

## ARIES EXAMPLE.

### Log:

After a crash, we find the following log:

0	BEGIN CHECKPOINT
5	END CHECKPOINT (EMPTY XACT TABLE AND DPT)
10	T1: UPDATE P1 (OLD: YYY NEW: ZZZ)
15	T1: UPDATE P2 (OLD: WWW NEW: XXX)
20	T2: UPDATE P3 (OLD: UUU NEW: VVV)
25	T1: COMMIT
30	T2: UPDATE P1 (OLD: ZZZ NEW: TTT)

### Analysis phase:

Scan forward through the log starting at LSN 0.

- LSN 5: Initialize XACT table and DPT to empty.
- LSN 10: Add (T1, LSN 10) to XACT table. Add (P1, LSN 10) to DPT.
- LSN 15: Set LastLSN=15 for T1 in XACT table. Add (P2, LSN 15) to DPT.
- LSN 20: Add (T2, LSN 20) to XACT table. Add (P3, LSN 20) to DPT.
- LSN 25: Change T1 status to "Commit" in XACT table
- LSN 30: Set LastLSN=30 for T2 in XACT table.

### Redo phase:

-Scan forward through the log starting at LSN 10.

- LSN 10: Read page P1, check PageLSN stored in the page. If PageLSN<10, redo LSN 10 (set value to ZZZ) and set the page's PageLSN=10.
- LSN 15: Read page P2, check PageLSN stored in the page. If PageLSN<15, redo LSN 15 (set value to XXX) and set the page's PageLSN=15.
- LSN 20: Read page P3, check PageLSN stored in the page. If PageLSN<20, redo LSN 20 (set value to VVV) and set the page's PageLSN=20.
- LSN 30: Read page P1 if it has been flushed, check PageLSN stored in the page. It will be 10. Redo LSN 30 (set value to TTT) and set the page's PageLSN=30.

### Undo phase:

- T2 must be undone. Put LSN 30 in ToUndo.
- Write Abort record to log for T2
- LSN 30: Undo LSN 30 - write a CLR for P1 with "set P1=ZZZ" and undonextLSN=20. Write ZZZ into P1. Put LSN 20 in ToUndo.
- LSN 20: Undo LSN 20 - write a CLR for P3 with "set P3=UUU" and undonextLSN=NULL. Write UUU into P3.