

SQLServerFast.com

Execution Plan Video Training

Block 1: Understanding execution plans

Level: Basic

Chapter 5: Where to find execution plans

Where to find execution plans

Directly from query in query window

- Execution plan only

- Execution plan plus run-time statistics

- Execution plan with live statistics

Where to find execution plans

Directly from query in query window

Controlled by T-SQL

`SET SHOWPLAN_XML`

Don't execute, get execution plan only

Returned as XML

Management Studio can render it as a graphical execution plan

Where to find execution plans

Directly from query in query window

Controlled by T-SQL

`SET SHOWPLAN_XML`

`SET STATISTICS XML`

Execute, then get execution plan plus run-time statistics

Returned as XML

Management Studio can render it as a graphical execution plan

Where to find execution plans

Directly from query in query window

Controlled by T-SQL

SET SHOWPLAN_XML

SET STATISTICS XML

Used by Management Studio and Azure Data Studio buttons

Can be used to get execution plans for *part* of batch or procedure

Can be used to collect the XML, then automatically analyze it

Searching for specific issue in hundreds of captured execution plans

Building generic third-party tool for execution plan analysis

Where to find execution plans

Directly from query in query window

Controlled by T-SQL

Finding problem queries (and execution plans) on a busy server

Plan cache

Stores all^(*) executed queries, with their execution plan and some extra data

Can be queried through DMOs (requires VIEW SERVER STATE permission)

^(*)Not *all* queries and execution plans stored...

OPTION(RECOMPILE)

Optimize for ad hoc workloads

Plans cleared from cache

Where to find execution plans

Directly from query in query window

Controlled by T-SQL

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OPTION(RECOMPILE)

Optimize for ad hoc workloads

Plans cleared from cache (restart,

Where to find execution plans

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OPTION(RECOMPILE)

Optimize for ad hoc workloads

Plans cleared from cache (restart, explicit removal,

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OPTION(RECOMPILE)

Optimize for ad hoc workloads

Plans cleared from cache (restart, explicit removal, memory pressure)

Where to find execution plans

Plan cache DMO's

`sys.dm_exec_cached_plans`

One row for each entry in the plan cache

May be a “real” execution plan, or a plan stub

Stub for parameterized query

Stub for first execution with “optimize for ad hoc execution” enabled

Where to find execution plans

Plan cache DMO's

`sys.dm_exec_cached_plans`

`sys.dm_exec_query_stats`

For ad hoc queries

`sys.dm_exec_procedure_stats`

For queries in stored procedures and triggers

`sys.dm_exec_query_stats`

For queries in user-defined functions

(except when inlined)

