No Hot Spot Non-Blocking Skip List
Experiment

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Experiment Motivation

Motivation

Range Query

- It is commonly used for large data extracts in OLAP(Online Analytical Processing).
- Skip list is often used as an index in a distributed DB.
- The experiment ran in a **read-only environment** where no additional insertions/deletions occur after the initial insertion.

Experiment Hypothesis

Hypothesis

Performance prediction

- If set size small, CF-NR > CF-NA > CF
- As set size increases, CF > CF-NR > CF-NA

- CF-NR: Don’t remove a logically deleted node(height > 1)

→ This means traversing through a large number of nodes, including those marked as deleted.

→ In our experiment, there is no real insertion/deletion, but traversing overhead exists.

- CF-NA: Don’t adapt its structure dynamically in response to change data

→ It includes CF-NR. (more comprehensive)

→ This lack of adaptation doesn’t change of height of tower(by raising or lowering).

Experiment Design

Design

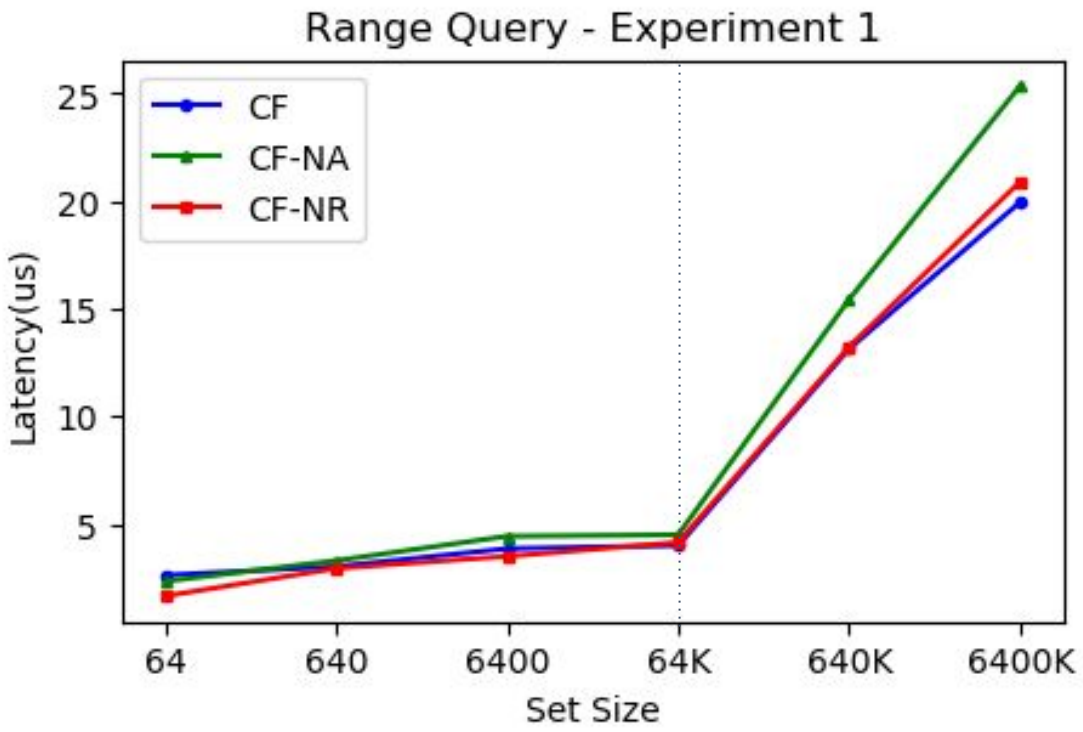
```
processor       : 15
vendor_id       : GenuineIntel
cpu family      : 6
model           : 165
model name      : Intel(R) Core(TM) i7-10700K CPU @ 3.80GHz
```

