

Aries example - Analysis Phase

Below are the log entries retrieved from disk after a crash. We are going to apply the Aries algorithm to these entries to rebuild our database.

LOG ENTRIES									LSN	undo
									being	Next
LSN	prevLSN	TransID	Type	PageID	Length	Offset	Before	After	undone	LSN
990	0	T3	Update	P30	3	20	ABC	DEF		
991	989	T2	Update	P10	3	1	123	456		
992	991	T2	Commit							
993	992	T2	End_trans							
994	0	T4	Update	P20	2	10	GH	IJ		
995	994	T4	Update	P40	4	20	40	41		
996	0	0	Beg_ckpt							
997	0		End_ckpt (Trans table, {(T3, 990), (T4, 995)}, Dirty Page Table {(P30, 990), (P40, 995), (P20, 994)})							
998	990	T3	Update	P30	4	10	10	11		
999	0	T5	Update	P50	4	20	12	13		
1000	0	T6	Update	P60	4	19	15	16		
1001	995	T4	Abort							
1002	998	T3	Update	P30	4	10	11	12		
1003	1001	T4	CLR	P40	4	20	41	40	995	994
1004	999	T5	Update	P50	2	2	Mm	Nn		
1005	1004	T5	Update	P50	2	2	Nn	Oo		
1006	1003	T4	CLR	P20	2	10	IJ	GH	994	0
1007	1000	T6	Update	P60	3	8	ABC	XYZ		
1008	1006	T4	End_trans							
1009	0	T7	Update	P70	1	0	K	M		
1010	1005	T5	Commit							
CRASH										

During the Analysis phase, we are going to rebuild the transaction table and the dirty page table. Log entries have a sequence number associated with them.

LastLSN is the last log record written by this transaction
 recLSN is the first log record of a change being made to this page
 Status is either U for Undo or C for Committed

Analysis phase - we go to the checkpoint record and start scanning forward

Analyzing the checkpoint records gives us:

Trans table			Dirty Page Table	
Trans ID	LastLSN	Status	PageID	recLSN
T3	990	U	P30	990
T4	995	U	P40	995
			P20	994

Analyzing 998 gives us:

Trans table			Dirty Page Table	
Trans ID	LastLSN	Status	PageID	recLSN
T3	998	U	P30	990
T4	995	U	P40	995
			P20	994

Analyzing 999 gives us:

Trans table			Dirty Page Table	
Trans ID	LastLSN	Status	PageID	recLSN
T3	998	U	P30	990
T4	995	U	P40	995
T5	999	U	P20	994
			P50	999

Analyzing 1000 gives us:

Trans table			Dirty Page Table	
Trans ID	LastLSN	Status	PageID	recLSN
T3	998	U	P30	990
T4	995	U	P40	995
T5	999	U	P20	994
T6	1000	U	P50	999
			P60	1000

Analyzing 1001 gives us:

Trans table			Dirty Page Table	
Trans ID	LastLSN	Status	PageID	recLSN
T3	998	U	P30	990
T4	1001	U	P40	995
T5	999	U	P20	994
T6	1000	U	P50	999
			P60	1000

Analyzing 1002 gives us:

Trans table			Dirty Page Table		
Trans ID	LastLSN	Status	PageID	recLSN	
T3	1002	U	P30	990	
T4	1001	U	P40	995	
T5	999	U	P20	994	
T6	1000	U	P50	999	
			P60	1000	

Analyzing 1003 gives us:

Trans table			Dirty Page Table		
Trans ID	LastLSN	Status	PageID	recLSN	
T3	1002	U	P30	990	
T4	1003	U	P40	995	
T5	999	U	P20	994	
T6	1000	U	P50	999	
			P60	1000	

Analyzing 1004 gives us:

Trans table			Dirty Page Table		
Trans ID	LastLSN	Status	PageID	recLSN	
T3	1002	U	P30	990	
T4	1003	U	P40	995	
T5	1004	U	P20	994	
T6	1000	U	P50	999	
			P60	1000	

Analyzing 1005 gives us:

Trans table			Dirty Page Table		
Trans ID	LastLSN	Status	PageID	recLSN	
T3	1002	U	P30	990	
T4	1003	U	P40	995	
T5	1005	U	P20	994	
T6	1000	U	P50	999	
			P60	1000	

Analyzing 1006 gives us:

Trans table			Dirty Page Table		
Trans ID	LastLSN	Status	PageID	recLSN	
T3	1002	U	P30	990	
T4	1006	U	P40	995	
T5	1005	U	P20	994	
T6	1000	U	P50	999	
			P60	1000	

Analyzing 1007 gives us:

Trans table			Dirty Page Table	
Trans ID	LastLSN	Status	PageID	recLSN
T3	1002	U	P30	990
T4	1006	U	P40	995
T5	1005	U	P20	994
T6	1007	U	P50	999
			P60	1000

Analyzing 1008 gives us:

Trans table			Dirty Page Table	
Trans ID	LastLSN	Status	PageID	recLSN
T3	1002	U	P30	990
T5	1005	U	P40	995
T6	1007	U	P20	994
			P50	999
			P60	1000

Analyzing 1009 gives us:

Trans table			Dirty Page Table	
Trans ID	LastLSN	Status	PageID	recLSN
T3	1002	U	P30	990
T5	1005	U	P40	995
T6	1007	U	P20	994
T7	1009	U	P50	999
			P60	1000
			P70	1009

Analyzing 1010 gives us:

Trans table			Dirty Page Table	
Trans ID	LastLSN	Status	PageID	recLSN
T3	1002	U	P30	990
T5	1010	C	P40	995
T6	1007	U	P20	994
T7	1009	U	P50	999
			P60	1000
			P70	1009