CS 265

Stratos Idreos

BIG DATA SYSTEMS

NoSQL | Neural Networks | Image AI | LLMs | Data Science

BITS PER ENTRY IN FILTERS: OPTIMIZED OUT

Monkey: **O**ptimal **N**avigable **Key**-Value Store @SIGMOD2017

DASlab @ Harvard SEAS

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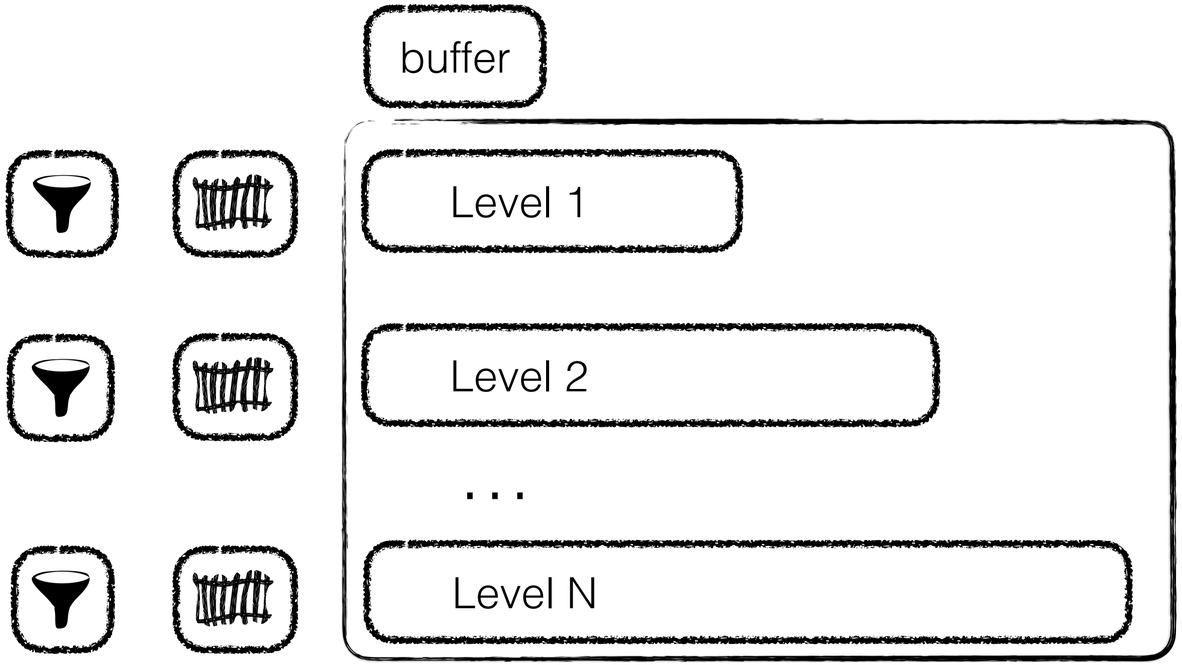

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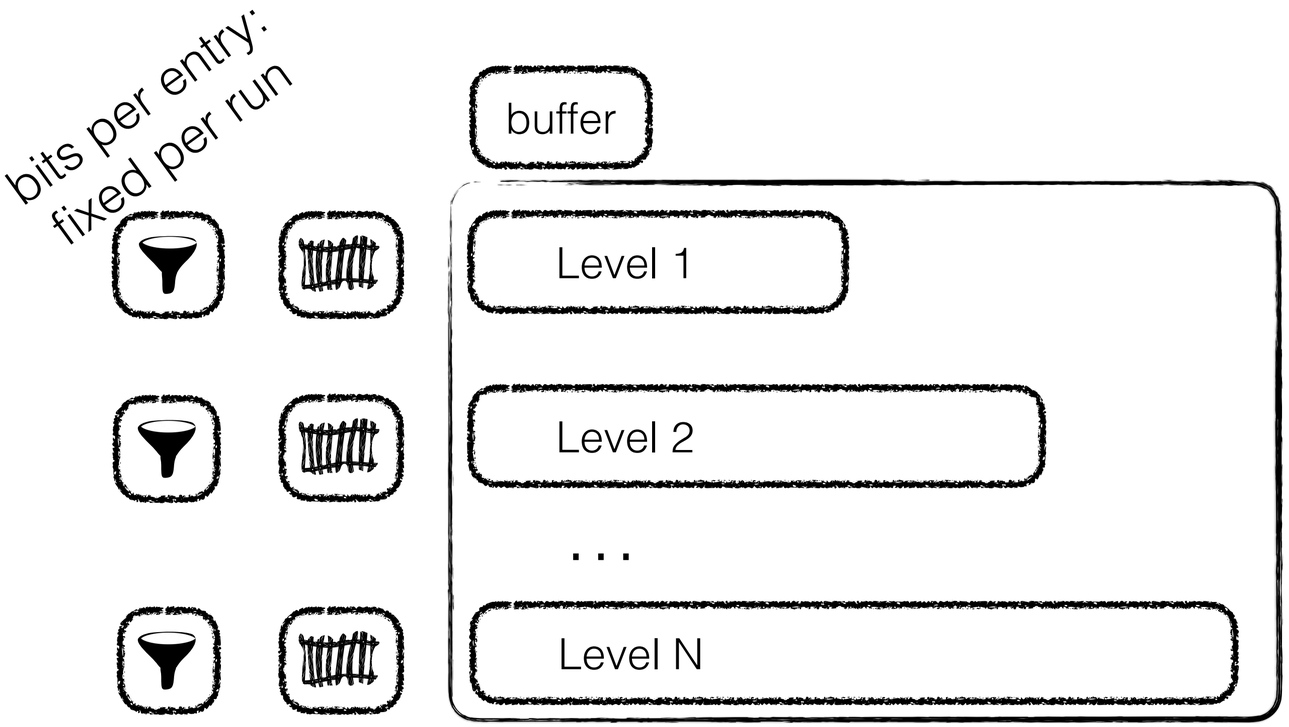

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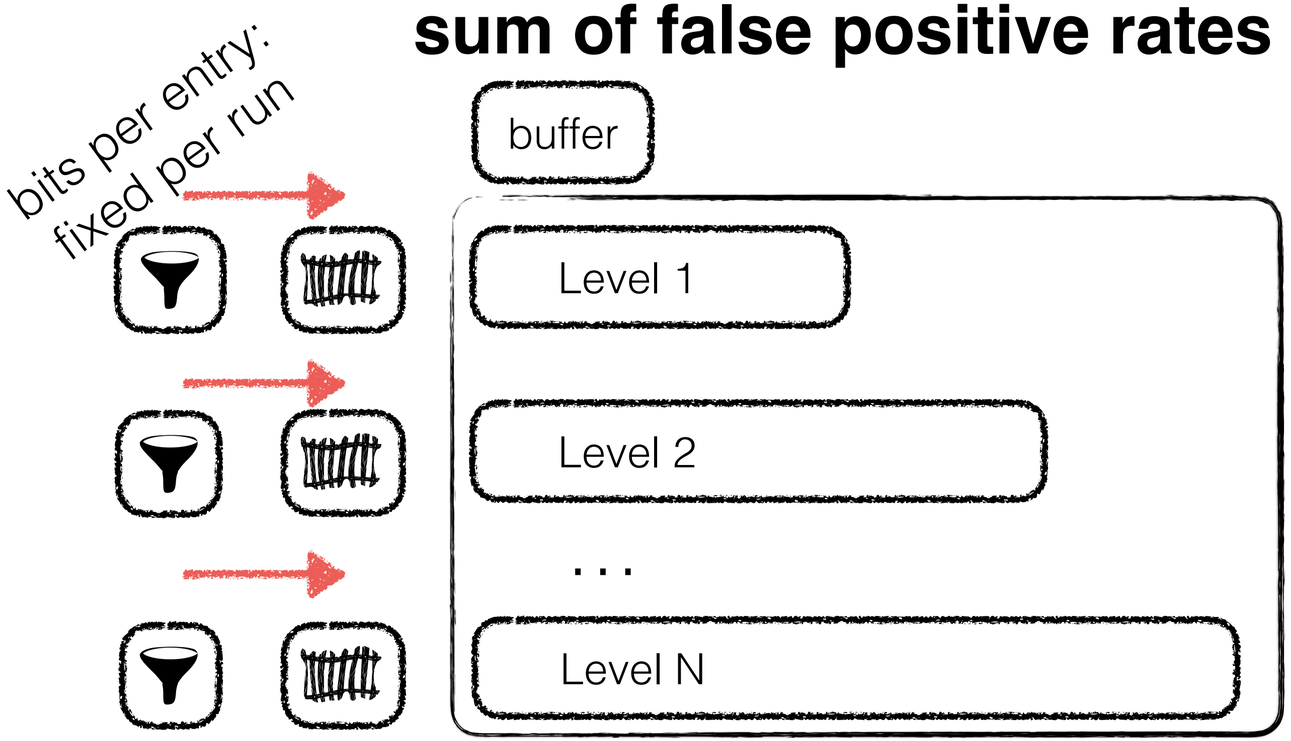
worst lookup cost:
sum of false positive rates



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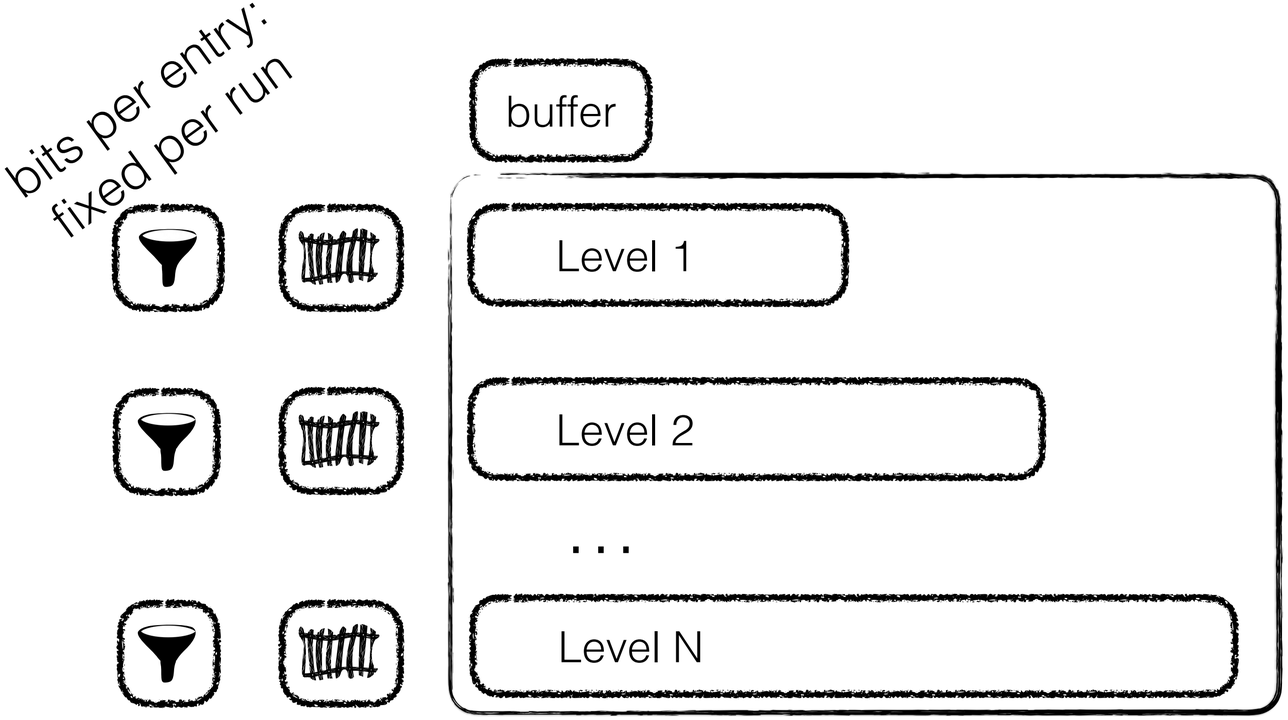
the same memory budget
is more impactful at smaller levels