Where to find execution plans

Plan cache DMO's

`sys.dm_exec_cached_plans`

`sys.dm_exec_query_stats`

`sys.dm_exec_procedure_stats`

`sys.dm_exec_query_stats`

`sys.dm_exec_sql_text(plan_handle)`

Returns the text of the query

Where to find execution plans

Plan cache DMO's

`sys.dm_exec_cached_plans`

`sys.dm_exec_query_stats`

`sys.dm_exec_procedure_stats`

`sys.dm_exec_query_stats`

`sys.dm_exec_sql_text(plan_handle)`

`sys.dm_exec_query_plan(plan_handle)`

Returns the execution plan

Where to find execution plans

Plan cache DMO's

`sys.dm_exec_cached_plans`

`sys.dm_exec_query_stats`

`sys.dm_exec_procedure_stats`

`sys.dm_exec_query_stats`

`sys.dm_exec_sql_text(plan_handle)`

`sys.dm_exec_query_plan(plan_handle)`

`sys.dm_exec_query_plan_stats(plan_handle)`

SQL Server 2019+

Returns the execution plan plus run-time statistics of last finished execution

Where to find execution plans

Plan cache

- Not all execution plans are (still) in the plan cache

 - Luckily, most are

 - Need to be aware of edge cases and culprits

- Not necessarily best instrument to investigate *currently active* workload

Where to find execution plans

Plan cache

Currently executing

`sys.dm_exec_requests`

One row for each currently executing request

Uses same `plan_handle` column as plan cache DMV's

Can be used with `sys.dm_exec_sql_text` or `sys.dm_exec_query_plan`

Not useful with `sys.dm_exec_query_plan_stats`

Where to find execution plans

Plan cache

Currently executing

`sys.dm_exec_requests`

`sys.dm_exec_query_profiles`

One row for each operator of currently executing request

One row per thread for each operator in parallel execution

Where to find execution plans

Plan cache

Currently executing

- `sys.dm_exec_requests`

- `sys.dm_exec_query_profiles`

- `sys.dm_exec_query_statistics_xml(session_id)`

 - Snapshot of execution plan with live statistics

 - Fetch repeatedly to track progress

Where to find execution plans

Plan cache

Currently executing

Complete history

Query Store

- Introduced in SQL Server 2016

- Always enabled in Azure SQL Database

- Disabled by default in SQL Server

 - Enabling recommended

 - Possibly fine tune the options

 - Only disable when the overhead is too much

Where to find execution plans

Plan cache

Currently executing

Complete history

Query Store

Collects all queries

Collects their execution plans

Collects *some* run-time statistics

Stored within the database, so persisted across restarts

Can be queried through catalog views

*Full coverage of Query Store
is not in scope for this course*

Many resources available

- [sys.database_query_store_options \(Transact-SQL\)](#)
- [sys.query_context_settings \(Transact-SQL\)](#)
- [sys.query_store_plan \(Transact-SQL\)](#)
- [sys.query_store_query \(Transact-SQL\)](#)
- [sys.query_store_query_text \(Transact-SQL\)](#)
- [sys.query_store_wait_stats \(Transact-SQL\)](#)
- [sys.query_store_runtime_stats \(Transact-SQL\)](#)
- [sys.query_store_runtime_stats_interval \(Transact-SQL\)](#)

Where to find execution plans

Plan cache

Currently executing

Complete history

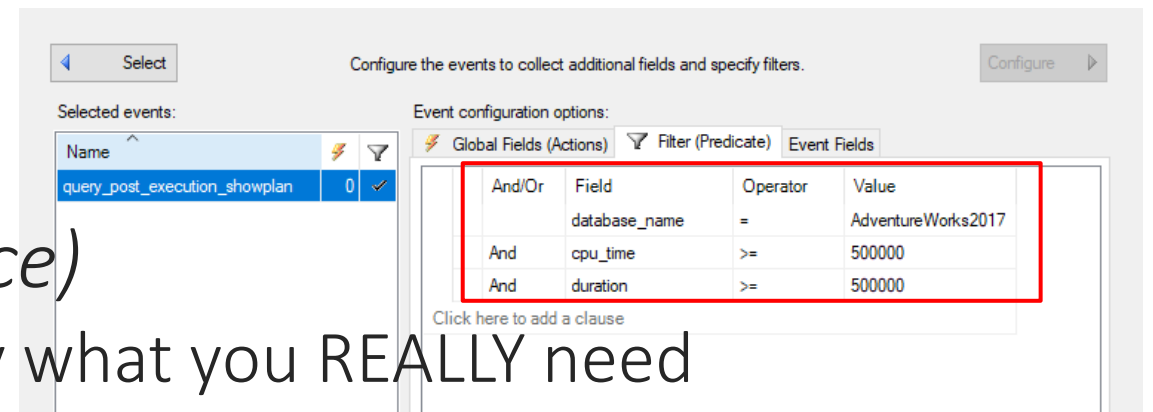
Extended events (or Profiler / Trace)

Use aggressive filtering, capture only what you REALLY need

Only use for limited periods, don't "just leave it on"

*Full coverage of Extended Events
is not in scope for this course*

Many resources available



Summary

SET options to get execution plan only or execution plan plus

Dynamic Management Objects

- Plan cache

- Currently executing

Query Store

Extended Events

Next chapters

Chapter 6: Cardinality in the execution plan

- Estimates and actual numbers

- Where to find them

- How to use them?

- Don't be misled!

Chapter 7: Percentages in the execution plan