MangoDB
Milestone 3
Jared G.
Dominic Q.
Abhi S.
Haskell M.
Noah K.
Quecc Rid Planning

<table>
<thead>
<tr>
<th>Operation</th>
<th>Parsed / Abstacted</th>
<th>Operation Struct</th>
<th>Temporary Rids Map</th>
<th>DB</th>
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<tbody>
<tr>
<td>Insert</td>
<td></td>
<td></td>
<td>r0</td>
<td></td>
</tr>
<tr>
<td>Select</td>
<td></td>
<td></td>
<td>r5</td>
<td></td>
</tr>
<tr>
<td>Update</td>
<td></td>
<td></td>
<td>r2</td>
<td></td>
</tr>
<tr>
<td>Increment</td>
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</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
<td>r1</td>
<td></td>
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</table>

Executor Unpack/Reinterpret
QueCC

Thread Pool

Plan Rid Queues

Execute

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>r2</td>
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<td>r2</td>
<td>r0</td>
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<tbody>
<tr>
<td>r2</td>
<td>r3</td>
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</tr>
<tr>
<td>r1</td>
<td>r2</td>
<td>r3</td>
</tr>
<tr>
<td>r1</td>
<td>r2</td>
<td>r4</td>
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</table>

Atomic Commit
Buffer Pool CC

Page→Frame Lookup (DashMap)

None

Atomic Eviction Search

Try Acq. Write Frame[e]

Try Acq. Write Frame[e]

Yes

Pin Count Zero?

Yes

Try Page→Frame Insert

No

RESTART

No

RESTART

Mark For Evict Write If Dirty

Read In New Page And Pin

Some(Val)

RESTART

None

RESTART

Yes

PIN

No

RESTART

Yes

Frame Has Page?

No

RESTART

Some(i)

Acquire Read Frame[i]

Yes

PIN

No

RESTART

Some(Val)
Benchmarks

Merge Vs. No Merge

<table>
<thead>
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<td>93283</td>
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<tr>
<td>Sum of 100</td>
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</tbody>
</table>

Operations Per Second (100k)
Benchmarks

Buffer Pool Size
Potential Optimizations

Custom Thread pool / async runtime
Lock-free data structure integration
SIMD operations
FFI
Non Cumulative Updates
- Tightly Packed Columns