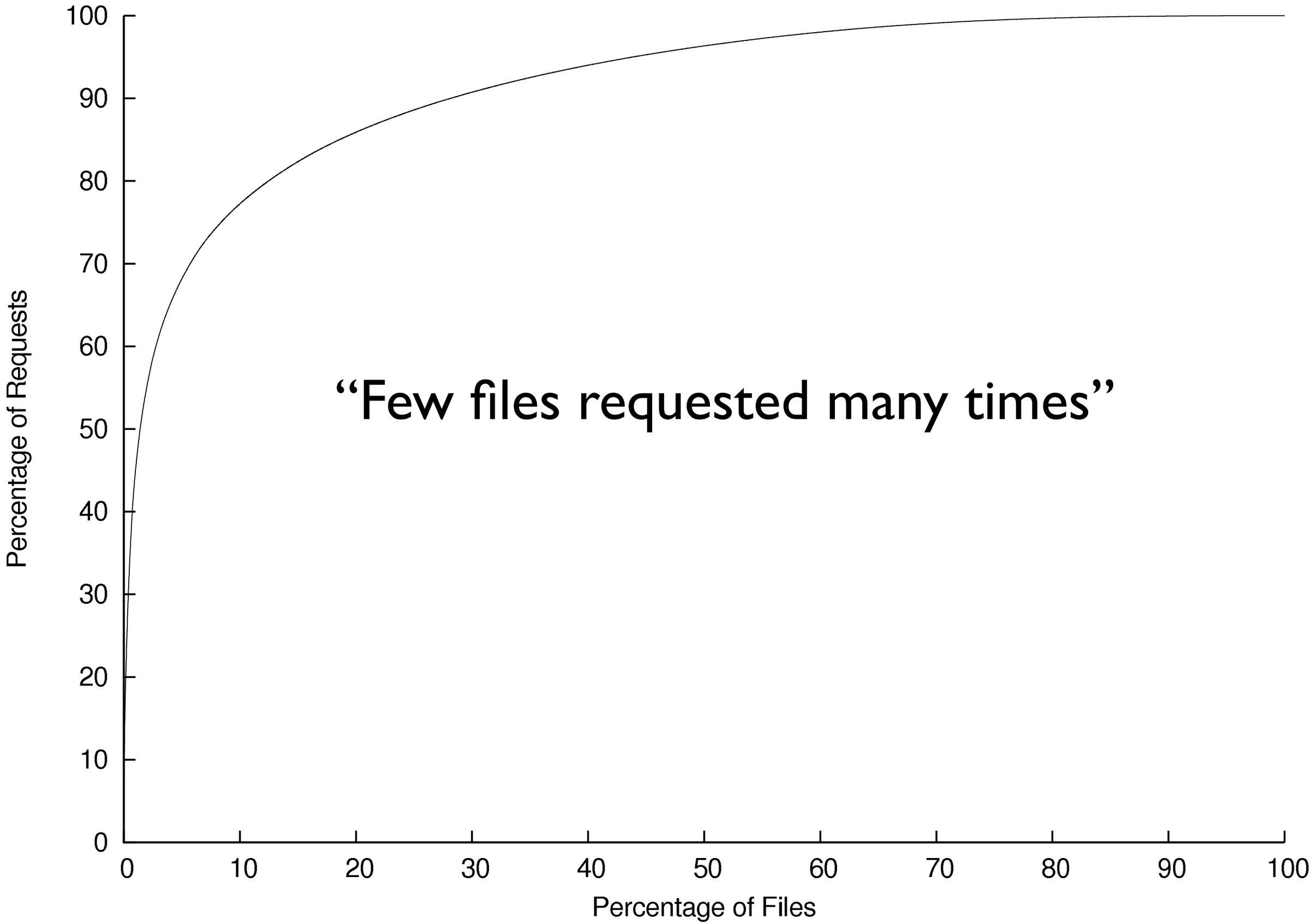
Simulation Environment

- 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”
Percentage of Requests
Percentage of Files
0
10
20
30
40
50
60
70
80
90
100

