

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

The image shows a screenshot of the Uitzendinggemist website in a browser window. The browser's address bar displays `http://www.uitzendinggemist.nl/`. The website header includes the 'omroep nl' logo and navigation links for various channels: Nederland 1, Nederland 2, Nederland 3, Radio 1, Radio 2, 3FM, Radio 4, Radio 5, Radio 6, and FunX. The main navigation bar features the 'Uitzending Gemist' logo and utility links for 'help', 'nieuwsbrief', and 'scre'. Below the navigation, there are filters for 'Kies een net' (Nederland 1, 2, 3, Z@PP), 'Kies een dag' (vandaag, gisteren, maandag, dinsdag, woensdag, donderdag, vrijdag, zaterdag), and 'Kies een titel' (0-9, A-Z). The content area is divided into sections: 'Moet je zien' with an article 'Slapend rijk worden' (viewed 223 times, rating 3.9), 'Media Markt belazert de consument' (viewed 610 times, rating 5.0), and 'Nieuw toegevoegd' with an article 'Het familiediner' (viewed 1 time, rating 3.9). A 'Special' section is also visible. Overlaid on the right side is a video player window titled 'bb.20090130.asf'. The video shows a man with long hair standing in a studio with a 'VARA' logo and a 'WDD MEDIA' globe in the background. The video player includes a progress bar at 00:00:43 and standard playback controls.