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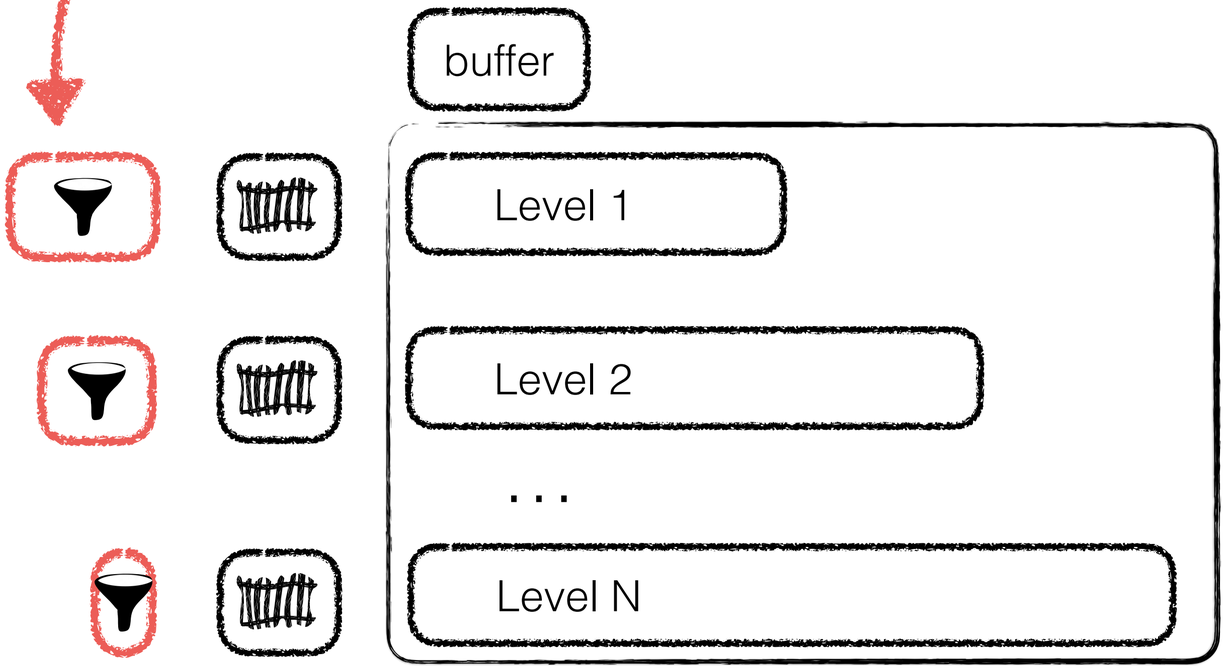

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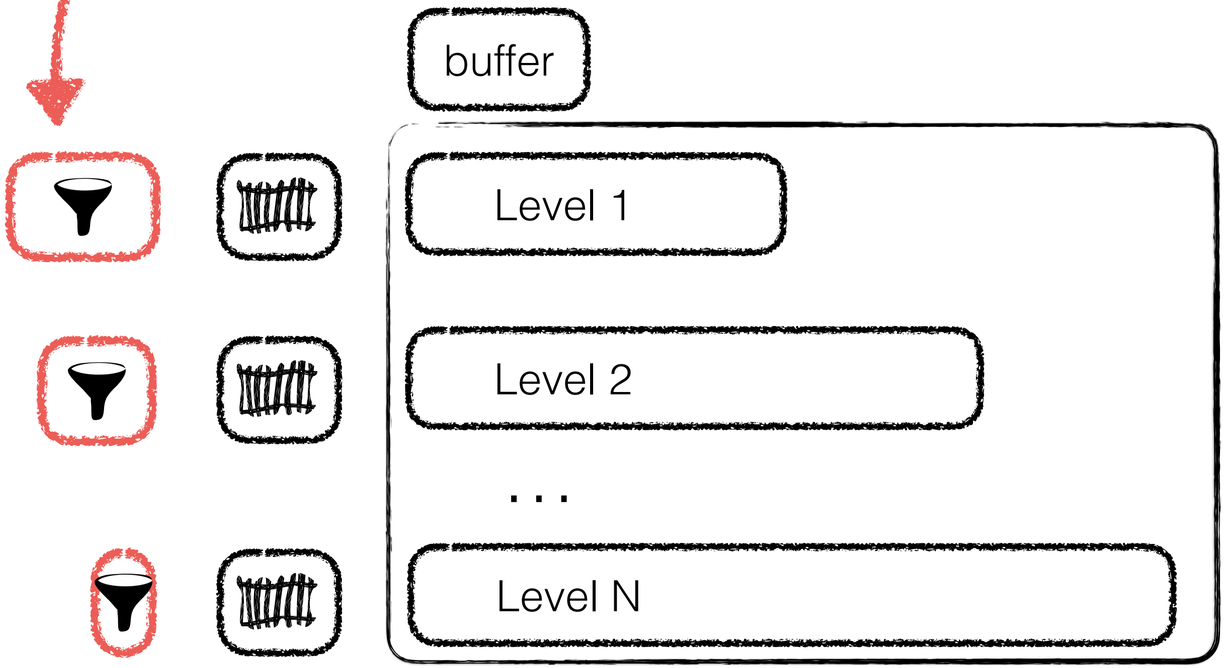

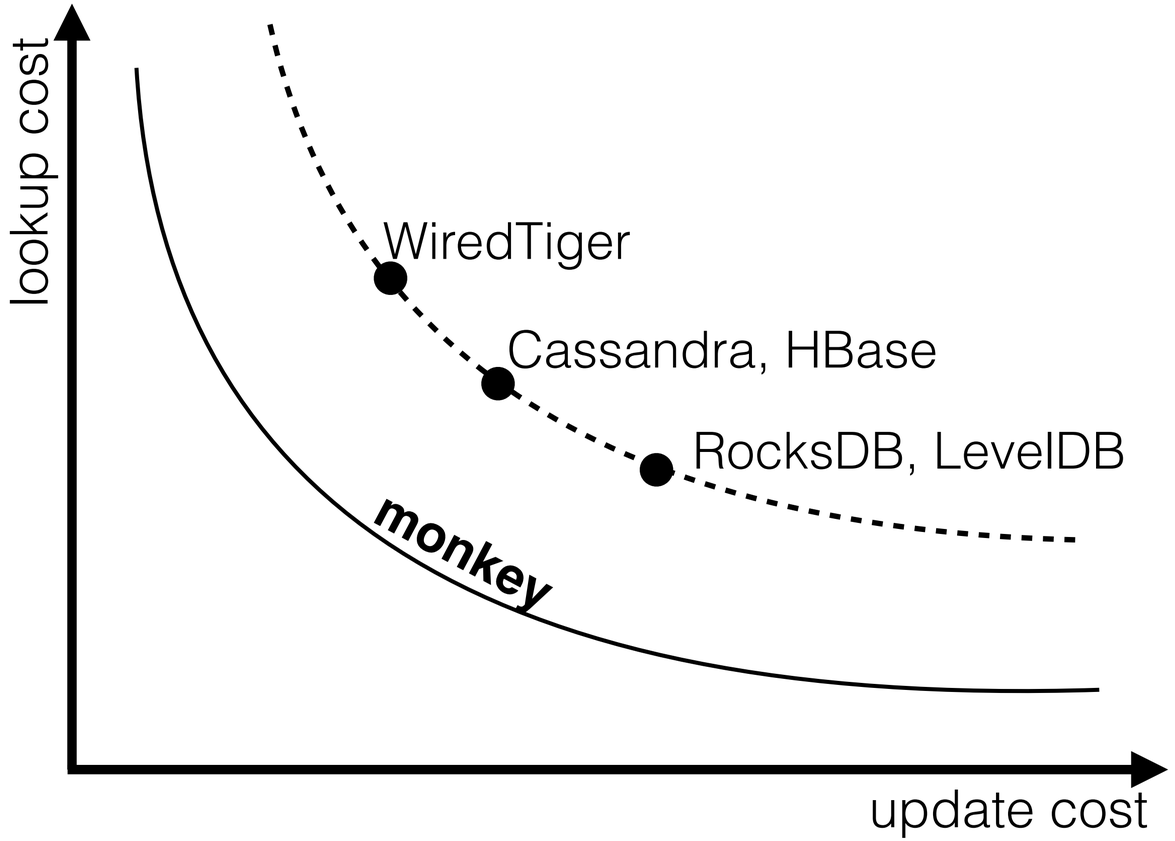

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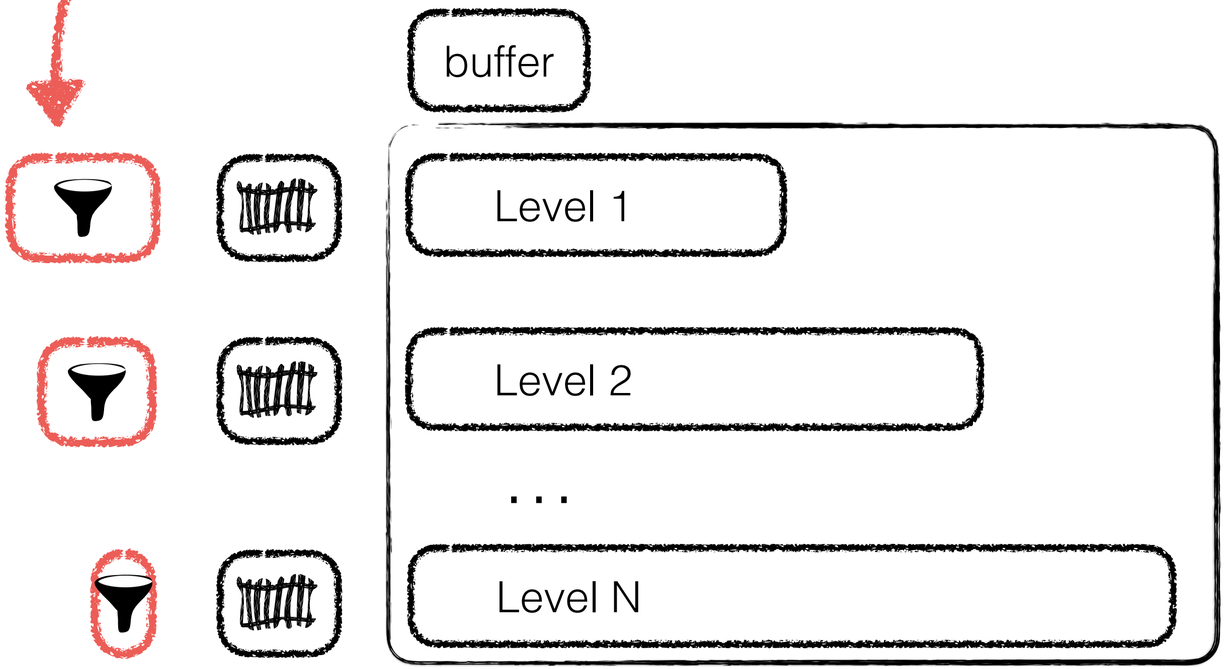

