The World's Largest Community of SQL Server Professionals

SQL Server Optimization Checklist

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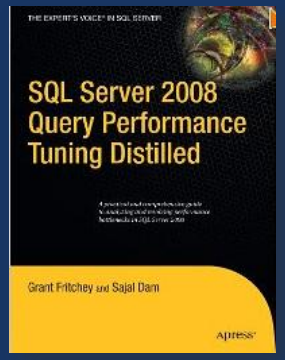
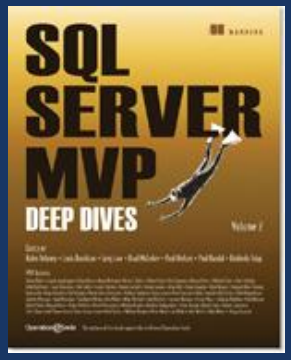
Who?

- Product Evangelist for Red Gate Software
- Microsoft SQL Server MVP
- Author:
  - SQL Server Execution Plans
  - SQL Server 2008 Query Performance Tuning Distilled
  - Chapter in SQL Server MVP Deep Dives Volume 2





Goal

- Describe common and recognizable types of performance issues in order to provide best practices to avoid or mitigate them.

Test

Test

Test

Test

Test

Remember

- This is focused on performance tuning
- There are always exceptions
- Your situation may be different
- Did I mention test?
- Incremental changes
- Monitor your servers

Nested Table Valued User Defined Functions

- Problem
  - User defined functions that call user defined functions that call…
- Identification
  - Simplistic execution plans
  - Unrealistic costs in execution plans
  - Very slow performance
- Resolution
  - Use properly structured queries

Cost Threshold for Parallelism

- Problem
  - Simple queries execute in parallel
- Identification
  - Cost Threshold for Parallelism set to default (5)
  - Parallel plans for simple queries
  - Excessive cxpacket waits (not automatically bad)
  - Excessive queuing on CPU
- Resolution
  - Increase Cost Threshold
  - Simplify queries

Ad Hoc TSQL

- Problem
  - Memory problems caused by ad hoc tsql or bad ORM code
- Identification
  - Very low plan cache hit ratio
  - Excessive compile events
  - Very low page life expectancy
- Resolution
  - Work with ORM tool to resolve issues
  - Use stored procedures or parameterized queries
  - Enable ‘Optimize for Ad Hoc Workload’

Everything on One Disk

- Problem
  - Disk queuing due to all data and logs being on a single disk
- Identification
  - Excessive disk queues
  - Blocking from reads and writes
- Resolution
  - Increase the disks or LUNs on the system
  - Work with SAN team to ensure proper distribution

Blocking From Recompile

- Problem
  - Excessive, long-running, recompiles block system access
- Identification
  - Multiple blocked processes from single source
  - Wait on recompile
- Resolution
  - Reduce query complexity
  - Use table variables where applicable instead of temp tables
  - Use KEEP FIXED PLAN hint (but carefully)

Inappropriate Use of Query Hints

- Problem
  - FAST 1 query hint used everywhere
- Identification
  - Extremely simplistic execution plans
  - Execution plan shows estimated 1 row
- Resolution
  - Remove the hint
  - Deal with performance problem directly

Inappropriate Use Of Query Hints 2

- Problem
  - NO_LOCK query hint used everywhere
- Identification
  - Incorrect data returned
  - Extra rows
  - Missing rows
- Resolution
  - Remove the hint
  - Enable a type of snapshot isolation
  - Tune queries and indexes to reduce blocking

Removing Normalization

- Problem
  - Removing foreign key constraints to speed up inserts slows down reads
- Identification
  - Bad data due to missing constraints
  - Overly complex execution plans due to missing simplification step
- Resolution
  - Use foreign key constraints
  - Also use primary key and unique constraints

Indexes Don't Help Performance

- Problem
  - Adding an index doesn't speed up queries or it slows them down
- Identification
  - Execution plan ignores index
  - Execution plan changes to something unexpected
- Resolution
  - Verify index will help query
  - Validate that data supports selectivity

Applying Missing Indexes Doesn't Help

- Problem
  - Missing index recommendations are applied without knowledge or testing
- Identification
  - Indexes named [<Name of Missing Index, sysname,>]
  - Duplicate indexes
  - Excessive number of indexes
- Resolution
  - Test missing index suggestions
  - Validate need for all indexes

Deadlocks Hurt Performance

- Problem
  - Performance impact due to large number of deadlocks
- Identification
  - Deadlock errors in log
  - Complaints from users and errors in application
- Resolution
  - Reduce contention
  - Ensure processing order
  - Reduce execution time

Excessive Indexes Hurt Performance

- Problem
  - An index has been created on every column in the table
- Identification
  - Indexes never touched in sys.dm_db_index_usage_stats (but be careful)
- Resolution
  - Remove extraneous and unnecessary indexes
  - Do not add indexes without cause

Checklist

- Exercise in caution when nesting functions and views
- Change default settings for cost threshold for parallelism
- Enable ‘optimize for ad hoc workload’
- Distribute storage to multiple disk locations
- Write TSQL to avoid unnecessary recompiles
- Use query hints sparingly and appropriately
- Use normalization, primary key, foreign key and unique constraints
- Add indexes judiciously
- Test missing index suggestions carefully
- Deadlocks are a performance issue and must be dealt with

Goal

- Describe common and recognizable types of performance issues in order to provide best practices to avoid or mitigate them.

Resources

- Scarydba.com\presentation-resources

- Microsoft SQL Server 2008 Internals
  Kalen Delaney et al
- SQL Server MVP Deep Dives Vol I & II
  Kalen Delaney et al
- Inside SQL Server 2008 T-SQL Querying
  Itzik Ben Gan et al
- Brad's Sure DBA Checklist

Questions?

How would you… ?

What happens when… ?

Why does… ?

When do I… ?

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