Diagnosing Storage and Memory-related Database Issues

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Module Overview

Storage and memory-related database queries

Interpreting query results

Alleviating storage and memory-related database Issues

Buffer Usage

Buffer usage by object for current database

Shows buffer counts and memory usage

Returns row counts for tables

Buffer Usage

Shows which tables and indexes are using the most memory in the buffer pool

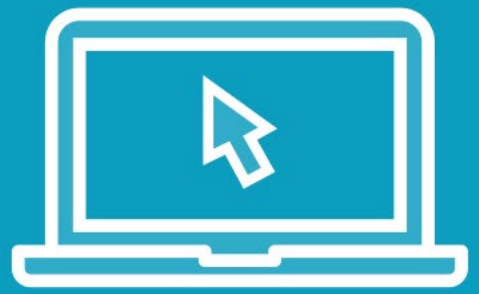
Monitor these metrics after making index or data compression changes

This query can help identify possible data compression candidates

This query can take some time to complete on a large database

Also useful to help identify index and query tuning opportunities

Demo



Buffer Usage

SP Logical Reads

Top cached SPs ordered by logical reads

Look for “Has Missing Index” column

Look at graphical execution plan

SP Logical Reads

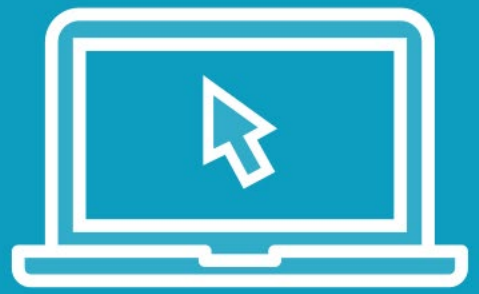
Identifies which cached stored procedures in current database are causing memory pressure

Helps identify query / index tuning opportunities to reduce memory usage

Look at graphical query plan to help understand what queries are doing

“TotalLogicalReads” value usually tapers off quickly for top consumers

Demo



SP Logical Reads

High Aggregate Logical Read Queries

Highest aggregate logical read queries over last hour

Query Store must be enabled for this query to return results

Helps identify source of recent memory pressure

High Aggregate Logical Read Queries

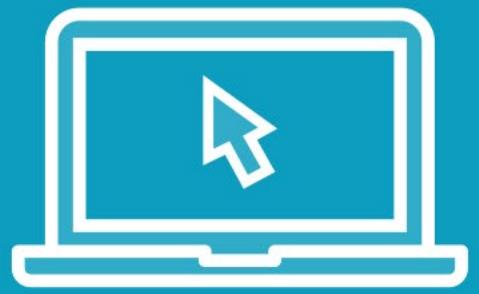
Returns information from Query Store for current database

Focus on top five results first as total logical reads usually decrease rapidly

Make note of queries with parallel plans that may be tunable

Look at graphical execution plans for expensive queries

Demo



High Aggregate Logical Read Queries

I/O Statistics By File

I/O statistics by file for current database

Shows location and size on disk for each database file

Returns metrics about read and write activity

I/O Statistics by File

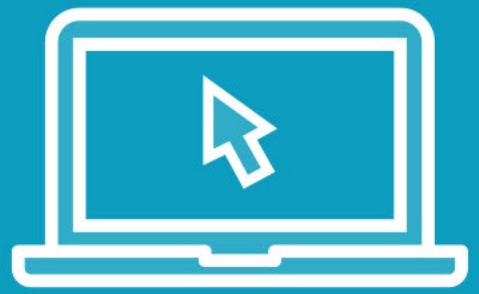
Helps understand I/O workload by file for current database

Useful for design, configuration, and tuning purposes

Cumulative since last SQL Server service start

Include all activity against database files, not just regular workload

Demo



I/O Statistics By File

SP Physical Reads

Top cached SPs ordered by physical reads

Look for “Has Missing Index” column

Look at graphical execution plan

SP Physical Reads

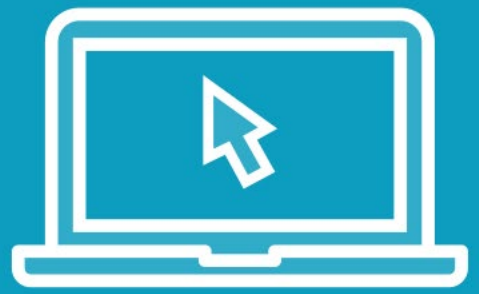
Identifies which cached stored procedures in current database are causing read I/O pressure

Helps identify query and index tuning opportunities to help reduce physical I/O usage

Look at graphical query plan to understand what queries are doing

“TotalPhysicalReads” value usually tapers off quickly for top consumers

Demo



SP Physical Reads

SP Logical Writes

Top cached SPs ordered by logical writes

Look for “Has Missing Index” column

Look at graphical execution plan

SP Logical Writes

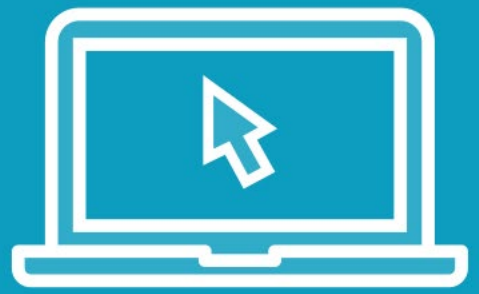
Identifies which cached stored procedures in current database are causing write I/O pressure

Helps identify query/index tuning opportunities to reduce logical writes

Look at graphical query plan to help understand what queries are doing

TotalLogicalWrites value usually tapers off quickly for top consumers

Demo



SP Logical Writes

Top I/O Statements

Identifies statements within queries and SPs

Helps isolate cause of I/O pressure

Helps identify query and index tuning candidates

Top I/O Statements

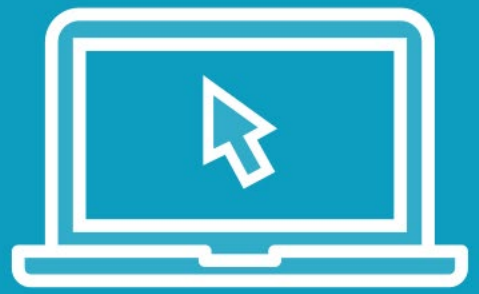
Returns SP Name, Avg I/O, Execution Count, and Query Text

Focus tuning efforts on SPs with highest average I/O

Consider execution counts as you prioritize your tuning efforts

Query Text column is actual statement generating the high average I/O

Demo



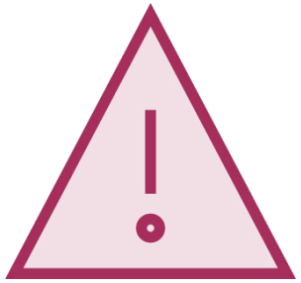
Top I/O Statements

What We Covered

- Storage and memory-related database queries
- Interpreting query results
- Alleviating storage and memory-related database issues

What now?

Course Summary



Many SQL Server instances have performance issues

DMV queries can detect most performance issues

Proper tuning and configuration gives better performance

Use best practice configuration settings as a baseline