Microsoft

WorkshopPLUS: SharePoint Server Administration

How to Operate and Maintain SQL Server

Agenda - Chapter 1

1	**SQL Server Operations**
2	SQL Server Maintenance
3	SQL Server Troubleshooting

SQL Operations

Daily Operations

Monitor the SQL Error Log

Ensure Maintenance Plans are running

Ensure Backup Operations are completing successfully

Check System Resource Consumption

Weekly operations

Review security log

Monthly/Quarterly Operations

SQL Patching

Auto-growth

- Treat as a protection for unexpected growth
- Regular capacity planning should estimate capacity for each database
- Pre-size databases to a size that supports 6-12 months of workload
- Set auto-growth to fixed values up to 1GB
- Turn on database file instant initialization to improve growth-operation performance
- Ensure that TempDB is not subject to Auto-Growth (Particularly if you have >1)

Agenda - Chapter 2

1	SQL Server Operations
2	**SQL Server Maintenance**
3	SQL Server Troubleshooting

Index Fragmentation: SP Managed Databases

Fragmentation managed on most databases via Health Analyzer rules

- Health Analyzer Rules triggered by Timer Jobs
- Most of these rules are set with Automatic Repair = YES
- If you see issues in your Health Analyzer, Automatic repair steps may be failing.

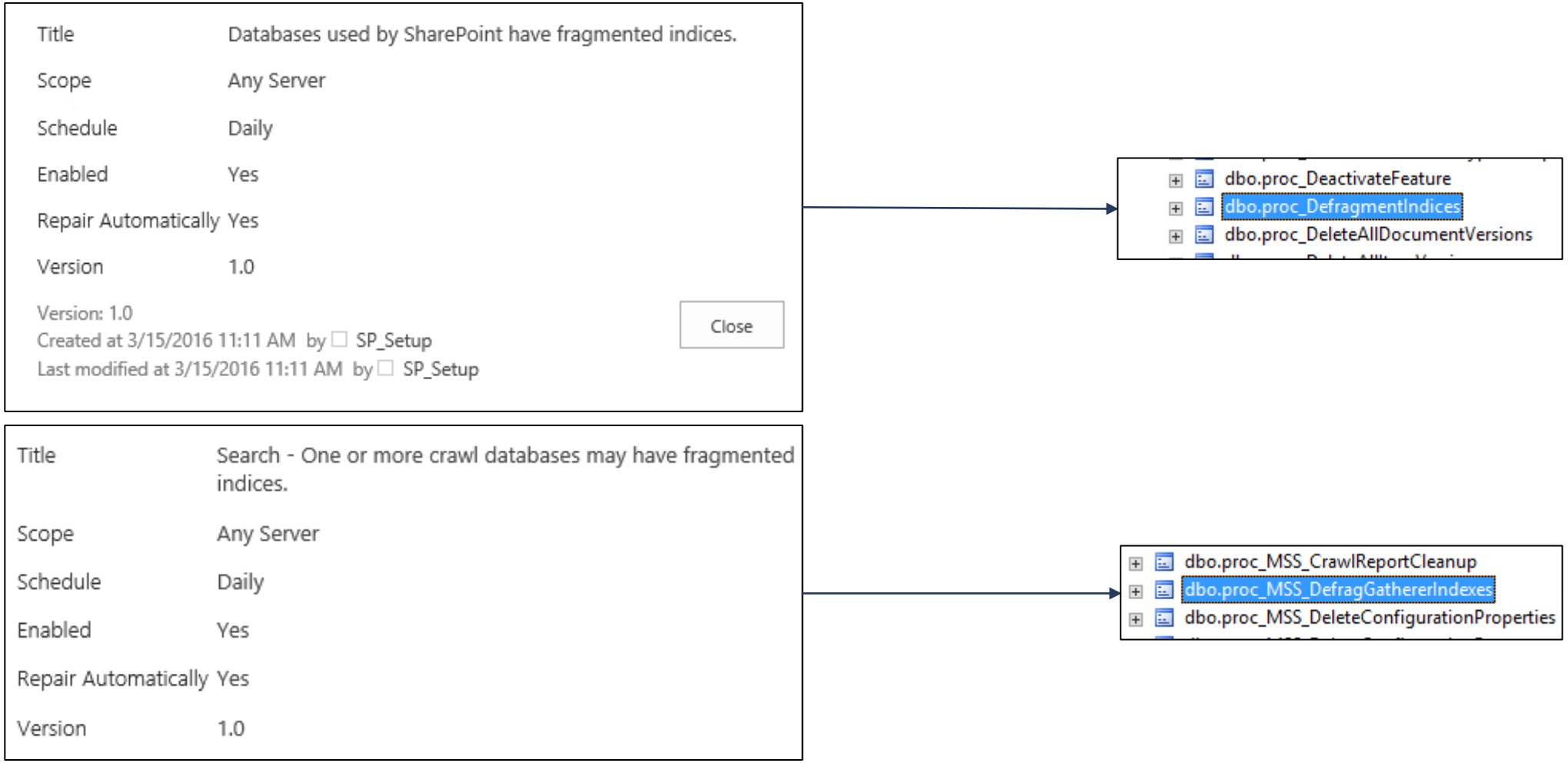
Following Health Analyzer Rules address High Fragmentation

