5 Evaluation

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(a) Current time

Missing figure

(b) Causal present

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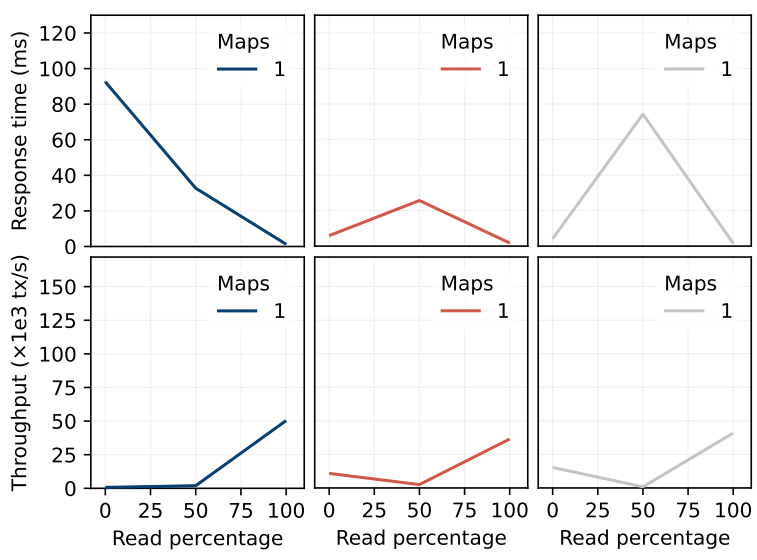
(c) Write

Missing figure

(d) Size

Figure 6: Comparison of different timestamp encodings.



(a) *Sync* **(b) *Async*** **(c) *No-mat***

Figure 7: Comparison of different materialization strategies in CRDV, based on the workload and number of *maps*.

Missing file

(a) `WHERE cart_id =` x

Missing file

(b) `WHERE p_id BETWEEN` x `AND` y

Missing file

(c) b) + an index on `p_id`

Listing 3: Physical plans for different CRDV queries

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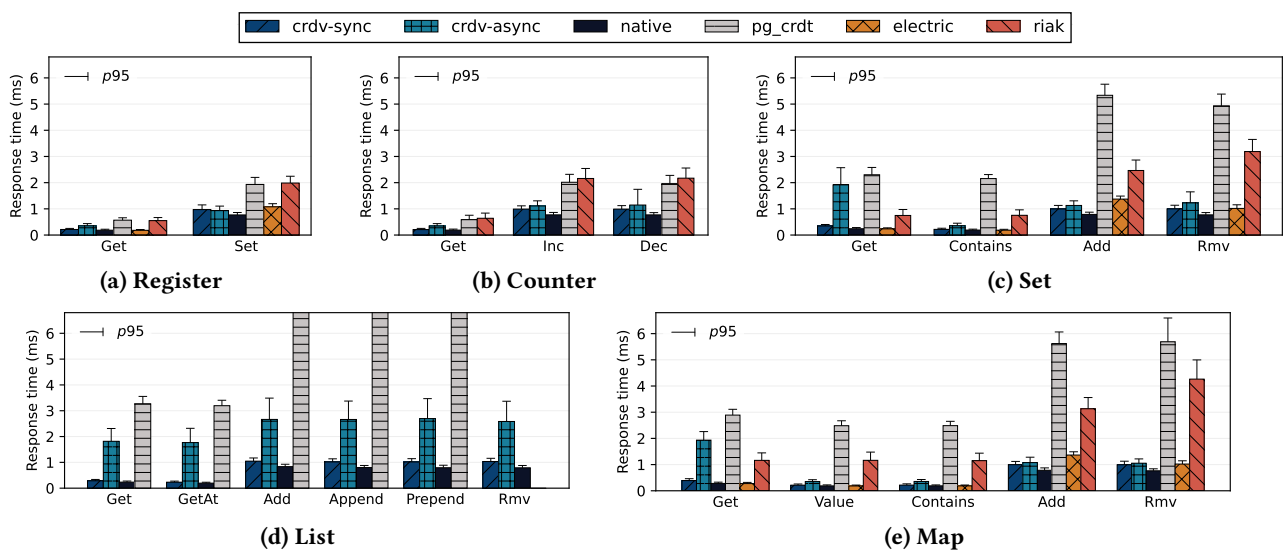
(d) Response time

Figure 9: CRDV's read performance with different levels of nesting. M refers to the *MapAwLww* view.



(a) Register **(b) Counter** **(c) Set**

(d) List **(e) Map**

Figure 10: Performance comparison between different operations in different structures, using different solutions. *Get* - read the structure; *GetAt* - list's element at some index; *Contains* - check if an element/key exists in a *set*/*map*; *Value* - value of some key in a *map*; *Set* - update a *register*; *Inc/Dec* - increment/decrement a counter; *Add* - add a new entry to a *set*/*list*/*map* or update a *map's* value; *Prepend/Append* - insert an entry at the start/end of a list; *Rmv* - remove an entry from a *set*/*list*/*map*. The missing structures/operations are not supported by their respective solutions.

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(a) Throughput

Missing figure

(b) Response time

Figure 11: Write performance of different solutions in a variable contention workload, using 64 clients.

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(a) Storage

Missing figure

(b) Reads

Missing figure

(c) Writes

Figure 12: Storage usage and latency of different solutions with 100k key-value pairs, based on the total number of *maps*. $x = 1 \rightarrow 100$k *maps* of size 1, $x = 2 \rightarrow 50$k *maps* of size 2, and so on.

Missing figure

(a) Total storage per site

Figure 13: Storage usage based on the number of sites.

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Figure 14: Network overhead of different distributed solutions, based on 100k operations performed to *maps*. X_1 and X_{100} represent operations done to *maps* with 1 and 100 entries, respectively.

(a) CRDV **(b) Riak** **(c) Pg_crdt(*local op*)**

Figure 15: Delay and throughput over time of different distributed solutions. The network is partitioned between t=25 and t=35.

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Missing figure

(a) Reads

Missing figure

(b) Writes

Figure 16: Performance comparison based on the cluster size.