Technical University of Moldova

Faculty of Computers, Informatics and Microelectronics

Department of Software Engineering and Automation

Database Laboratory Work Nr.2

Title: Creating and maintaining a database

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Chișinău 2020

Prerequisites

SQL Server Management Studio, MS SQL Server 2017

Objectives

This chapter addresses the creation of databases, plan maintenance and management the of their properties, using SQL Server Management Studio tools. In addition, we will learn about the logical way to organize and maintaine a database.

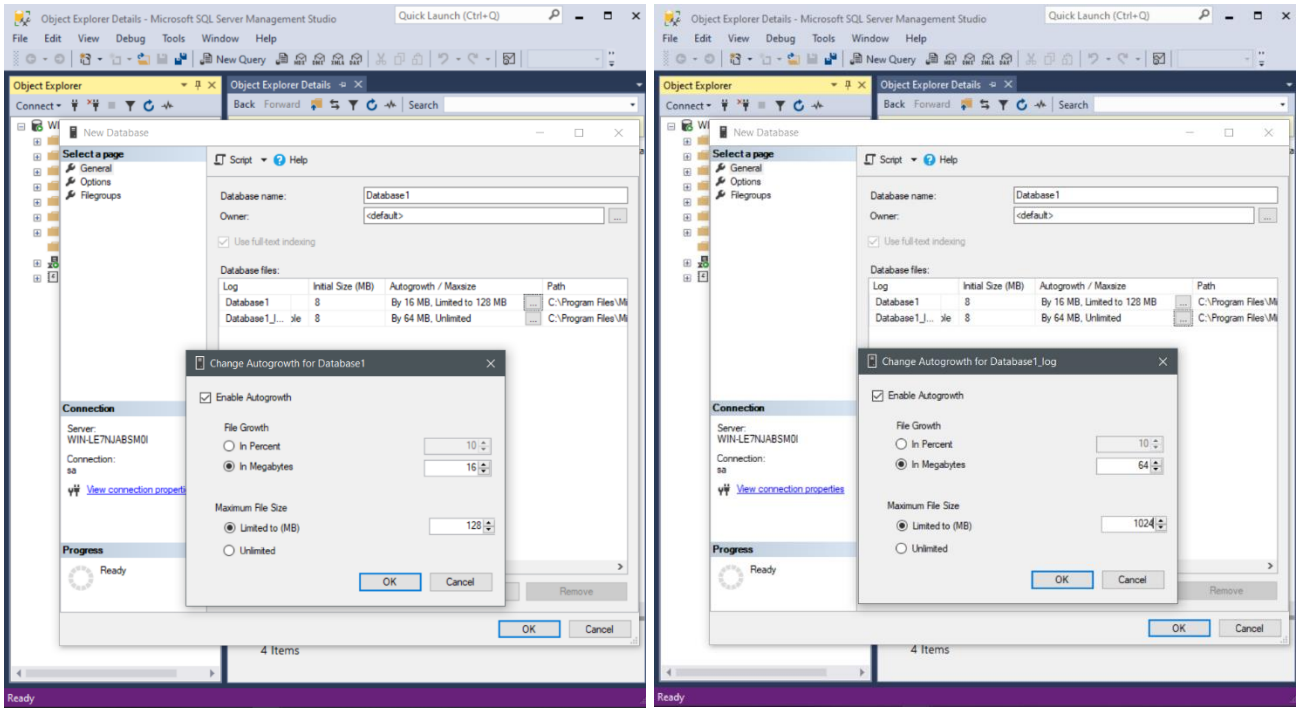
Tasks

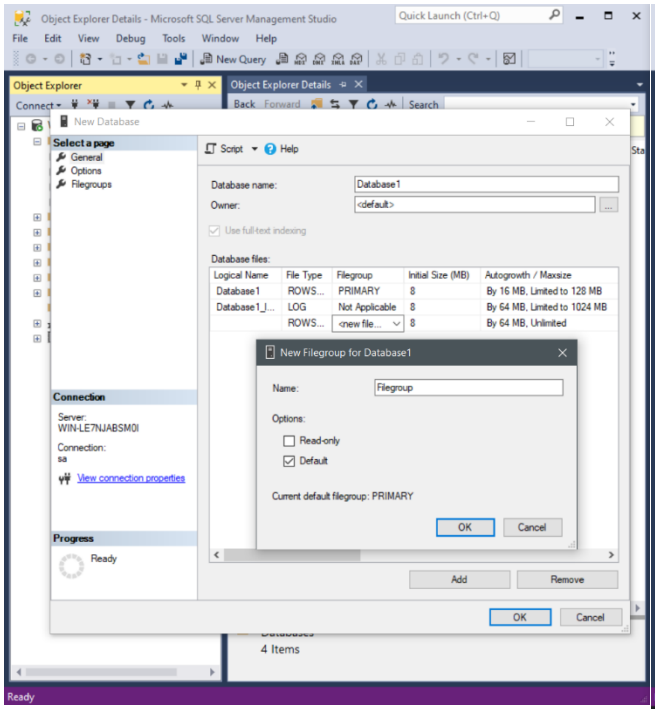
1) Create a database physically placed in the MyDocuments\Data folder, setting a file growth of 16 MB with a growth limit of 128 MB for the data and for the log a 64 MB growth with 1024 MB growth limit. For the secondary files there needs to be defined a new default Filegroup, setting the growth to 64 MB with a limit of 1024 MB.
2) Create a database, where the log file is physically placed in the MyDocuments\Log folder, the log file name of the operating system environment must differ from the logically defined name in the physical scheme. It is important that the created database is compatible with the MS SQL System Server 2017 and it should be accessible to only one user at a time.