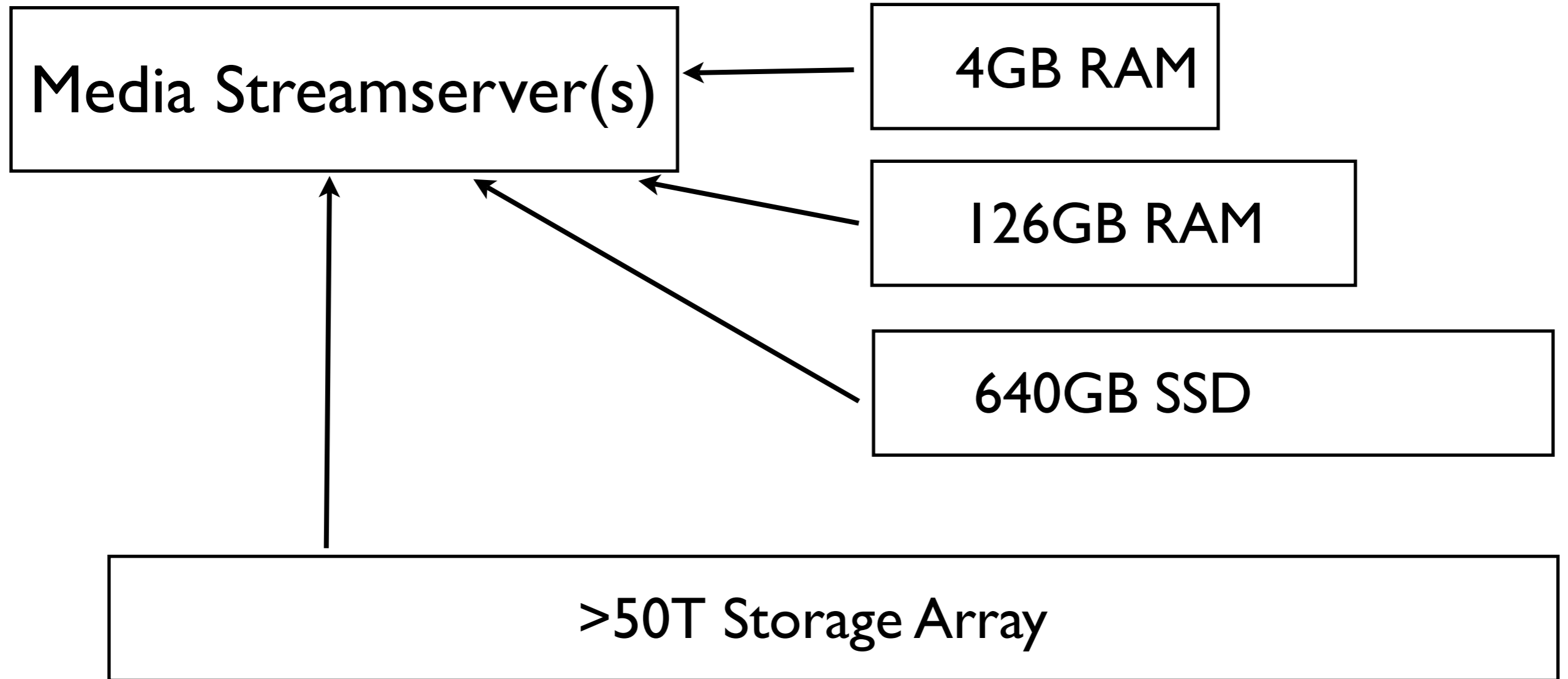
Media Stream Servers

Media Streamserver(s)

