Important Information in a Plan

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Module Overview

Review additional, essential information in a query plan, including:

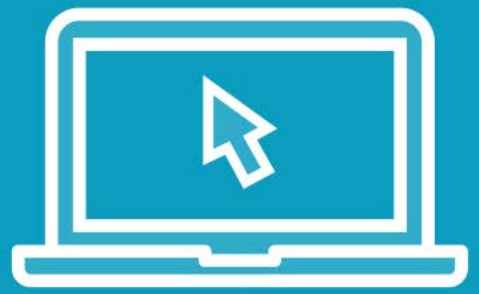
- Row estimates/actuals
- Parallelism
- Predicates
- Warnings

Input Parameters

Input values for a query, used on initial compilation, can be found in the plan

This can be extremely important when comparing an actual plan (with different values) to the plan in cache

Demo



Finding Input Parameters in a Plan

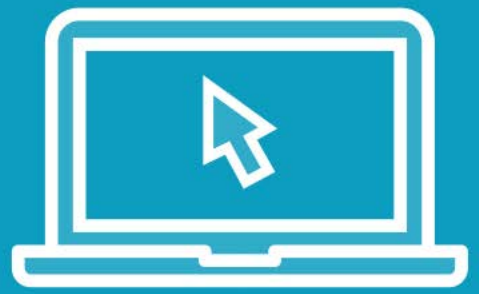
Trace Flags

Global and session trace flags are captured by execution plans in SQL Server 2014 SP2 and SQL Server 2016

Use IsCompileTime attribute to determine if flag present at compilation and execution

https://support.microsoft.com/en-us/kb/3170115

Demo



Trace Flags in a Query Plan

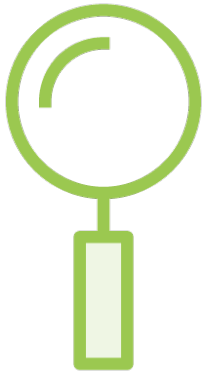
Cardinality Estimator Version

The cardinality estimator (CE) was significantly changed in SQL Server 2014

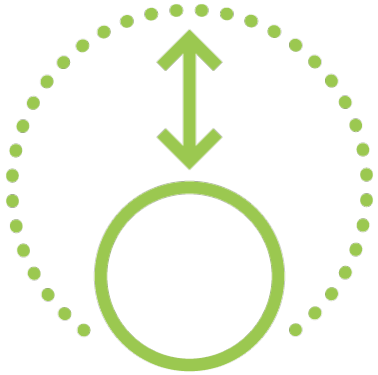
The new CE can be enabled in a variety of ways

To confirm CE used, check attribute value in the plan

Cardinality Estimate Issues



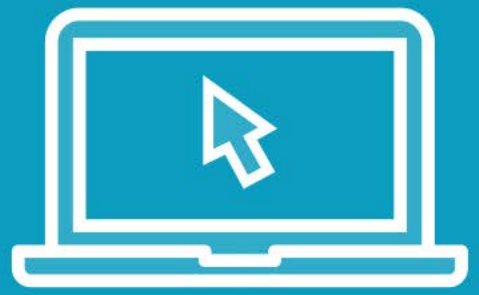
Check for differences between estimates and actual



