SQL Server Best Practices

Everybody can have one,
a perfect SQL Server installation

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About me

trivadis
makes IT easier.

ANDRE ESSING

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Profile

DBA and Senior Consultant, Microsoft Certified Solutions Expert, Trainer and SQL Server Enthusiast

- Working in IT since 1998
- SQL Server since version 7.0
- Focus on SQL Server infrastructure and mission critical systems
- Microsoft Certified Trainer and MCSE: Data Platform
- Microsoft P-TSP Data Platform
- Friend of Redgate
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The Key for a Perfect System

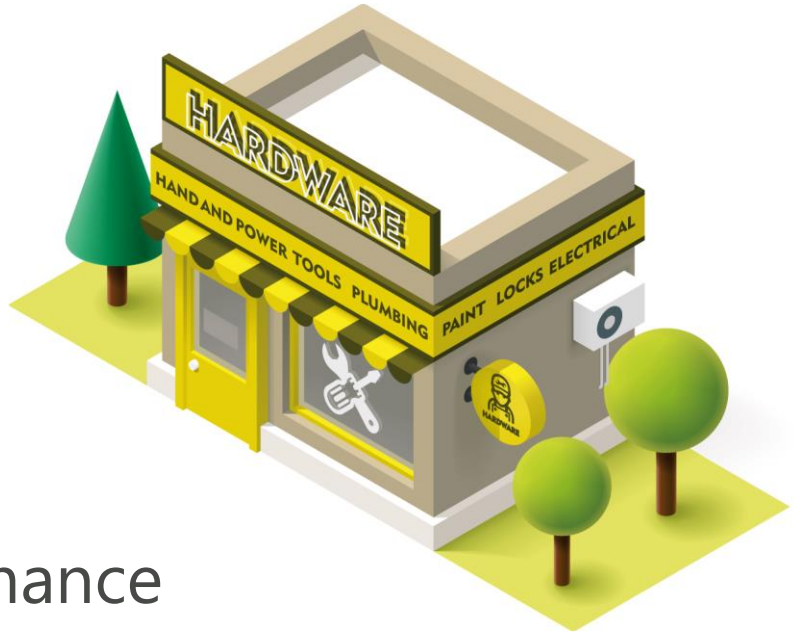
- The key is to build a balanced system without bottlenecks
- The SQL Server software is only a small part of the whole system

- Plan your system before you build it

PRE DEPLOYMENT

Hardware

- Hyper-Threading
  - 1 scheduler per logical core
  - Disable Hyper-Threading for “normal” workloads
- Energy settings
  - You want maximum performance
  - SQL Server licenses are expensive
  - Disable all settings about power savings



Storage

- Which kind of storage
  - Direct attached or SAN
  - HDD, SSD or Flash
  - RAID levels
  - Read caching isn't necessary
  - Prefer small disks
- Don't use thin provisioning
- Low read and write latency is important
  - Virtual disks are slower than physical

