Correction to: Data dependencies for query optimization: a survey

Jan Kossmann¹ · Thorsten Papenbrock¹ · Felix Naumann¹

Published online: 28 December 2021

© Springer-Verlag GmbH Germany, part of Springer Nature 2021

Correction to: The VLDB Journal
<https://doi.org/10.1007/s00778-021-00676-3>

The original article has been updated.

The original article was published with an error in Table 1.
The correct Table is given below.

Table 1 Possible optimizations categorized by (i) the examined data dependencies, (ii) the area of application, i.e., operators of the relational algebra, and where possible (iii) the query optimization activity that is affected by the optimization, which is indicated by background color and symbol: **cost-based plan transformations** (†), **cost-independent transformations / rewriting** (*), **cardinality and cost estimation** (‡). For optimizations that have not been scientifically published, we mention the section where this optimization is explained.

Application area	Unique Column Combinations (Sec. 5)	Functional Dependencies (Sec. 6)	Order Dependencies (Sec. 7)	Inclusion Dependencies (Sec. 8)
Join	<ul style="list-style-type: none">• Spurious-free back-joins [127] *• Semijoin transformation [87] *• Pipeline with grouping [30, 124] †• Invisible join [2] †	<ul style="list-style-type: none">• Simplification / avoidance [65] *• Complexity reduction (Sec. 6.2) *• Self-join avoidance [6] *• Plan generation [38] †	<ul style="list-style-type: none">• Join avoidance [115, 117] *• Pipeline with grouping [23, 49] †• Avoid sort for sort-merge-joins [42, 100, 110] †• Attribute substitution (Sec. 7.2) †• Pipeline index scan with join [49] †	<ul style="list-style-type: none">• Join elimination [24, 64] *• Substitute relations [33] †• Avoid semijoin reductions (Sec. 8.1) †• Accurate cardinalities [56] ‡
Selection	<ul style="list-style-type: none">• Early abort (Sec. 5.6) *• Accurate cardinalities (Sec. 5.6) ‡	<ul style="list-style-type: none">• Early abort (Sec. 6.3) *• Substitute attributes [24, 68] †• Estimations without independence assumption [25, 58, 106] ‡	<ul style="list-style-type: none">• Use binary search [100] †	
Grouping & Aggregate functions	<ul style="list-style-type: none">• Grouping is redundant [23] *• Accurate cardinalities (Sec. 5.6) ‡	<ul style="list-style-type: none">• Reduce attributes [17, 114] *	<ul style="list-style-type: none">• Simplify MIN, MAX, MEDIAN [93, 100] *• Sort-based grouping [100, 110, 115, 125, 126] †	
Projection & Distinctness	<ul style="list-style-type: none">• Avoid DISTINCT [99, 100, 101] *	<ul style="list-style-type: none">• Distinctness: see grouping [121] *• Simplification [29] *• Estimate projections [44] ‡	<ul style="list-style-type: none">• Distinctness: See grouping †	
Sorting	<ul style="list-style-type: none">• Reduce attributes (Sec. 5.6) *• Unstable sorting (Sec. 5.6) *	<ul style="list-style-type: none">• Reduce attributes [24, 110, 114] *	<ul style="list-style-type: none">• Reduce attributes [113, 114, 115] *• Avoid sort [49, 100] *• ORDER BY with index [115] *• Main-memory sorts [115] †• Substitute attributes [100] †• Accurate estimates (Sec. 7.4) ‡	
Set Operations	<ul style="list-style-type: none">• EXCEPT to EXCEPT ALL [100] *• INTERSECT to INTERSECT ALL [60, 99] *• INTERSECT to join [99, 100] †• Accurate cardinalities (Sec. 5.6) ‡		<ul style="list-style-type: none">• Order optimizations [100] †	<ul style="list-style-type: none">• Simplify UNION (Sec. 8.2) *• Simplify INTERSECT (Sec. 8.2) *• Eliminate EXCEPT (Sec. 8.2) *• Accurate cardinalities (Sec. 8.2) ‡
Other	<ul style="list-style-type: none">• Subquery to join [99, 100] *• Subquery sort avoidance [108] †	<ul style="list-style-type: none">• Scalar subqueries [29]• Table decomposition rewrites [45]	<ul style="list-style-type: none">• Correlated subqueries [100] ‡• Sparse over dense indexes [34]	<ul style="list-style-type: none">• Query folding [33, 51, 57] *• Eliminate correlated subqueries in EXISTS [83] (Sec. 8.2) *

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

The original article can be found online at <https://doi.org/10.1007/s00778-021-00676-3>.

✉ Jan Kossmann
jan.kossmann@hpi.de
Thorsten Papenbrock
thorsten.papenbrock@hpi.de
Felix Naumann
felix.naumann@hpi.de

¹ Hasso Plattner Institute, University of Potsdam, Potsdam, Germany