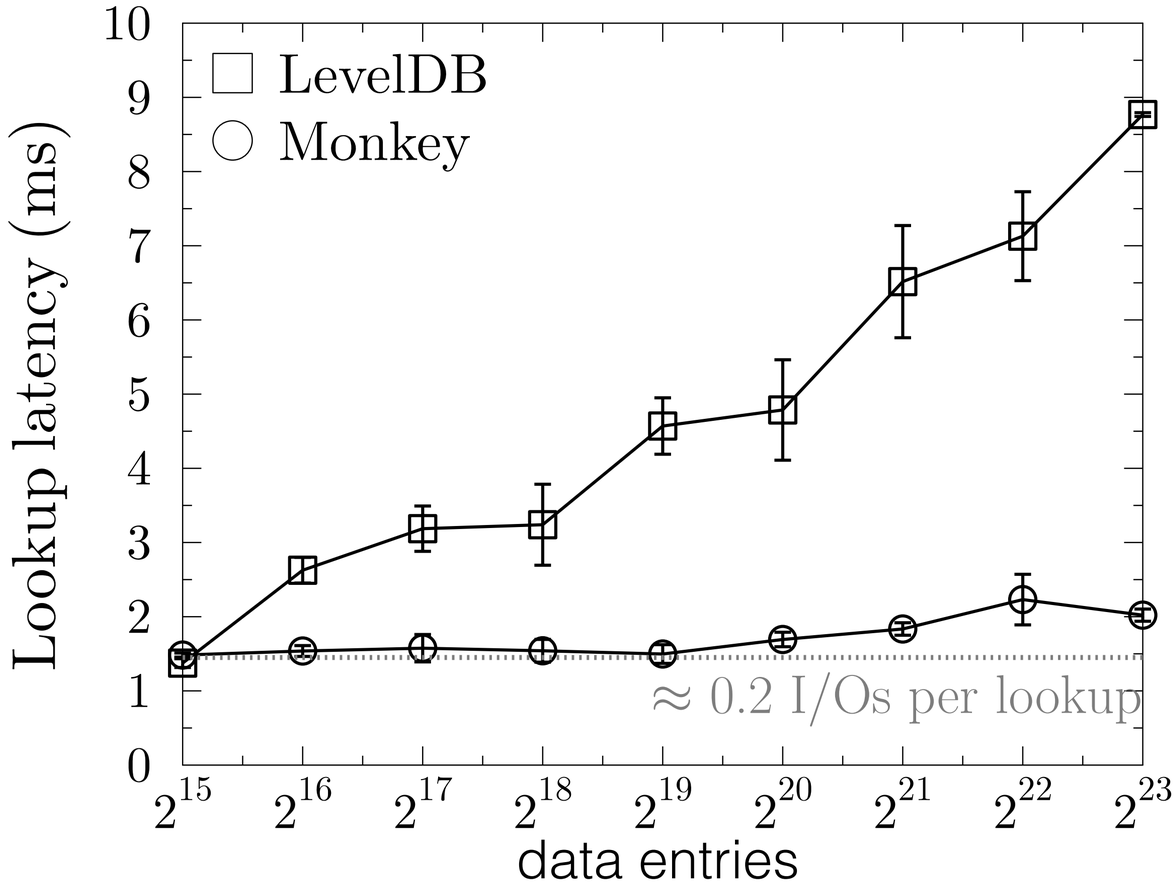

uniform, zero result, point queries, entry size=1KB

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MERGE POLICY: SHOULD BE TUNED

@SIGMOD2018

Dostoevsky: **S**pace-**T**ime **O**ptimized **Ev**olvable **S**calable **K**e**y**-Value Store

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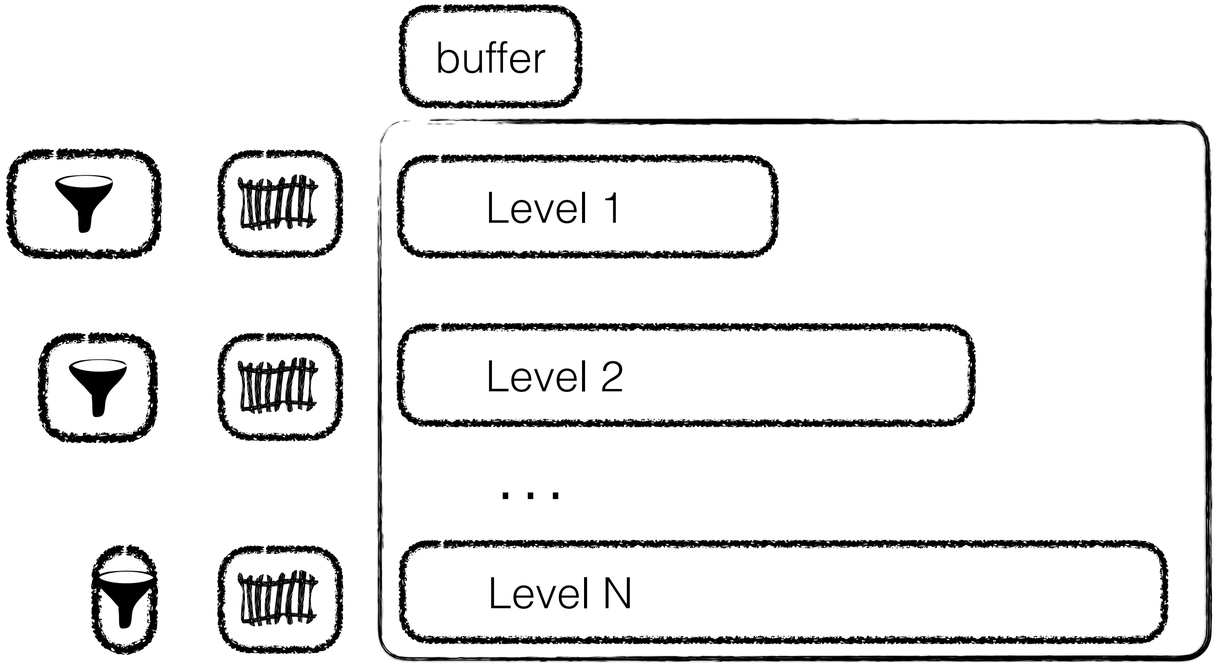

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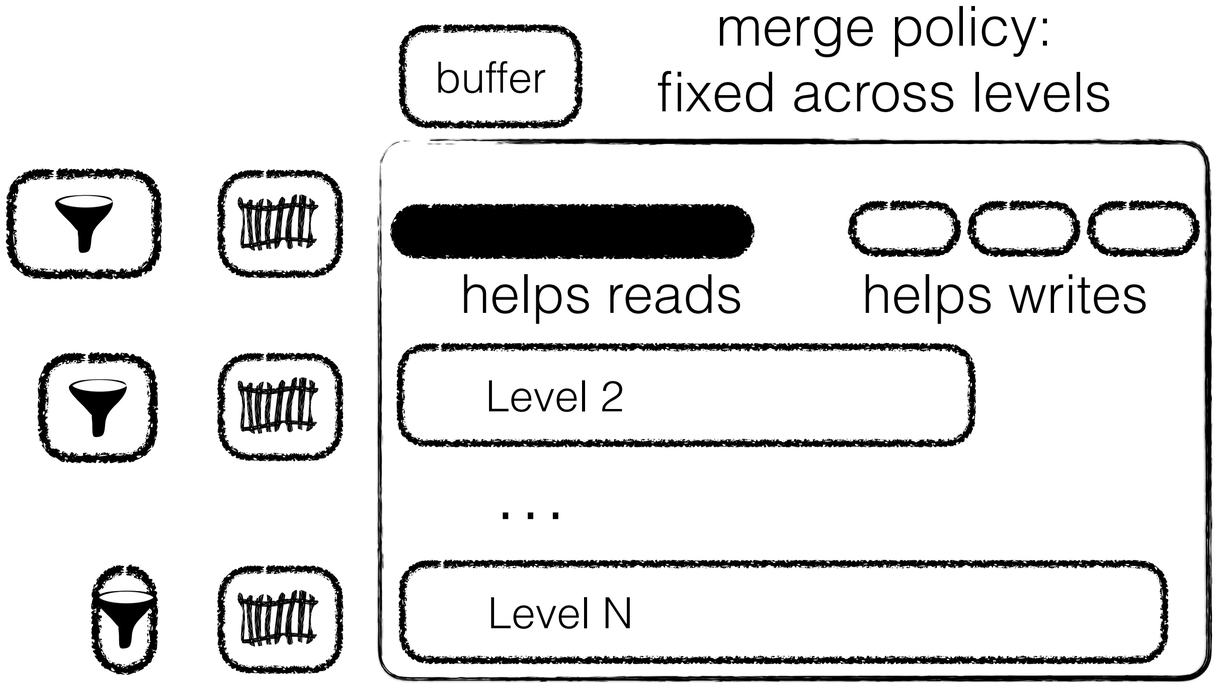