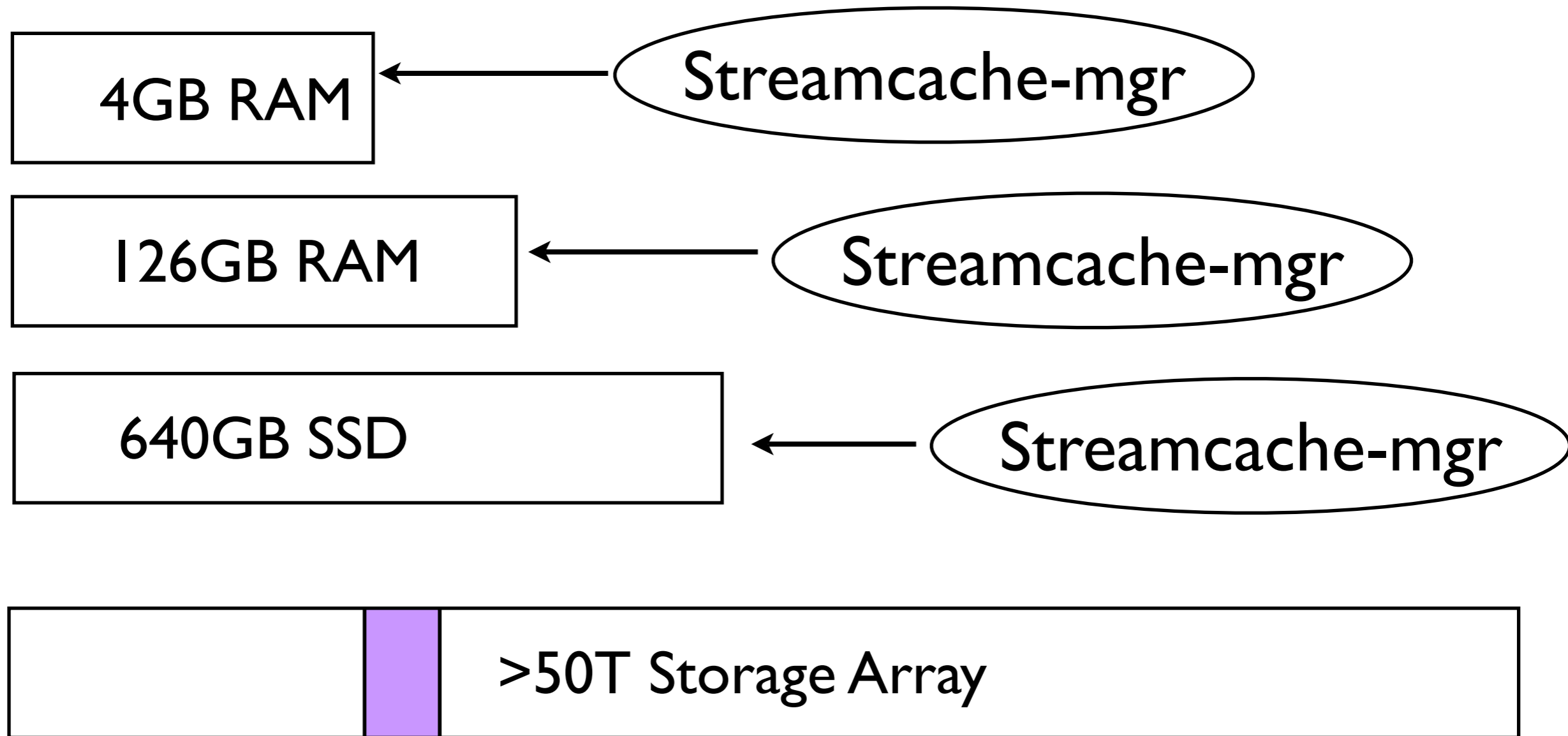
```
graph BT; A[Media Streamserver(s)] --- B[>50T Storage Array];
```

