

Adjust performance in SQL Server: find slow queries

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1. Find slow queries with DMV of SQL

One of the great features of SQL Server is the built-in Dynamic Management Views (DMVs). These dynamic management modes provide a lot of information about different issues.

There are some DMVs that provide data about query statistics, execution plans, recent queries, and more. Some DMVs can be used together to provide some important details.

For example, the following query is used to find queries with most read, write, uptime (CPU), etc.

```
SELECT TOP 10 SUBSTRING ( qt . TEXT , ( qs . Statement_start_offset / 2 ) + 1
```

The result of the query will look like the image below. You can see that the query at the top occupies all the resources.

(No column name)	execution_count	total_logical_reads	total_logical_writes	total_worker_time	total_elapsed_time_in_S	last_execution_time
select Page, Query, Clicks, Impressions, clicks/convertfloa...	7	311978	2	33134409	179	2017-06-16 15:01:59.670
SELECT v.name AS [Name], SCHEMA_NAME(v.schema_id) AS [Schema]	1	44390	2	171245	0	2017-06-16 17:53:39.593
select Timestamp, SUM(TotalPageViews) PageViews, Tag ...	3	33630	0	710290	0	2017-06-16 14:47:28.603
select Timestamp, SUM(TotalPageViews) PageViews, Tag ...	1	11210	0	232029	0	2017-06-16 17:22:31.287
select SUM(TotalPageViews) PageViews, Tag from view_...	1	11157	0	205006	0	2017-06-16 17:22:42.037
select Timestamp, SUM(TotalPageViews) PageViews, Tag ...	2	8329	5	411043	0	2017-06-16 15:57:55.270
select top 100 Page, Author, Published, Title, ImageURL, Ta...	2	222	0	6227	0	2017-06-16 15:01:59.023
select is_federation_member from sys.databases where na...	1	16	0	487	0	2017-06-16 17:52:16.707
SELECT TOP 10 SUBSTRING(qt.TEXT, (qs.statement_start_offset / 2) + 1	1	0	0	43947	0	2017-06-16 17:52:19.603

From this result, we can copy that SQL query and consider performance improvement measures such as adding an index, etc.

Advantages: Always give aggregate statistics.

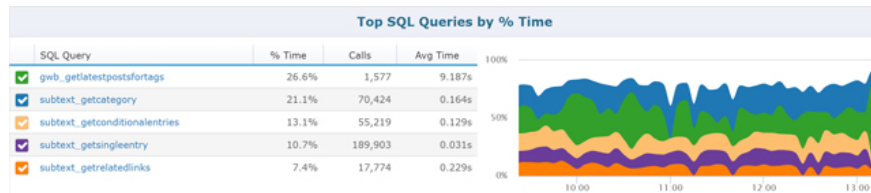
Disadvantages: Don't let the user know what's calling the query and can't imagine when queries are invoked over time.

2. Report queries through APM solutions

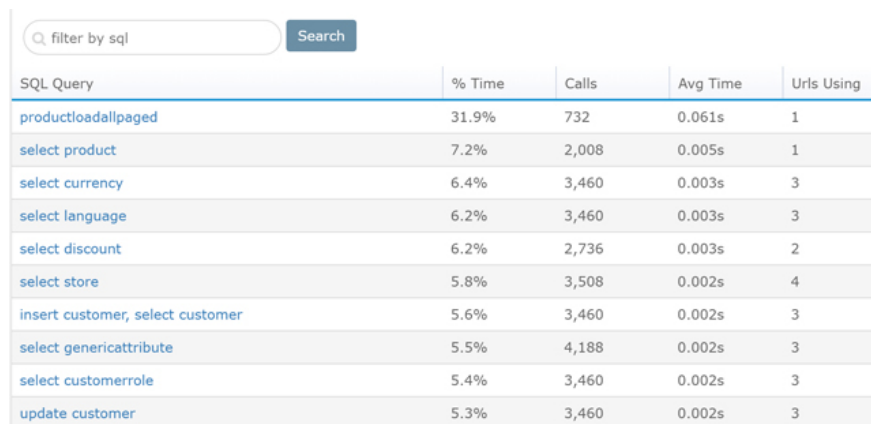
One of the great features of the application performance management tool (APM) is the ability to track SQL queries. For example, Retrace tracks SQL queries across multiple database providers, including SQL Server.

Retrace can tell users how many queries have been performed, average query execution time and queries that are calling queries. These are really valuable information for adjusting SQL performance.

