CSE 350

Advanced Data Structures

Topic 17: Recovery





HR IES Patabase Sturt -Last 00 transactions Xact table

Log(Write) - Page Index being Changey - New value of page (Re12) - Old value of Page (Unds) -Transaction Performing change -Previous log entrofor the transaction Timestamp (LogSenvence H= LSW) XAC+ LastIs Fram To Page 11-60011 2-Ph/95e Lo Carry Cottee We 9550Me that X locks by Combat 131 666 it comsits or

- () mm[+ - Aport Start - (Neck point -EnlCheckPoint

ID State Lastlog

X Running

Y Abort

Z Commit

Eviction Queve Last WriteTS First WiteTS PINNOU PaseTA () 1 1 0 1 /1 0 1/10 tye 15 Of the tsot (95 t logenta 421.4 forg entry WITP totus Writte Page

Read 7 Jaleun Pingl I finot in Butt Mgri Evict Page: truehod Jellean page Fetch page From DB Return Page Connect to flish page to disk first Diwsh Log to dish May be - Unneccessory 1 f log entry 9/ready on dish flushlogentries up to Le tue last write to the Page

Mark (hanged)
- Flag Page as Pirty
- Write a log entry for the Page

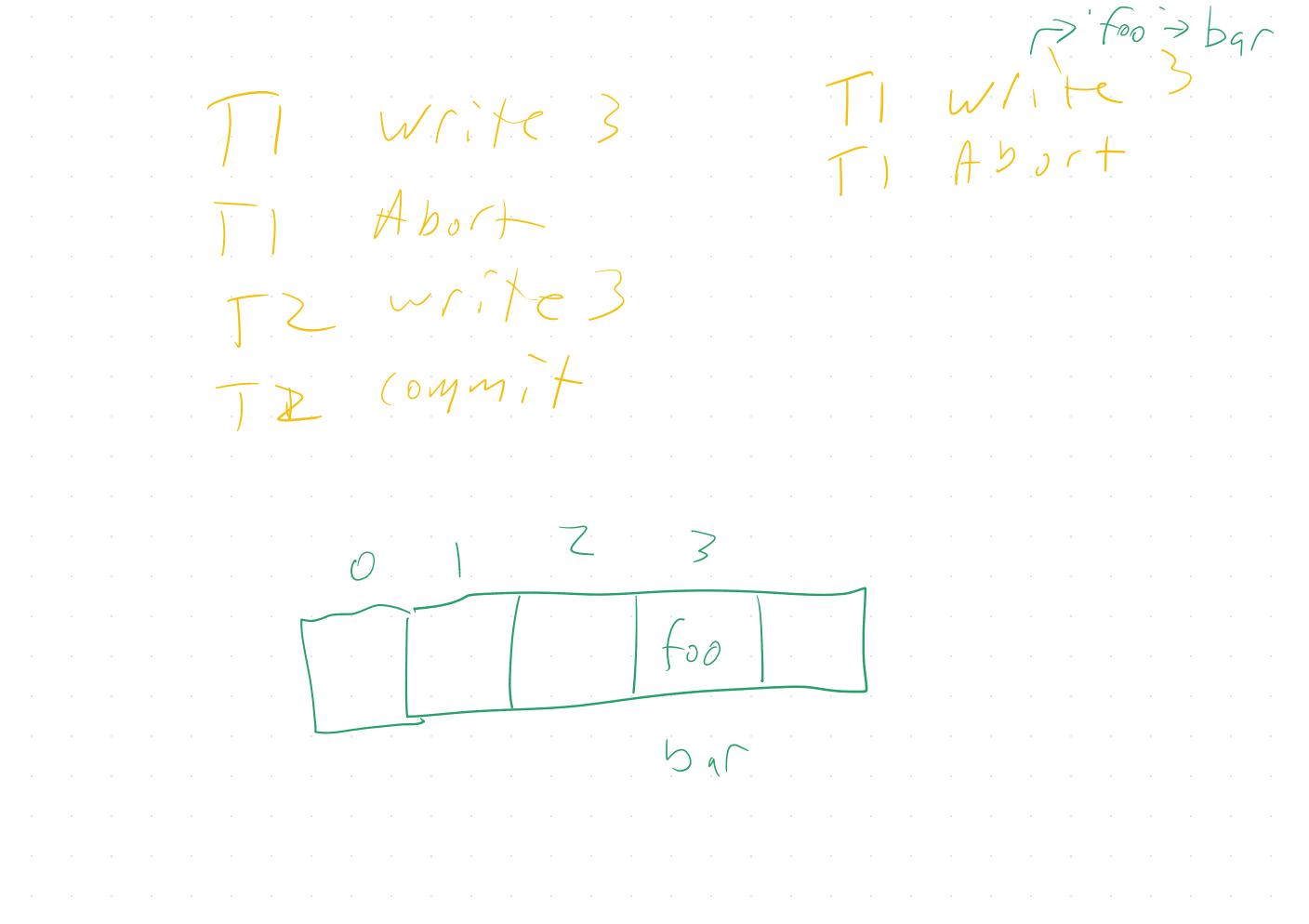
Evolution of a Page Vo De Productives vis write? Tf this loy entry
sately on dish,
I can sately write
Page and to disk

Commission

Write (ommit logentry
Flush logbot FRE

Abort - Resert Changes L) Start at end of log Replay backwards, undoing all changes ASSUMPTION: Externil Concurrences layer grantees that no other Xact can modify pages that Aborted xact modified

- Write Abort to Log



Recovery (Power goes out) What do we need to tix? gould RestoreDR, to its State according 90912 L) Abortall transactions, running at the DQ1=Which Xacts Were
Nunning?

- gothrough log: Kreate Xact table entry for each xact in log

Ly If xact never writes it won't appear

put also doesn't need to be aborted L) Commit record -xact committed DABURT record = xact ybor ted LaNo commit or abort = runing

goul 1 : Restore PB replay (og, apply "to" ettects Donly replay log entries for [committed xalts] Wan use Bitter Mon when replaying

9999 For Each Xactin State "Ruggin," callabort DReplay each logentry in the second of aborted write a loy entroit hat "writes" ture undo 1) Compensation Log Rocord (CLR) Summary

- Restore Xact table "Analysis"

- Restore DB "Redo"

thont Nuning xacts

Checkpointing

- Analysis La Checkpoint Transaction Table

> 9dd + W x9ct Z add to W Xact drop I Commit xact = Wact 3 The State add to Check point
>
> xact of this
>
> Point in
>
> Late ley Commit 3

ptimization As of what log Checkpoint entry is the Checkpoint Valid 0 ptimization The actual data >> Start checkpoint 15 This is the Ts for which the Xact table is valid DENA Check point Us Logents Pointing to kact table data.



Redo " "

Generaliest log entry not ceftected andish

Checkpoint

Oxact type

Wrighte

Henlogentry

WITH OPE add to W Xact z add to w xact 1 75, drop 15 Commit xact 1 Ts3 repla) 5 W Xact 3 (0 0) 165.tart ChetRPoint f'mm Z Commit 3 TSS DO 90 TO (OURSPORT)

Z End Checkport earliest unreflected (0) 2 Running TSS DFind Runnin TSS Last 'annlysis L) Distrehas I end checkpoint writes from Cload ract Cloadract T 5 3

Anglysis Redo opera vining Lust-checkpointey ond sklog entrs Checkpoil.