>50T Storage Array

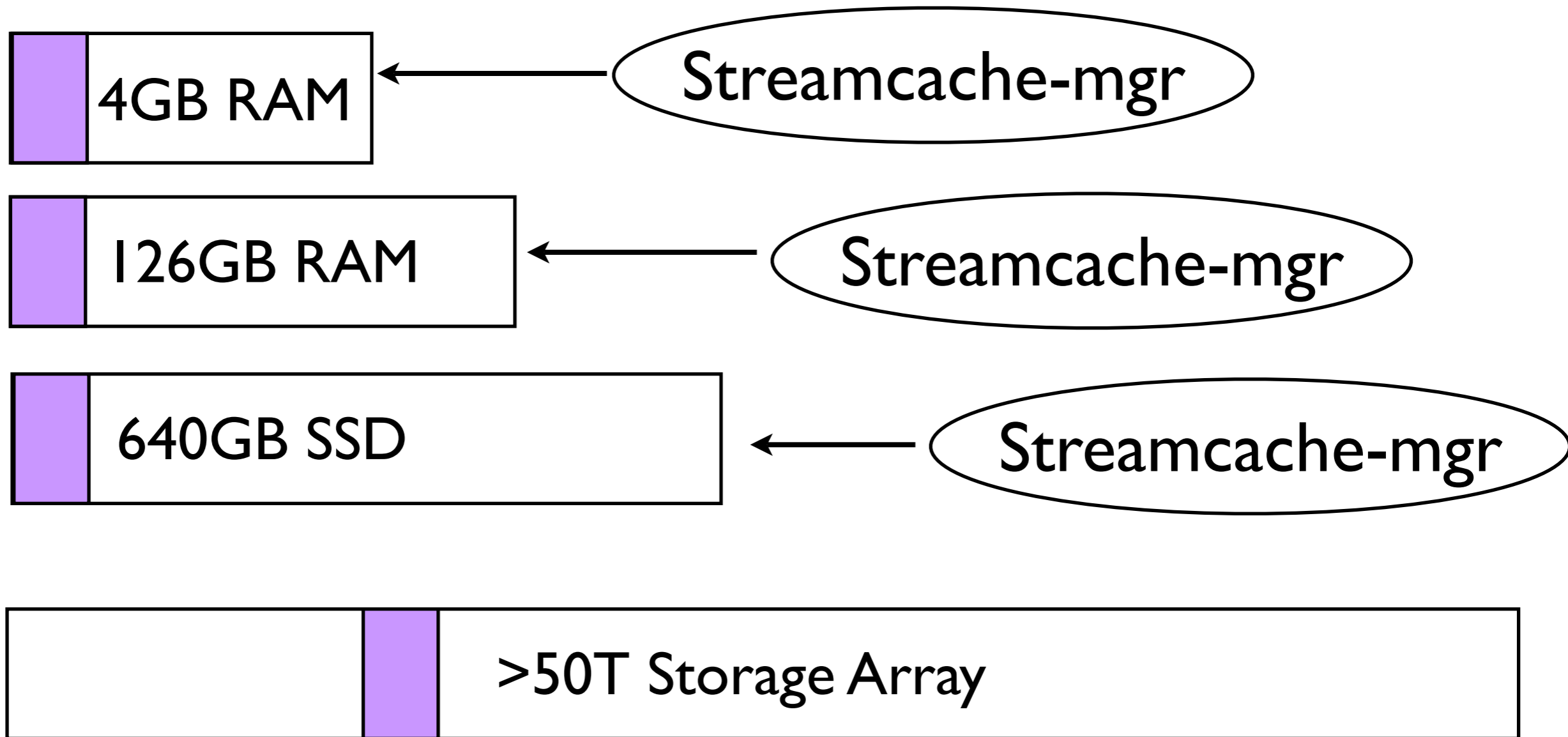
Media Stream Servers



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)

