Twin Block

Idea: keep two versions for each block:

- old, consistent version
- new, (possibly) inconsistent version

atomic switch to indicate consistent versions
Example: Modifying Transaction T1

T1

B0_a  B0_b  B1_a  B1_b  B2_a  B2_b  B3_a  B3_b  B4_a  B4_b

pointer to consistent version
Modify B1

T1

B1_0

B0_a B0_b B1_a B1_b B2_a B2_b B3_a B3_b B4_a B4_b

pointer to consistent version
Write Back B1

T1

B0_a, B0_b, B1_a, B1_b', B2_a, B2_b, B3_a, B3_b, B4_a, B4_b

pointer to consistent version
Read B3

T1

B1\_b' B2\_a B2\_b B3\_a B3\_b B4\_a B4\_b

B0\_a B0\_b B1\_a

pointer to consistent version
Modify B3

T1

B0_a B0_b B1_a B1_b' B2_a B2_b B3_a B3_b B4_a B4_b

pointer to consistent version
Write Back B3

T1

B0a B0b B1a B1b' B2a B2b B3a B3b' B4a B4b

pointer to consistent version
Committing T1?

T1

B0_a | B0_b | B1_a | B1_b' | B2_a | B2_b | B3_a | B3_b' | B4_a | B4_b

pointer to consistent version
Switch Global Pointer!

T1

B0a  B0b  B1a  B1b'  B2a  B2b  B3a  B3b'  B4a  B4b

pointer to consistent version
Copy b over a

T1

B0_a B0_b B1_b' B1_b' B2_a B2_b B3_b' B3_b' B4_a B4_b

b

pointer to consistent version
Copy b over a

T1

B0_a B0_b B1_a B1_b B2_a B2_b B3_a B3_b B4_a B4_b

pointer to consistent version
<table>
<thead>
<tr>
<th>B0a</th>
<th>B0b</th>
<th>B1a</th>
<th>B1b</th>
<th>B2a</th>
<th>B2b</th>
<th>B3a</th>
<th>B3b</th>
<th>B4a</th>
<th>B4b</th>
</tr>
</thead>
</table>

pointer to consistent version
A Second Transaction T2

T2

B1_a

B0_a B0_b B1_a B1_b B2_a B2_b B3_a B3_b B4_a B4_b

b

pointer to consistent version
Aborting T1?

T1

B0_a, B0_b, B1_a, B1_b', B2_a, B2_b, B3_a, B3_b', B4_a, B4_b

pointer to consistent version
DO NOT Switch Global Pointer!

T1

B0_a B0_b B1_a B1_b B2_a B2_b B3_a B3_b B4_a B4_b

pointer to consistent version
Copy a over b

<table>
<thead>
<tr>
<th>B0a</th>
<th>B0b</th>
<th>B1a</th>
<th>B1a</th>
<th>B2a</th>
<th>B2b</th>
<th>B3a</th>
<th>B3a</th>
<th>B4a</th>
<th>B4b</th>
</tr>
</thead>
</table>

pointer to consistent version
Done.

<table>
<thead>
<tr>
<th>B0_a</th>
<th>B0_b</th>
<th>B1_a</th>
<th>B1_b</th>
<th>B2_a</th>
<th>B2_b</th>
<th>B3_a</th>
<th>B3_b</th>
<th>B4_a</th>
<th>B4_b</th>
</tr>
</thead>
</table>

a

pointer to consistent version
A Second Transaction T2

B0_a, B0_b, B1_a, B1_b, B2_a, B2_b, B3_a, B3_b, B4_a, B4_b

pointer to consistent version
Discussion

Advantages:

no extra help data structures
undo of changes easy
no fragmentation
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Disadvantages:

Doubles storage for all blocks