



WorkshopPLUS: SharePoint Server Administration

Setting up SQL Server for SharePoint



Topics - Chapter 1

1	Prerequisites
2	Configuring SQL Server
3	SQL Server Security

Supported Versions of SQL Server

SQL version that supports a specific database compatibility level	SharePoint 2019: Database compatibility level 130
	SharePoint SE: Database compatibility level 150
Cumulative Updates required for Workflow Manager	SQL Server 2016 requires CU4
	SQL Server 2017 requires CU5

SQL Server Recommended Hardware Requirements

Component	Requirement
Memory*	Minimum: <ul style="list-style-type: none">• Small Farm: 8GB• Medium Farm: 16GB• Large Farm(Up to 2TB): 32GB; 2TB – 5TB: 64GB
Disk	All RAID types are supported, RAID 10 is recommended
CPU	Minimum: 4 Cores Recommended: 8 Cores

* and should be increased as database size increases to ensure optimal performance. (Use PLE counter in SQL as a baseline.)

SQL Server High Availability Solutions

AlwaysOn Failover Cluster Instance

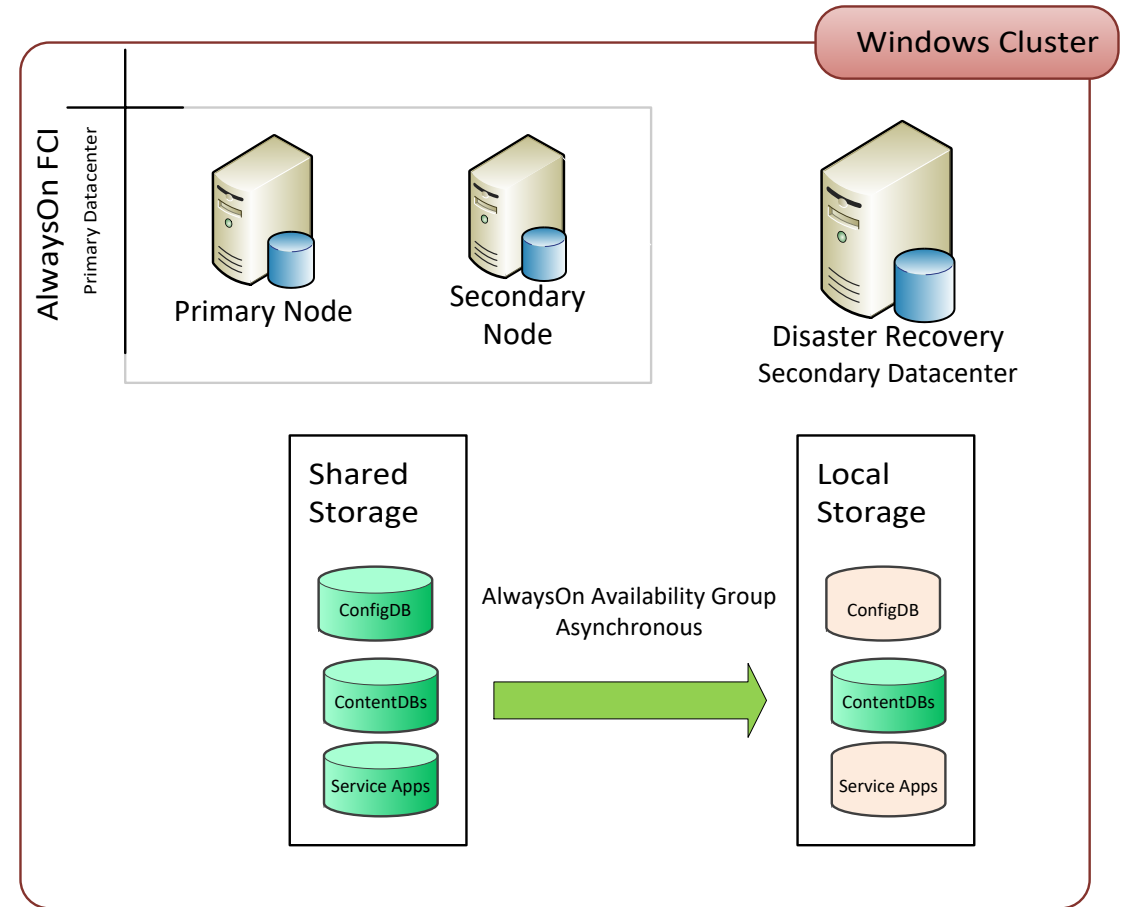
- Entire Server/Instance Failover
- All nodes use same shared storage
- Active or Passive Secondary Nodes
- Recovery Point Objective: 0 (no data-loss)
- Recover Time Objective: Seconds
- Failover: Automated
- Requires Windows Server Failover Cluster

