

SQL Server: Query Plan Analysis

Module 2: Capturing Query Execution Plans

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Module Introduction

- **This module will cover the various methods you can use to capture a query execution plan**
- **Not all methods are equivalent (and some can even incur significant overhead), so even if you've informally captured plans before you'll want to review the concepts in this module**

“Capturing” a Plan

- **Estimated plan (compile):**
 - SET SHOWPLAN_TEXT (on deprecation path)
 - SET SHOWPLAN_ALL (on deprecation path)
 - SET SHOWPLAN_XML
 - Graphical Showplan
 - sys.dm_exec_query_plan, sys.dm_exec_text_query_plan
- **Actual plan (runtime):**
 - SET STATISTICS PROFILE (on deprecation path)
 - SET STATISTICS XML
 - Graphical Showplan

Why Deprecate?

- **XML Showplan formats may seem more unwieldy and verbose than their text-based / tabular counterparts, but there are some key advantages:**
 - Can be processed via XPath and XQuery
 - Can capture plan for plan guide use
 - Saving the SHOWPLAN_XML or STATISTICS_XML output to a file with “.sqlplan” extension can be opened in SSMS in the graphical format (and XML)
 - Rich array of data to mine, and I’ll call out opportunities as we go along

DMOs

- **sys.dm_exec_cached_plans**

- One row for each query plan currently in memory
- plan_handle is the plan identifier
- objtype tells us what kind of cached object it is (e.g. ad hoc query, stored procedure, prepared statement)

- **sys.dm_exec_query_plan**

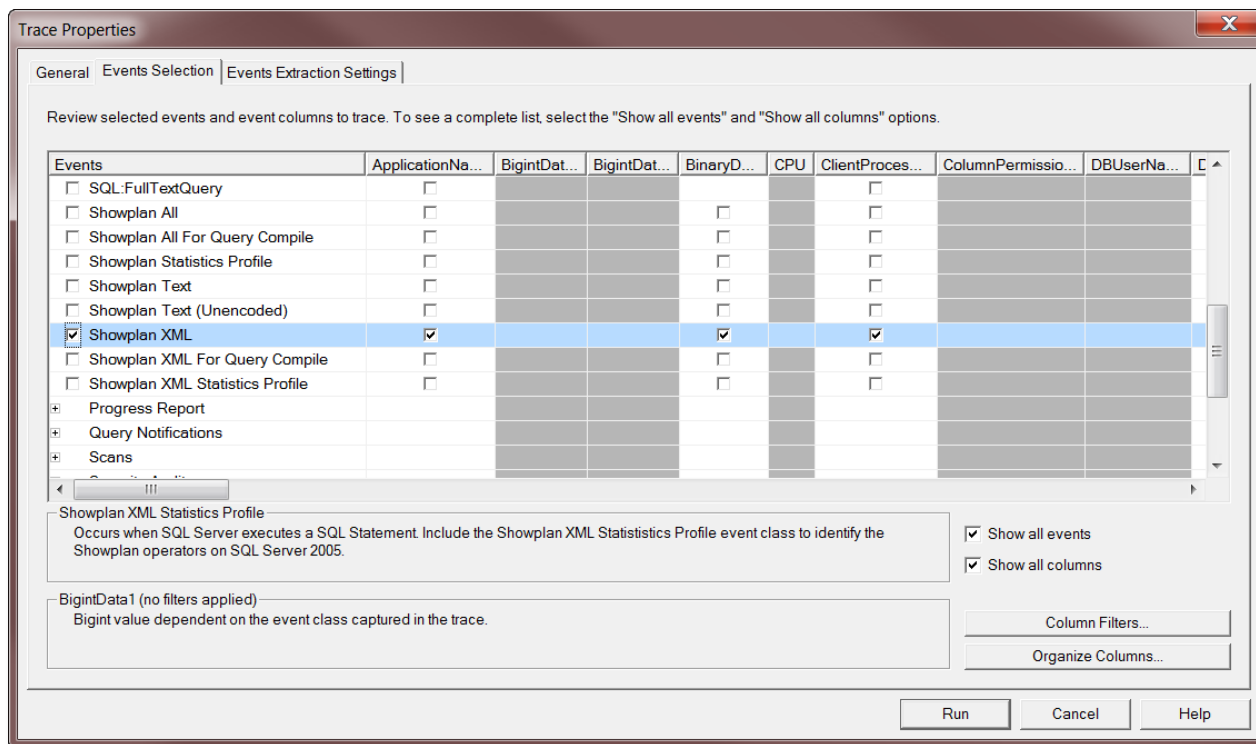
- Provided a plan_handle, it returns the plan in XML format
 - Limit 128 levels of nested elements
 - Can be a cached plan or from currently executing request

- **sys.dm_exec_text_query_plan**

- Output is in text format
- No size limit
- Can specify individual statements within a batch

SQL Trace

- **Plans available to capture via SQL Trace, but be careful of the overhead!**
 - This is not a preferred method
 - Even Extended Events has non-trivial overhead for capturing plans, so disregard the emerging myth



Graphical Showplan

- **Within SSMS**
 - “Display Estimated Execution Plan”
 - Parsed but not executed
 - “Include Actual Execution Plan”
 - Parsed and executed
- **Tree of icons (operators) connected by arrows**
- **Can still be useful for very large plans unless the cost distribution is extremely distributed (difficult to identify hot spots)**
 - This is where third-party options come in

SQL Sentry Plan Explorer

- **SQL Sentry Plan Explorer**
 - Free tool
- **Good for plans from small to very large**
- **Pulls out key information in compact way**

Estimated vs. Actual

- **Estimated plan**

- Query not actually executed
- Plan represents how the statements will be executed
 - Pulling plan from cache shows estimated not actual
 - Parallel plan could become serial
- Ideally the row estimates are accurate, but when they aren't, this is one of the red flags which we'll discuss how to identify later

- **Actual plan**

- Includes estimated AND actual number of rows by operator and executions by operators
 - Key for detecting cardinality estimate issues