RocksDB Festival

4nd

Supported by IITP, StarLab.

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RocksDB Festival

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    - level_compaction_dynamic_level_bytes
    - max_bytes_for_level_multiplier
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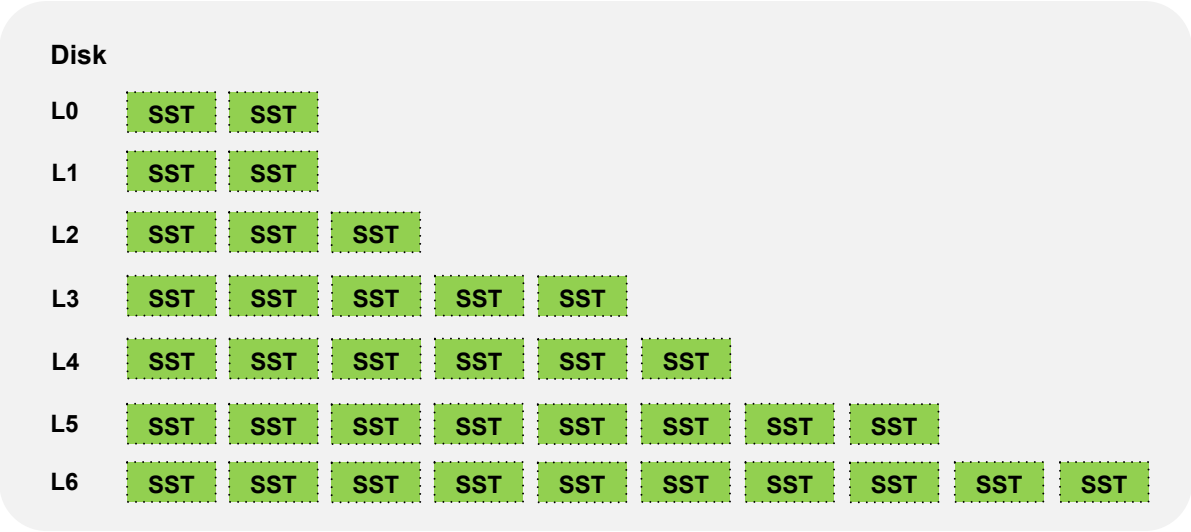
- This Week
  - ✔ Focus on **“Space Amplification”** among 3 amplifications

☞ Study both documents

1. https://github.com/facebook/rocksdb/wiki/Space-Tuning
2. https://rocksdb.org/blog/2015/07/23/dynamic-level.html

Enable the **level_compaction_dynamic_level_bytes** to reduce Space Amplification!!



