

# 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<sup>(\*)</sup> executed queries, with their execution plan and some extra data

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

<sup>(\*)</sup>Not *all* queries and execution plans stored...

OPTION(RECOMPILE)

Optimize for ad hoc workloads

Plans cleared from cache

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Plans cleared from cache (restart,

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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

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`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

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`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

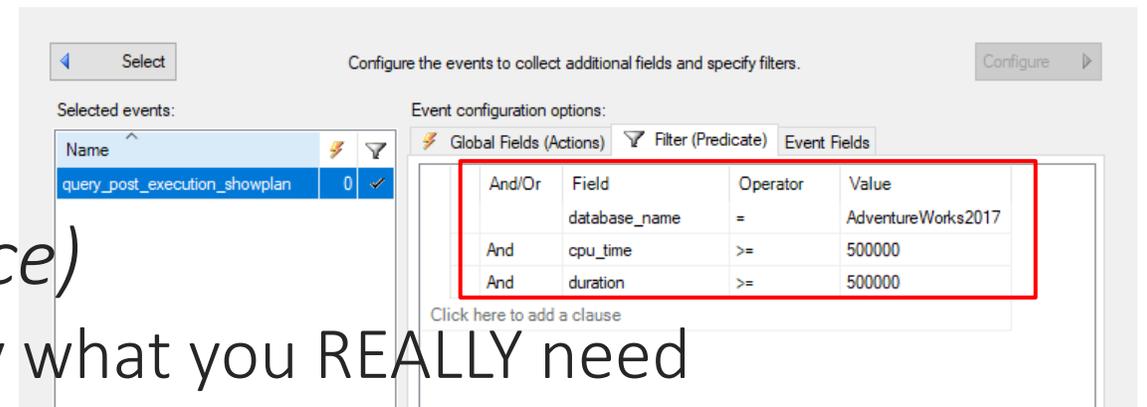
Extended events (or Profiler / Trace)

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