Deltek

Deltek Maconomy®

SQL Server Setup Best Practice

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Contents

Introduction

This guide provides recommendations and best practices for the setup and configuration of SQL Server when used with Maconomy.

The guide is divided into three parts:

- Part 1—Covers storage / disk configuration.
- Part 2—Covers SQL Server instance configuration
- Part 3—Covers database configuration

Note: All information in this document, unless otherwise noted, is as Deltek recommends (sometimes noted as "we recommend").

Part 1—Storage/Disk Configuration

Disk Block Size

Deltek recommends an allocation size of 64 KiB for devices used for storage of database files, including tmpdb (but not required for the modeldb and systemdb), and log files.

Part 2—SQL Server Instance Configuration

Ad-Hoc Workload Optimization

Deltek recommends enabling **Optimize for Ad-Hoc Workloads.**

When to Change Settings, and When to Activate

Deltek recommends only changing the settings (as listed in the next section) outside normal operation hours, when traffic is low on the system.

The change itself (*SP_CONFIGURE* and *RECONFIGURE* commands) does not directly disrupt SQL Servers handling of queries.

However, the *RECONFIGURE* command clears the plan cache from all compiled queries, and may result in what appears as slower performance because all new queries must complete a plan compilation.

When multiple changes are applied, Deltek recommends performing all the changes on the database instances (involving ALTER DATABASE commands) prior to this change.

Configuration Change

Configure **Optimize for ad hoc workloads** on the SQL Server Instance either in sqlcmd or in SQL Management Studio.

To configure in sqlcmd:

```
SP_CONFIGURE 'Show Advanced Options', 1
GO
RECONFIGURE
GO
SP_CONFIGURE 'optimize for ad hoc workloads', 1
GO
RECONFIGURE
GO
```

To configure in SQL Management Studio:

1. Select the SQL Server Instance.

2. Right-click, and select **Properties** from the menu**.**

3. Select **Advanced** page.

4. Scroll to **Miscellaneous.**

5. Change **Optimize for Ad hoc Workloads** to **True**.

Cost Threshold for Parallelism

Deltek recommends setting **Cost Threshold for Parallelism** to 50.

When to Change Settings, and When to Activate

Deltek recommends only changing the settings (as listed in the next section) outside normal operation hours, when traffic is low on the system.

The changes themselves (*EXEC sp_configure* and *RECONFIGURE* commands) do not directly disrupt SQL Servers handling of queries.

However, the *RECONFIGURE* command clears the plan cache from all compiled queries, and may result in what appears as slower performance because all new queries must complete a plan compilation.

When multiple changes are applied, Deltek recommends performing all the changes on the database instances (involving ALTER DATABASE commands) prior to making changes.

Change Settings

The change applies to the server instance, and not individual databases. Make updates either in sqlcmd or SQL Server Management studio.

To make changes in sqlcmd:

```
EXEC sp_configure 'show advanced options', 1 ;
GO
RECONFIGURE
GO
EXEC sp_configure 'cost threshold for parallelism', 50 ;
GO
RECONFIGURE
GO
```

To make changes in SQL Server Management studio:

1. Select the SQL Server instance.

2. Right-click, and select **Properties** from the menu**.**

3. Select the **Advanced** page.

4. Scroll to **Parallelism**.

5. Change **Cost Threshold for Parallelism** to **50**.

Part 3—Database Configuration

Arithabort and ANSI Warnings

To get consistent results with cached execution plans from Maconomy and SQL Server Management Studio, Deltek recommends enabling both **Arithabort** and **ANSI Warnings**.

When to Change Settings, and When to Activate

Deltek recommends only changing the settings (as listed in the next section) outside normal operation hours, when traffic is low on the system.

The change itself (*ALTER DATABASE* command) does not directly disrupt SQL Servers handling of queries. It applies to new queries, and only affects the plans stored in the query cache following the change.

However, the DBCC FREEPROCCACHE command clears the plan cache from all compiled queries, and may result in what appears as slower performance because all new queries must complete a plan compilation.

When multiple changes are applied, Deltek recommends performing all the change actions (in this case, *ALTER DATABASE*) before invoking *DBCC FREEPROCCACHE*.

Configuration Change

Make the DBCC FREEPROCCACHE change either in sqlcmd or in SQL Server Management studio.