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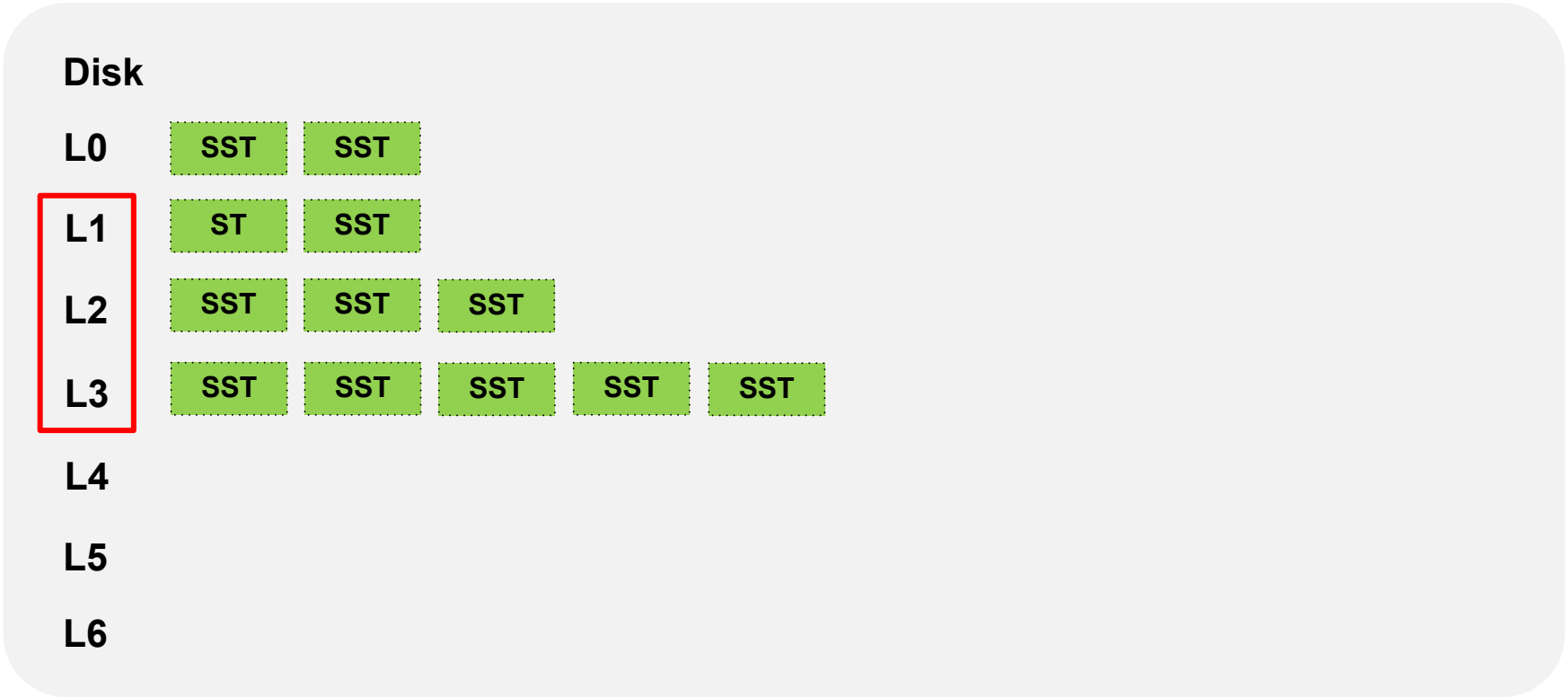
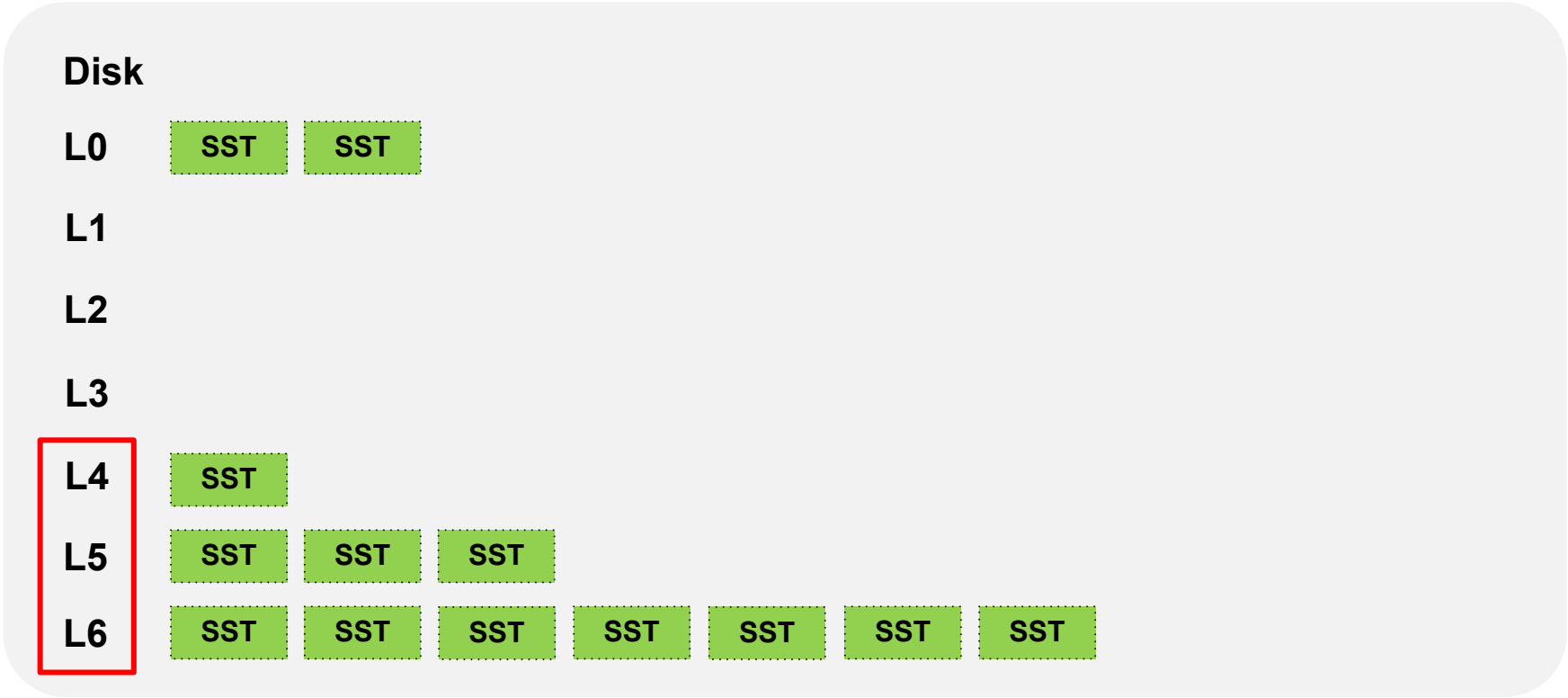
- Related Options
  - ✔ level_compaction_dynamic_level_bytes=false (default)