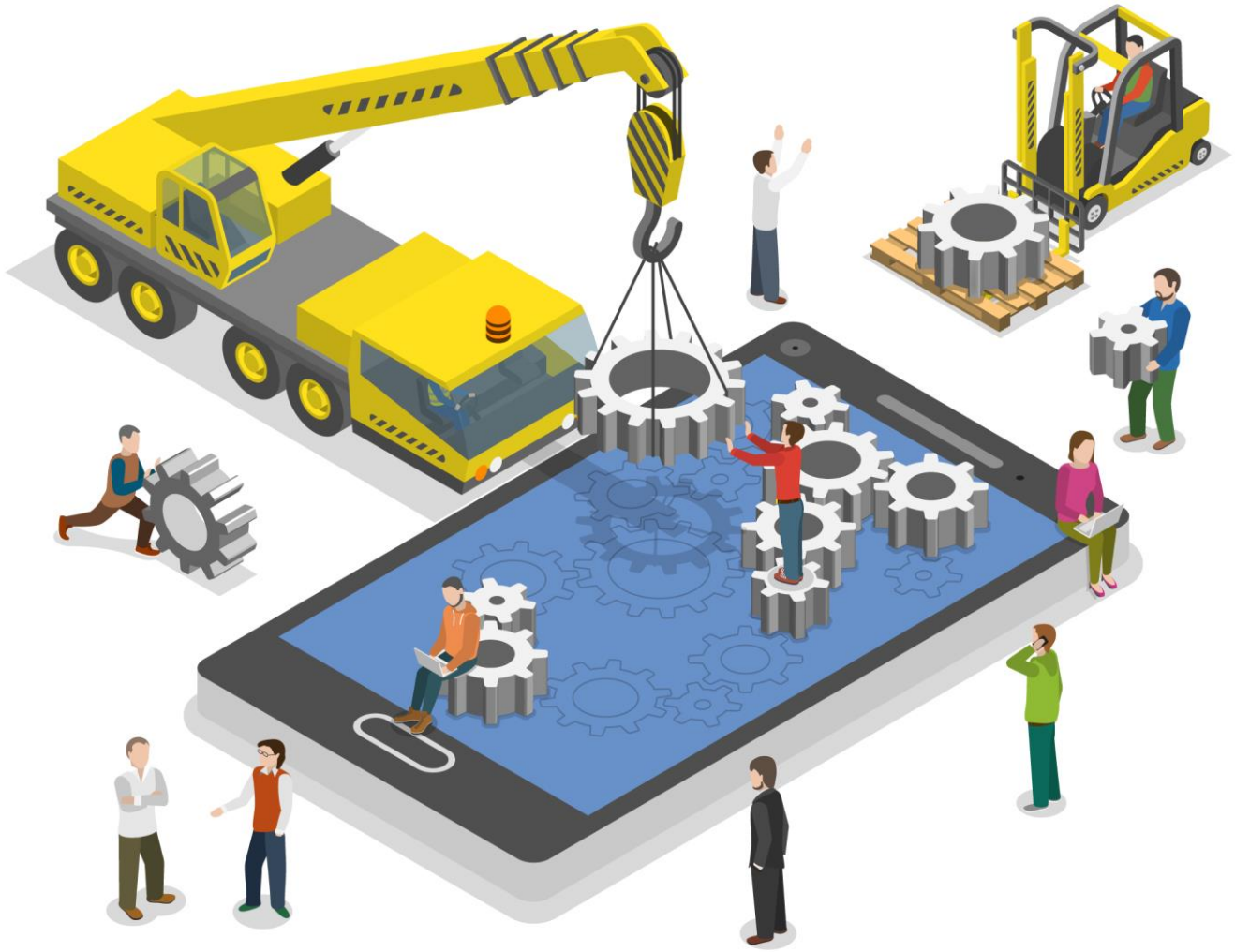
Filesystem

- Check partition alignment
  http://msdn.microsoft.com/en-us/library/dd758814.aspx
- Format volumes the right way
  - Use NTFS with 64KB cluster size
  - Don't do quick format
  - Disable file indexing and defrag
- Disk layout is important
  - Data, Transaction Log, TempDB and Backup files on different disks
  - Consider a remote backup location
- Use mountpoints

Operating System

- Energy settings
  - Power plan on high performance
- Use service accounts
- Local Security Policy
  - Lock Pages In Memory
  - Perform Volume Maintenance Tasks
- Antivirus software & exclusions
  https://support.microsoft.com/en-us/kb/309422
- Windows Firewall & User Access Control

SETUP



Installation

- Only install components you really need
  - Smaller attack surface
  - Faster patching
  - Safes ressources
- Choose the correct collation
- Install using a configuration file
  - Standardize your installation
  - Helps with disaster recovery
- Don‘t forget to install updates
- SQL Server is not a workstation