- **Databases used By SharePoint Have Fragmented indices**
  - Calls *proc_DefragmentIndices* for every database that has it
- **Search - One or more crawl databases have fragmented indices**
  - Calls proc_MSS_DefragGathererIndexes

Important!

- Never manually defragment indices using T-SQL if SharePoint has provided a stored procedure

Index Fragmentation: Stored Procedures



Index Fragmentation: Non-SharePoint Managed Databases

Health Analyzer rules do not target all databases.

Monitor these databases for fragmentation. Rebuild indexes when fragmentation exceeds 30%.

Set up a Maintenance Plan to monitor databases on a weekly basis.

These databases should not see heavy activity and will only require periodic maintenance.

Databases	
Search Administration Database	Usage Database
Secure Store Database	Managed Metadata Database
State Service Database	Business Connectivity Services Database
Profile Sync Database	PerformancePoint Services Database

Fragmentation level	Defragmentation method
Up to 10%	Reorganize (online)
10-75%	Rebuild (online)
75%	Rebuild (offline)

Monitoring Fragmentation

You can check fragmentation using T-SQL query (see notes).

Fragmentation is checked for each index in the table. Majority should show fragmentation <30%

A few indexes will not be addressed

```
USE SP2013_CONTENT_001;
SELECT OBJECT_NAME(ind.OBJECT_ID) AS TableName,
ind.name AS IndexName, indexstats.index_type_desc AS IndexType,
indexstats.avg_fragmentation_in_percent
FROM sys.dm_db_index_physical_stats(DB_ID(), NULL, NULL, NULL, NULL) indexstats
INNER JOIN sys.indexes ind
ON ind.object_id = indexstats.object_id
AND ind.index_id = indexstats.index_id
--WHERE indexstats.avg_fragmentation_in_percent > 30--You can specify the percent as you want
ORDER BY indexstats.avg_fragmentation_in_percent DESC
```

Results | Messages

	TableName	IndexName	IndexType	avg_fragmentation_in_percent
7	AllWebParts	ListIdUserId_NCI	NONCLUSTERED INDEX	30
8	AllLists	AllLists_PK	CLUSTERED INDEX	30
9	AllLinks	Links_Backward	NONCLUSTERED INDEX	28.5714285714286
0	AllUserData	AllUserData_PK	NONCLUSTERED INDEX	26.9230769230769
1	EventCache	EventCache_Id	CLUSTERED INDEX	26.6666666666667
2	AllDocs	Docs_IdLevelUnique	NONCLUSTERED INDEX	26.4705882352941
3	AllWebParts	AllWebParts_BySolution	NONCLUSTERED INDEX	25
4	Resources	Resources_PK	CLUSTERED INDEX	25
5	EventCache	EventCache_Time	NONCLUSTERED INDEX	25
6	EventReceivers	EventReceivers_ByHost	CLUSTERED INDEX	25
7	DocStreams	DocStreams_CI	CLUSTERED INDEX	23.5294117647059
8	StorageMetrics	StorageMetrics_DocId	CLUSTERED INDEX	22.8571428571429
9	ContentTypeUsage	ContentTypeUsage_SiteIsFClassCTIdW...	CLUSTERED INDEX	15.0684931506849
0	WebPartLists	WebPartLists_ListId	NONCLUSTERED INDEX	14.2857142857143
1	ContentTypeUsage	ContentTypeUsage_SiteIsFListClass	NONCLUSTERED INDEX	12.8571428571429
2	AllDocs	AllDocs_Url	NONCLUSTERED INDEX	8.13953488372093
3	AllWebParts	PageUrlID_FK	CLUSTERED INDEX	7.89473684210526
4	AllUserData	AllUserData_ParentId	CLUSTERED INDEX	5.12820512820513
5	FeatureTracking	FeatureTracking_PK	CLUSTERED INDEX	4.54545454545455