- Related Options
  - ✔ level_compaction_dynamic_level_bytes=true
  - ✔ if “max_bytes_for_level_base / max_bytes_for_level_multiplier”?
  - ✔ maybe the size of that level is **0**

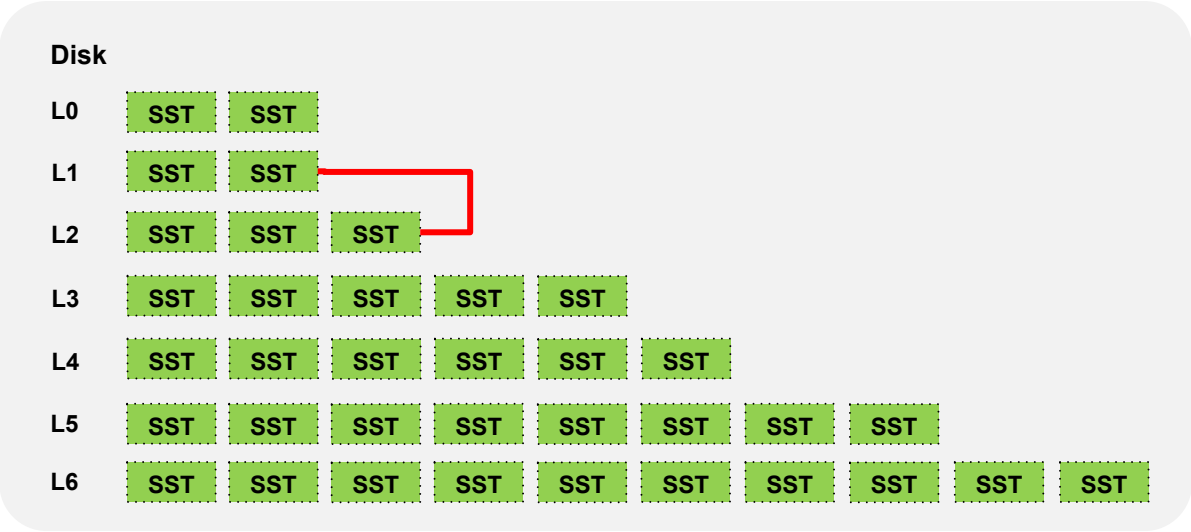


- This Week
  - ✔ and **max_bytes_for_level_multiplier**. (default:10)

    Often using **8**, but **10** is the optimized value.

