Block nested loop

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A **block-nested loop** (**BNL**) is an algorithm used to join two relations in a relational database.[1]

This algorithm[2] is a variation on the simple nested loop join used to join two relations R and S (the "outer" and "inner" join operands, respectively). Suppose $|R| < |S|$. In a traditional nested loop join, S will be scanned once for every tuple of R. If there are many qualifying R tuples, and particularly if there is no applicable index for the join key on S, this operation will be very expensive.

The block nested loop join algorithm improves on the simple nested loop join by only scanning S once for every *group* of R tuples. For example, one variant of the block nested loop join reads an entire page of R tuples into memory and loads them into a hash table. It then scans S, and probes the hash table to find S tuples that match any of the tuples in the current page of R. This reduces the number of scans of S that are necessary.

A more aggressive variant of this algorithm loads as many pages of R as can be fit in the available memory, loading all such tuples into a hash table, and then repeatedly scans S. This further reduces the number of scans of S that are necessary. In fact, this algorithm is essentially a special-case of the classic hash join algorithm.[*citation needed*]

The block nested loop runs in $O(P_r P_s/M)$ I/Os where M is the number of available pages of internal memory and P_r and P_s is size of R and S respectively in pages. Note that block nested loop runs in $O(P_r + P_s)$ I/Os if R fits in the available internal memory.

References [edit]

1. ^ "8.2.1.14 Block Nested-Loop and Batched Key Access Joins". *MySQL 5.6 Reference Manual*. Oracle Corporation. Retrieved 2 August 2015.
2. ^ "Block Nested Loop Join". *MariaDB*. MariaDB Corporation Ab. Retrieved 2 August 2015.

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