Can cause significantly more data to move through the plan than needed

Validate statistics, CE version, table variables, table value functions to start

Demo



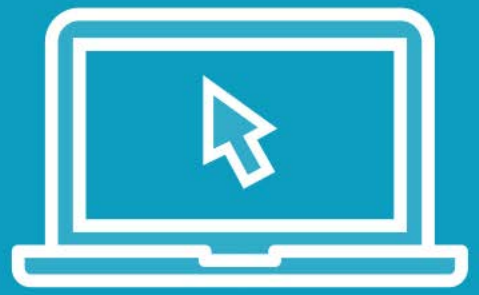
Examining CE Version and Estimates

Operator Execution Statistics

Available in SQL Server 2014 SP2 and SQL Server 2016

Includes CPU, duration, and I/O information on a per-operator basis

Demo



Execution Statistics for Operators

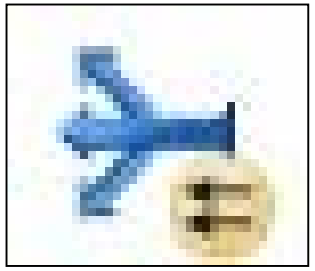
Parallelism in Plans

If MAXDOP is not set to 1, the optimizer can generate a serial or parallel plan

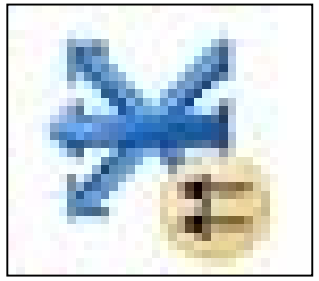
Not every plan can be parallelized

Indicates a higher cost query – not necessarily good or bad

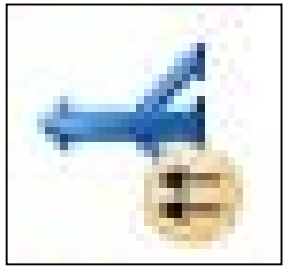
Parallelism and Operators



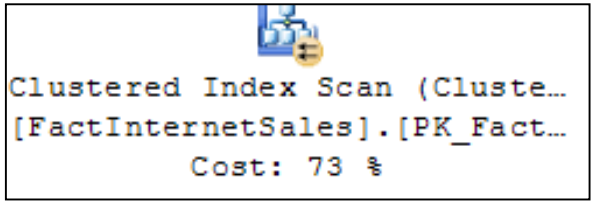
Distribute Streams



Repartition Streams



Gather Streams



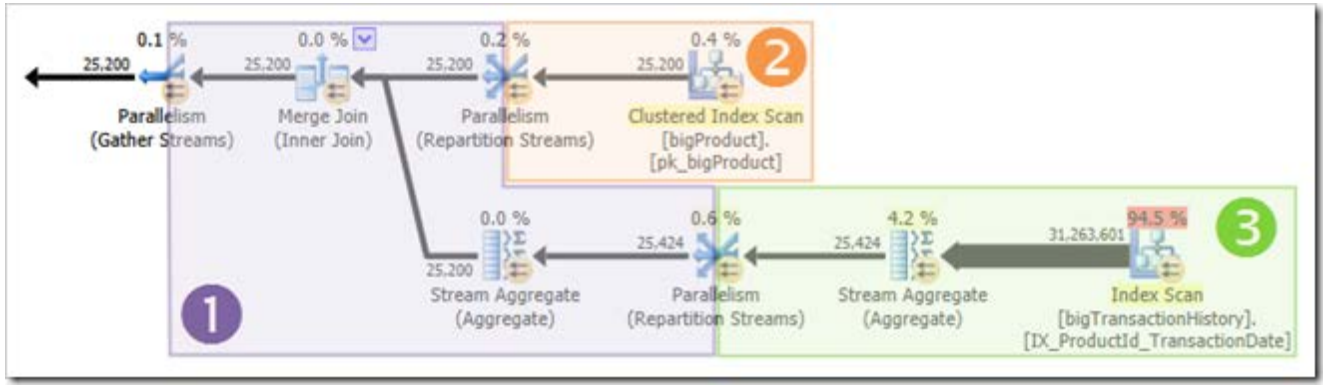
Operator running in parallel

Parallelism

Parallel plans can have multiple zones of concurrent execution

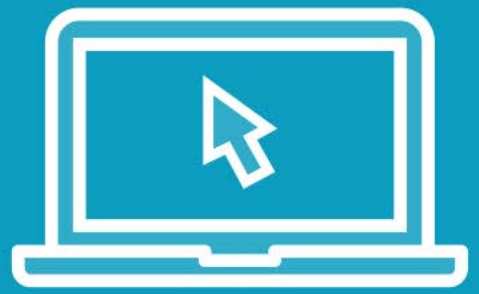
MAXDOP limits the maximum number of threads *per operator*