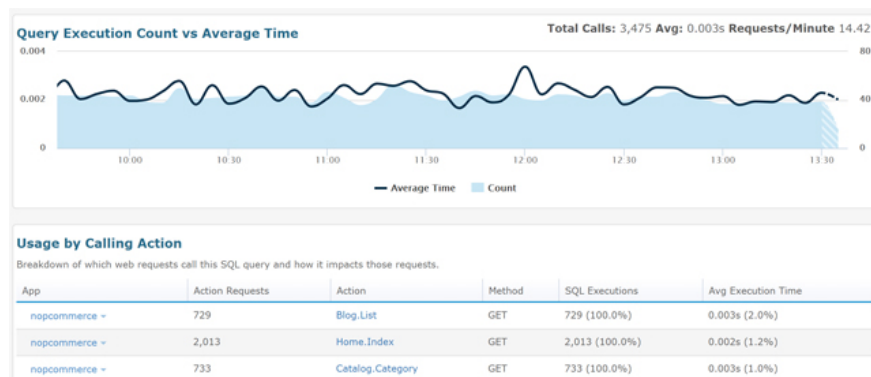
APM solutions collect data by creating low performance for application code when running. Below is a screenshot from the application control panel of Retrace, showing that a specific application has the most SQL query time.



Retrace collects performance statistics about each SQL query executed. You can search for specific queries to find potential problems.



By selecting a specific query, you can see how often that query was invoked by the time and query execution time. In addition, you can also view websites that use SQL queries and good factors that affect performance.



Because Retrace is a tool to write code and track ASP.NET request objects, it can even provide all information about the operation of the code.

The image below shows all SQL queries and other detailed information about code operations. Retrace can even display log messages in the same view. In addition, it shows the server address, the query database name being executed and how many records are returned.

Took (ms)		From (ms)
37	> Request Started GET /desktops	0
264	▼ Primary Handler (ASP.NET MVC)	37
0	SqlConnection.Open stackify-nop.database.windows.net nopCommerce-prod	49
7	SqlInternalConnection.BeginSqlTransaction	49
2	> SqlCommand.ExecuteNonQuery UPDATE Customer, Records: 1	57
9	SqlInternalTransaction.Commit	59
0	SqlConnection.Open stackify-nop.database.windows.net nopCommerce-prod	68
1	> SqlCommand.ExecuteReader SELECT Category, Records: 1	68
0	SqlConnection.Open stackify-nop.database.windows.net nopCommerce-prod	76
1	SqlInternalConnection.BeginSqlTransaction	76
1	> SqlCommand.ExecuteReader INSERT GenericAttribute, SELECT GenericAttribute, Records: 1	78
	INSERT INTO [dbo].[GenericAttribute] ([EntityId],[KeyGroup],[Key],[Value],[StoreId]) VALUES (@_p0, @_p1, @_p2, @_p3, @_p4)	
	SELECT [Id]	
	FROM [dbo].[GenericAttribute]	
	WHERE @@ROWCOUNT > @_p5 AND [Id] = scope_identity()	
8	SqlInternalTransaction.Commit	79
0	SqlConnection.Open stackify-nop.database.windows.net nopCommerce-prod	101
6	> SqlCommand.ExecuteReader SELECT Currency, Records: 2	101
0	SqlConnection.Open stackify-nop.database.windows.net nopCommerce-prod	107
3	> SqlCommand.ExecuteReader SELECT GenericAttribute, Records: 1	108
0	SqlConnection.Open stackify-nop.database.windows.net nopCommerce-prod	111
36	> SqlCommand.ExecuteReader ProductLoadAllPaged	117
0	SqlConnection.Open stackify-nop.database.windows.net nopCommerce-prod	156
1	> SqlCommand.ExecuteReader SELECT Discount, Records: 2	159
132	▼ ViewResultBase.ExecuteResult	168

Retrace provides comprehensive SQL information and many tracking and warning features about SQL queries.

Advantages : Provide detailed reports on each application and each query. Can show detailed transactions how queries are used for only \$ 10 a month.

Disadvantages: Does not provide read or write numbers for each query.

3. SQL Server Profiler

SQL Server Profiler is a useful logging tool if you want to see how SQL queries are executed in real-time databases. SQL Profiler records detailed events about interacting with SQL Server.

1. Connect login, disconnect login and cannot connect
2. SELECT, INSERT, UPDATE, DELETE statements
3. RPC procedural package call status calls
4. Start and end the Stored Procedure
5. Start and end the Stored Procedure commands.
6. Open and end an SQL command package
7. Error recorded in the error log of SQL Server
8. A lock is purchased or released on a database object
9. Open pointer data type
10. Check for security permissions

