Seminar 5 - 921 (8.05.2025)

### Performance Tuning in SQL SERVER

QUIZ: Under which concurrency model are you able to replicate the UPDATE CONFLICT?

1. Identify waits at the server level (locks, transaction logs, I/O, etc.)
2. Correlate waits with queues
3. Drill down to db/ file level
4. Drill down to process level
5. Tune problematic queries
6. sys.dm\_os\_wait\_stats

- Wait\_type - resource waits (locks, latches, network, I/O)

- queue waits

- external waits (stored procedures)

- waiting\_tasks\_count

- wait\_time\_ms

- max\_wait\_time\_ms

- signal\_wait\_time\_ms

DBCC SQLPERF(‘sys.dm\_os\_wait\_stats’, CLEAR)

1. Sys.dm\_os\_performance\_counters

- object\_name (category of the counter)

- counter\_name

- instance\_name

- cntr\_value

- cntr\_type - 65792, value represent the actual value

- 272696576, value is time-cumulative, need to use additional table or logs to get intermediate values

- 537003264, value is useless, needs to be divided by a base (ratio or percentage)

- 1073874176 (cv1) and 1073939712 (bv1) at t1

After t2 seconds

Cv2 and bv2

UnitsPerSec = (cv2-cv1) / (bv2-bv1) / (t2-t1)

E.g., Locks, General Statistics, Transactions, Sql Errors, Buffer Manager, Plan Cache, ….

1. Sys.dm\_io\_virtual\_file\_stats

- return I/O info about the data and the log files

- parameters: database id (DB\_ID - function)

File id (FILE\_IDEX - function)

- returned table:

- database\_id

- file\_id

- sample\_ms

- number\_of\_reads

- number\_of\_bytes\_read

- io\_stall\_read\_ms

- number\_of\_writes

- number\_of\_bytes\_written

- io\_stall\_write\_ms

- io\_stall

-file\_handle

1. - analyze the batches (GO - batch separator), procedures, queries, …

- patterns

- LEFT function

- parser

- SQL Server Profiler

1. Indexes (see seminar 5, Databases)

- structure used to optimize the access to the table

- impact on queries: filtering, joining, sorting, grouping etc. Deadlock avoidance and blocking

- types: clustered/ nonclustered,

Unique / non-unique

Single-column / multi-column

Covering index

Indexed views (seminar 7, Databases)

...

- the query optimizer may use more multi-col indexes or covering indexes to cover the query

- when adding indexes there is a need to take into account how often SELECT queries are performed compared to INSERT/ DELETE/ UPDATE operations

Tools to Analyze the query Performance

- graphical execution plan

- STATISTICS IO

- STATISTICS TIME

- STATISTICS XML

- STATISTICS PROFILE

- SHOWPLAN\_TEXT

- SHOWPLAN\_ALL

- SHOWPLAN\_XML

Query Optimization:

- evaluate the execution plans

- look for physical vs logical operations

Optimization:

- search predicate

- joined tables

- join conditions

- list of indexes

- size of the result set

Goal: avoid the most inefficient queries

SQL Server has a cost-based query optimizer