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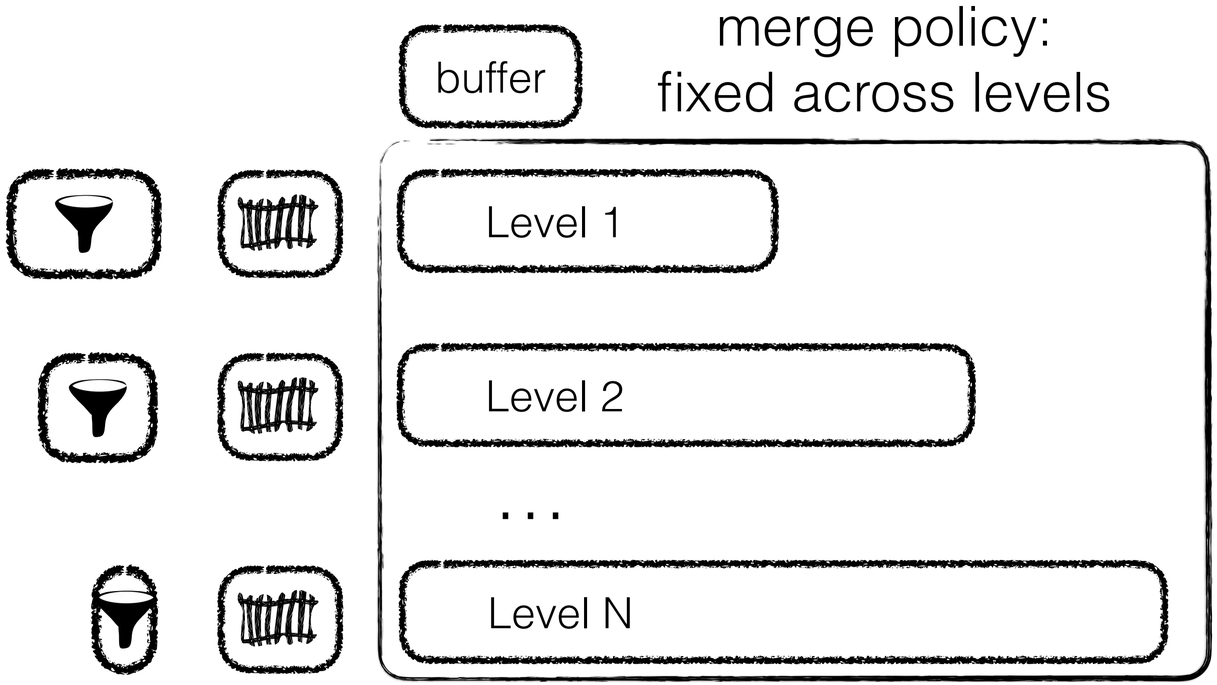

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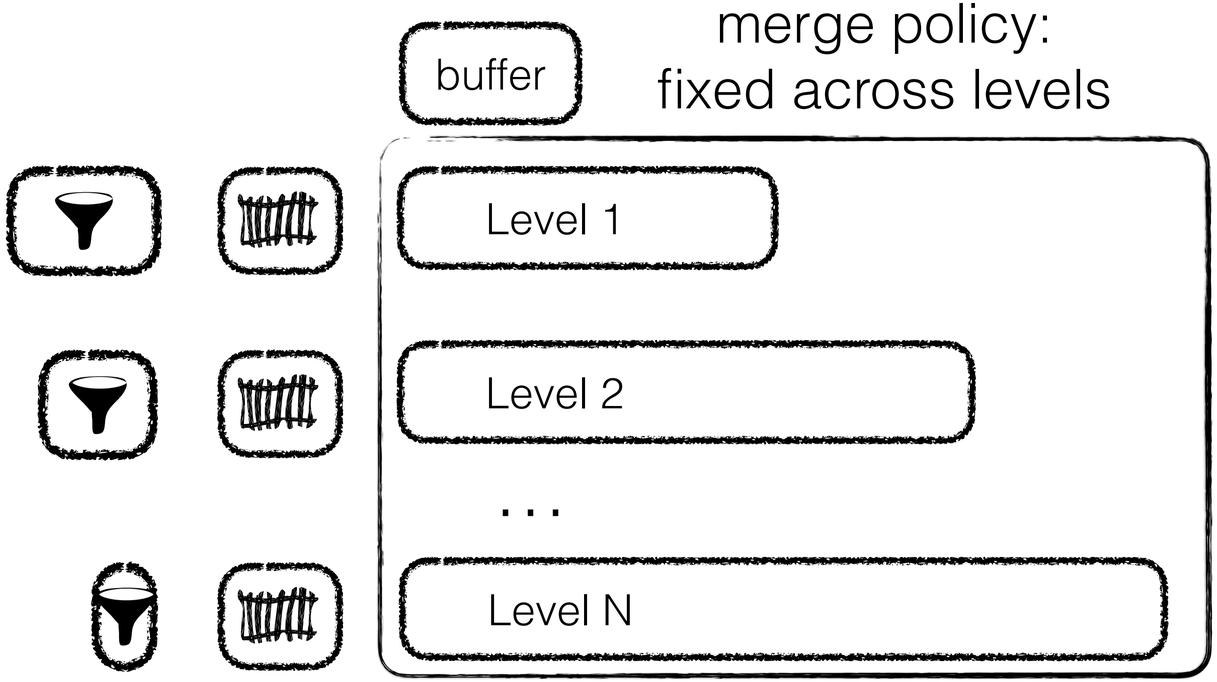
merging small levels does not help that much (point,range,space)



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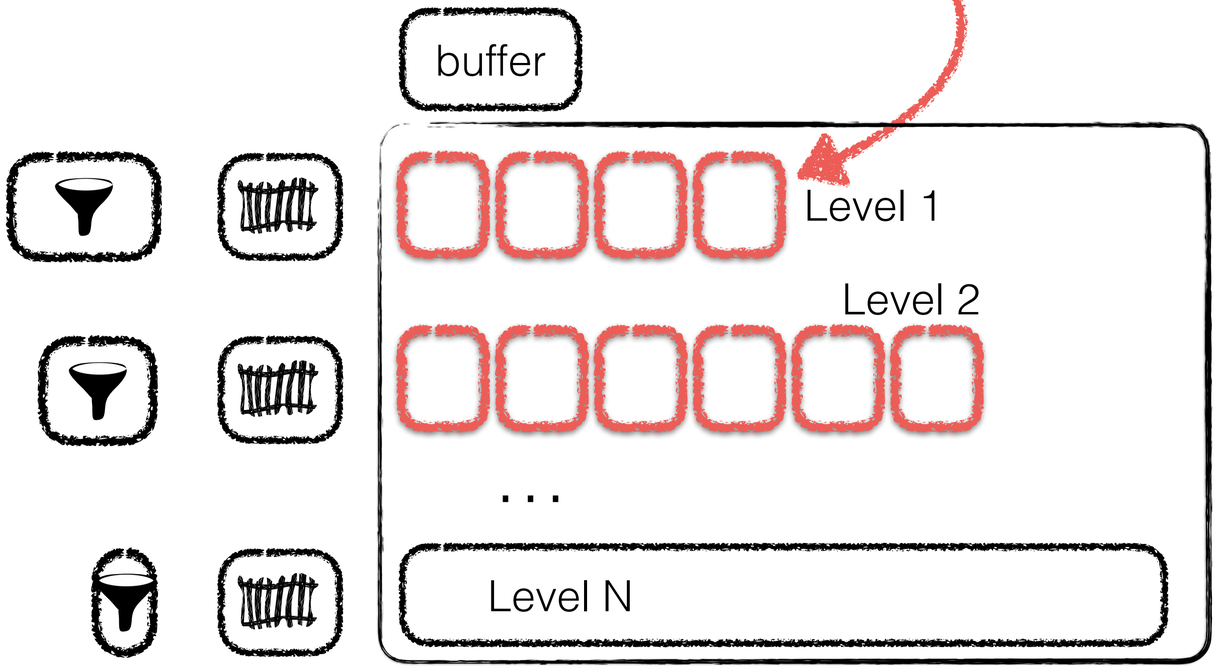

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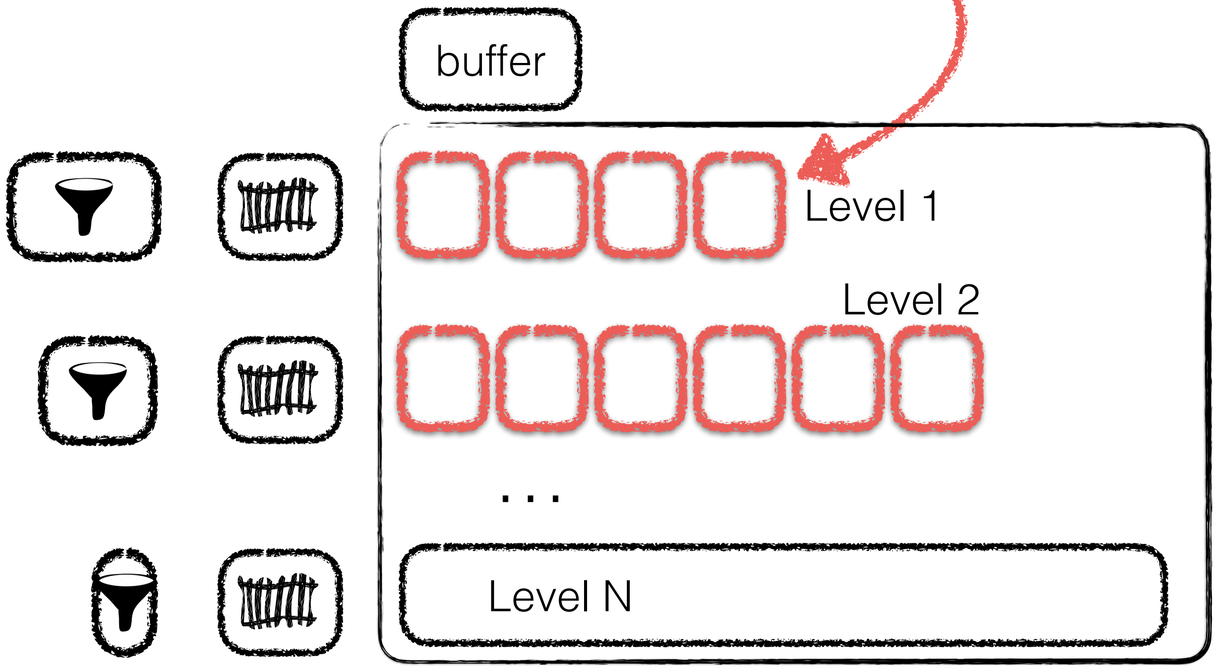