EventClass	Duration	ObjectName	TextData	CPU	Reads	Writes
Trace Start						
SQL:BatchStarting			exec dbo.ADGSP_EN_SalesInstr			
Showplan XML		ADGSP_E...	<ShowPlanXML xmlns="http://sc...			
SP:StmtCompleted	11186	ADGSP_E...	SELECT dbo.im_localstr_tbl.im...	7...	19516	0
SQL:BatchCompleted	11376		exec dbo.ADGSP_EN_SalesInstr	8...	20132	0
SQL:BatchStarting			SELECT top 50000 *, gl_...			
Showplan XML		Dynamic...	<ShowPlanXML xmlns="http://sc...			
SQL:BatchStarting			exec dbo.ADGSP_EN_BOLInstr			
Showplan XML		ADGSP_E...	<ShowPlanXML xmlns="http://sc...			
SP:StmtCompleted	2820	ADGSP_E...	SELECT dbo.im_localstr_tbl.im...	1...	13855	0
SQL:BatchCompleted	2933		exec dbo.ADGSP_EN_BOLInstr	1...	14023	0
SQL:BatchStarting			exec dbo.ADGSP_SO_LOADNOTSHIP			
Showplan XML		ADGSP_S...	<ShowPlanXML xmlns="http://sc...			

```

SELECT dbo.im_localstr_tbl.im_localstr_txt AS Instruction,
dbo.im_prpmst_tbl.im_prpmst_name AS PrintProfile,
dbo.im_localgrp_tbl.im_localgrp_key AS Groupkey,
dbo.im_localxf_tbl.im_entmst_key AS Entitykey,
dbo.im_localstr_tbl.im_localstr_rseq AS [Sequence No],
dbo.im_localstr_tbl.im_localins_key AS [Instruction Key]
FROM dbo.im_prpmst_tbl INNER JOIN
dbo.im_localins_tbl INNER JOIN
dbo.im_localxf_tbl INNER JOIN
dbo.im_localgrp_tbl ON
dbo.im_localxf_tbl.im_localgrp_key = dbo.im_localgrp_tbl.im_localgrp_key

```

You can read the Database Monitoring article with SQL Profiler to know how to use SQL Server Profiler.

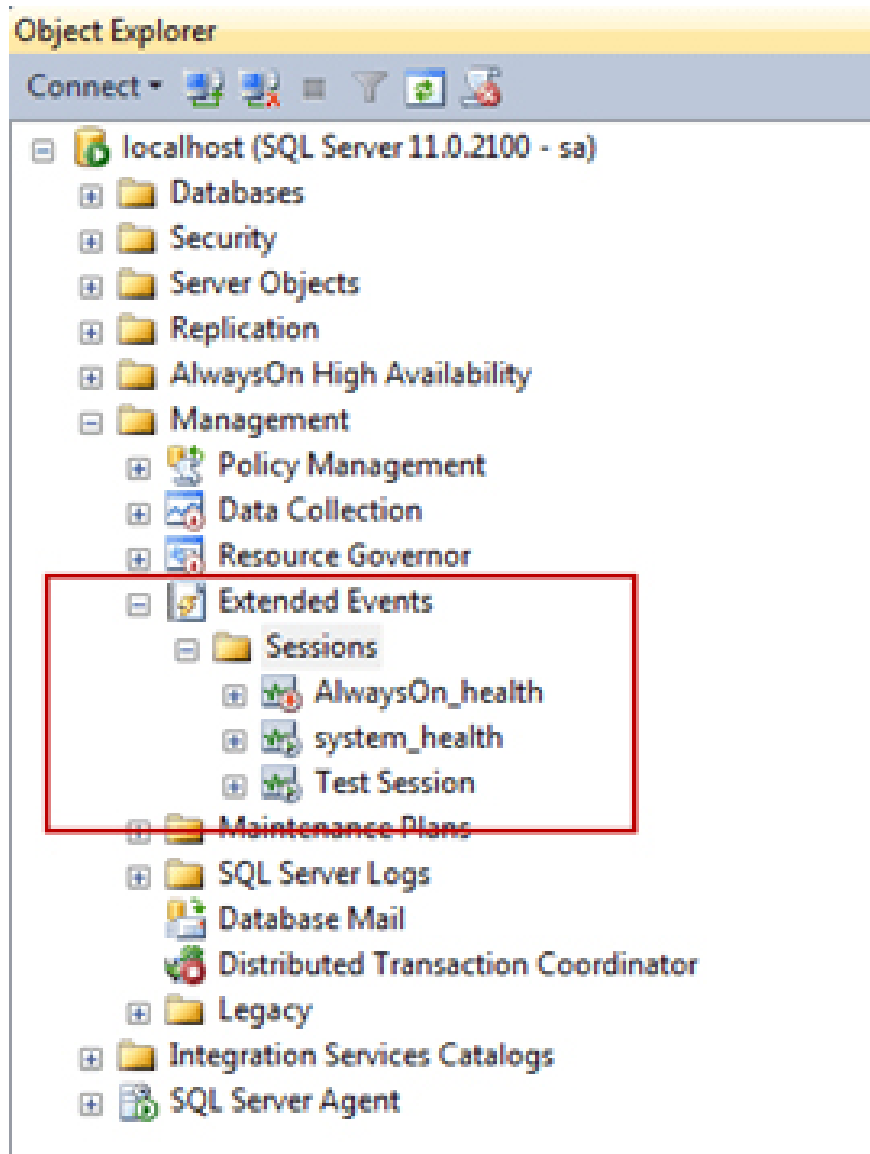
Advantages: provide detailed data information.