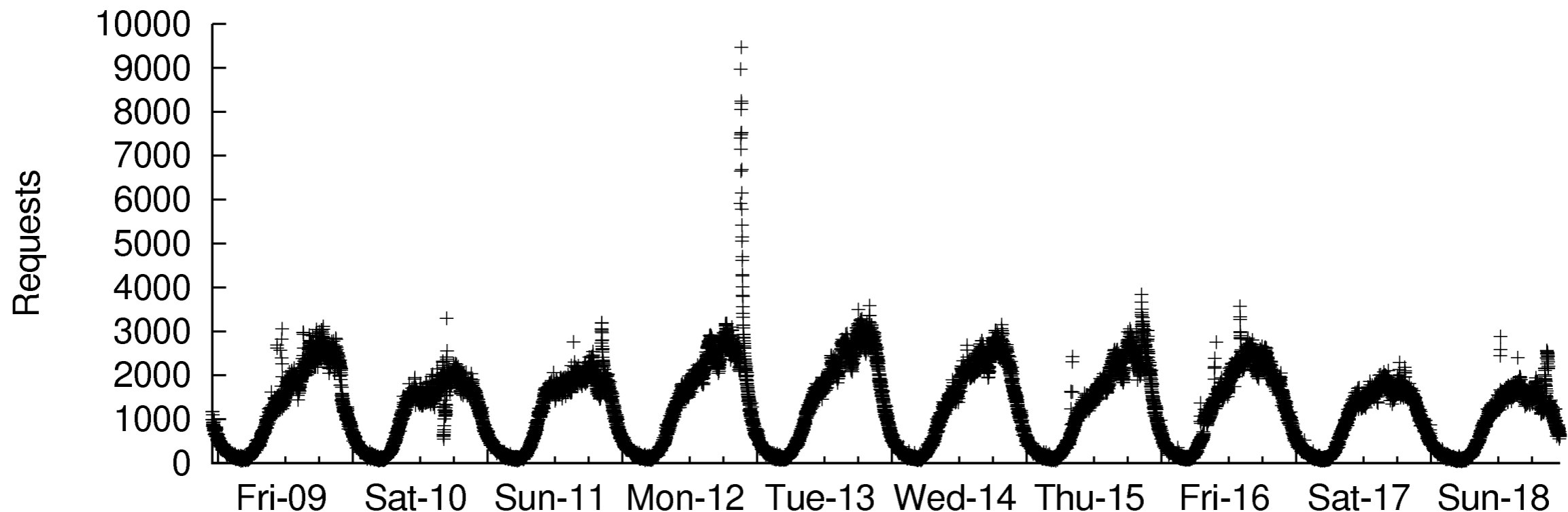
Simulation Environment

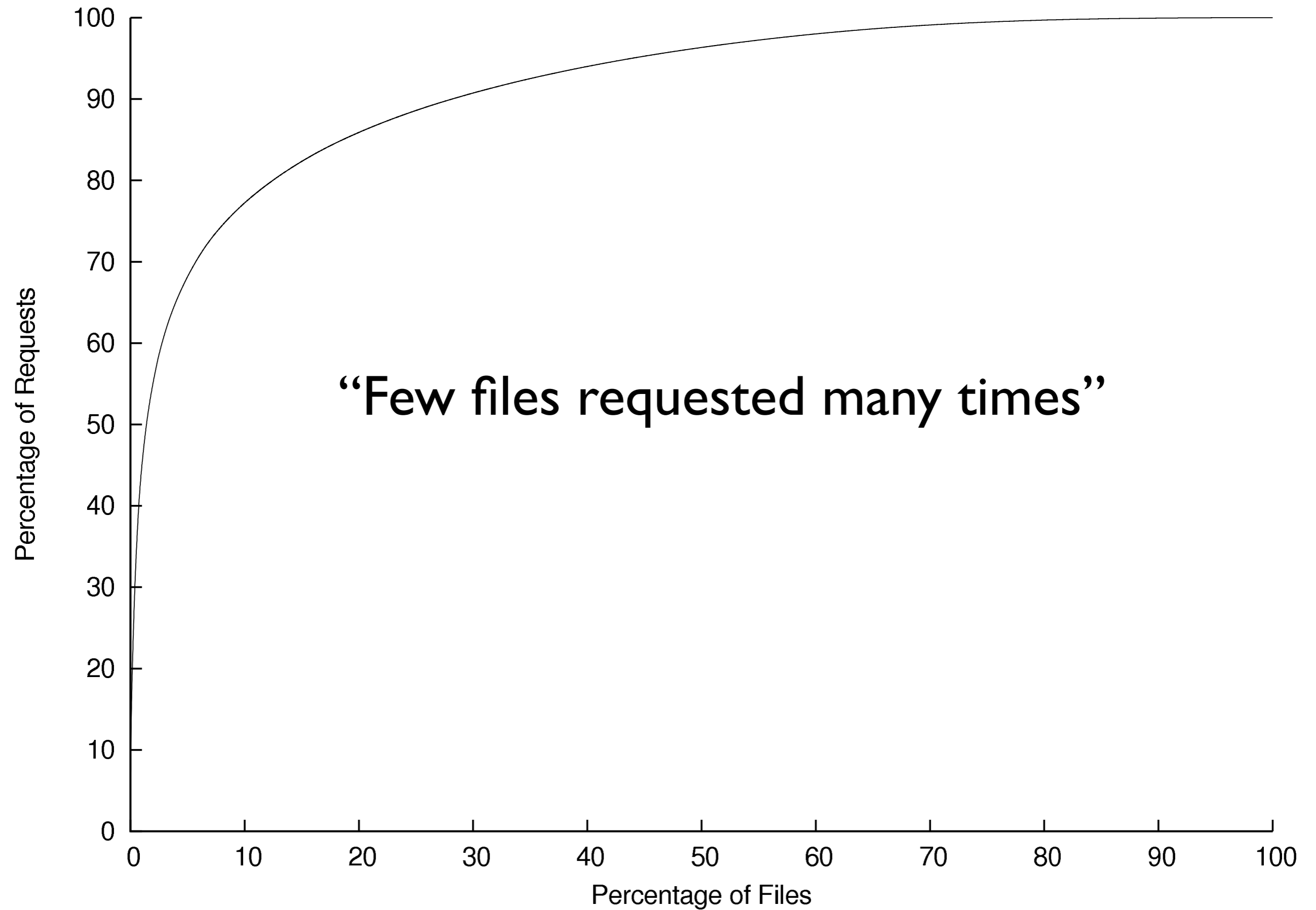
- Real Input Data (Archived)
- 11 days in January 2009 (Thu 08 - Sun 18)
- LRU and LFU written in Perl
- Cache and Storage are a Database
- Modified Streamcache-mgr © D.Snippe