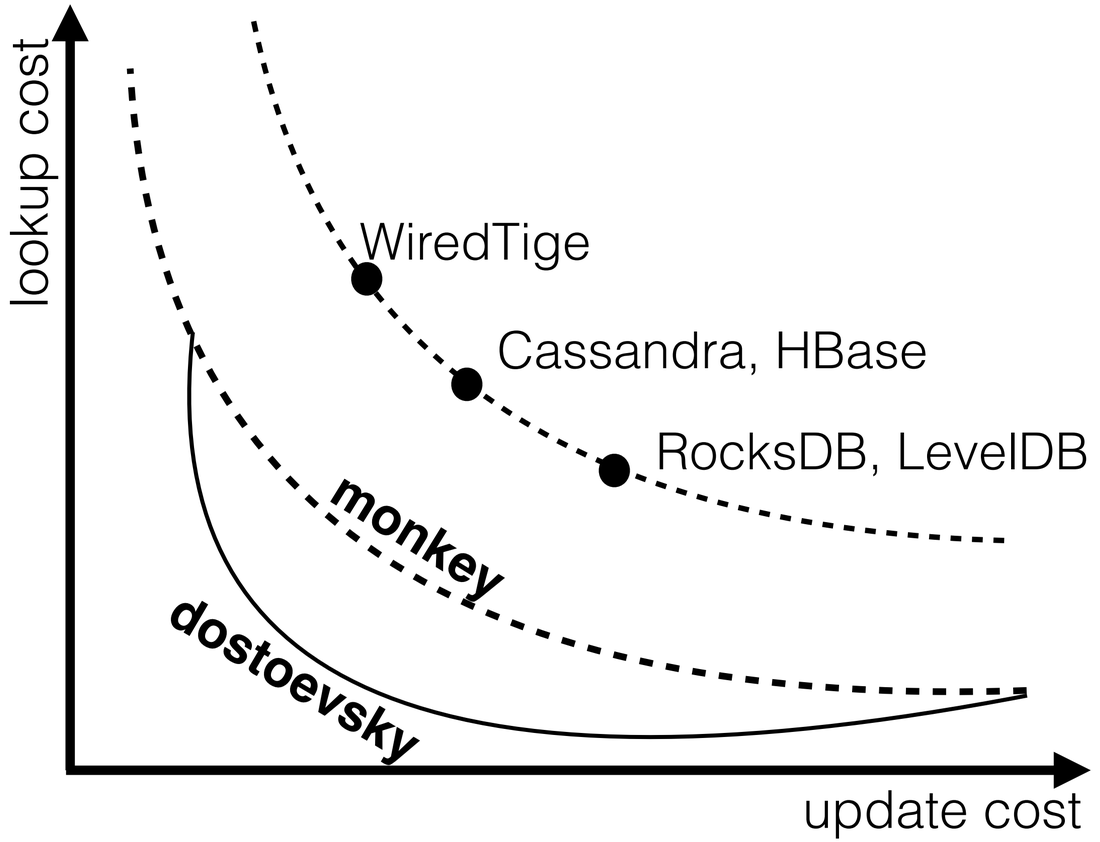

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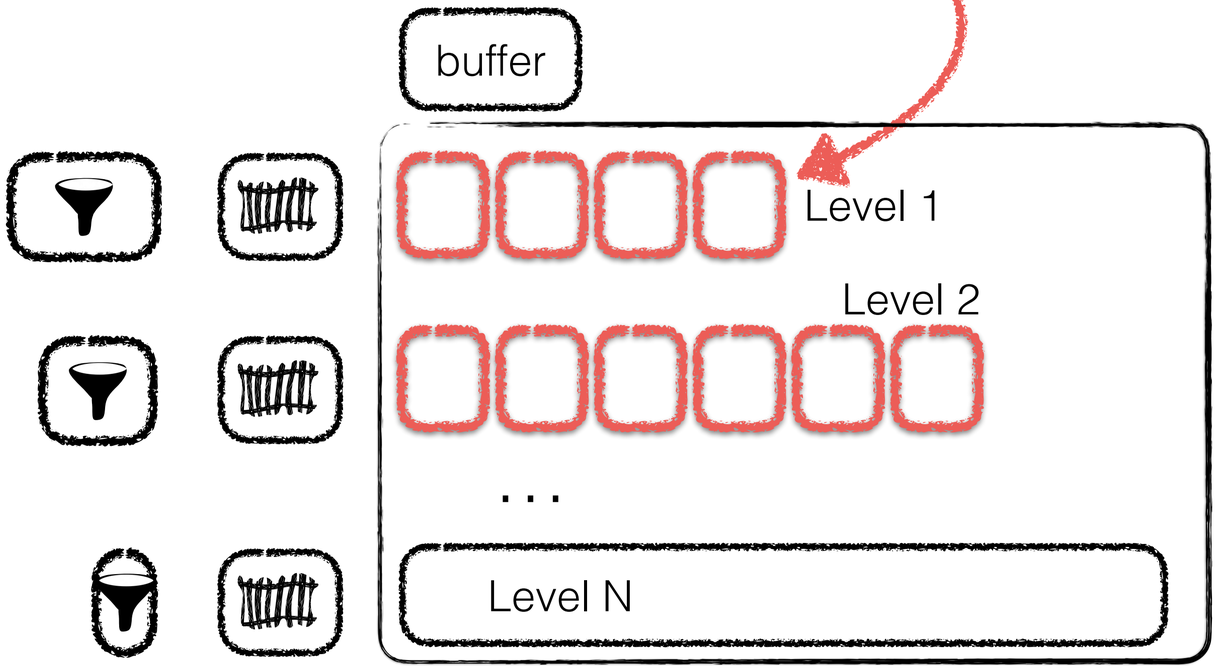

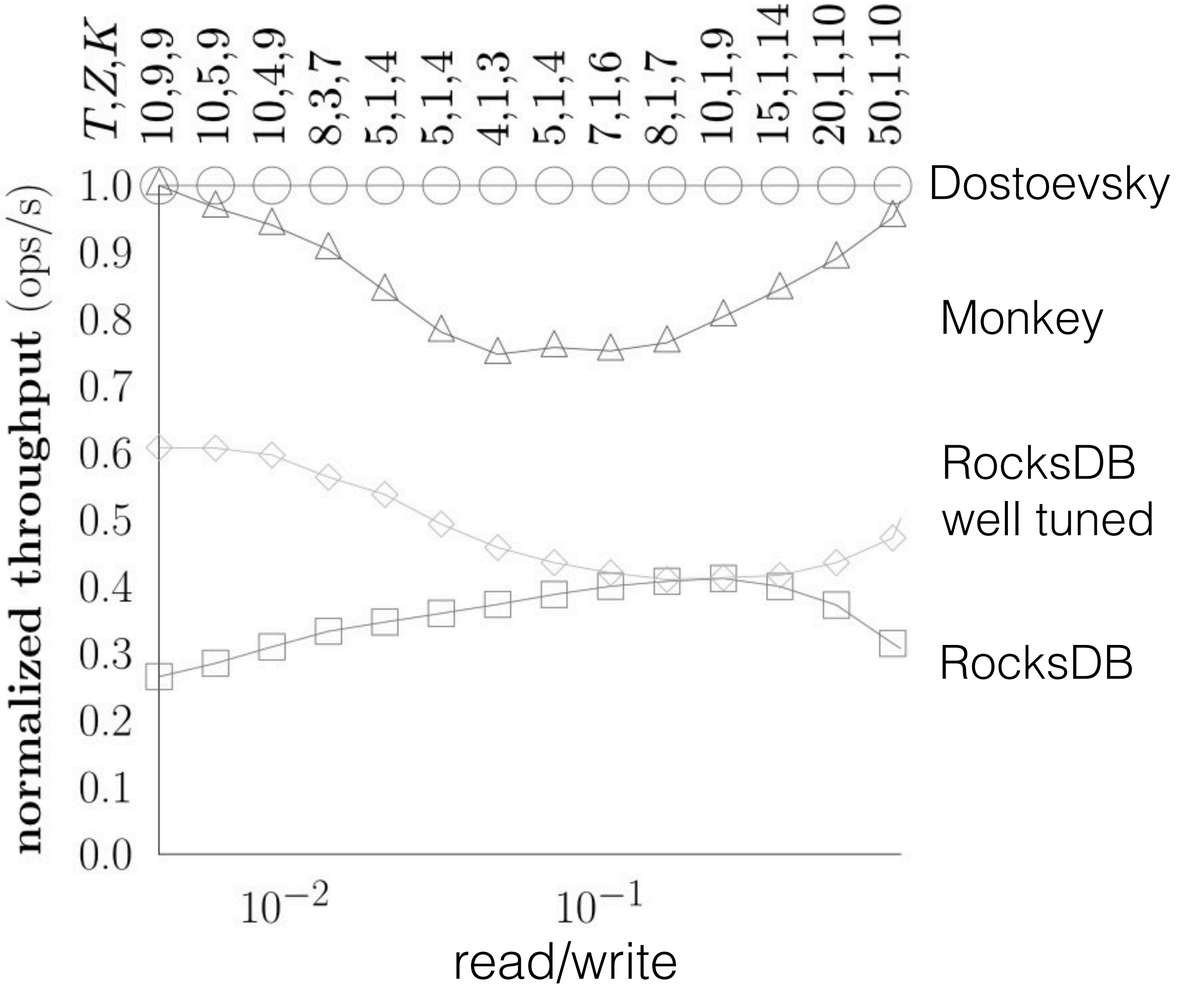

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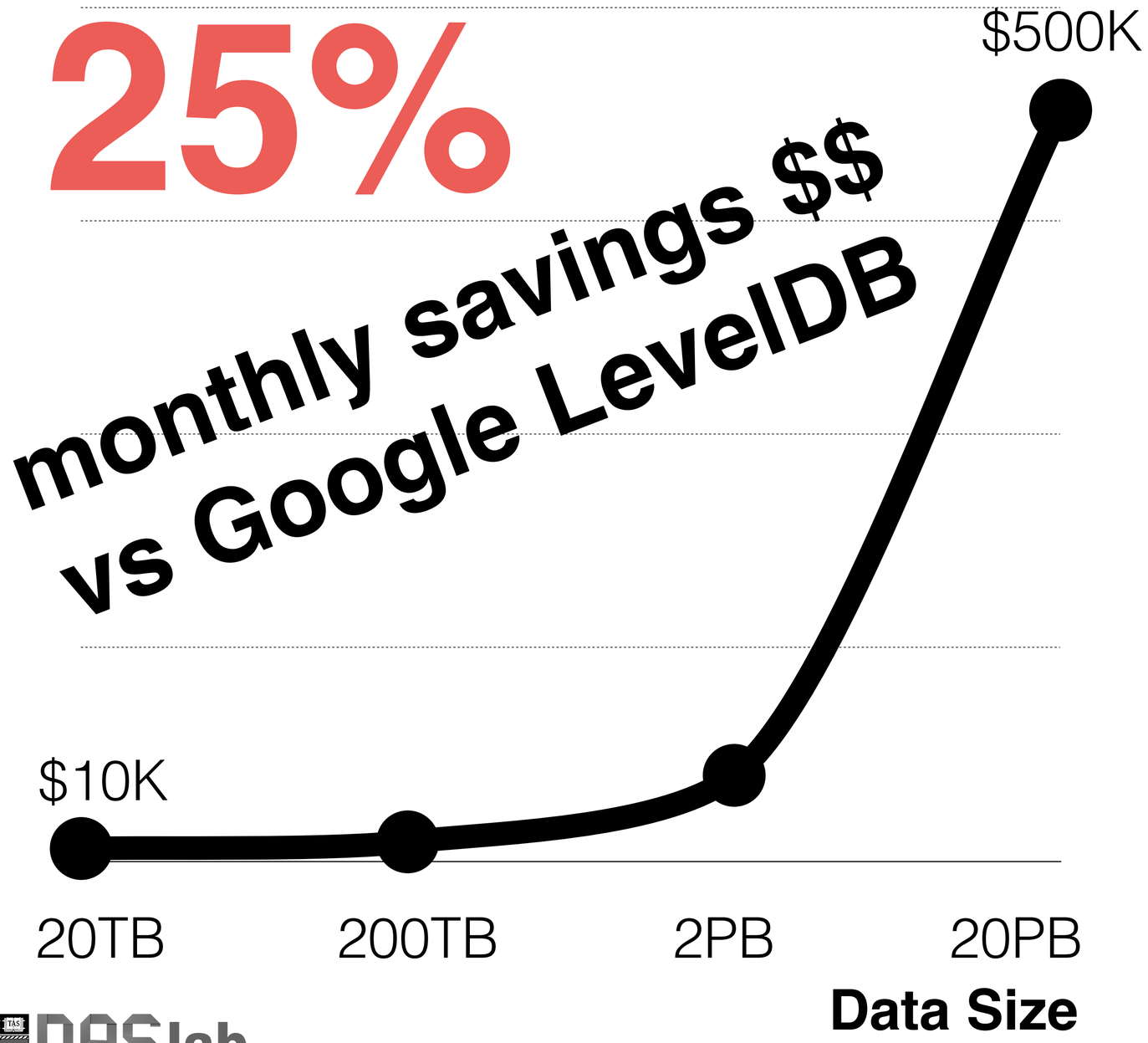
25%