    If level_compaction_dynamic_level_bytes = false, all default values

    ex) L2 size = L1 size * 10



- Discussion
  - ✔ Calculate Space Amplification

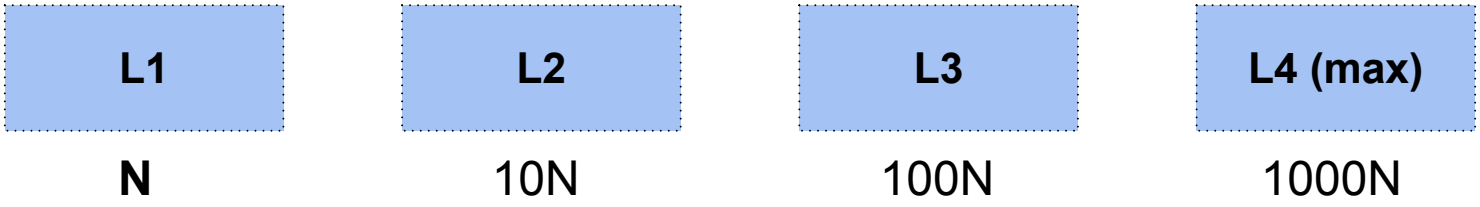
  Disk's DB File size / User data size

  but, this value is hard to understand in db_bench.

  ☞ Use **"Size of the entire level / Size of the last level"**

- Discussion
  - ✔ When level_compaction_dynamic_level_bytes is false
  - ✔ L1's target will be max_bytes_for_level_base(default:256MB).
  - ✔ Target_Size(**Ln+1**) = Target_Size(Ln) * max_bytes_for_level_multiplier

max_bytes_for_level_multiplier = 10 (default)

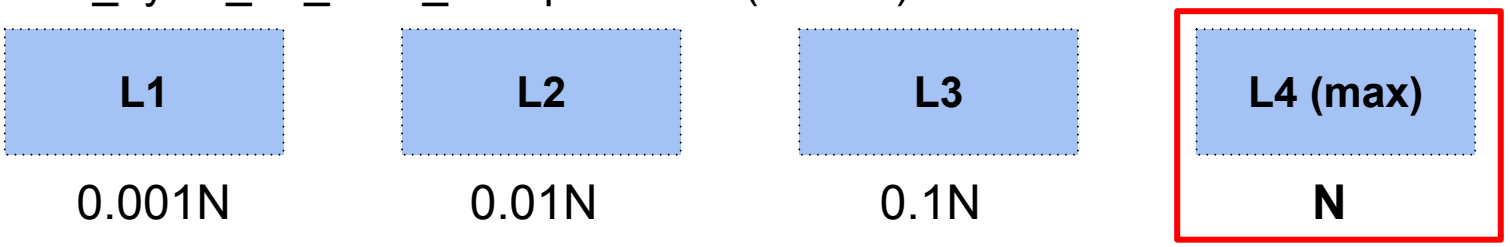


* N = max_bytes_for_level_base

- Discussion
  - ✔ When level_compaction_dynamic_level_bytes is true
  - ✔ Target size of the last level will always be actual size of the level.
  - ✔ Target_Size(**Ln-1**) = Target_Size(Ln) / max_bytes_for_level_multiplier

What's the size of N ??

max_bytes_for_level_multiplier = 10 (default)



if max_bytes_for_level_base / max_bytes_for_level_multiplier ?
=> maybe the size of that level is **0**

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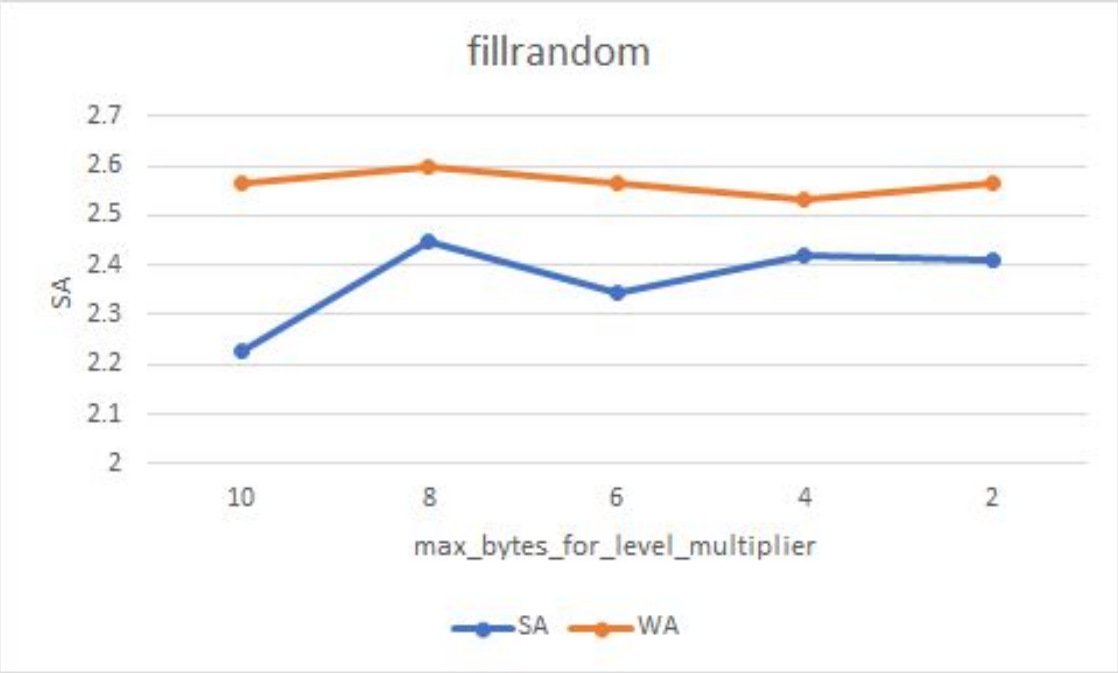
- Experiment Info

