Recoverability

M₁ → M₂

Larger actions?

Recoverable sector

D₀  D₁  chooser

Commit point
id ← begin_ra()

  COMMIT()

end_ra()

ABORT()
Version histories

Cell storage

Install

Journal storage $x:

\[ V_n \rightarrow \rightarrow \rightarrow V_2 \rightarrow V_1 \]

WriteJournal(item x, v, id)
ReadJournal(item x, id)

Commit record table

id₁  P  C
id₂  P

1) Bootstrap
2) Slow

id₇  P  A
id₈

...
Logging:

Cell st. : read / write

Log : non-volatile + sequential
Plan:

1) Fail ➔ Recover from log
   ➔ uncommitted ➔ back out (undo)
   ➔ committed ➔ install (redo)

2) ABORT () ➔ undo cur. action (redo)
Append-only:

1) When to write log?

2) How to recover?
Disk-bound DB:

1) WAL protocol: Write ahead logging

2) Log COMMIT record before returning from commit()
Recovery:

1) Scan log backwards
2) Winners: COMMITTED or ABORTED
   Losers: Everything else
3) Redo COMM. Winners
   Undo Losers