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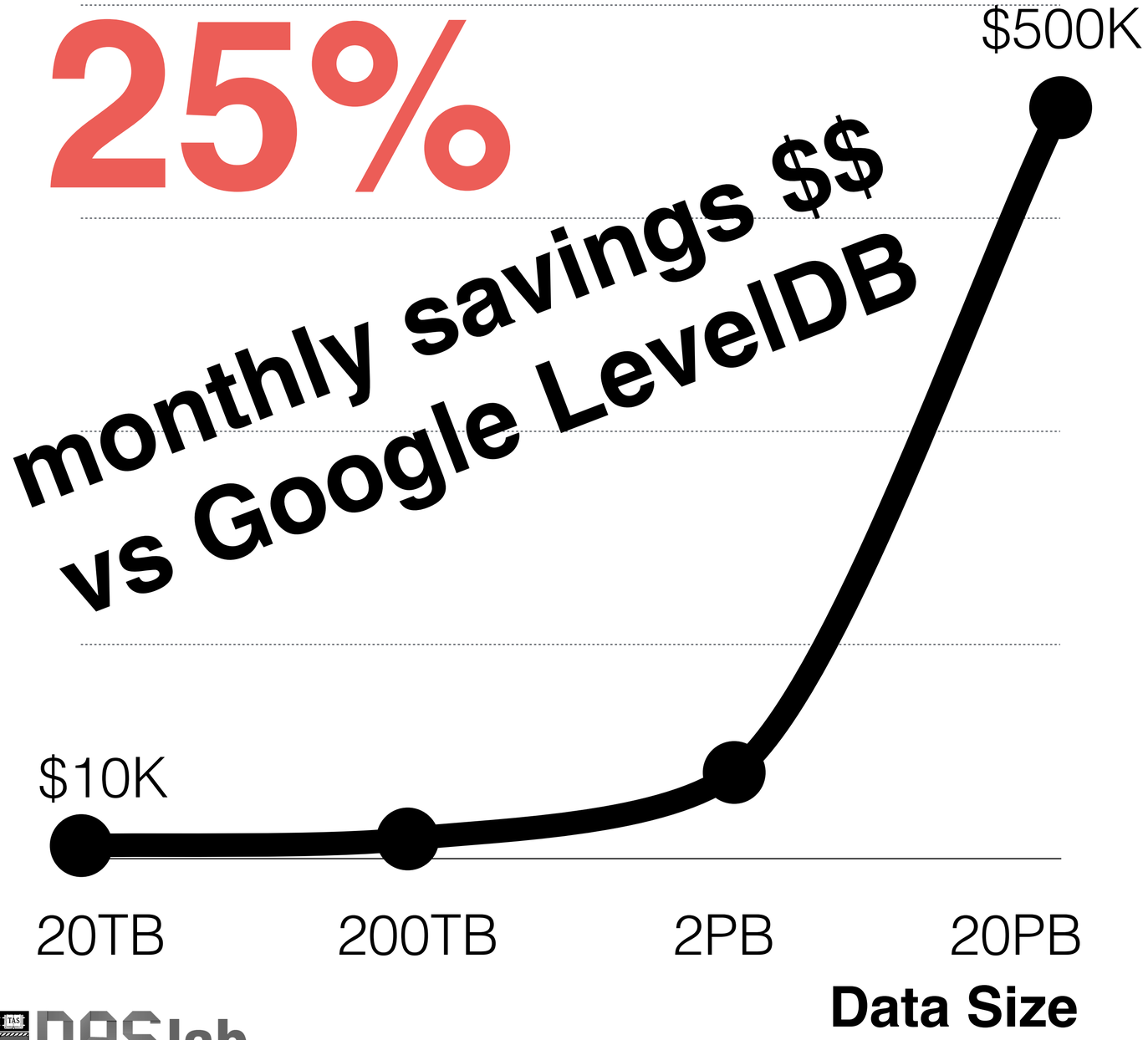
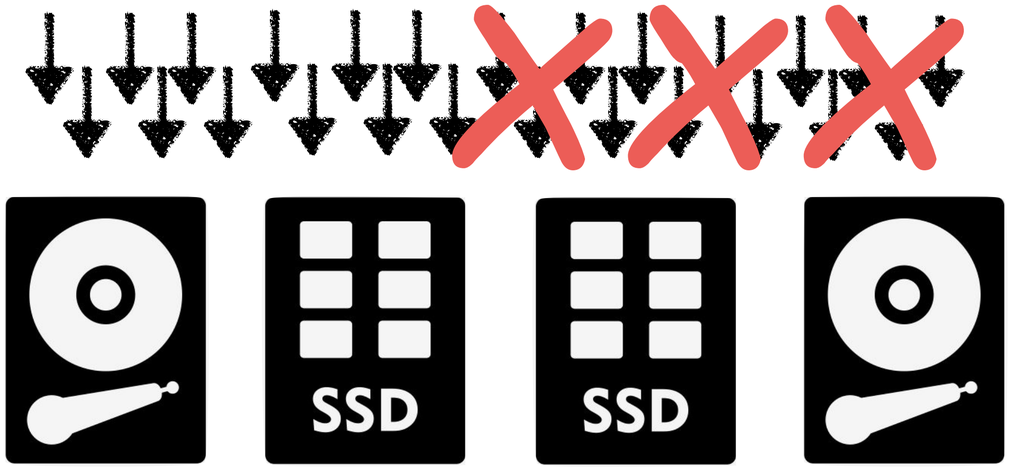
Amazon Cloud (North America)

25%





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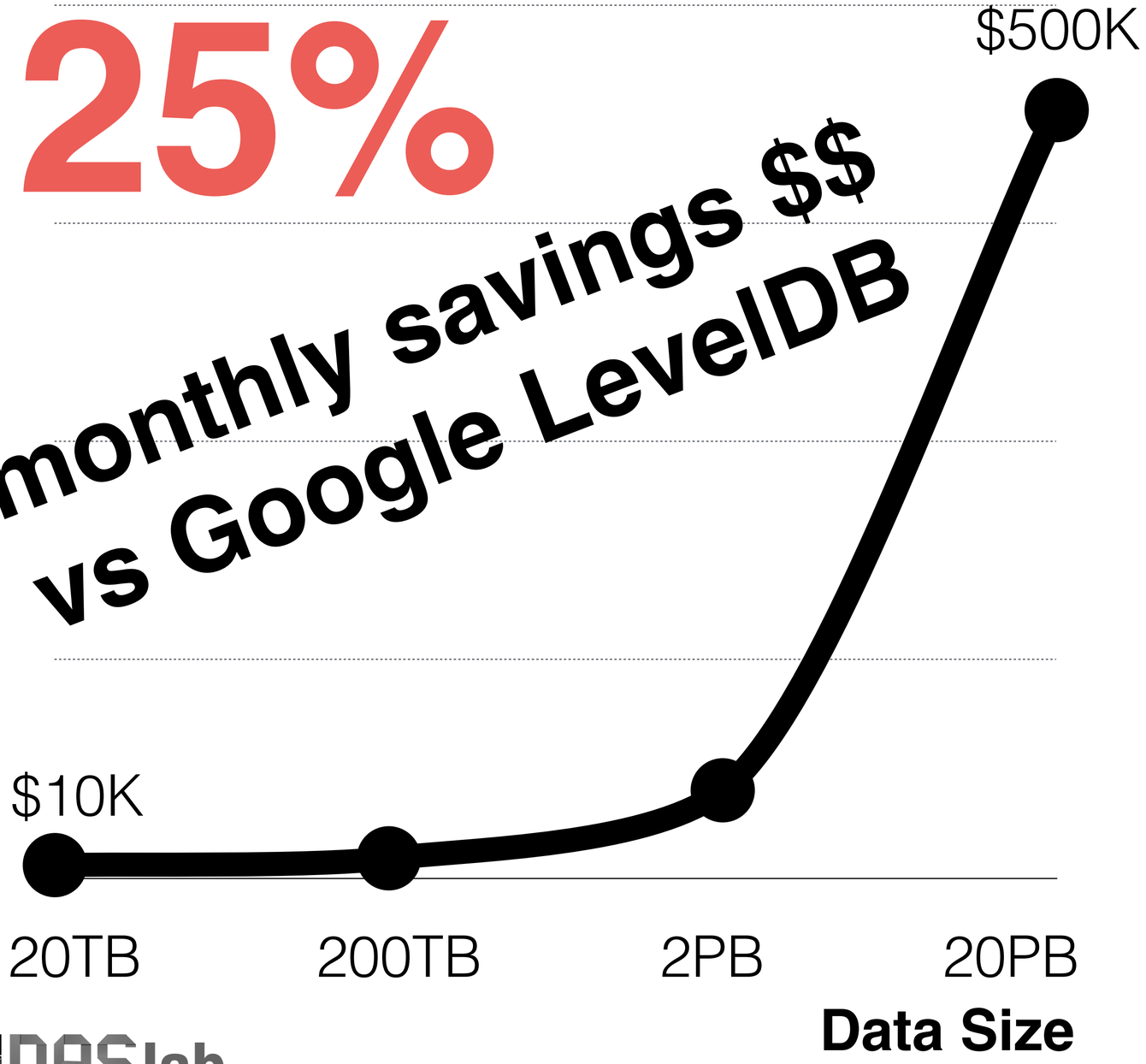
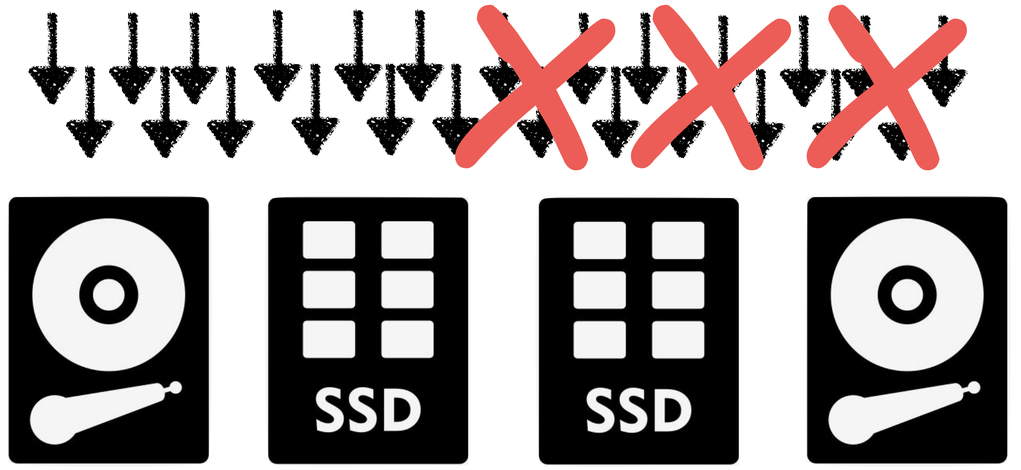
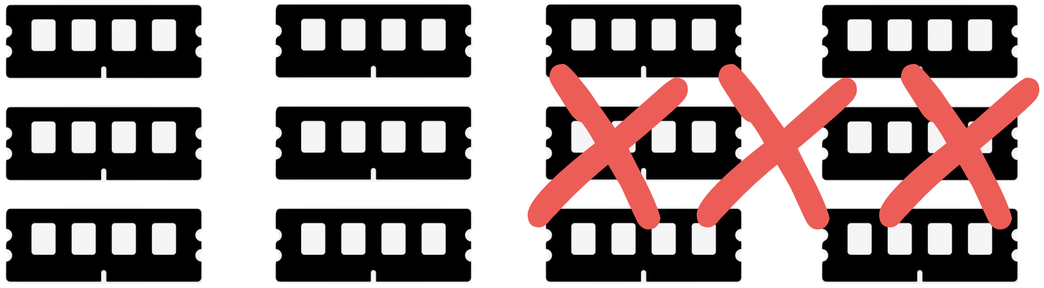
Amazon Cloud (North America)

25%

monthly savings $$
vs Google LevelDB







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Summary

Once you understand the design, you can think of new ideas.
Just keep asking “why”.