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,

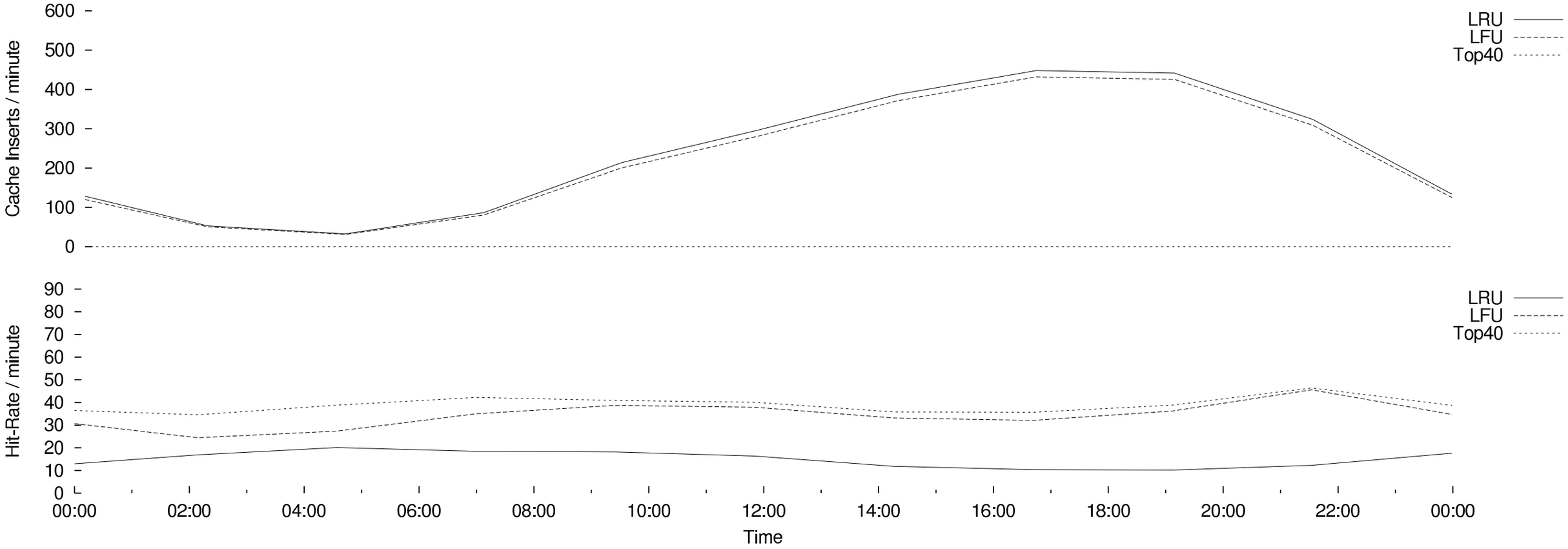
delete least requested file from cache

Note: LFU cache Aging to avoid pollution

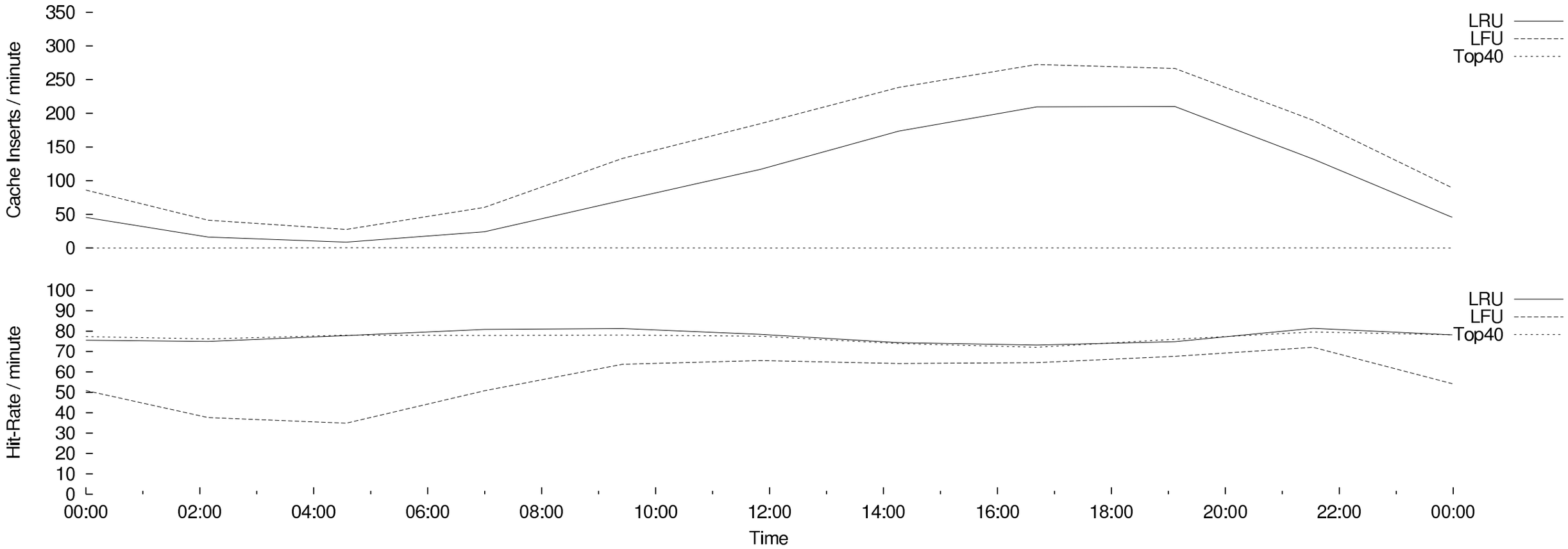
