

<https://github.com/dbaduck/Presentations/DataCon/SQLConfiguration>

SQL Server Configuration Best Practices

Ben Miller - DBADuck



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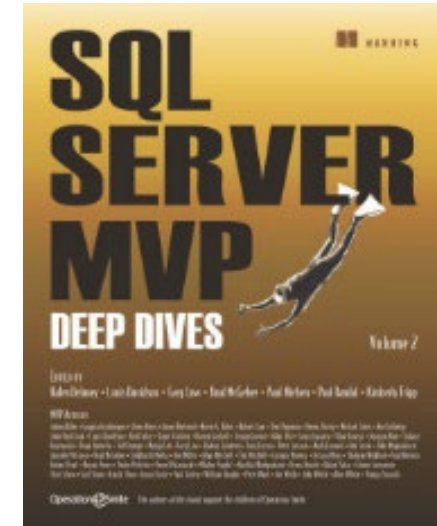
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Who is this Ben Miller/DBADuck person?



- Author, MVP, MCT, MCM
- PowerShell Trainer/Practitioner
- Consulting Company Owner
- @DBADuck everywhere on Social Media
- ben@benmiller.net (any time)
- <https://www.dbaduck.com>



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Agenda

- Operating System
- SQL Server Engine
- Database Configuration
- Management Best Practices
- Agent Best Practices

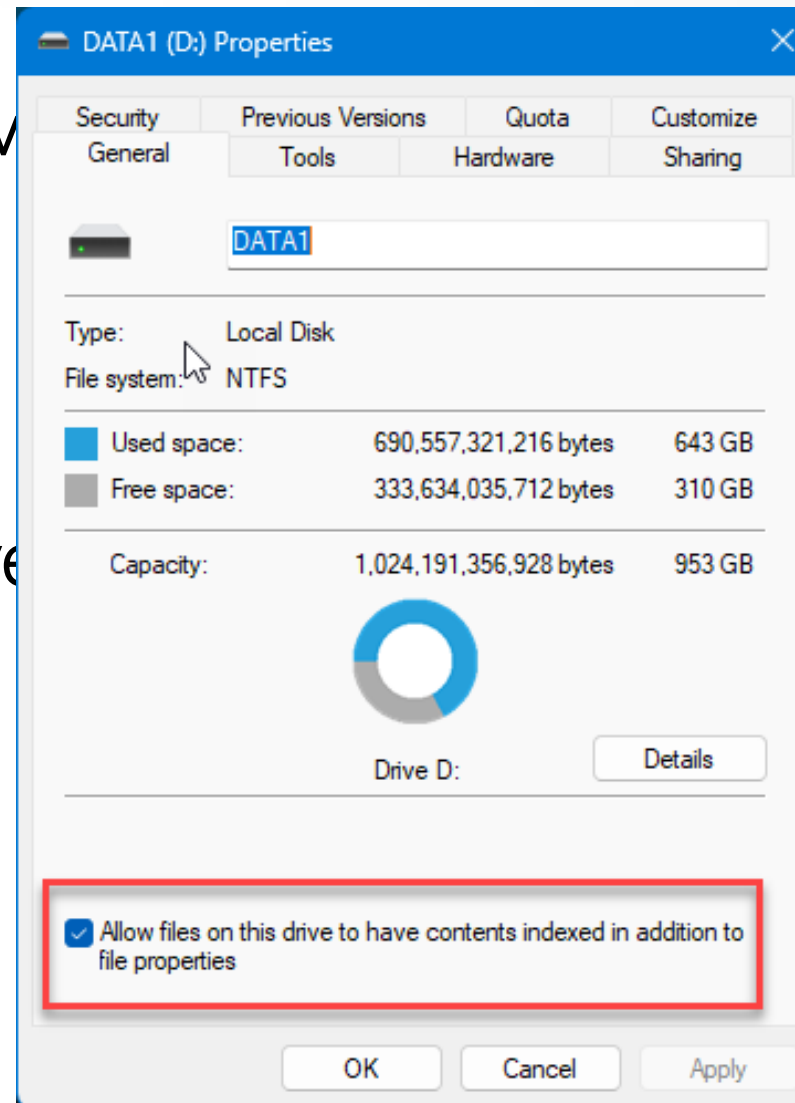
Operating System Detail

- Windows Server 2016+
 - SQL and Windows co-developed and has benefits together
- Windows Server 2019
- Windows Server 2022

- Drives at 64KB – NTFS
 - SQL works with data in 8x8KB pages (64KB)
 - If at default 4K then it is 16 reads of that many blocks to get to 64KB