To make the change in sqlcmd:

```
ALTER DATABASE <DatabaseName> SET ANSI_WARNINGS ON
ALTER DATABASE <DatabaseName> SET ARITHABORT ON
```

Clear the plan cache (which may be postponed until all changes are made):

```
 DBCC FREEPROCCACHE
```

To make the change in SQL Server Management studio:

1. Select the database, right-click, and select **Options** from the menu.

2. Scroll down to **Miscellaneous**.

3. Change **ANSI Warnings Enabled** to **True.**

4. Change **Arithmetic Abort Enabled** to **True**.

To clear the plan cache (which may be postponed until all changes are made):

1. Open a query window, and paste in:

```
DBCC FREEPROCCACHE
```

2. Execute the statement.

Compatibility Level

In general, Deltek recommends using the default (highest possible) Compatibility Level for the databases.

This is automatically the case for any database created after upgrade of SQL Server to a newer version.

For existing databases, the compatibility level is not changed (unless it no longer is supported, in which case, the lowest supported compatibility level is used).

Deltek recommends, after an SQL Server upgrade, verifying the behavior and performance with the old compatibility level as first step. After, change the compatibility level to the default one and repeat the verifications.

Any performance problems may require enabling optimizer fixes (see next section).

Optimizer Fixes

Deltek follows the recommendations from Microsoft, which is to enable optimizer fixes only if a performance problem is detected.

Optimizer Fixes Enabled by Compatibility Level

Note: From SQL Server 2016, using a compatibility level different than default also enables any Optimizer fixes which were available at release time (RTM) of the SQL Server installed for the SQL server corresponding to the compatibility level.

This means that installing SQL Server 2019 (15.x) and setting the compatibility level to 110 enables all Optimizer fixes made to SQL Server 2012 (11.x) prior to 2020-01-07 (RTM of SQL Server 2019), without using Traceflag 4199.

This may lead to different execution plans, compared with the original SQL Server 2012, if Traceflag 4199 was not active (or if the system had Service Packs and CUs installed which were released either before or after RTM of SQL Server 2019).

Quoted Identifier

Deltek recommends enabling Quoted Identifier on each database instance.

When to Change Settings, and When to Activate

The change to QUOTED_IDENTIFIER on the database only takes effect on new connections, and does not directly affect performance.

Configuration Change

Make the change either in sqlcmd or SQL Server Management studio.

To make the change in sqlcmd:

```
ALTER DATABASE <DatabaseName> SET QUOTED_IDENTIFIER ON
```

To make the change in SQL Server Management studio:

1. Select the database, right-click, and select **Properties** from the menu**.**
2. Select the **Options** page.
3. Scroll to **Miscellaneous**.
4. Change **Quoted Identifiers Enabled** to **True**.

Force Parameterize

Deltek recommends setting PARAMETERIZE to FORCED.

When to Change Settings, and When to Activate

Deltek recommends only changing the settings (as listed in the next section) outside normal operation hours, when traffic is low on the system.

The change itself (*ALTER DATABASE* command) does not directly disrupt SQL Servers handling of queries. It applies to new queries, and only affects the plans stored in the query cache following the change.

However, the DBCC FREEPROCCACHE command clears the plan cache from all compiled queries, and may result in what appears as slower performance, because all new queries must complete a plan compilation.

When multiple changes are applied, Deltek recommends performing all the change actions (in this case *ALTER DATABASE*) before invoking *DBCC FREEPROCCACHE*.

Configuration Change

Make the configuration change either in sqlcmd or SQL Server Management studio.

To make the change in sqlcmd:

```
ALTER DATABASE <DatabaseName> SET PARAMETERIZATION FORCED
```

Clear the plan cache (which may be postponed until all changes are made):

```
 DBCC FREEPROCCACHE
```

To make the change in SQL Server Management studio:

1. Select the database, right-click, and select **Properties** from the menu.

2. Select the **Options** page,

3. Select **Miscellaneous**.

4. Change **Parameterization** to **Forced**.

5. Clear the plan cache (which may be postponed until all changes are made):

6. Open a query window, and paste in:

```
DBCC FREEPROCCACHE
```

7. Execute the statement.

Max Degree of Parallelism (Max DOP)

Deltek recommends setting MAXDOP to half of the logical processors per NUMA node, with a max of 8 for hosts with a single NUMA node, and a max of 16 for hosts with multiple NUMA nodes.