3) Create the database maintenance plan for the database from task 1. Unused space by must be removed when it reaches 2000Mb and the freed up space must be returned to the operating system. This operation must run every Friday at 00:00. The maintenance plan execution report must be saved to MyDocuments\SQL_event_logs. Initialize the execution of the plan. After execution, check results in the log file.
4) Create the database maintenance plan for the database from task 2. The name of the plan will be: “Reconstruire index”. In this plan, the system must perform the reconstruction indices only on the basic tables from all the existing schemes. The free space on the page must be 10%. Sorting indexes must be performed in a tempdb file. Then this is followed by the collection of statistics. The third step of the plan should be the clearing the history of the Backup-Restore operations on SQL Server. Must delete the history that is older than 6 weeksand the plan must be executed each first Sunday of every month. Create the

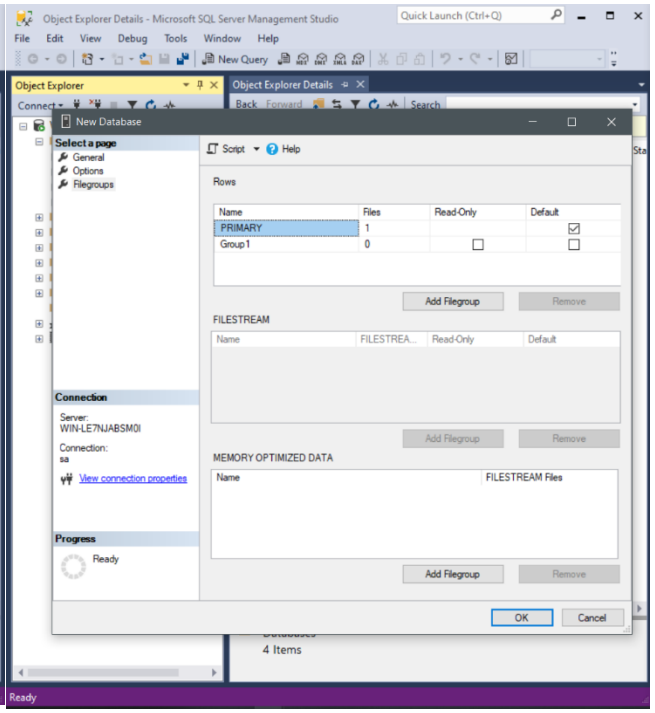
MyDocuments\SQL_reports folder. Execution report of this file must be added to the folder. Initialize the execution of the plan. After execution, check the results in the log file.