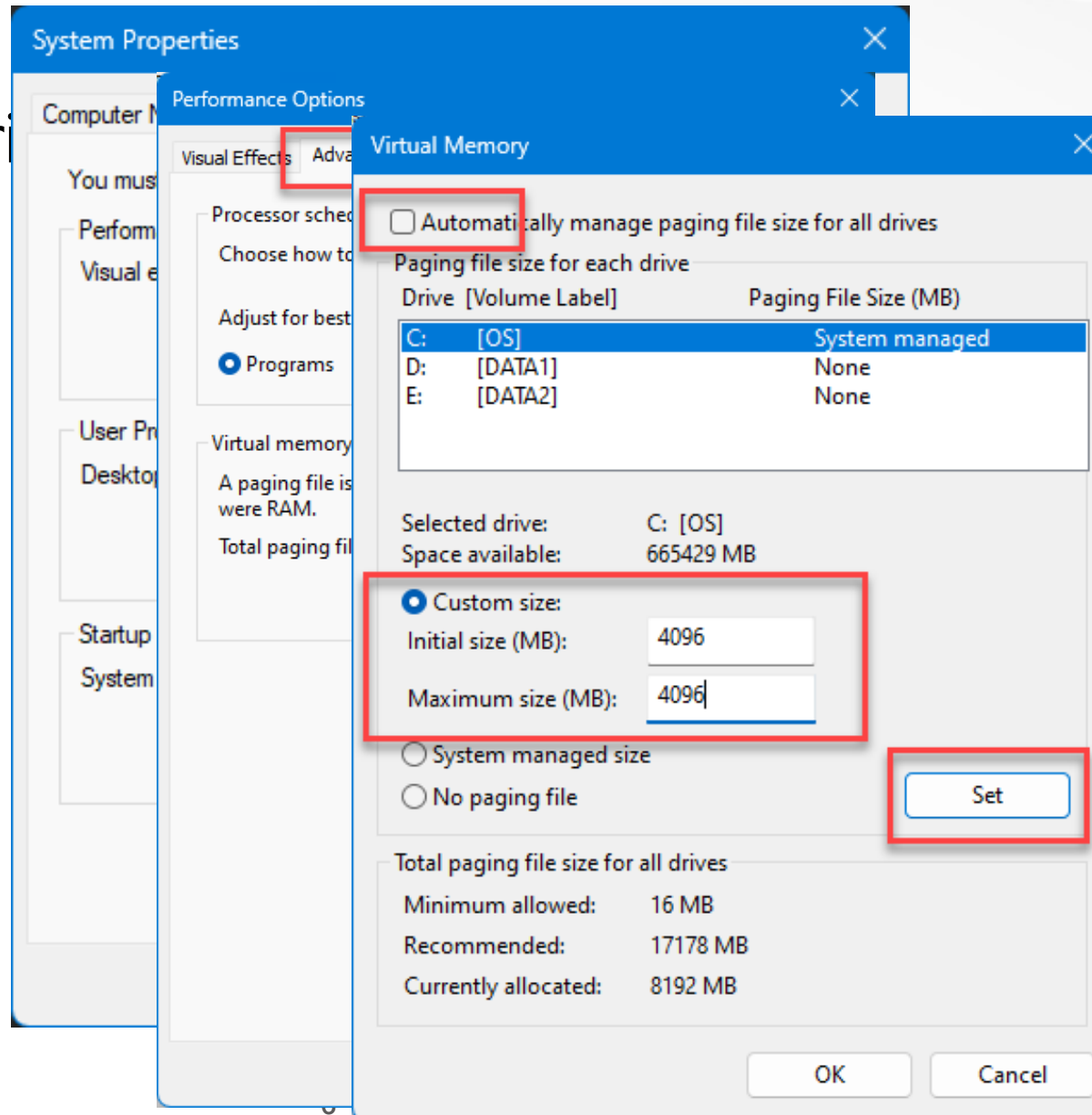
Operating System Detail

- Turn off Indexing on SQL Server
- No Data/Log Files on C:\ Drive



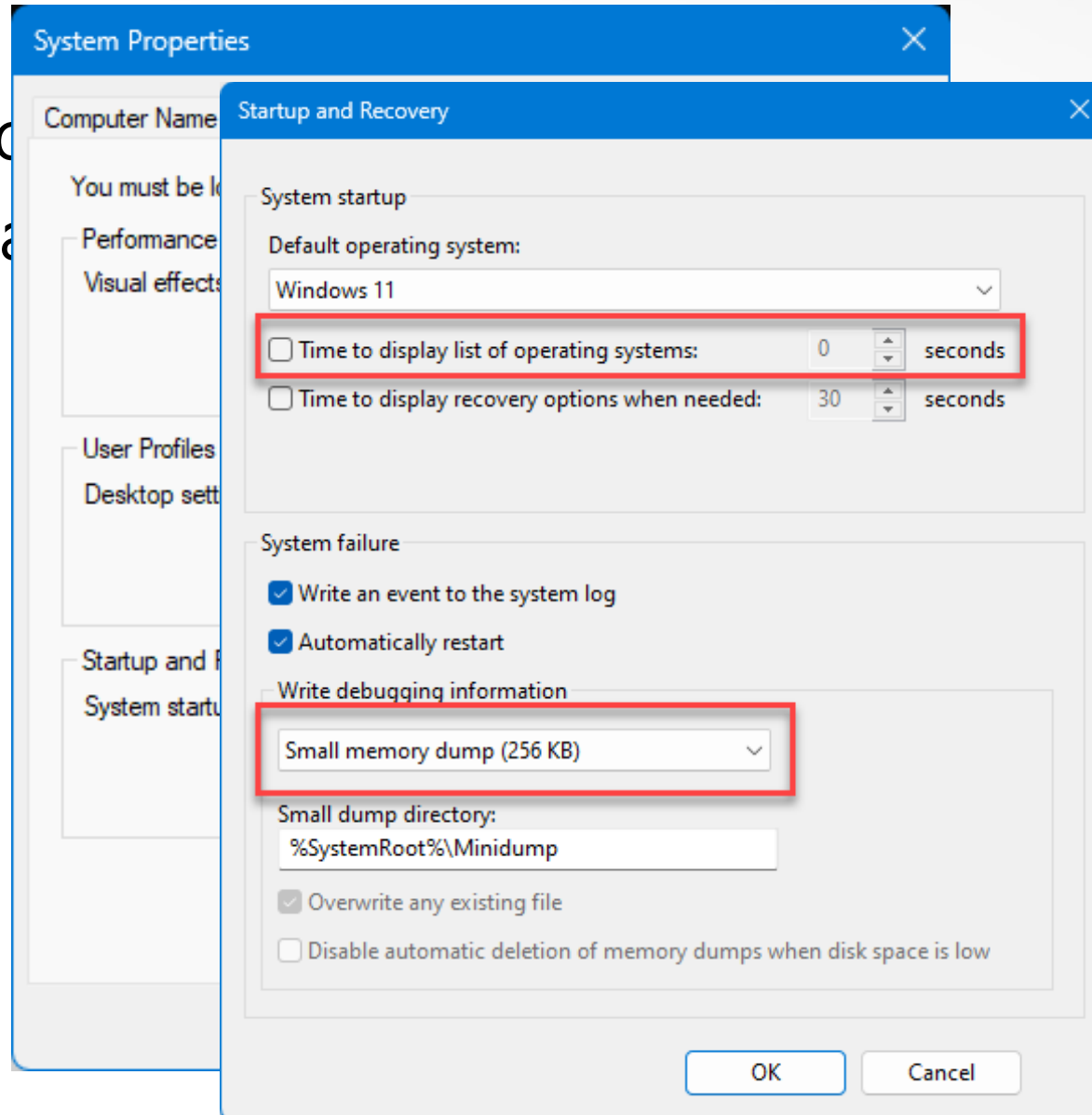
Operating System Detail

- Data/Log/TempDB Drive
- Page File fixed at 4GB



Operating System Detail

- Except for Clusters and
- Memory Dump to Small



Operating System Detail

- Service account as domain account or gMSA (Group Managed Service Account)
 - Especially the SQL Server Service Account
- Perform Volume Maintenance – Instant File Initialization
 - This is an option in Setup for 2016+ but always set it for quick expansion of database files (not applicable completely to Log files)
- Lock Pages in Memory
 - Typically set on VM computers, but I do it on physical too
 - Locks pages used in SQL Server in memory to protect against balloon driver reapers



Windows Server Configuration for SQL Server



SQL Server Configuration

- Sp_Configure options
 - Max server memory
 - Max DOP
 - Cost Threshold
 - Optimize for Adhoc Workloads
 - Backup Compression
 - Backup Checksum (later versions)
 - Remote Admin Connections

sp_configure options

- **Max server memory**
 - Do not leave it default (2PB) as you do not want tug of war between OS and SQL for memory
- **Max DOP**
 - Discussion and debatable. I typically set it to 4 for anything above 6 cores. And 2 for below 6 cores.
- **Cost Threshold**
 - NEVER leave it at default of 5 (story of how that came to be the number)
- **Optimize for Adhoc Workloads**
 - Always set it on, unless you prove that it is a bad thing. There is more to it but for the most part, this is my rule. (Query for adhoc)

sp_configure options

- Backup Compression

- For when someone uses BACKUP DATABASE and does not specify to compress.