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Just keep asking “why”.

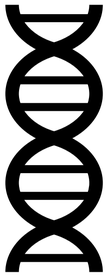
Tons of opportunities in big data as everything is new and changing.

Once you think of a new idea, then it is just about following good research practices = requires technical skills but easier (just following steps).

DESIGN SPACE

COST SYNTHESIS

WHAT-IF



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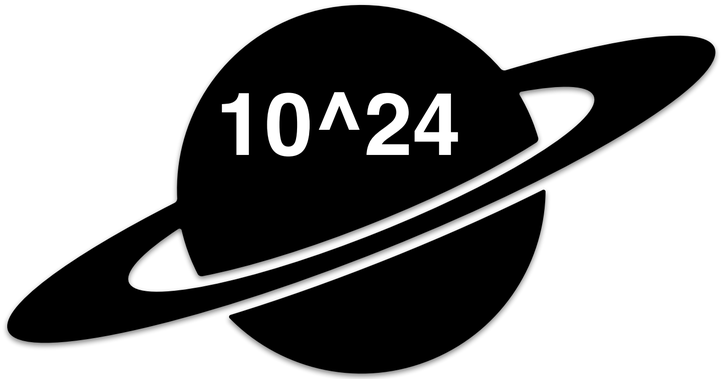
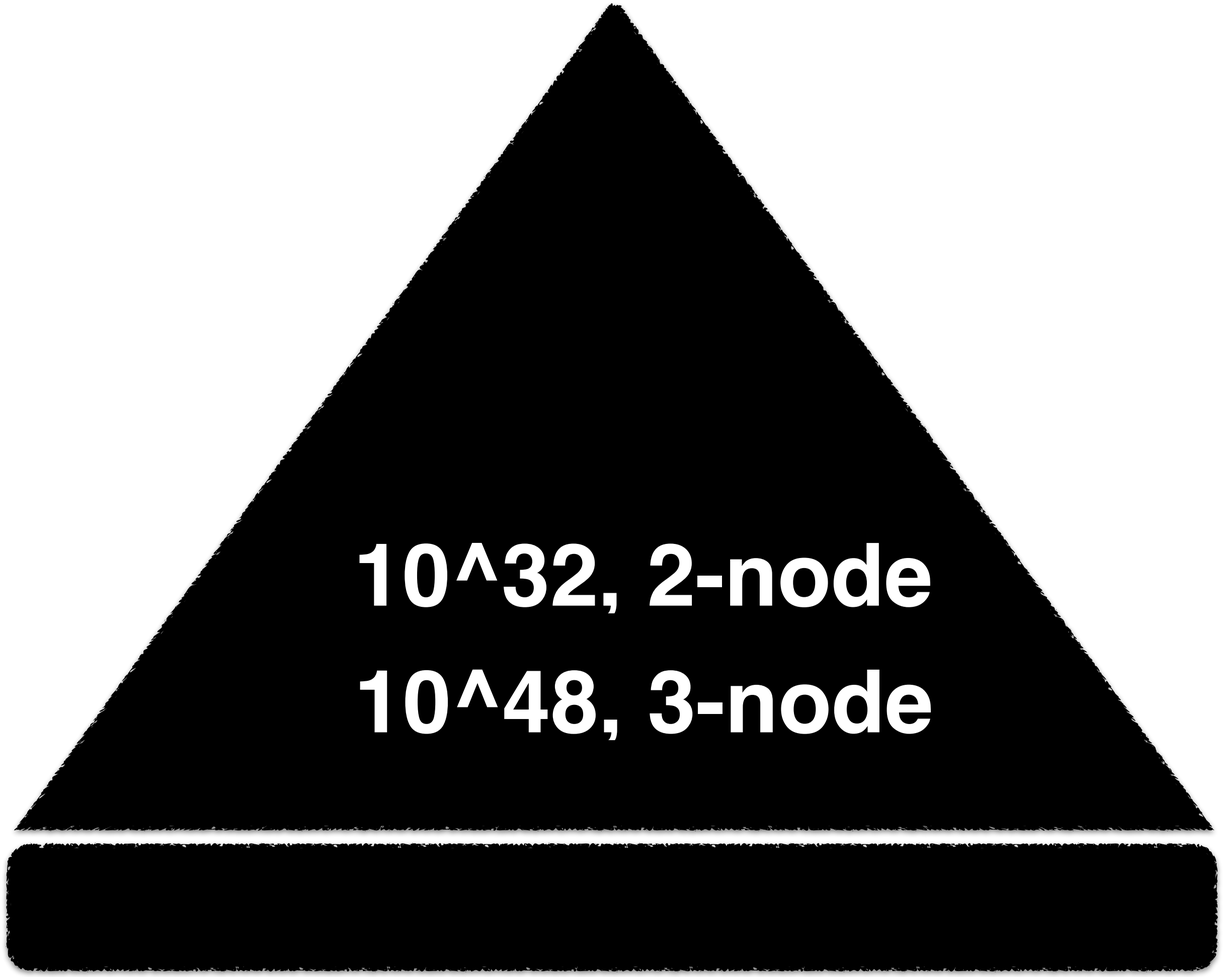
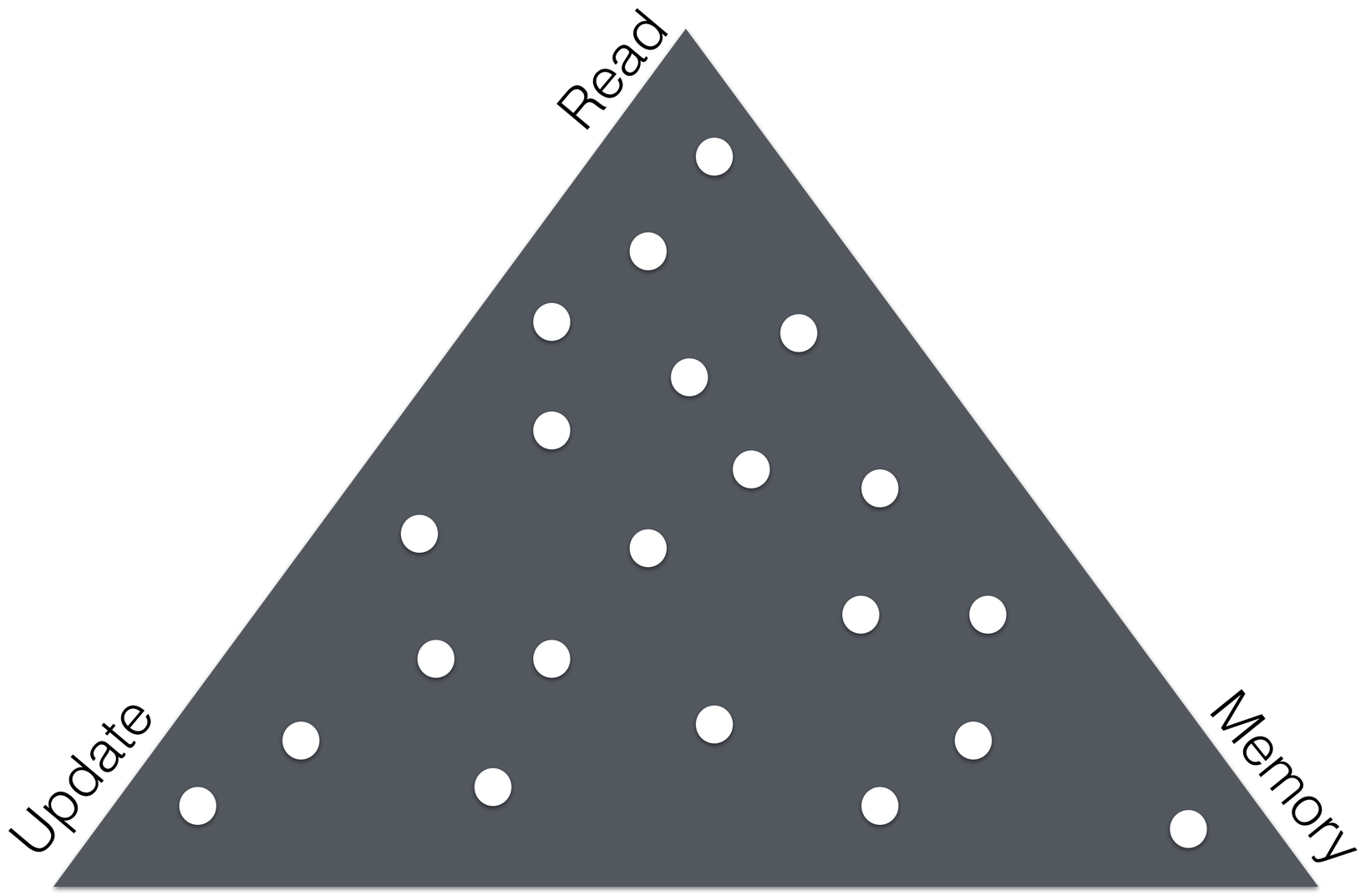
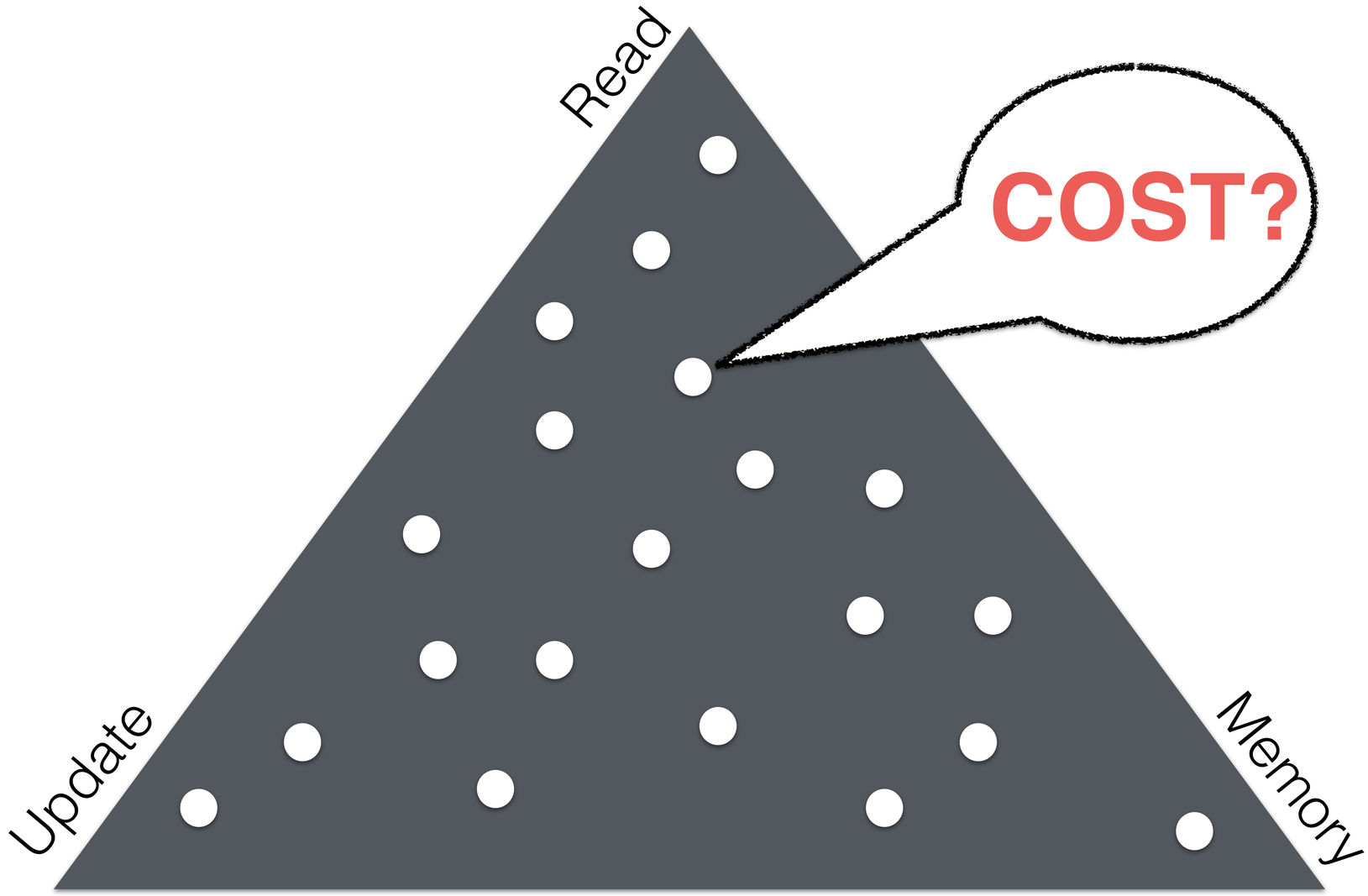