AlwaysOn Availability Groups

- Per-availability group failover
- Nodes can have independent storage
- Secondary replicas (Active or Read-Only)
- RPO: "0" (no data-loss, sync replication) or "Near-0" (async replication)
- RTO: <1 Minute
- Failover: Automated
- Requires Windows Server Failover Cluster

SQL Topologies–High Availability with AlwaysOn

- Always-On Failover Cluster Instance
 - Local High Availability
 - Requires shared storage
- Always-On Availability Group
 - Disaster Recovery



Demonstration 1

SQL Server Overview



Topics - Chapter 2

1

Prerequisites

2

Configuring SQL Server

3

SQL Server Security

SQL Instance Settings (1/3)



Database Collation

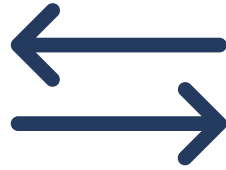
Server setting must be any Case Insensitive

Recommended:

Latin1_General_CI_AS_KS_WS

SharePoint will assign

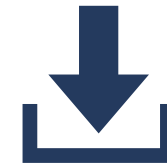
Latin1_General_CI_AS_KS_WS to all databases upon creation



Max Degree of Parallelism (MaxDOP)

Mandatory to 1

Checked during installation and by Health Analyzer rule



Fill Factor

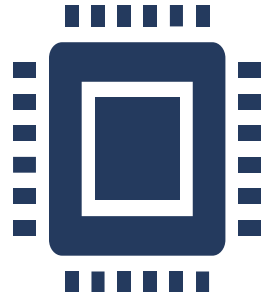
Do not set at instance level

SharePoint 2010 and earlier benefitted from optimizing the Fill Factor setting

Since SharePoint 2013:

Configured during database creation

SQL Instance Settings (2/3)



Maximum Memory

Server hosting multiple instances: Leave memory for the OS (minimum of 10-20%)

Single instance: Minimum 4GB for the OS

Account for any other components on the server

Setting refers to Managed Stack only! (SQL Process can use more memory.)

- Use Page Life Expectancy counter



AutoCreate Statistics

Leave default

Can modify the database schema which is unsupported for SharePoint

This is a per-database setting (not instance level)

SQL Instance Settings (3/3)

SharePoint 2019 and SE require a very specific database compatibility level

SharePoint 2019	SharePoint SE
<ul style="list-style-type: none">▪ 130 (SQL Server 2016)	<ul style="list-style-type: none">▪ 150 (SQL Server 2019)

```
SELECT name, compatibility_level FROM sys.databases
```

More information: <https://docs.microsoft.com/en-US/sharepoint/troubleshoot/administration/sql-database-compatibility-for-sharepoint-installation>

Database Autogrowth



Pro

- Easy
- Minimum maintenance

Con

- Might happen during business hours
- Expensive operation
- Size of growth matters
- Percent growth is bad in multiple ways
- High overhead with small databases
- Long time with large databases

Disk Configuration



Storage is key for performance. Separating database and log files leads to significantly improved disk performance.



Many disk subsystems use a single-array configuration which negates much of the value for separating databases.



It is recommended that the following database file separation be used (separate disks, separate LUNs), in priority order, where possible.



