SQLServerFast.com
Execution Plan Video Training

Block 1: Understanding execution plans

Level: Basic

Chapter 4: Properties

Properties

Three categories

    Control operator behavior

    Information from compilation

    Run-time statistics

Properties

Three categories

    Control operator behavior

        Examples

            Output List

                List of columns the operator will return to its calling (parent) operator

                Exists on every operator

Properties

Three categories

Control operator behavior
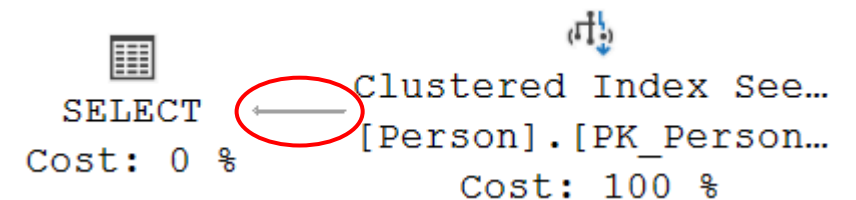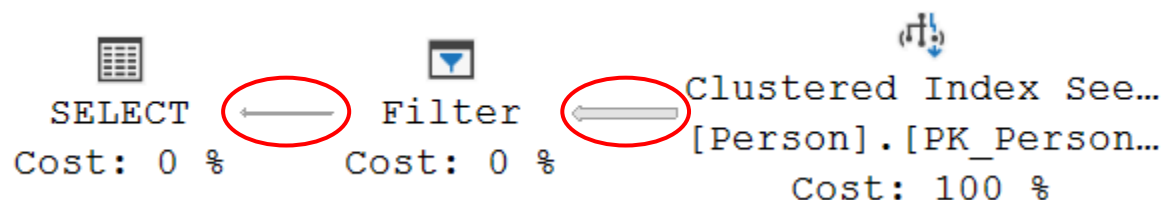
Examples

Output List

Predicate

Only supported on some operators

Usually optional

Condition a row must meet or else it will be removed from the result set

Predicate pushdown

SELECT
Cost: 0 %

Filter
Cost: 0 %

Clustered Index See…
[Person].[PK_Person…
Cost: 100 %

SELECT
Cost: 0 %

Clustered Index See…
[Person].[PK_Person…
Cost: 100 %

Properties

Three categories

    Control operator behavior

        Examples

            Output List

            Predicate

            … and many more

        Set by Query Optimizer

            Based on the expected results of the query

            Direct optimizer to do the *right* task

    Trivial for simple queries and their execution plans

    Essential for understanding complex execution plans

Properties

Three categories

    Control operator behavior

    Information from compilation

        Examples

            Estimated Number of Rows *and* Estimated Number of Rows to be Read

                Used to estimate which execution plan will be faster / cheaper

                Bad execution plan choices often caused by wrong estimates

Properties

Three categories

    Control operator behavior

    Information from compilation

        Examples

            Estimated Number of Rows *and* Estimated Number of Rows to be Read

                Used to estimate which execution plan will be faster / cheaper

                Bad execution plan choices often caused by wrong estimates

            Warnings

                Can occur on many different operators, for many different reasons

                May or may not be an indication of a serious problem

Properties

Three categories
- Control operator behavior
- Information from compilation
- Run-time statistics
  - Not in all execution plans
    - All are available in execution plan plus run-time statistics
    - Some are available in execution plan with live statistics
    - Never in execution plan only