MAXDOP does not limit the total threads for the plan



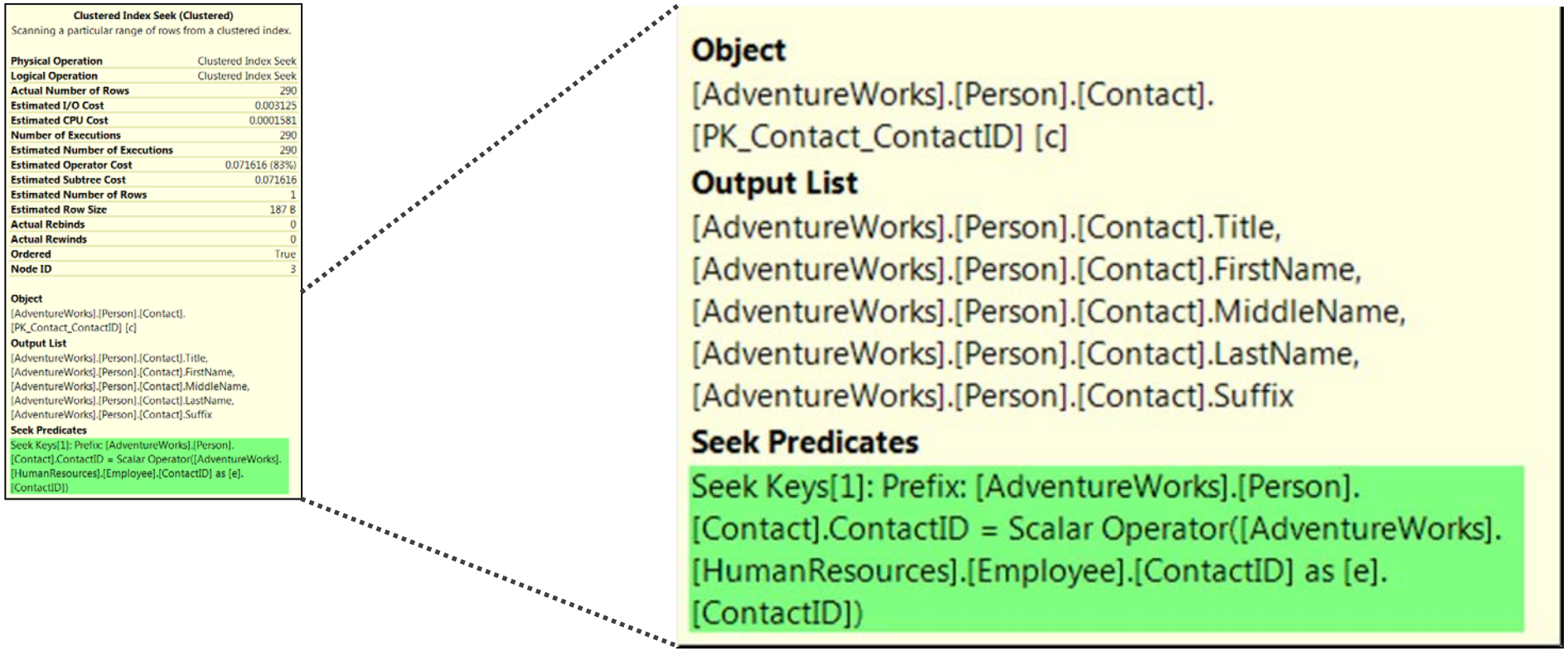
https://sqlperformance.com/2013/10/sql-plan/parallel-plans-branches-threads

