

Ordering Transactions with Prediction in Distributed Object Stores

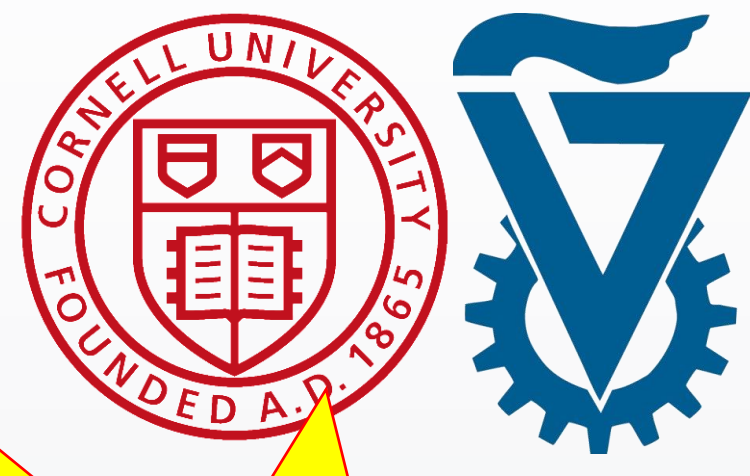
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In a world of big data

we want transactions

```
begin_txn
Reads (return value)
writes (return ack)
...
end_txn (returns commit/abort)
```

of sharded data

with ACID guarantees

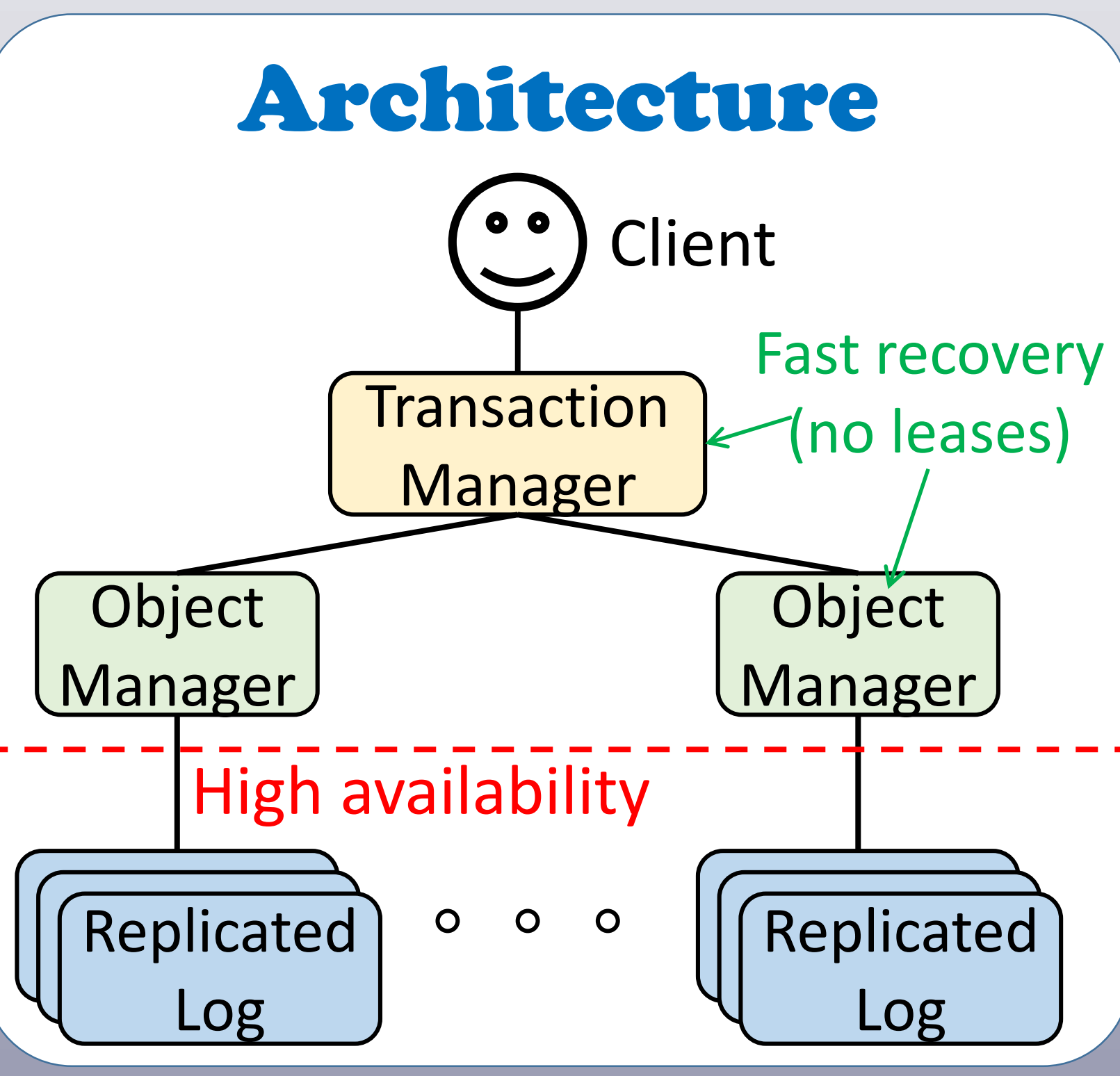
- Atomic
- Consistent
- Isolated
- Durable