Top40

- 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)

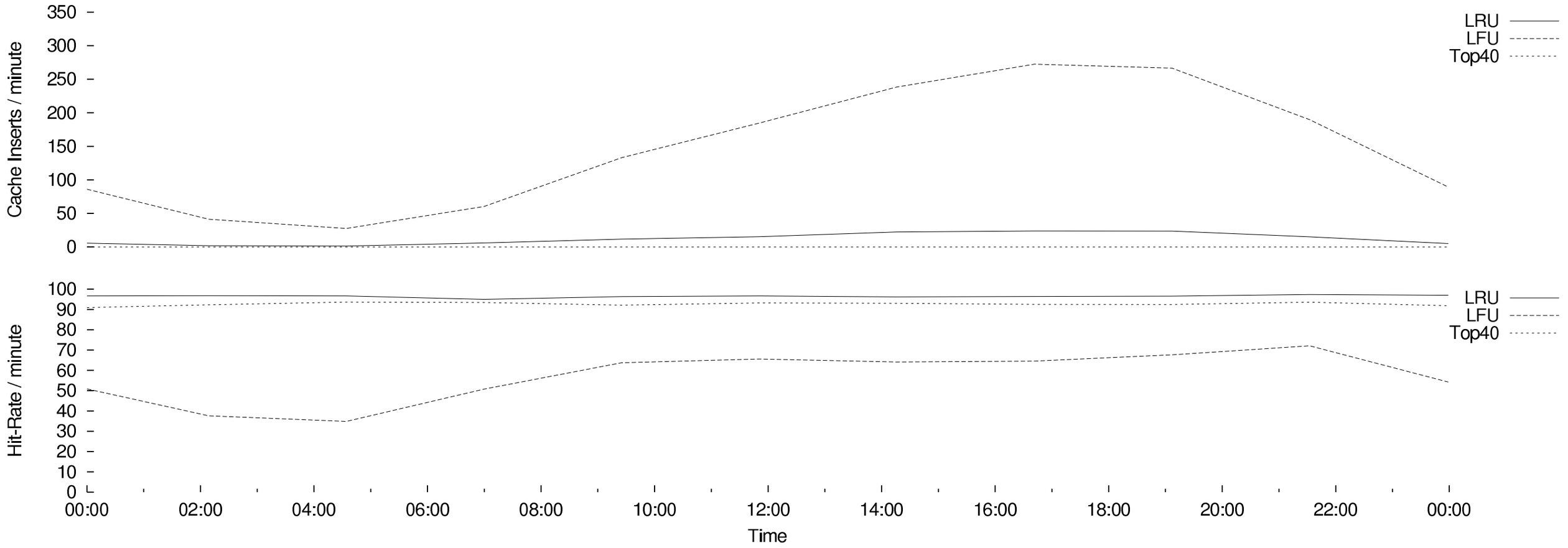
Results 4GB Wed-12



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