Properties

Three categories

  Control operator behavior

  Information from compilation
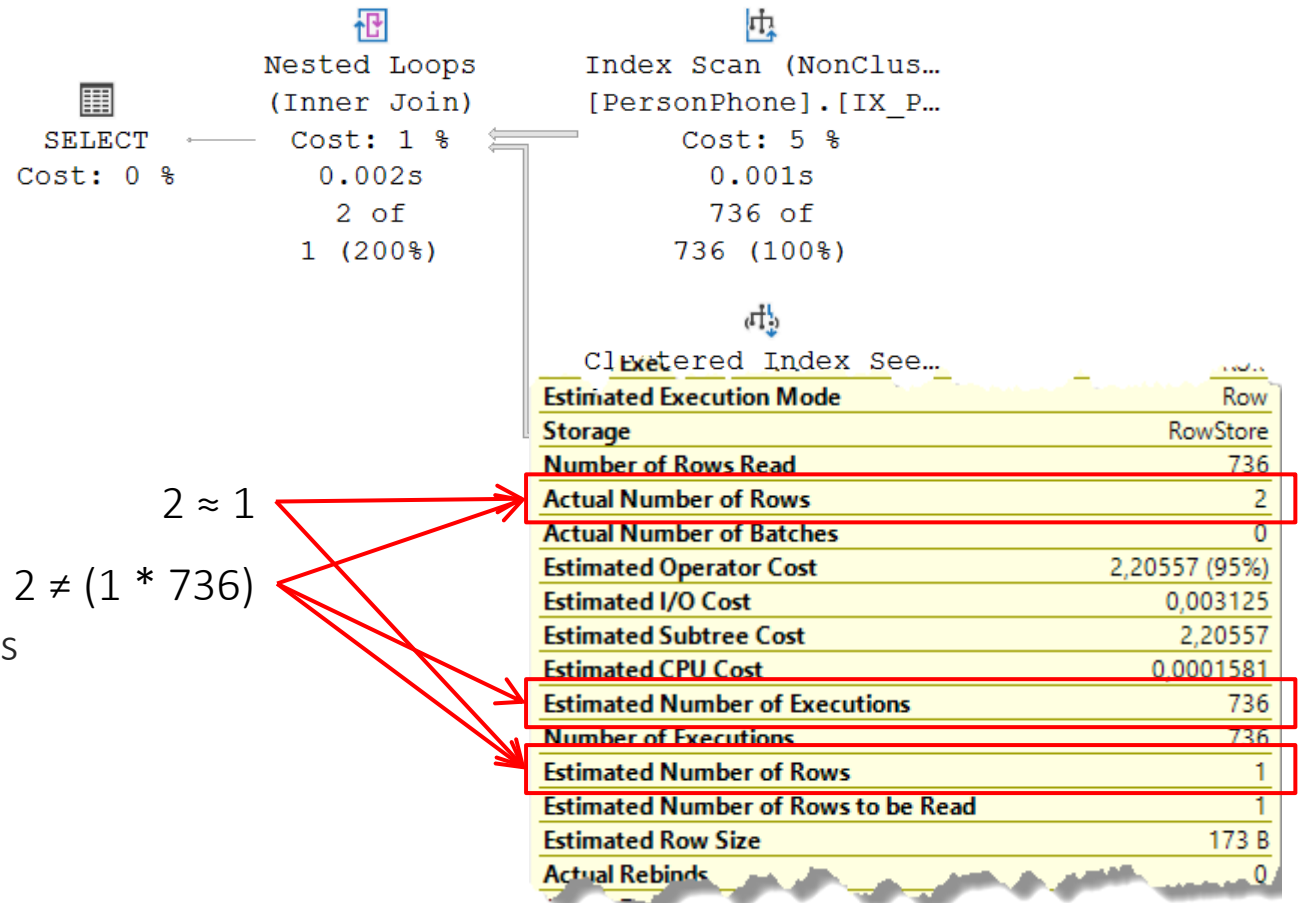
  Run-time statistics

    Not in all execution plans

    Examples

      Actual Number of Rows

        Compare to Estimated Number of Rows

        Sometimes misleadingly presented

Nested Loops
(Inner Join)
Cost: 1 %
0.002s
2 of
1 (200%)

SELECT
Cost: 0 %

Index Scan (NonClus...
[PersonPhone].[IX_P...
Cost: 5 %
0.001s
736 of
736 (100%)

Clustered Index See...

2 ≈ 1

2 ≠ (1 * 736)

Estimated Execution Mode	Row
Storage	RowStore
Number of Rows Read	736
Actual Number of Rows	**2**
Actual Number of Batches	0
Estimated Operator Cost	2,20557 (95%)
Estimated I/O Cost	0,003125
Estimated Subtree Cost	2,20557
Estimated CPU Cost	0,0001581
Estimated Number of Executions	**736**
Number of Executions	736
Estimated Number of Rows	**1**
Estimated Number of Rows to be Read	1
Estimated Row Size	173 B
Actual Rebinds	0

