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Performance Tuning with the Plan Cache

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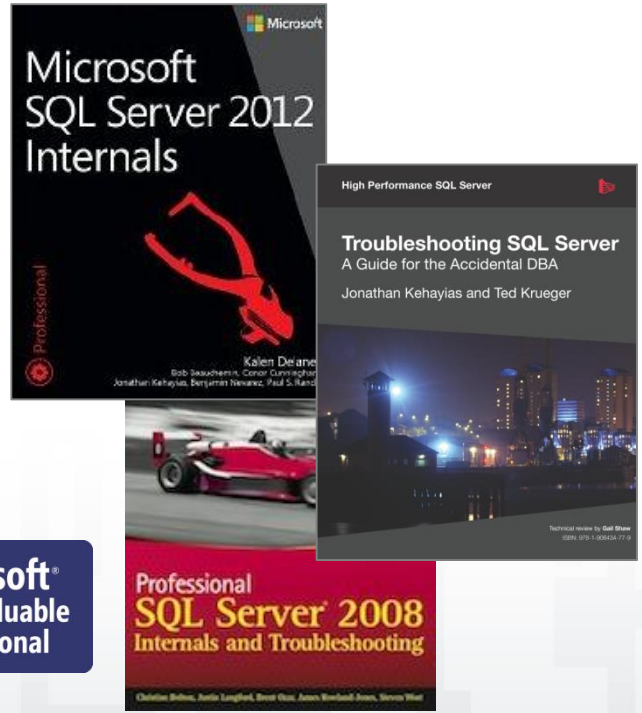

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Overview

- What is the Plan Cache?
- Why is it important?
- How do we look at its contents?
- How do we use it for tuning SQL Server?

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What is the Plan Cache?

- Also known as “procedure cache” or “statement cache”
- Caches more than just procedures, also caches parsed queries
- No control over the size, but control over how it is used
- Allows reuse of compiled execution plans for optimized access to data
- Queriable allowing analysis of its contents

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How do we find plan cache information? (sys.dm_exec_requests)

- **Actively executing requests only**
- **Important columns**
  - plan_handle
  - SQL Server 2008/R2+
    - query_hash
    - query_plan_hash
    - See BOL Topic: Finding and Tuning Similar Queries by Using Query and Query Plan Hashes (http://msdn.microsoft.com/en-us/library/cc645887.aspx)

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How do we find Plan Cache information? (sys.dm_exec_cached_plans)

- One entry per cached plan
- Important Columns
  - usecounts
  - size_in_bytes
  - objtype
  - plan_handle

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How do we find Plan Cache information? (sys.dm_exec_query_stats)

- One row per query statement within a cached plan
- Important Columns
  - All of them

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How do we look at the Plans?

- **sys.dm_exec_query_plan(plan_handle)**
  - Returns the XML Showplan for the plan_handle provided
  - Output is a strongly typed XML document based on the published schema.
    - http://schemas.microsoft.com/sqlserver/2004/07/showplan/
  - Up to 128 nested execution levels by xml datatype limitation

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How do we look at the Plans?

- **sys.dm_exec_text_query_plan(plan_handle || {statement_start_offset/statement_end_offset})**
  - Returns the text Showplan for the plan_handle provided.
  - Allows optional statement offsets to return a specific statement in a larger batch.
  - Has no size limitation for the plan being returned.

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What can we learn from the Plan Cache? (Basics)

- TOP N most frequently executed queries
- TOP N most costly queries
- TOP N CPU/IO consuming queries
- Query plans with long average execution times
- Cache bloat from Adhoc / Non-Parameterized workloads.
- Plans that consume the most memory in the plan cache.

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What can we learn from the Plan Cache? (Complex)

- Queries associated with missing indexes reported by the missing index DMV's
- Implicit column side data type conversions
- Key Lookups and the queries that caused them
- Queries using a specific index or table in a database
- The calculated cost for parallel queries
- Missing column statistics

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A Friendly Warning!!

- **The information may be free, but querying the plan cache isn't.**

Additional References

- **Plan Caching in SQL Server 2008 Whitepaper**
  - http://msdn.microsoft.com/en-us/library/ee343986(SQL.100).aspx

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Review

- What is the Plan Cache?
- Why is it important?
- How do we look at its contents?
- How do we use it for tuning SQL Server?

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Questions?

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Performance Tuning with the Plan Cache

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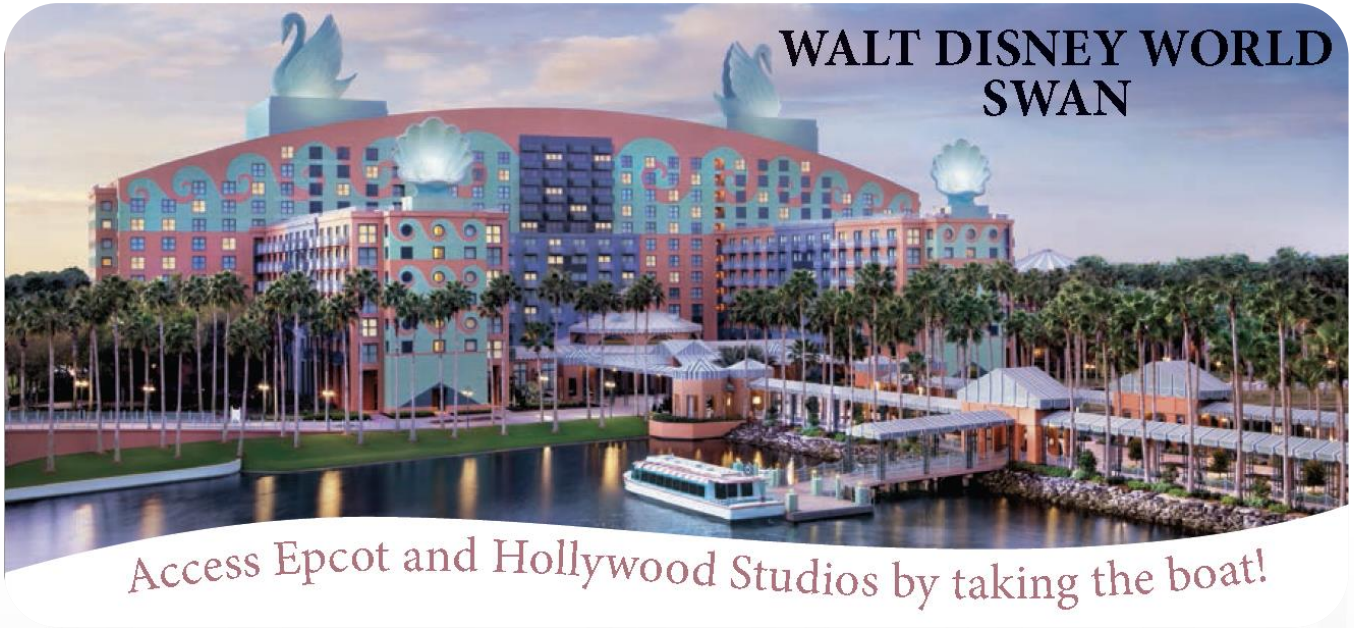
Thank you!

Save the Date!



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