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





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

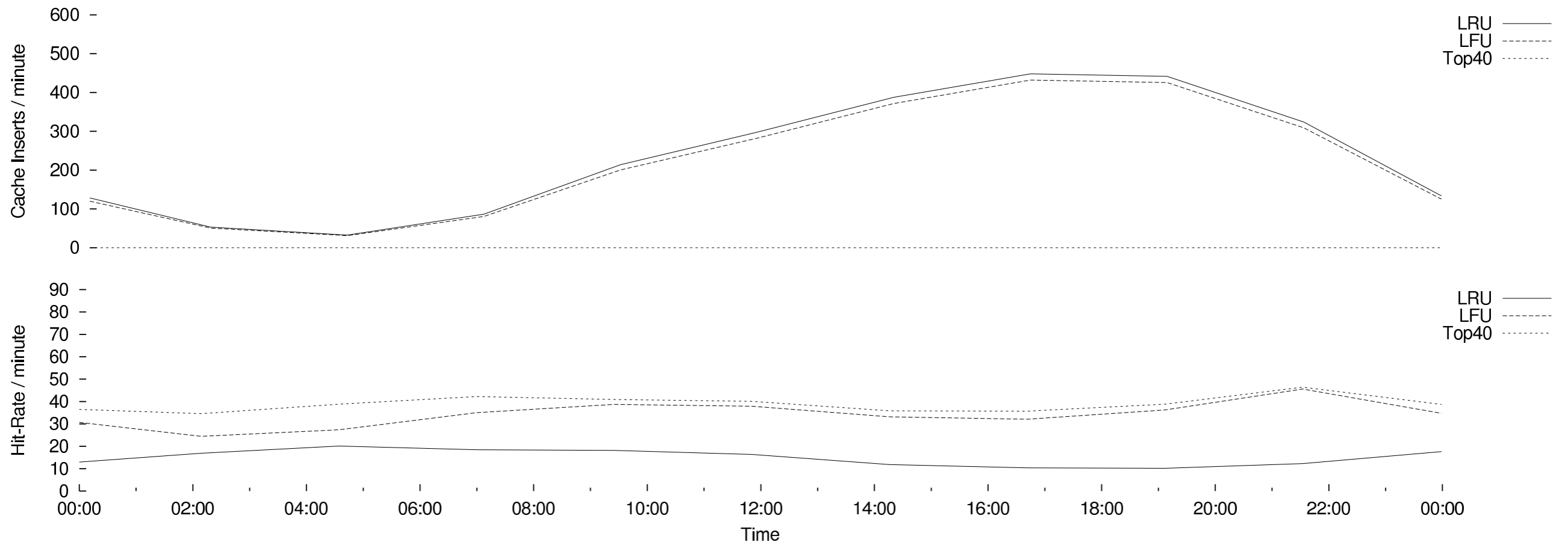
Note: LFU cache Aging to avoid pollution

Top40

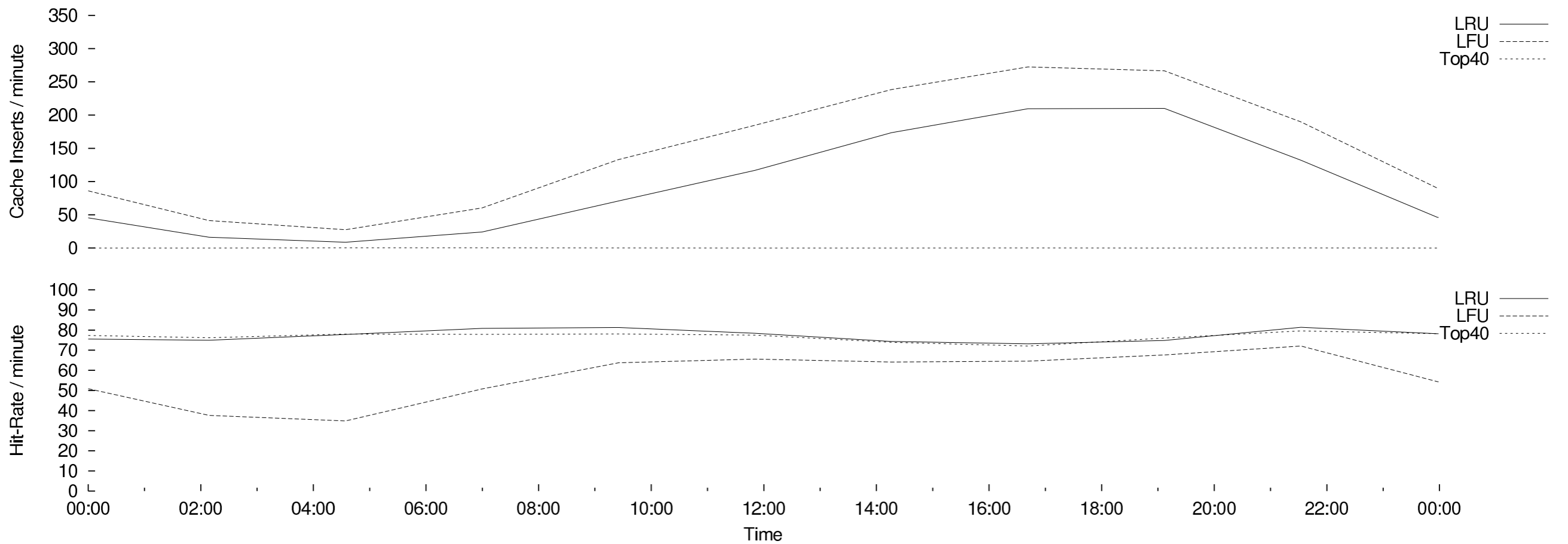
- Heavily modified LFU
- Ignores one-time request
- A “chart” of weights
- Files only removed from cache when below threshold
- Files only inserted when above threshold (from nothing to number one)