Query executed successfully. | advsql (12.0 SP1) | ADVENTURE\gusp (371) | SP2013_CONTENT_001 | 00:00:00 | 302 rows

Statistics

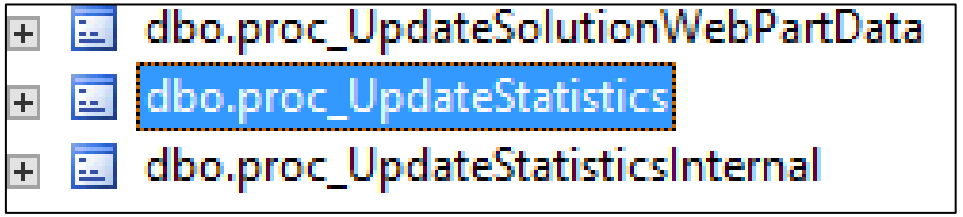
Statistics in SQL Server

Use by SQL Server to optimize queries

These Health Analyzer rules can address outdated statistics:

SharePoint Databases have outdated statistics

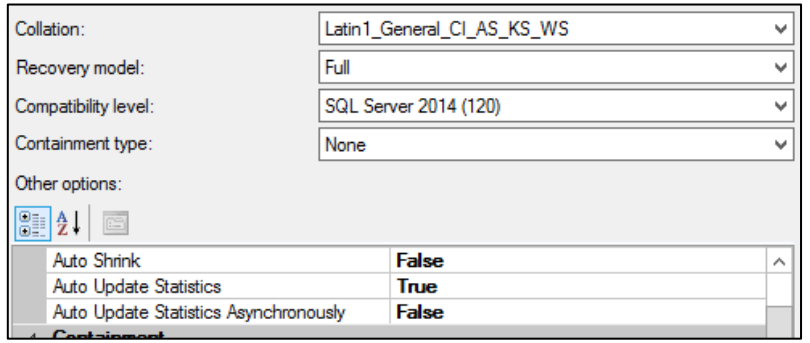
- Calls on a PROC_UpdateStats to keep statistics updated



Retain the default statistics settings

Databases not monitored by SharePoint are configured to AutoUpdateStatistics = TRUE

Recommended to NEVER enabling AUTO CREATE statistics



Database Integrity Checks

Checking Database Integrity

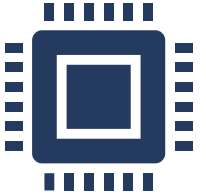
Database Integrity traditionally caused by disk subsystem failures

Also caused by improper reboots (hard shutdown) or process crash

Important

If not fixed in the database, it will persist into all backups

Check integrity before running a database backup



Integrity checks are highly resource intensive

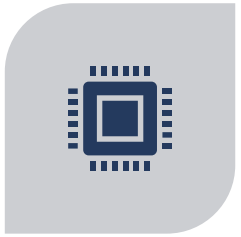
CPU, Memory and Disk

If production isn't an option: Run these against backups in a staging environment

Shrinking Databases

AutoShrink NOT supported on SharePoint databases

Recommended to only shrink content databases



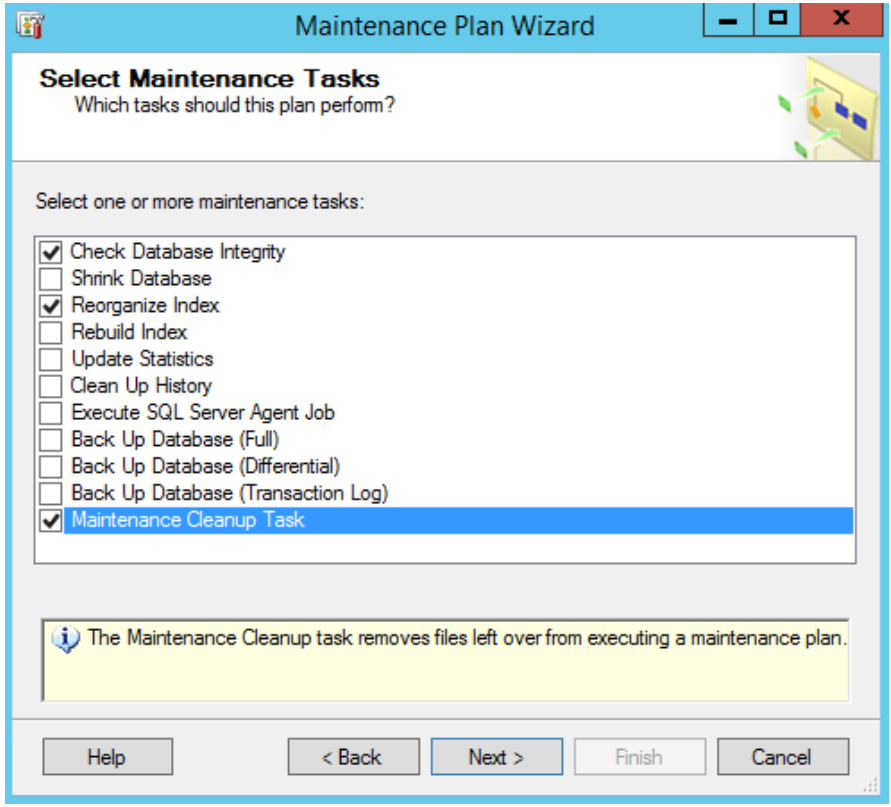
Shrinking databases is an extremely resource-intensive operation