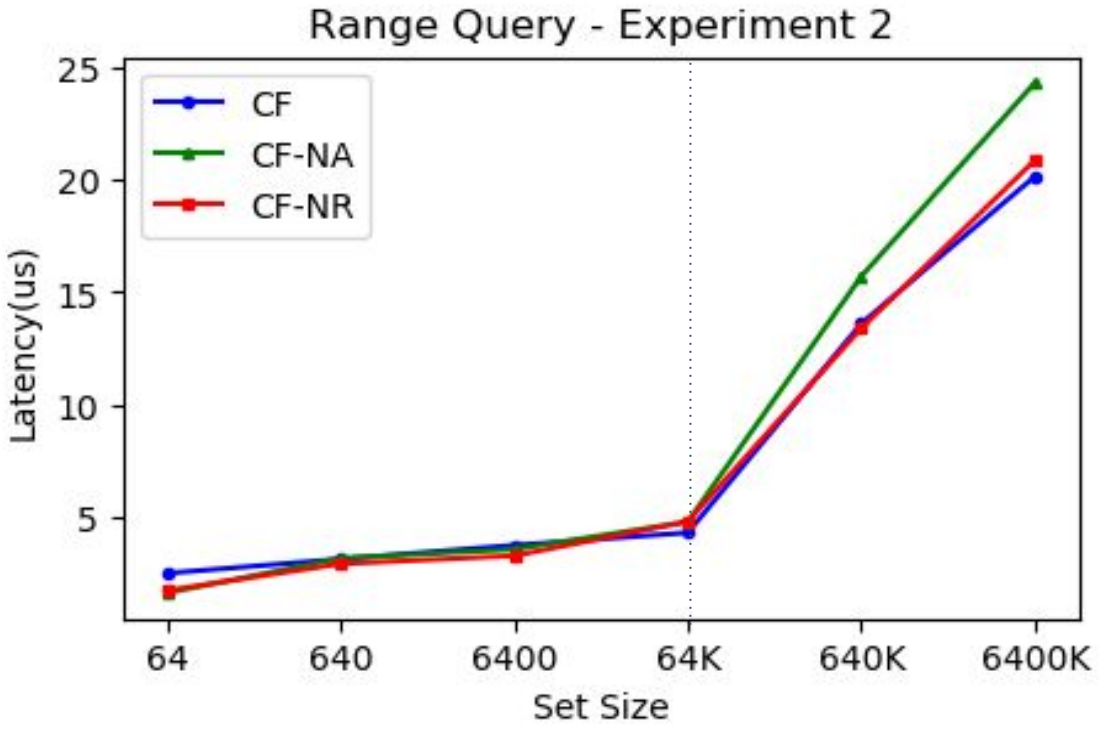
Experiment Design

- Comparison Target: CF / CF-NR / CF-NA
- Dataset Size: 64 / 640 / 6400 / 64K / 640K / 6400K

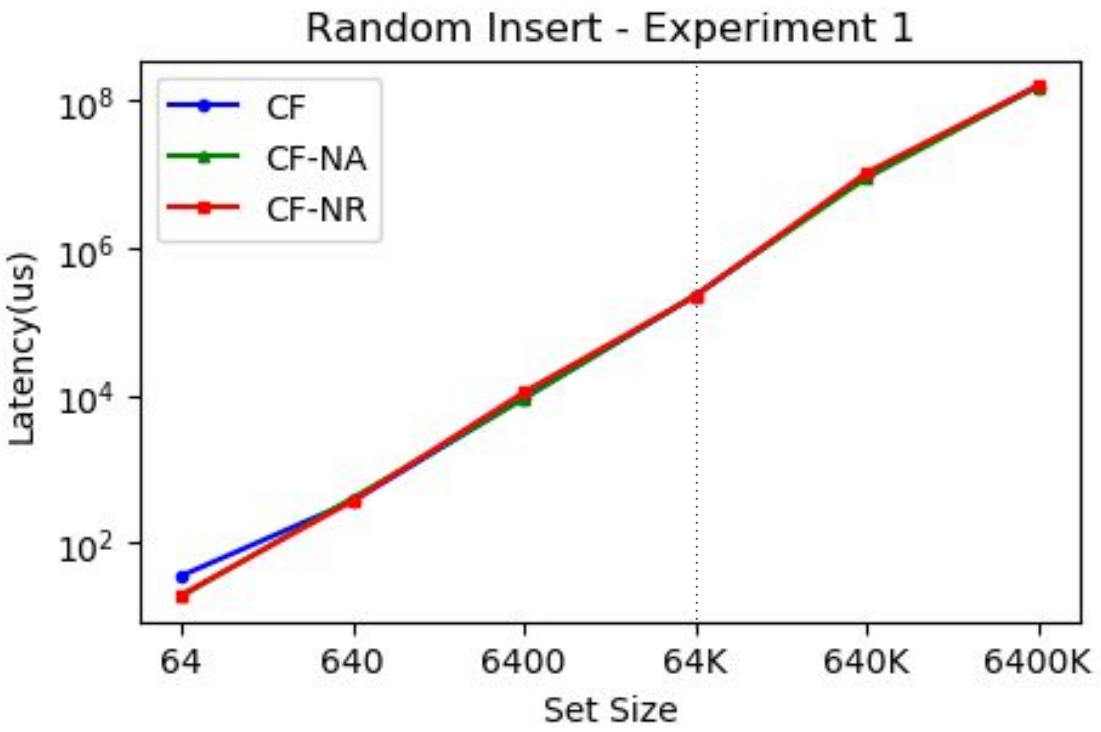
  Random insertion before querying
- Number of Threads: 20
- Range Query
  - Return 100 values starting from a random lookup key
  - Times: 1K average