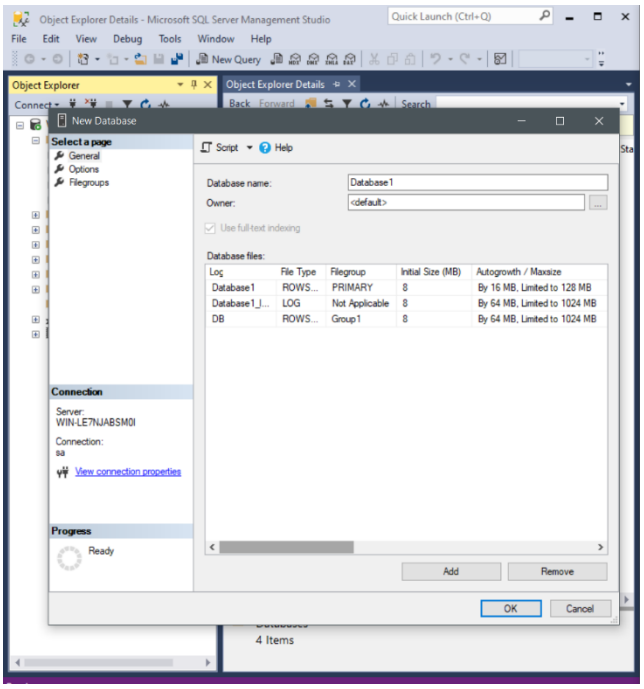
Implementation

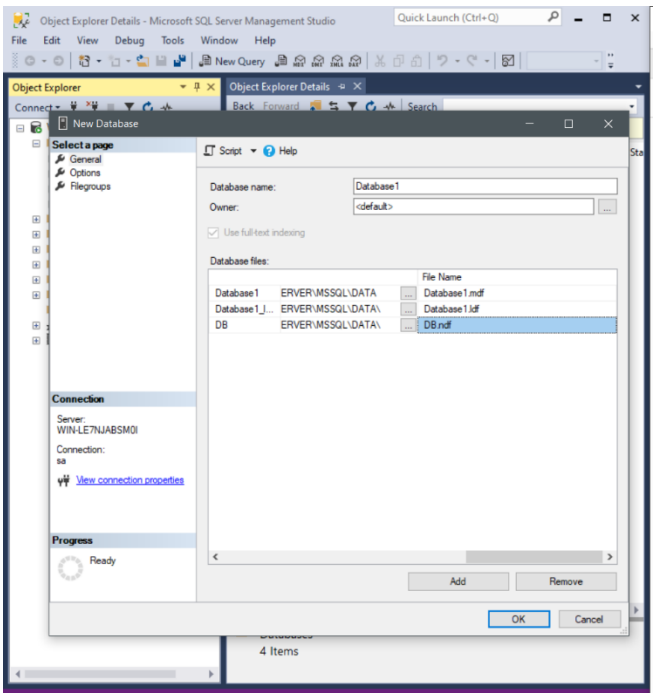
1.



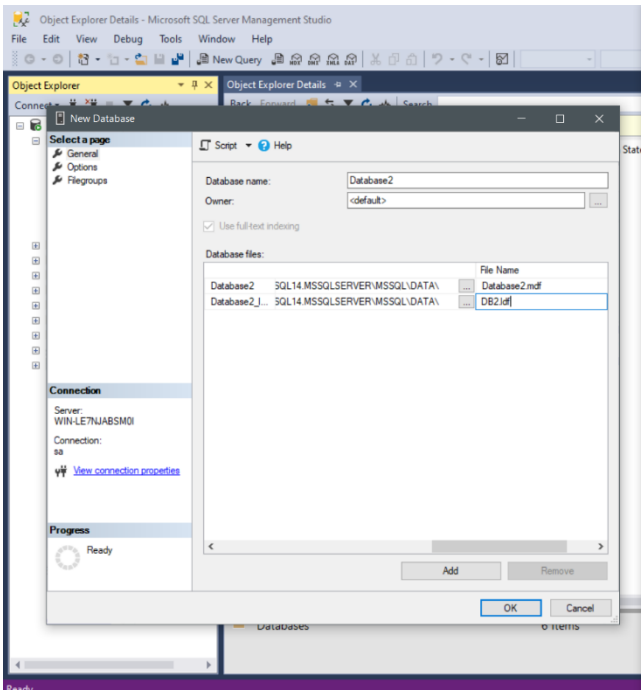

Object Explorer Details - Microsoft SQL Server Management Studio
New Database
Select a page
General
Options
Filegroups
Database name: Database1
Owner: <default>
Use full-text indexing
Database files:
Logical Name | File Type | Filegroup | Initial Size (MB) | Autogrowth / Maxsize
Database1 | ROWS... | PRIMARY | 8 | By 16 MB, Limited to 128 MB
Database1_l... | LOG | Not Applicable | 8 | By 64 MB, Limited to 1024 MB
ROWS... | <new file...> | 8 | By 64 MB, Unlimited
New Filegroup for Database1
Name: Filegroup
Options:
Read-only
Default
Current default filegroup: PRIMARY
OK
Cancel
Add
Remove
Connection
Server: WIN-LE7NJABSM0I
Connection: sa
View connection properties
Progress
Ready
4 Items