Disadvantages: Users must activate this tool manually.

4. SQL Server Extended Events

SQL Profiler has been replaced with SQL Server Extended Events, which has frustrated many users. Extended Events operate through Event Tracing (ETW), which is a common way that Microsoft does for all of its technologies to deliver diagnostic data.

ETW offers much more flexible features. As a developer, you can easily touch ETW events from SQL Server to collect data for custom purposes.



Advantages : Easy to activate and run.

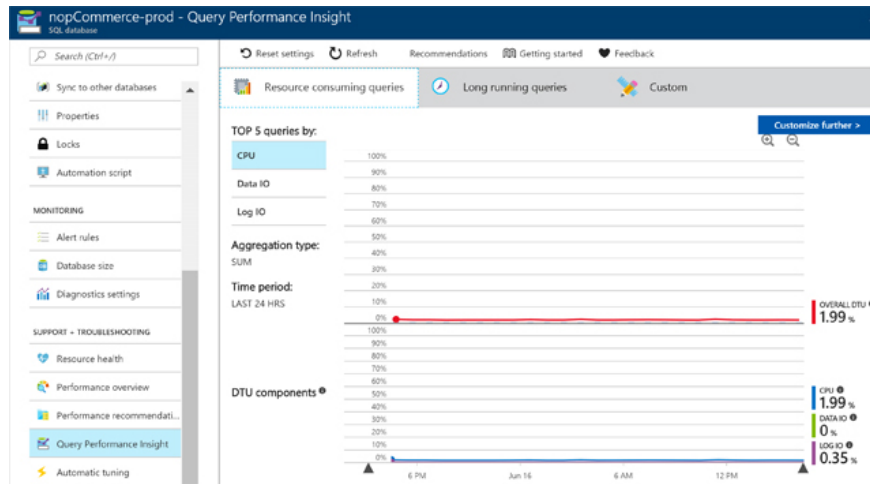
Disadvantages: Because this tool is quite new, not many people know about it.

5. Query Performance Insight for SQL Azure database

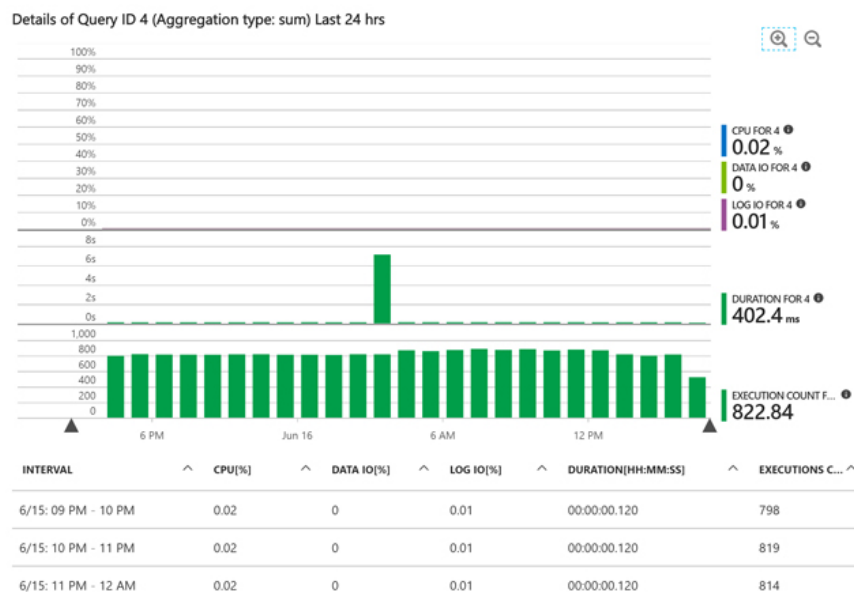
In the Azure Portal, you can access a variety of useful performance reports and optimization tips.

Note: These reports are only available for databases stored on SQL Azure.

In the screenshot below, you can see that SQL Azure easily uses queries that use most CPU, Data IO and Log IO. In addition, there are some excellent basic reports built in.



You can also choose a specific query to get detailed information that helps adjust SQL performance.



Advantages : Provide detailed basic information.

Disadvantages: Only works on Azure, not reported on multiple databases.

See more:

1. Install SQL Server 2008
2. Install SQL server 2016 from the Installation Wizard (Setup)
3. Segment tables in SQL Server

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