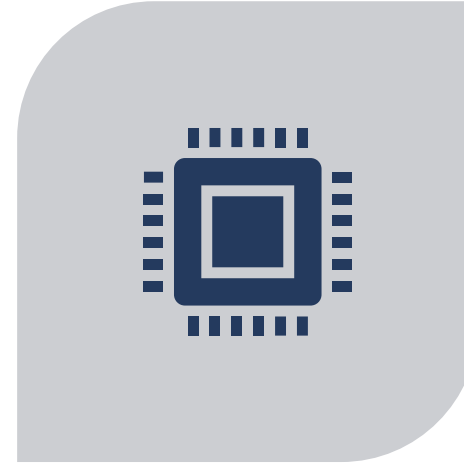
If the environment is heavily Read-Only, prioritize data files over transaction log files.

Priority	Database File	Optimization
1	TempDB data	Write
2	TempDB log	Write
3	Content DB logs	Write
4	Service Apps DB logs	Write
5	Search Crawl DB log	Write
6	Content DB data	Read/Write
7	Service Application DB data	Read/Write
8	Usage and Health data	Read/Write
9	Search Analytics DB	Read/Write
10	Search Property DB	Write

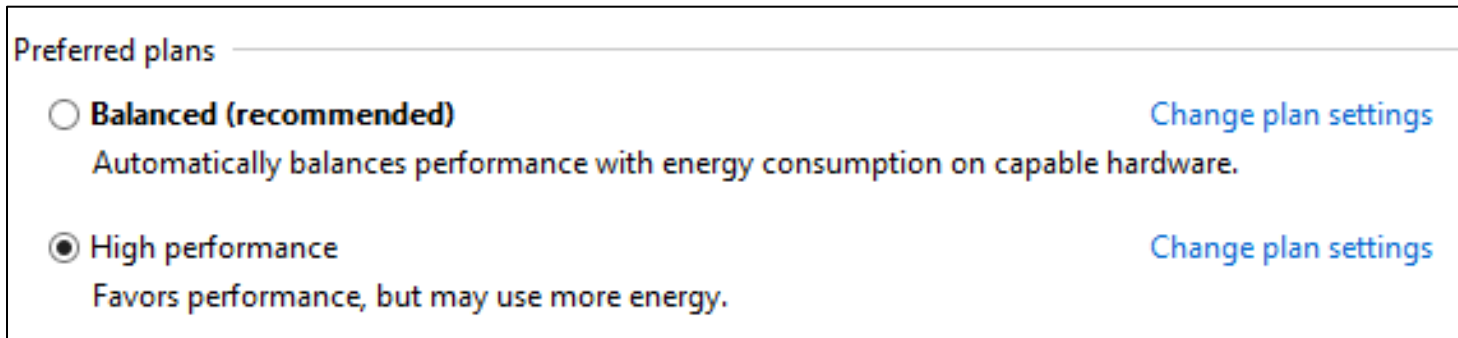
Power Plan Settings



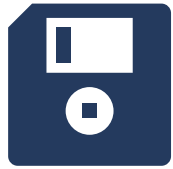
“Operating System Level Power Plan” should be: High Performance



Ensure BIOS-level Power Savings mode is disabled



Disk Allocation Unit



Default disk allocation unit for most drives is 4k

SQL uses extents to write data to the disk.