When to Change Settings, and When to Activate

Deltek recommends only changing the settings (as listed in the next section) outside normal operation hours, when traffic is low on the system.

The change itself (*ALTER DATABASE SCOPED CONFIGURATION* command) does not directly disrupt SQL Servers handling of queries.

However, the ALTER DATABASE SCOPED CONFIGURATION command clears the plan cache from all compiled queries, and may result in what appears as slower performance, because all new queries must complete a plan compilation.

When multiple changes are applied, Deltek recommends performing all the other A*LTER DATABASE* operations prior to the *ALTER DATABASE SCOPED CONFIGURATION* or changes containing *DBCC FREEPROCCACHE*.

Change Settings on Database Level

Change settings on database level either in sqlcmd or in SQL Server Management studio.

To make the changes in sqlcmd:

```
USE <DatabaseName>
ALTER DATABASE SCOPED CONFIGURATION SET MAXDOP <MAXDOP-Value>
```

To make the changes in SQL Server Management studio:

1. Select the database, right-click, and select **Properties** from the menu*.*
2. Select the **Options** page.
3. Scroll to **Database Scoped Configuration.**
4. Change **Max DOP** to **<MAXDOP-value>**, as detailed above.

Disable Lock Escalation

Deltek recommends disabling the lock escalation on all tables.

> **Note:** Lock escalations are disabled by default on installations of Maconomy using MConfig 9.8+.

When to Change Settings

Deltek recommends only changing the settings (as listed in the next section) outside normal operation hours, when traffic is low on the system.

The change itself (*ALTER DATABASE SET [LOCK_ESCALATION=Disable]* is done automatically by MConfig) and does not directly disrupt SQL Servers handling of queries.

Change of Configuration

1. Start MConfig version 9.8 (or later), navigate to the Application instance on which you must disable the Lock Escalation, and click **Edit**.

2. At the prompt for the database (db) administrator password (sa), provide the password. After, any table which did not have LOCK_ESCALATION disabled now has it disabled.

3. Click **OK** to exit the Application instance configuration dialog, (and MConfig, if you do not need to disable lock escalation for other application instances).

4. Verify the change made by MConfig by inspecting the MaconomyServerInstallation.log found in the subdir <maconomy-root>\MaconomyInstallLogs, where you will find lines as below:

```
[<time>] [<sessid>] Running SQL statement "select count (*) from sys.tables"
for database user w20m20c

[<time>] [<sessid>] Running SQL script
'C:\Windows\TEMP\MConfigTemp\tmpSelect.sys.tables.msql.116.sql' for w20m20c,
outputfile: 'C:\Windows\TEMP\MConfigTemp\tmpSelect.sys.tables.msql.116.sql.out'

[<time>] [<sessid>] Running external process: "c:\program ...

[<time>] [<sessid>] Running SQL statement "select name from sys.tables" for
database user w20m20c

[<time>] [<sessid>] Running SQL script
'C:\Windows\TEMP\MConfigTemp\tmpSelect.sys.tables.msql.115.sql' for w20m20c,
outputfile: 'C:\Windows\TEMP\MConfigTemp\tmpSelect.sys.tables.msql.115.sql.out'

[<time>] [<sessid>] Running external process: "c:\program ...

[<time>] [<sessid>] Disabling lock escalation on 2 table(s) for shortname
w20m20c

[<time>] [<sessid>] Running SQL script
'C:\maconomy\w_20_0.m20c\MaconomyDir\Database\changeLockEscalation.202111091313
46.sql' for w20m20c, outputfile:
'C:\maconomy\w_20_0.m20c\MaconomyDir\Database\changeLockEscalation.202111091313
46.w20m20c.log'
```

Where*:*

`w20m20c`

is the db shortname for the application instance

`Disabling lock escalation on 2 table(s)`

indicates the number of tables with lock escalation disabled (in this example, 2 tables)

`'C:\maconomy\w_20_0.m20c\MaconomyDir\Database\changeLockEscalation.2021
1109131346.sql'`

is the sql script used to disable lock escalation.

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