POST SETUP CONFIGURATION

Networking

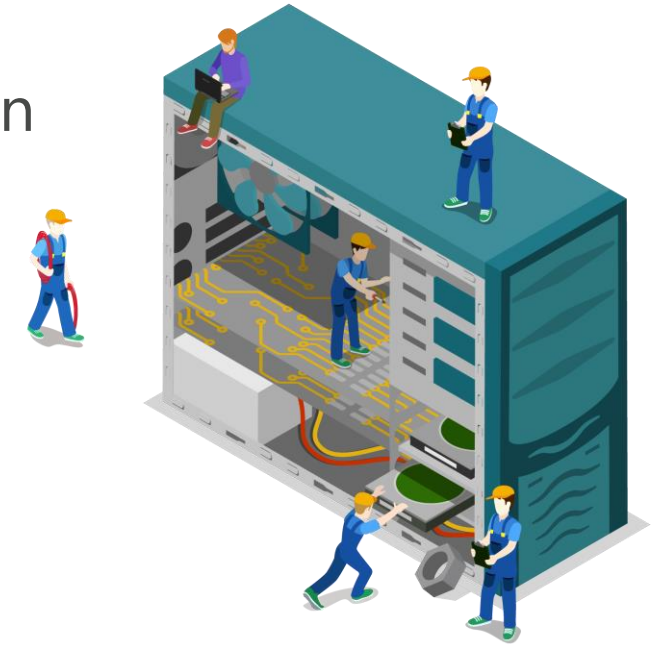
- Same port for all instances
  - Easier migrations
  - Easier access
- One IP per instance
  - Multiple instances with same port
- Use DNS alias for easy access
  - A-Records for Kerberos Auth
  - Transparent access
  - No application changes on migrations
- Set SPNs to use Kerberos authentication
  - Don’t use SQL Logins

Trace Flags

- Trace Flag 1117
  - Equally grows all data files
  - Recommended for all databases
  - Replaced in 2016 by filegroup option (AUTOGROW_ALL_FILES - sys.filegroups)
- Trace Flag 1118
  - Force use of unified extents for objects
  - Replaced in 2016 by database option (MIXED_PAGE_ALLOCATION - sys.databases)
  - Default in SQL Server 2016

Instance

- Configure memory limits
  - Min & Max Server Memory
- Optimize for ad hoc workloads
  - Helps to keep the plan cache clean
- Parallel processing
  - Max Degree of Parallelism
    - Not more than cores per socket
    - Some applications need a value of 1
    - Can be overwritten
  - Cost Threshold for Parallelism
    - 40 for OLTP workloads
    - 25 for DWH and mixed workloads



Database defaults

- Default fill factor
  - 0 means 100%
  - Best practice is 80%
  - Keep an eye on fragmentation
- Compress Backups
  - Saves I/O and disk space
  - Faster backups
  - A bit more CPU usage during backup
  - No reason to not turn it on
- Checksum default
  - No GUI, not documented, but ok to use
  - No reason to not turn it on

TempDB

- Split into multiple files
  - There are a lot complicated rules
  - Start with 8 files, more usually achieve no big advantage
- Size and growth of the files
  - Size depends on TempDB usage
  - Monitor old system, ask the vendor or guess
  - Start with 2-4GB per data file and 4-8GB log
  - Grow 256MB-1GB for data and 1GB for log
- Monitor TempDB usage
  - If it grows, set new size as initial size
- Don’t forget trace flag 1117 and 1118

Databases – Physical design

- The physical design matters
  - When possible, primary filegroup only for MDF
  - Create extra filegroups for your data
  - Start with 4 files per filegroup
- Set size and growth of files
  - Estimate the size for the next year(s)
  - Shouldn't grow automatically
  - Growth depends on database size
  - 256MB-1GB for data and 1GB for log
- Keep an eye on VLFs
  - DBCC LOGINFO

Databases – Options

- Don’t assign DB_Owner role to users
- Always use Full Recovery Model
  - Usually reliability is more important than speed
  - Don’t be afraid, it is easier than it sounds
  - Don’t forget the transaction log backups
- Never enable Auto_Close or Auto_Shrink
  - It always leads you into performance issues
  - With Auto_Shrink physical fragmentation is your new friend ☺
- Enable Auto_Create_Statistics and Auto_Update_Statistics
  - Most database haven’t statistics implemented
  - Normally increases the speed of your queries
  - Should be enabled if not forbidden

Maintenance

- Don’t forget instance and database maintenance
  - Backup (Full, Transaction log and perhaps differential)
  - Integrity checks
  - Index reorganize or rebuild
  - Update statistics
  - Clean up backup and job history
  - Cleanup mail items
- Never shrink automatically
- Use maintenance scripts
  - Don’t use maintenance plans
  - Trivadis Toolbox (http://www.trivadis.com/)
  - Ola Hallengren (https://ola.hallengren.com/)

QUESTIONS & ANSWERS

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https://channel9.msdn.com/Series/SQLServer-2016-in-15-Minuten

SQL PASS Austria Meeting Archive

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