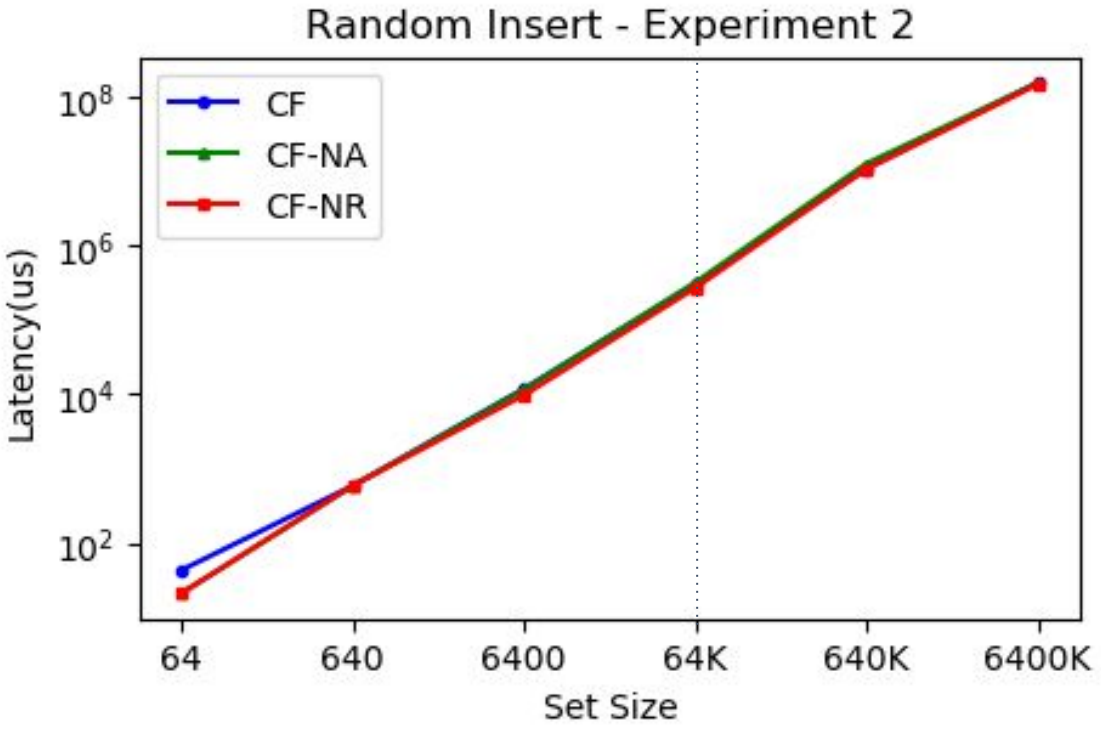
Experiment Result





Experiment Result





Conclusion

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Assumption and experimental results are consistent

- For smaller set sizes, CF performance is worse due to the overhead caused by the adapting thread.
  - traversing all of nodes
  - raising/lowering tower (not in this experiment)
- CF performance improves significantly as the set size increases.
  - high towers skip many nodes

Q&A

Thank you!