STARS IN THE SKY



POSSIBLE DATA STRUCTURES


Read
Update
Memory


Read
COST?
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What would the performance be
if we were to implement that design
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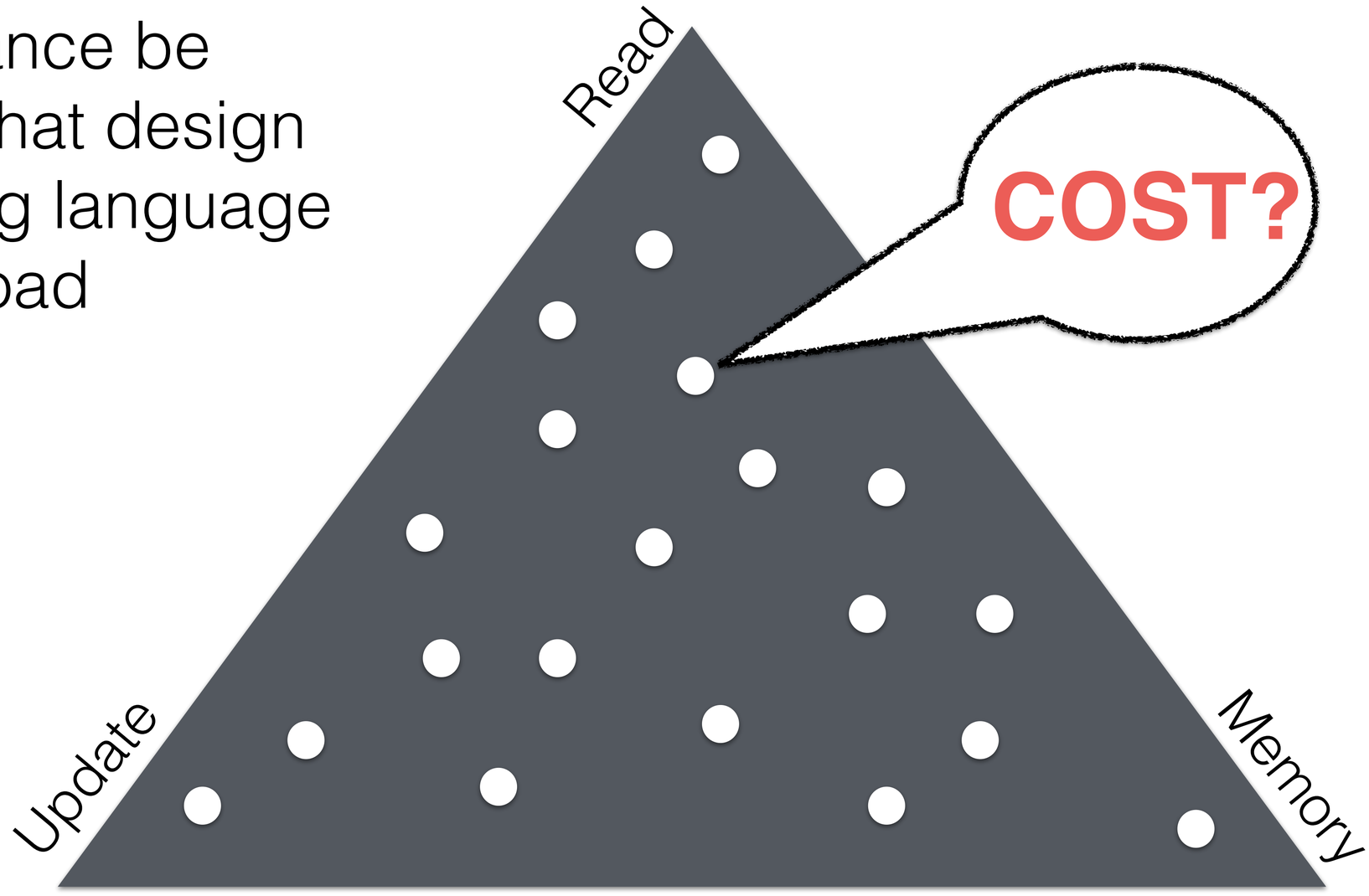
and test a specific workload
on a specific hardware



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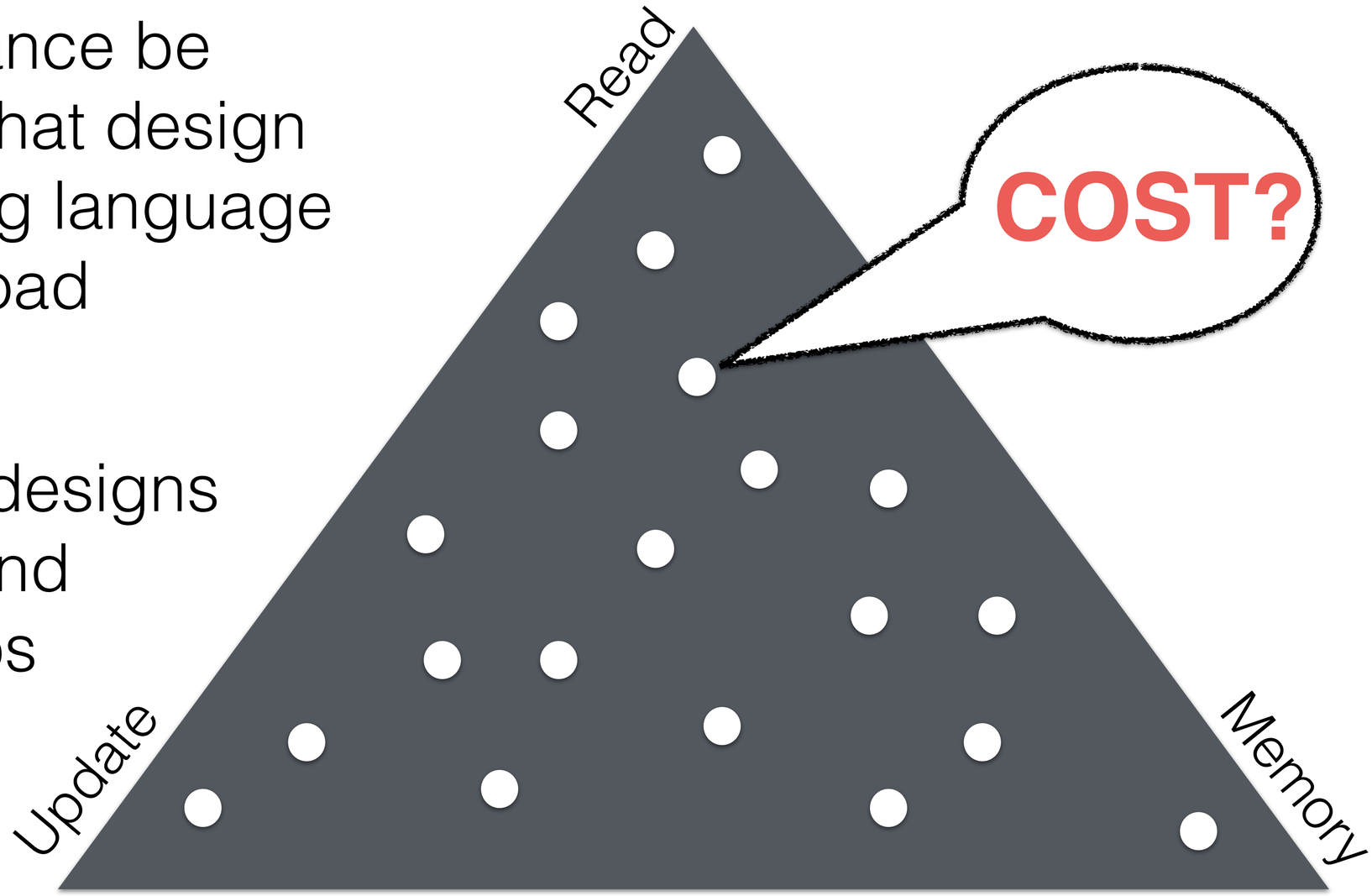
on a specific hardware

If we have the cost for 2 designs
we can compare them, and
we can build search algos



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