After a database shrink operation, the indexes within that database will be fragmented

Always leave space for near-term future growth (avoid Auto-Growth)

SQL Maintenance Plans

- Schedule SQL Maintenance
- DBCC CheckDB and Fragmentation for non-managed databases
- Requires SQL Server Agent to be enabled and started
- Maintenance plan recommendations
- Never include a database shrink
- Run each task individually to determine duration
- Maintenance Cleanup task



Transaction Log Management

Every SQL Server database has a transaction log (TLOG)

TLOG records all transactions and the database modifications

These are critical for Point-in-Time recovery features

The TLOG must be truncated on a regular basis to keep it from filling up

TLOG is truncated automatically in these cases:

Under the simple recovery model, after a checkpoint

Under the full recovery model or bulk-logged recovery model, after a log backup

Some factors can delay log truncation, so you must keep an eye on the log size

Demonstration

Creating a Maintenance Plan

Agenda - Chapter 3

1	SQL Server Operations
2	SQL Server Maintenance
3	**SQL Server Troubleshooting**

SQL Error Log

View the SQL Server error log to ensure that processes have completed successfully

Backup and restore operations, batch commands, or other scripts and processes

Login failures

Can be viewed with SQL Server Management Studio or any text editor

Located at Program Files\Microsoft SQL Server\MSSQL.*n*\MSSQL\LOG\ERRORLOG

A new error log is created each time an instance of SQL Server is started

SQL Profiler Trace and Extended Events

SQL Profiler is a graphical user interface to SQL Trace for monitoring an instance of the Database Engine

Deprecated in future versions of SQL Server (2016 and forward)

Extended Events is a light weight performance monitoring system that uses very few performance resources

Performance Monitor

Microsoft Performance Monitor provides SQL performance counters for monitoring SQL performance

PAL (Performance Analysis of Logs) is a codeplex tool that can analyze SQL PerfMon Logs (blg)

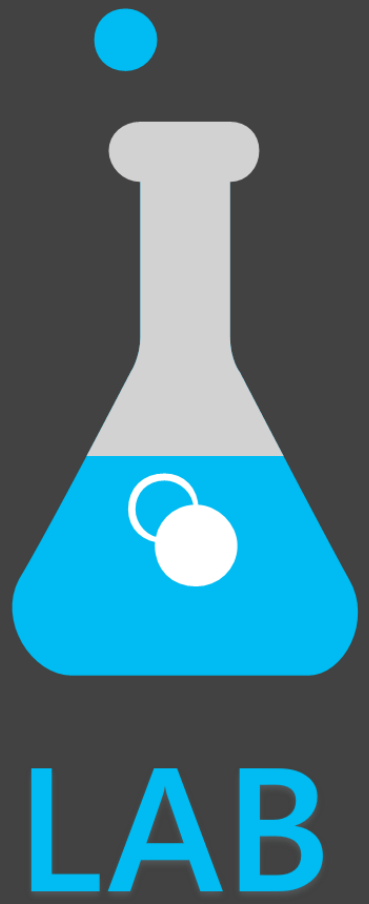
Consider using PerfMon or performance analysis tool of choice to establish SQL performance baselines

Lab 6:
Administer SQL Server

Objectives

After completing this lab, you will be able to:

- Configure the Auto-Growth settings for your databases
- Build a maintenance plan to Check Integrity



Knowledge Check

What type of maintenance operations should a SharePoint Administrator manage?

- Ensure AutoGrowth settings are correctly tuned for your workload
- DBCC CheckDB Integrity Checks
- Index Fragmentation

What tools are available for monitoring SQL Performance?

- SQL Profile Trace
- SQL Extended Events
- Performance Monitor with PAL

Questions?