  - ✔ RocksDB version 6.21
  - ✔ CPU 1 * Intel(R) Core(TM) i5-7500 CPU @ 3.40GHz

  - ✔ Key 64 bytes
  - ✔ Values 1KB
  - ✔ Entries 5,000,000
  - ✔ turn off compression
  - ✔ Other options are defaults

- Experiment 1
  - ✔ level_compaction_dynamic_level_bytes=false, fillrandom
  - ✔ Minimum SA is **10**
  - ✔ Minimum WA is 4, but there is less difference from **10**.



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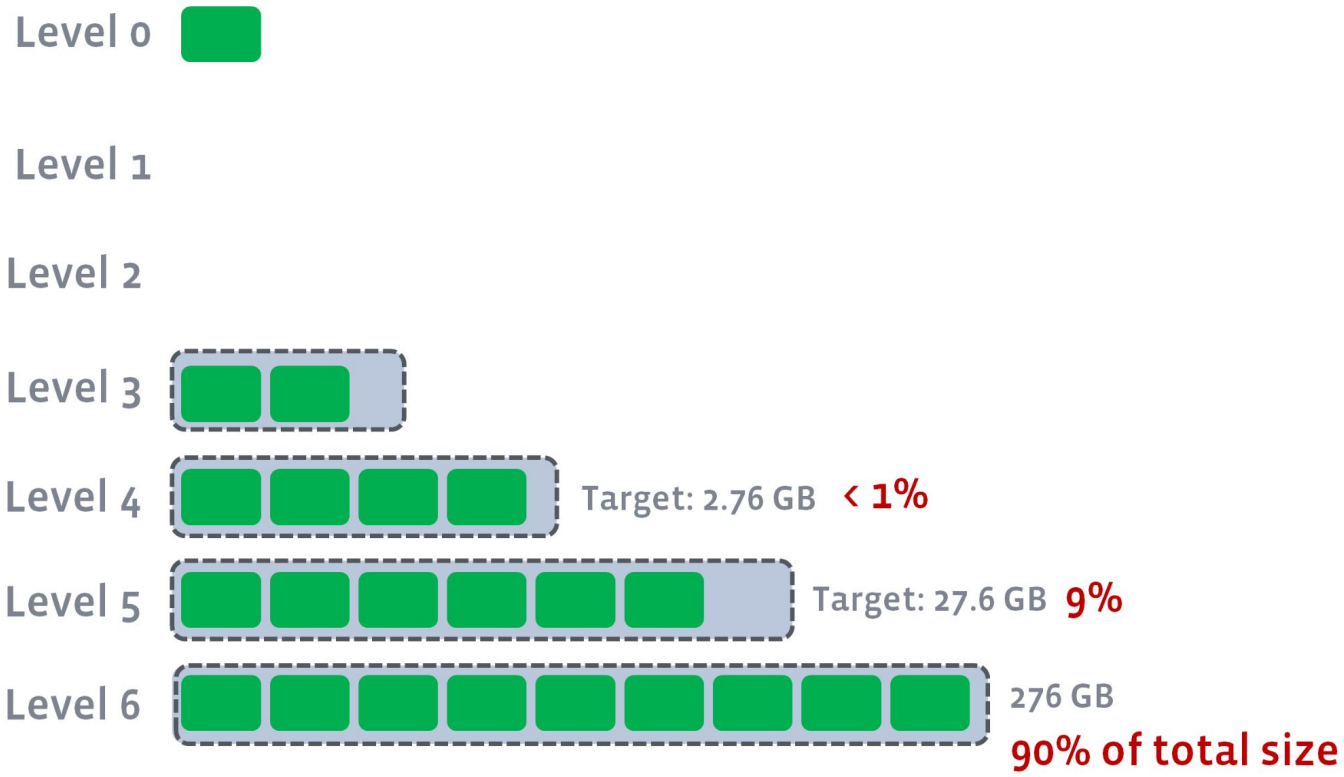