- Backup Checksum (later versions)

- Introduced in SQL 2017 to allow you to have BACKUP DATABASE automatically put checksums in the backup if you don't specify it

- Remote Admin Connections

- VERY important to ensure that you can use the Remote Admin connection remotely instead of having to RDP into the instance to fix stuff.

Trace Flags

- Trace Flags are a great topic (2016 and below)
 - 1117 – Auto grow all files in a file group at the same time
 - 1118 – Eliminate Shared GAM allocations and only get Uniform Extents
 - 2371 – Auto update stats algorithm changes from 20% + 500
- The above are auto on in 2016+

TempDB Configuration

- Get Ready for some fun It Depends action....
- How many files?
 - Anywhere between 4 and 12. With servers that have 4-6 processors the count can be anywhere from 4 to 6. When you get to 8 processors, you can go up to 12. Beyond 8, I would start with 8 and see how the contention gets.
- How big?
 - All files should be the same size with the same auto grow. In SQL 2014 and below, ensure that you use Trace Flag 1117.

Database Configuration

- **Owner should be other than Windows Account**
 - Owners not existing can cause the database to not start up
 - (especially when there is CLR involved)
- **Auto Close Off**
 - This is a setting typically set on Express Instances. When migrating to SQL Standard and above, this should be changed
- **Auto Shrink Off**
 - This is also a setting typically on Express Instances. This should be turned off.

Database Configuration

- **Auto Create Statistics**
 - Should be turned on. It is default.
- **Auto Update Statistics**
 - Should be turned on, typically.
- **Allow Snapshot**
 - Alternative to NOLOCK
- **RCSI On**
 - Default in Azure. Allows 3 of 4 contention points to resolve.

Database Configuration

- Page Verify CHECKSUM
 - Corruption Detector – make sure it is on.
- Query Store ReadWrite
 - Query store options – 1000+ in size, 30 days of Stale Query
- Target Recovery Time (except master database)
 - All databases should be something other than 0 and master at 0. This is about log hammer.



SQL Server and Database Configuration



Management Configuration

- SQL Server Errorlogs – 31
 - Default is 6 and that can pass fast on a flip flop start stop storm
- Daily sp_cycle_errorlog at midnight
 - When reading logs with the Log Viewer having multiple days in the logs can cause slowness.
- Do NOT use Maintenance Plans
 - They are old, deprecated and have been known to generate invalid scripts. They also lack many options that you can do in other maintenance solutions.

Management Configuration

- Ola Hallengren Maintenance Solution
 - Backups, Index Optimize, Output files for each steps
- Configure DBMail even with multiple profiles/accounts
 - Ensure that you have this enabled for Alerts, Job Failures, etc.

SQL Agent

- Agent Properties
- Alerting
 - First configure settings in Agent Properties
- Operator
 - Create one which allows email
- Fail Safe Operator
 - Make one either the one above

SQL Server Agent Properties - sql01

Select a page

- General
- Advanced
- Alert System**
- Job System
- Connection
- History

Script ? Help

Mail session

- ☒ Enable mail profile
- Mail system: Database Mail
- Mail profile: SendMail
- Test...
- ☒ Save copies of the sent messages in the Sent Items folder

Pager e-mails

Address formatting for pager e-mails:

	Prefix:	Pager:	Suffix:
To line:		<input type="checkbox"/>	
Cc line:		<input type="checkbox"/>	
Subject:			

To:
Cc:
Subject:<Subject>

☒ Include body of e-mail in notification message

Fail-safe operator

- ☐ Enable fail-safe operator
- Operator: DefaultDBA
- Notify using: ☐ E-mail ☐ Pager

Token replacement

- ☐ Replace tokens for all job responses to alerts

OK Cancel

SQL Agent

- **Job Notifications**
 - Should be set on jobs that are critical enough to insure you are notified
- **Job History specifications**
 - By default, it is 1000 total lines of completion. This should be changed to something a little more relevant to today.
- **Backup History management**
 - Keep in mind sometimes ISO and SOC may need proof of backups happening, and you may want to keep it longer. If that is true and you need to remove history, you may want to archive to another database with the same schema to ensure that you have auditability.



SQL Management and Agent Configuration



Review

- Operating System
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- Management Best Practices
- Agent Best Practices

Thank You!

Q&A



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