Properties

Three categories

  Control operator behavior

  Information from compilation

  Run-time statistics

    Not in all execution plans
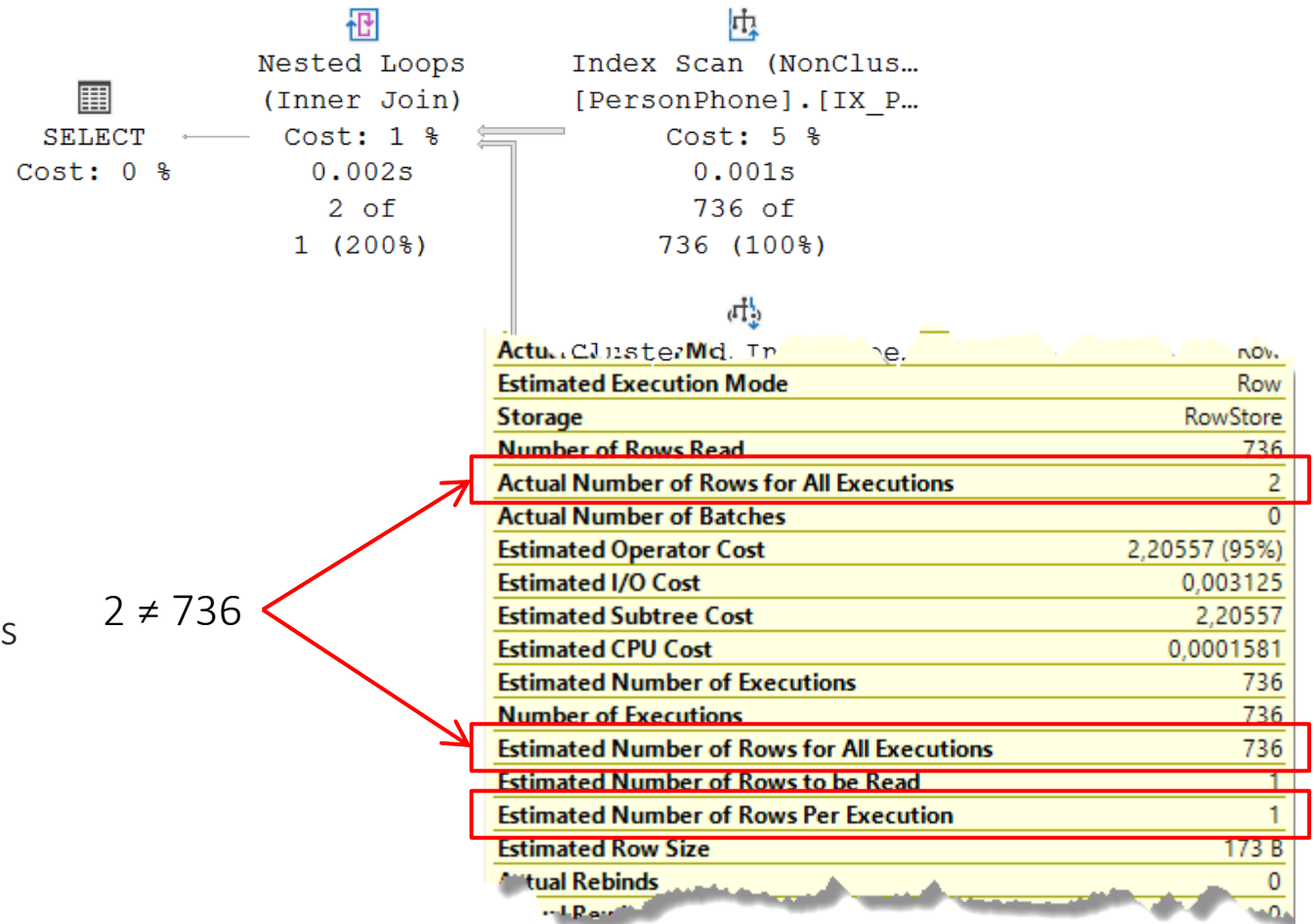
    Examples

      Actual Number of Rows

        Compare to Estimated Number of Rows

        Sometimes misleadingly presented

        Improved in SSMS 18.5 (April 2020)

2 ≠ 736

Actual Cluster Md. Tr...e.	Row.
Estimated Execution Mode	Row
Storage	RowStore
Number of Rows Read	736
Actual Number of Rows for All Executions	**2**
Actual Number of Batches	0
Estimated Operator Cost	2,20557 (95%)
Estimated I/O Cost	0,003125
Estimated Subtree Cost	2,20557
Estimated CPU Cost	0,0001581
Estimated Number of Executions	736
Number of Executions	736
Estimated Number of Rows for All Executions	**736**
Estimated Number of Rows to be Read	1
Estimated Number of Rows Per Execution	**1**
Estimated Row Size	173 B
Actual Rebinds	0

Nested Loops
(Inner Join)
SELECT   Cost: 1 %   Index Scan (NonClus...
Cost: 0 %   0.002s   [PersonPhone].[IX_P...
                2 of   Cost: 5 %
                1 (200%)   0.001s
                                      736 of
                                      736 (100%)

Properties

How to access properties

    Hover mouse over operator

        Easy, fast, convenient

        Not all properties shown

            Selection decided by Microsoft

            Not user configurable

        Long values truncated

    Use properties window

        Shows **ALL** properties, completely

        Can be left open and docked

Properties

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        Long values truncated (or even left out completely)!

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Properties

How to access properties

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    Hover mouse over arrow

Properties

How to access properties

    Hover mouse over operator

    Use properties window

    Hover mouse over arrow *or* use properties window for an arrow

        Shows very limited set of properties

        Subset of properties of the operator on the right of the arrow

        Only properties related to amount of data returned by operator

            (One exception: Number of Rows Read)

        Unreliable on lower input of a Nested Loops operator

Properties

How to access properties

    Hover mouse over operator

    Use properties window

    Hover mouse over arrow *or* use properties window for an arrow

Documentation of properties

    Little to none provided by Microsoft

    "Execution Plan Reference": extensive (but unofficial) documentation

Summary

Three types of properties

How to access properties

Next chapters

Chapter 5: Where to find execution plans
  Query Store
  Extended Events / Profiler
  DMVs

Chapter 6: Cardinality in the execution plan

Chapter 7: Percentages in the execution plan