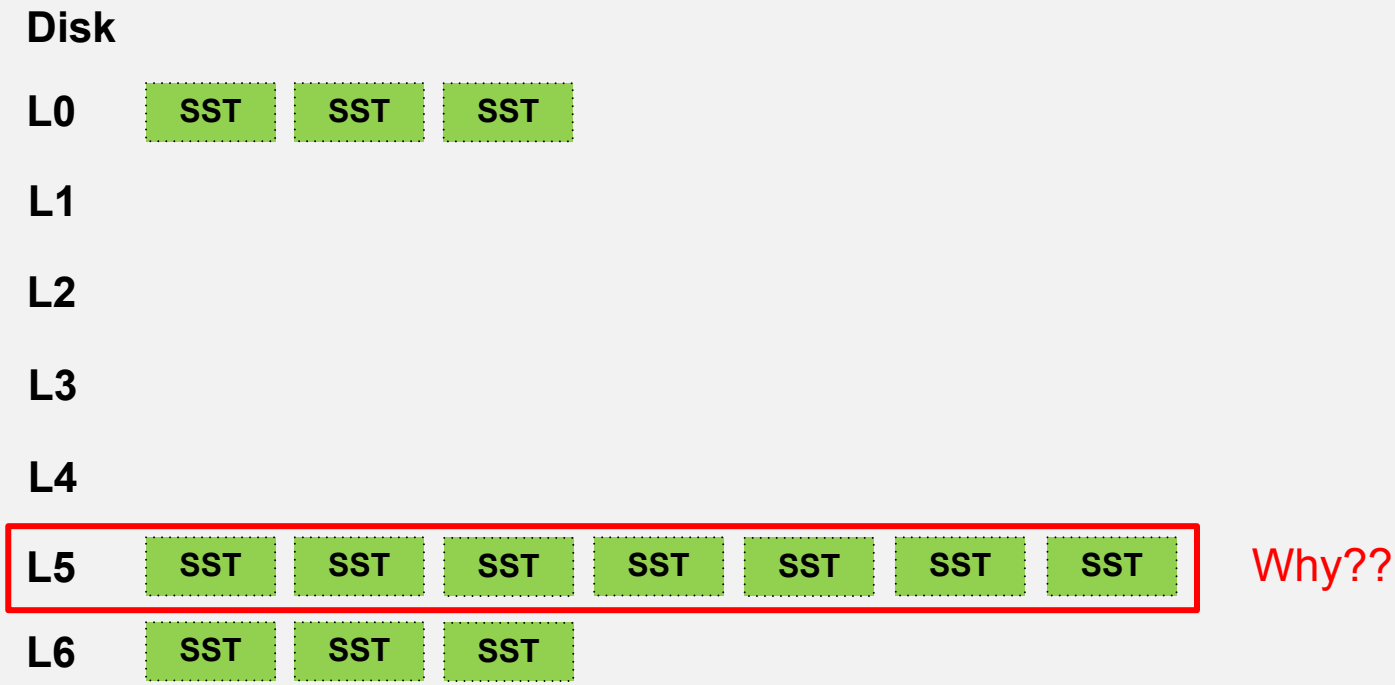
- Discussion
  - ✔ According to RocksDB Wiki, level_compaction_dynamic_level_bytes==true
  - ✔ RocksDB has **90%** of the data in **Lmax** by default...



https://github.com/facebook/rocksdb/wiki/Leveled-Compaction

- Discussion
  - ✔ But checked db_bench using fillrandom,
  - ✔ level_compaction_dynamic_level_bytes==true
  - ✔ the results were...