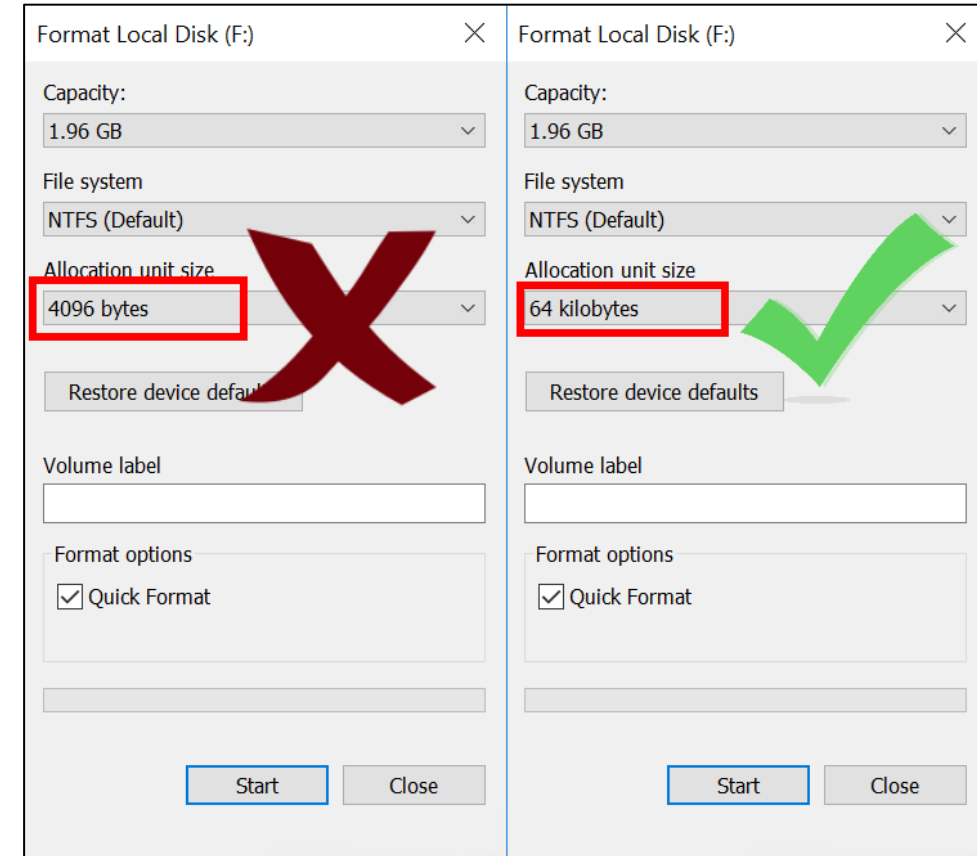
Each extent is composed of eight 8k pages

Each extent is a total of 64k



Format drives for 64k allocation unit

Will create performance improvements for operations that access bulk disk sectors (restores, database creation, etc.)



Anti-Virus Exclusion Rules

Exclude from real-time scanning

All SQL file extensions:

- *.mdf
- *.ndf
- *.ldf
- *.bak

When using SQL clustering

Also exclude:

- <\$windir>/cluster
- Witness disk

Additional

Plan for complete disk scans during downtime / maintenance

SQL Service Account



**Do not provide this account
Domain or Local Admin
Privilege**



**Local Security Policy -> User
Rights Assignments:**

Perform Volume Maintenance
Tasks: Enables SQL to use Fast
File Initialization

Lock Pages in Memory: Limits
the amount of memory the OS
can reclaim from SQL for
operations



Lock pages in memory

ADVENTURE\sql_dbsvc



Perform volume maintenance tasks

ADVENTURE\sql_dbsvc,...

SQL Alias



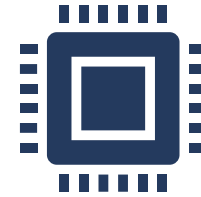
SQL Client Alias can provide flexibility if the database servers move / change



Aliases are configured for each server using the cliconfg.exe tool

C:\Windows\System32\cliconfg.exe (64-bit version)

C:\Windows\SysWOW64\cliconfig.exe (32-bit version)



SQL Client Aliases are not supported by any services making RPC/WMI calls directly to the server

Use DNS alias that aligns with the SQL Client alias for these services

Use A records to maintain support for Kerberos

TempDB Configuration

Part One



Ensure TempDB is on drives protected from disk failure via RAID (and all critical content databases)



Store TempDB files on fastest available disks (again)



Store SharePoint/User databases separate from TempDB



TempDB default size is 8mb and should be increased for SharePoint workloads

20-25% of your largest database is a standard but should be monitored

TempDB Configuration

Part Two



Additional TempDB data files increase disk bandwidth and reduce TempDB file contention

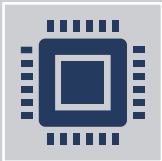
Add one TempDB data file per CPU core (up to 8 max)



Each TempDB file should be the same size

To prevent inconsistent TempDB files, either:

- Ensure TempDB is sized appropriately to avoid AutoGrowth
- Use Trace Flag 1117 to grow all data files simultaneously



Use SQL Query to identify the total CPU cores

```
SELECT *  
FROM sys.dm_os_schedulers
```

4 CPUs

cpu_id
0
1
2
3
0
0
1
2
3
0
1

Model Database



Model Database is used as blueprint for every database in SQL



SharePoint **only** uses the Model Database for:

Default database/log size

Recovery model

Database Compatibility Level



SharePoint does not use this for:

Auto-growth configuration

Collation

General Advice



SQL server is art:

To fine tune SQL server, talk to a SQL engineer



Database direct modification not supported



Direct query is not recommended:

Do it if you must.