Atomic transactions

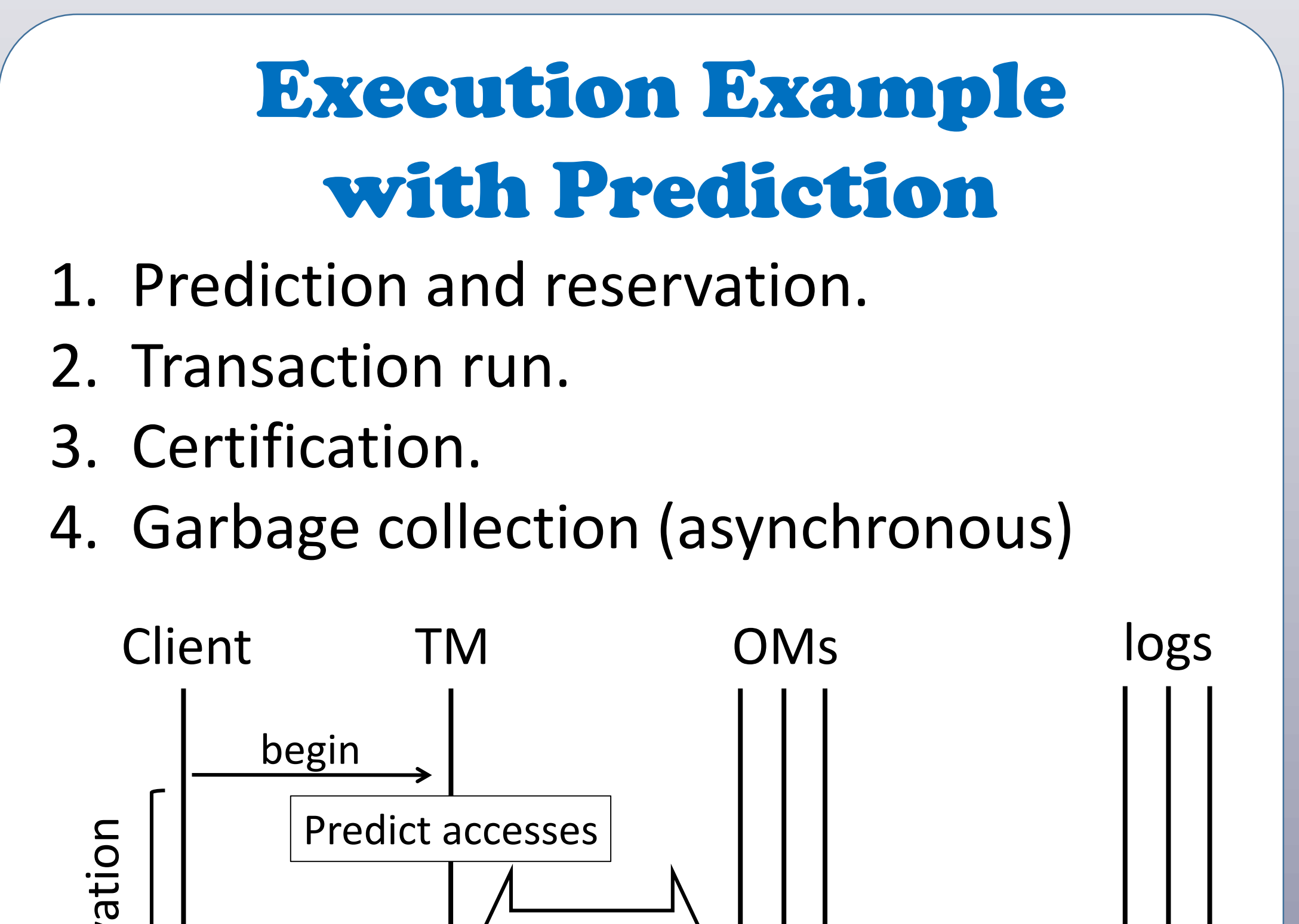
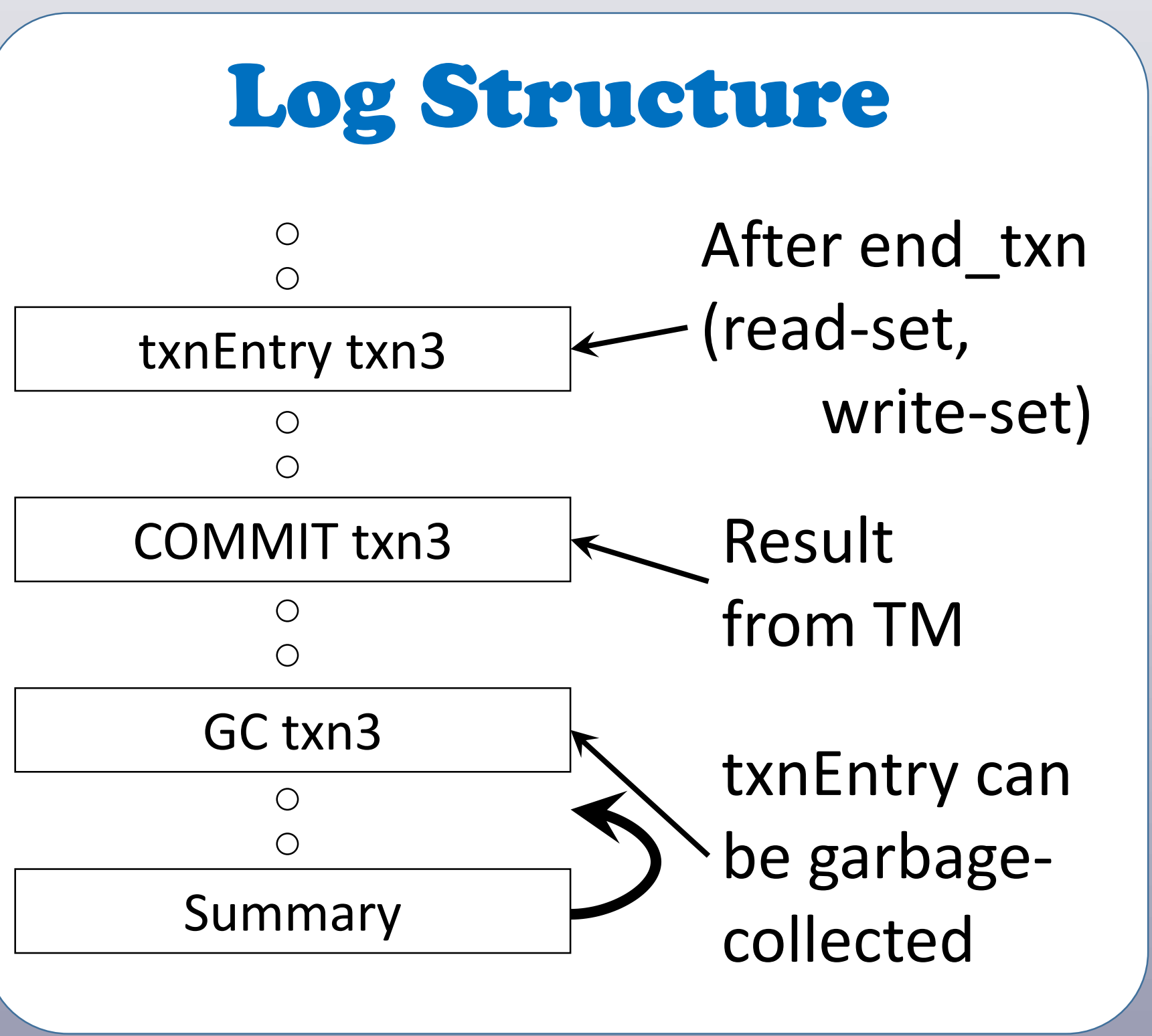
High availability

But 2PC doesn't scale.

ACID-RAIN: Ordering with Prediction, Committing with Independent Logs



- ### Concurrency Control
- Optimistic, transactions run speculatively and then certify.
 - Conflict detection w/ timestamps.
 - Version **reservation** (lock on future version) by **prediction**.
 - Final certification at transaction end → **lock-free**: can replace slow/failed nodes immediately; reservations are only hints.



Simulation Results

- Custom-made simulator.
- Transactional YCSB workloads.
- Uniform random object access.