Demo

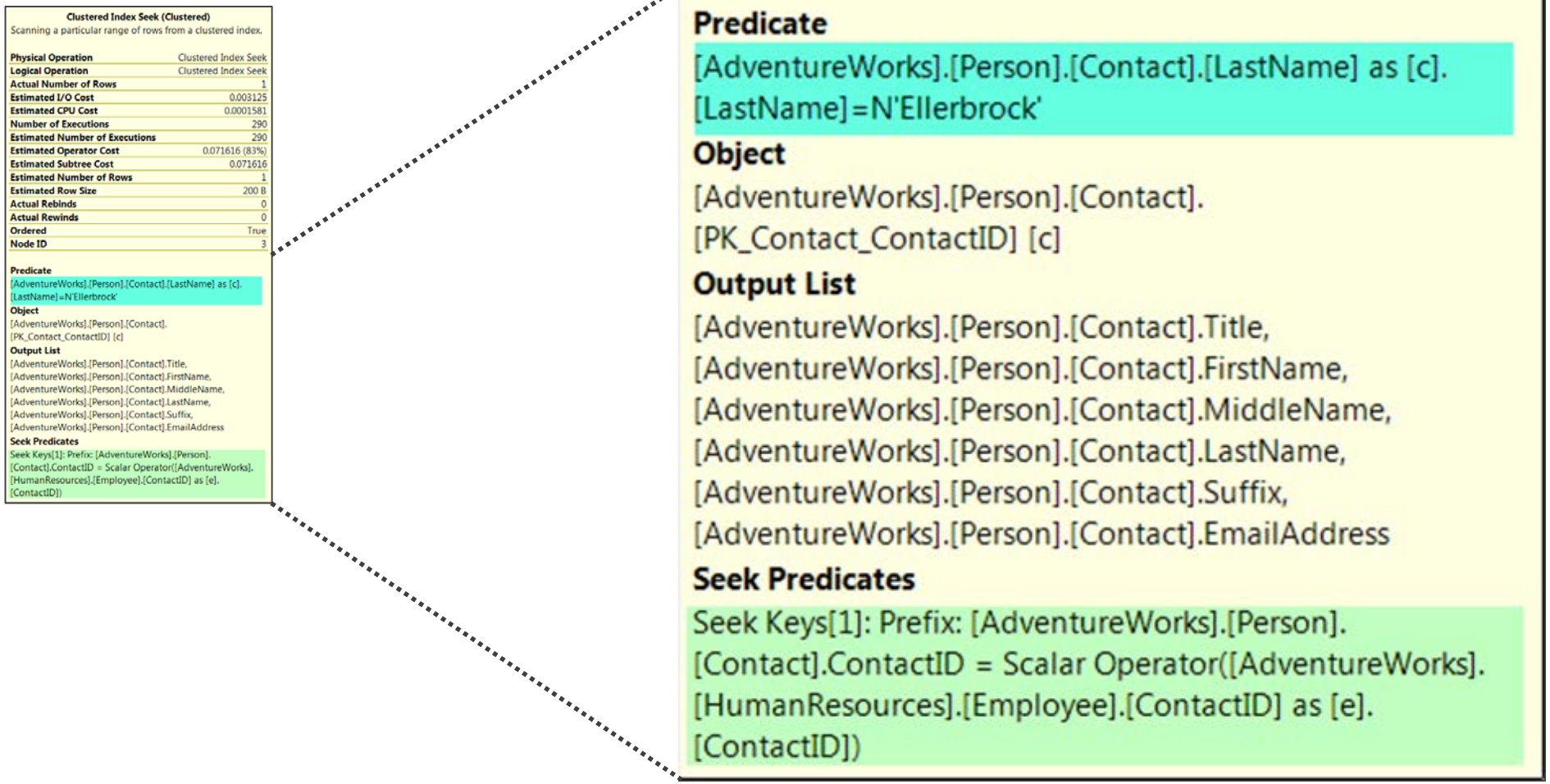


Parallelism in Plans

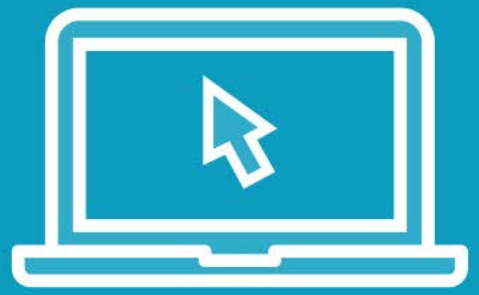
Seek Predicate



Residual Predicate



Demo



Seek and Residual Predicates

Warnings

Spill to tempdb (hash and sort)

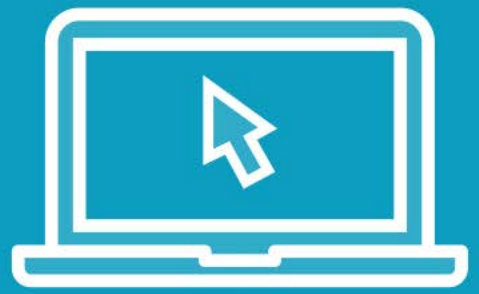
Implicit conversions

No statistics

Missing index

Missing join predicate

Demo



Generating Plan Warnings

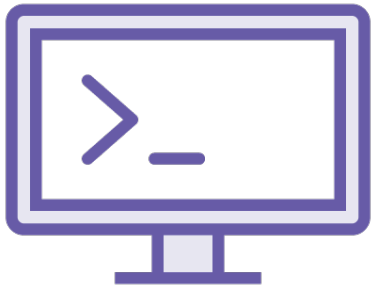
What We Covered

Review additional, essential information in a query plan, including:

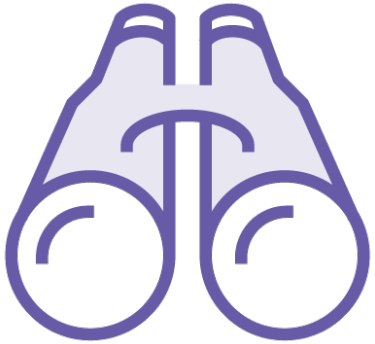
- Row estimates/actuals
- Parallelism
- Predicates
- Warnings

Next steps

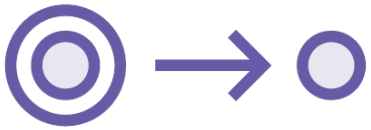
Practice, practice, practice



Develop scripts to capture query data



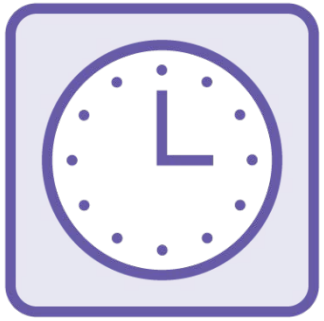
Review data and execution plans



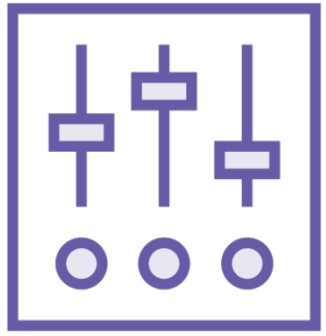
Make incremental changes to see how performance changes

Course Summary

Information about query execution can be captured in SQL Server



Data can be historical or real-time



Use this data to determine what to tune/change

Continue to monitor performance