Don't build solution on it.

Use NOLOCK directive.

Topics - Chapter 3

1

Prerequisites

2

Configuring SQL Server

3

SQL Server Security

SQL Security Hardening Options (1/2)

Windows vs. SQL Logins

Avoid mixed-mode authentication

- SQL Login authentication sends passwords directly to sever
- Windows Login uses encrypted password hashes

Access Services requires Mixed-Mode Authentication (SP2019 only)

- Consider a separate SQL instance for any Access Services DBs

Kerberos/SPNs

- Ensure your server has a correctly configured Service Principle Name on the database engine account
- SQL will automatically authenticate users via Kerberos when SPNs are configured

SQL Security Hardening Options (2/2)



Encryption at Rest

Accomplished via
Transparent Data
Encryption (TDE) in SQL

Protects/encrypts
databases and backups
on disk

Higher CPU
consumption



Cell level encryption

Only supported with 3rd
party (must be
transparent for
SharePoint)



Encryption in Transit – Server Certificates

Enable encrypted
connections via SQL
Configuration Manager



Server Isolation

Configure SQL to
respond to only
approved machines

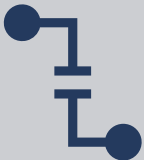
Use Windows Firewall
with Advanced Security
to add whitelisted IP
addresses

Can also be achieved
through network
design / segmentation

Server Roles vs. Schema Mapping



During deployment, **setup account** requires **SecurityAdmin** and **DBCreator** SQL server roles. The Products Configuration Wizard uses these roles to assign permissions to the **farm account**.



You will find SharePoint-created security schemas used for all other service accounts (web application pools, service application pools, etc.). These schemas are applied on a per database basis.

SharePoint_Shell_Access

WSS_Content_Application_Pools

SPDataAccess

SPReadOnly

SPSearchDBAdmin

SubscriptionSettingsService_Application_Pool

Patch!



**Keep SQL patched
with latest updates**

Windows Updates

SQL Patches

Demonstration 2

Configure Kerberos with SQL

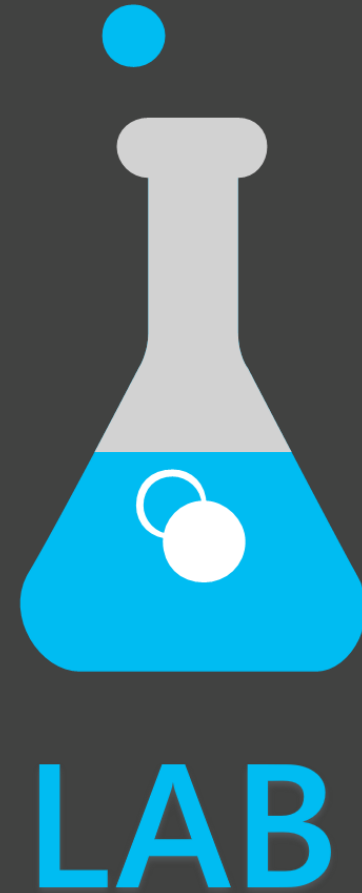


Lab 1: Configure SQL Server

Objectives

After completing this lab, you will be able to:

- Configure the TempDB with multiple data files and size
- Configure SQL Instance and Security settings



Knowledge Check

Which SQL Instance level settings should be modified when deploying for SharePoint?

- Maximum Memory
- MaxDOP

Which SQL High Availability strategy requires shared storage?

- AlwaysOn Failover Cluster Instance

What are the best practices for TempDB?

- Use fastest disks available,
- Create up to 8 data files (one per CPU core)
- Ensure all data files are sized equally

Questions?