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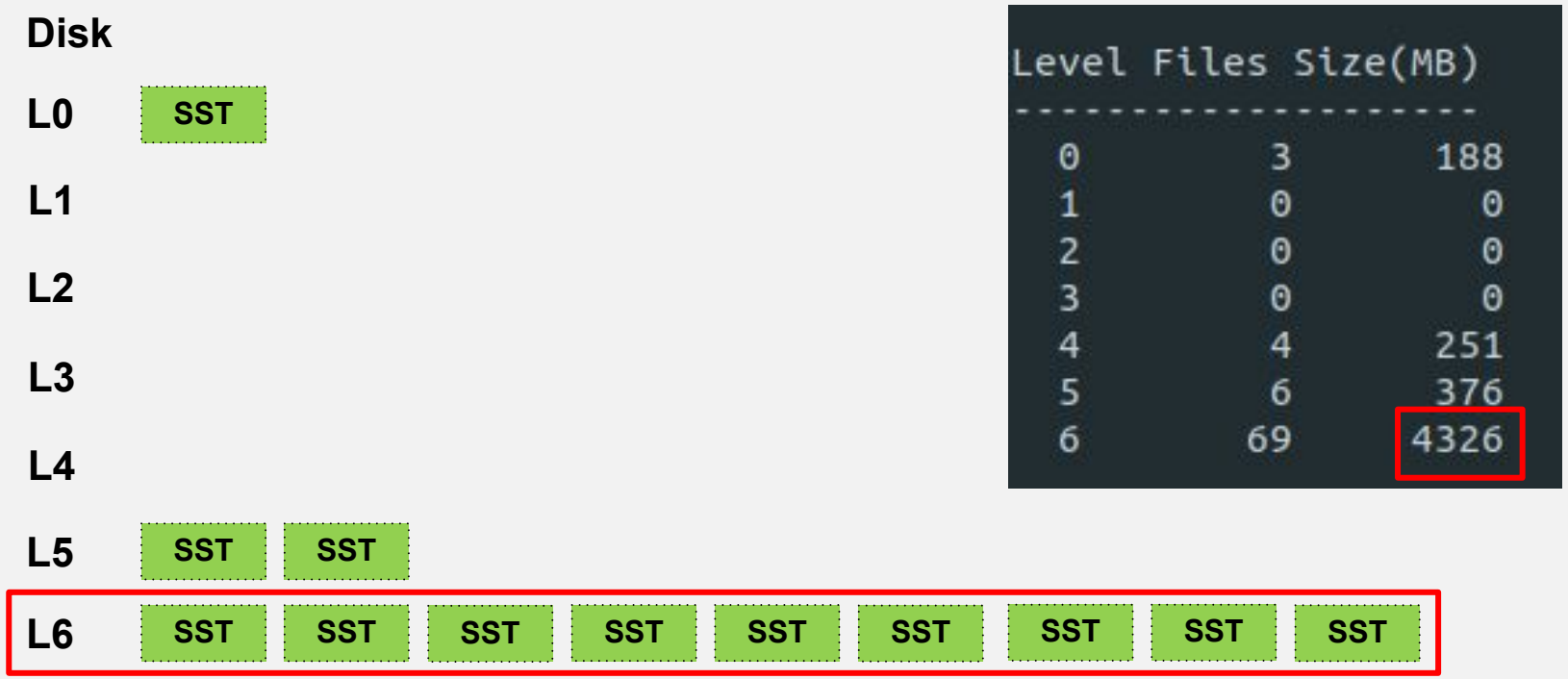
- Discussion
  - ✔ checked db_bench using fillseq,
  - ✔ level_compaction_dynamic_level_bytes==true
  - ✔ the results were...



Level	Files	Size(MB)
0	3	188
1	0	0
2	0	0
3	0	0
4	4	251
5	6	376
6	69	4326

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- Next week

  study to solve questions this week.

  Continue this week's experiment about Space Amplification!

Discussion