Results 4GB

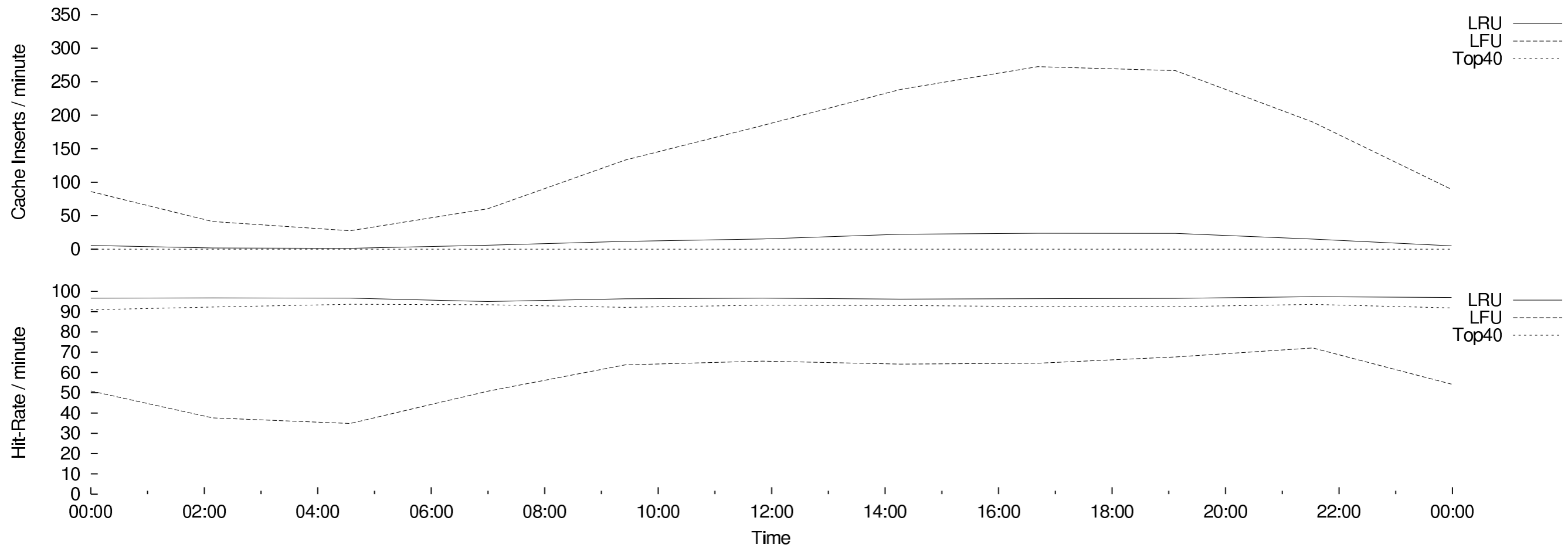
Wed-12



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

