**Write a short essay, plus screenshots talking about performance tuning in SQL Server. Must include Tuning Advisor, Extended Events, DMV, Logs and Execution Plan.**

Tuning advisor is a great tool to research and come up with some potential recommendations on how we can help address the issue of queries running slowly in database

SQL Tuning advisor takes one or more SQL statements as an input and invokes the automatic tuning optimizer to perform SQL tuning on the statements. The output takes the form of advice or recommendation and its expected benefit. The recommendation relates to a collection of statistics on objects, creation of new indexes, restructuring of the SQL statement, or creation of a SQL profile. And then we can choose to accept the recommendation to complete the tuning. The database can automatically tune SQL statements by identifying problematic statements and implementing recommendations using SQL tuning advisor during system maintenance windows.

Take assignment 7 as an example, cause this query runs slow.

Click Query and then choose ‘analyze query in database engine tuning advisor’ to open it.

Graphical user interface, text, application, email

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Then we choose what we want to analyze in general and tuning options. When we are happy with everything we want to analyze. We can click ‘start analysis’. Here is the result. If I do the six recommendations, it thinks I can get a 75% improvement in this query runs.

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There are six recommendations, including creating new indexes and new statistics. And in the report, we can see the detail of it.

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The ‘definition’ in ‘recommendation’ can give us the code how to do the recommendation. We can copy it.

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Extended events is a replacement for sql server profiler. We can find it in management.

Graphical user interface, application

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With green triangle, the sessions are running. With red square, the session is stopped.

We can right click session to watch live data.

Graphical user interface, text, application

Description automatically generated

Extended events is far less resources intensive. And we can also create our own session by right clicking. This is the new session wizard. We can use the templates it provides, like count the locks.

Graphical user interface, application

Description automatically generated

After we finishing it. We can stat and stop the session whenever we want.

This the creating new session. We can filter events by key words or category.

Graphical user interface, application

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And move it to ‘selected events’.

Graphical user interface, application

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By clicking the ‘configure’, then it shows the data we can gather. And we can choose what we want exactly.

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DMV (dynamic management views) is a collection if views to see how the system is generic work. It returns server state information that can be used to monitor the health of a server instance, diagnose problems, and tune performance.

By using SQL server logs help access information about errors and events that are captured. It’s in management. SQL Server allows the configuration of up to 6 to 99 error log files. But we can change the default number of error log files in congiration.

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The SQL Server error log file has information, warning, and critical messages of an instance. It is helpful for troubleshooting, audit logins (success, failure). The database administrator can configure the number of required archived error logs and directories to store these files.

We can use Execution plan to review the performance of specific queries that it executes. Click ‘Query’ and choose ‘display estimated execution plan’ or ‘include actual execution plan’ or ctrl plus L. We can see the execution plan. It tells us the flow of the query and let us know how a query will execute on the database engine to return some results.

We should find if any table scan. If it happens, that means we have missing index which make it have to scan the whole table to get data. And if it shows high percentage, we should find if there is any possible way to improve the performance. What we need to do is make it smaller.

We run the execution plan to see what’s taking most of the time and see if there’s a way we can smooth out that process. This gives us an idea where it is in our queries that causing our system to slow down.

Text

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