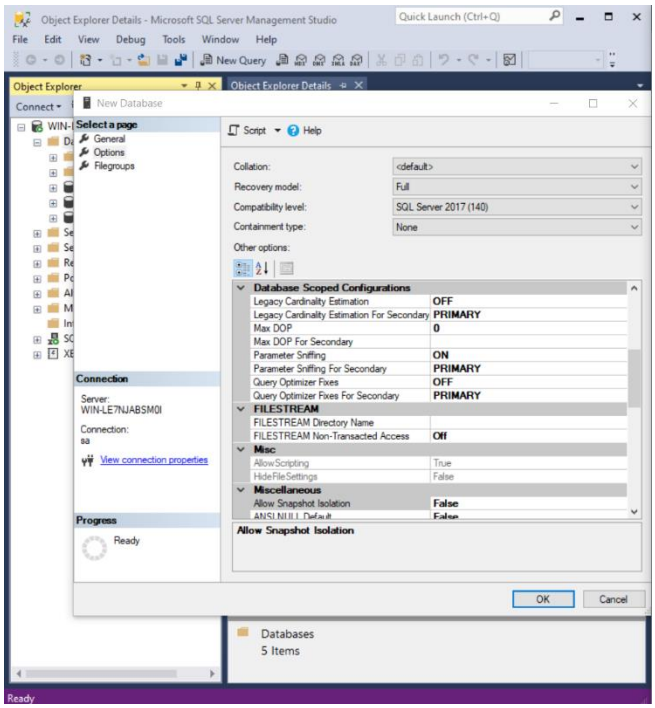

Object Explorer Details - Microsoft SQL Server Management Studio
New Database
Select a page
General
Options
Filegroups
Rows
Name | Files | Read-Only | Default
PRIMARY | 1
Group1 | 0
Add Filegroup
Remove
FILESTREAM
Name | FILESTREA... | Read-Only | Default
MEMORY OPTIMIZED DATA
Name | FILESTREAM Files
Connection
Server: WIN-LE7NJABSM0I
Connection: sa
View connection properties
Progress
Ready
OK
Cancel
4 Items

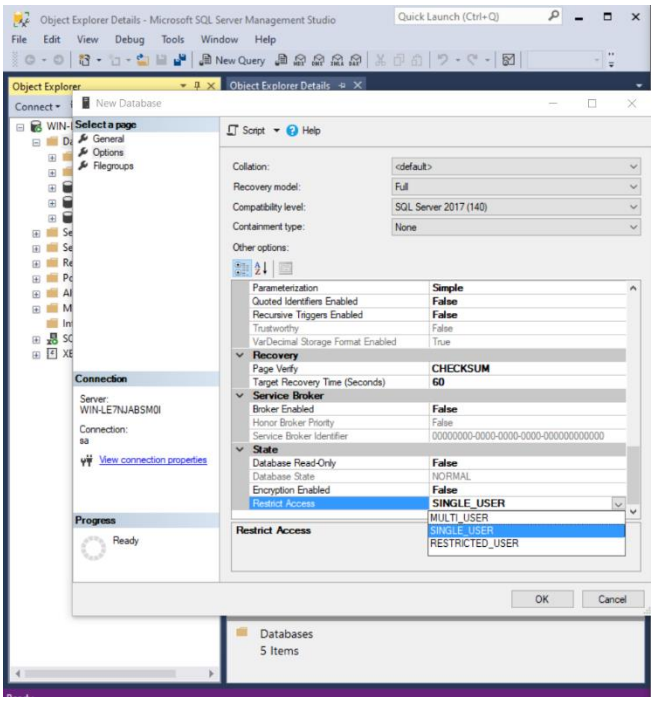

Object Explorer Details - Microsoft SQL Server Management Studio
New Database
Select a page
General
Options
Filegroups
Database name: Database1
Owner: <default>
Use full-text indexing
Database files:
Log | File Type | Filegroup | Initial Size (MB) | Autogrowth / Maxsize
Database1 | ROWS... | PRIMARY | 8 | By 16 MB, Limited to 128 MB
Database1_l... | LOG | Not Applicable | 8 | By 64 MB, Limited to 1024 MB
DB | ROWS... | Group1 | 8 | By 64 MB, Limited to 1024 MB
Add
Remove
Connection
Server: WIN-LE7NJABSM0I
Connection: sa
View connection properties
Progress
Ready
OK
Cancel
4 Items


Object Explorer Details - Microsoft SQL Server Management Studio
New Database
Select a page
General
Options
Filegroups
Database name: Database1
Owner: <default>
Use full-text indexing
Database files:
File Name
Database1 | ERVER\MSSQL\DATA | Database1.mdf
Database1_l... | ERVER\MSSQL\DATA\ | Database1.ldf
DB | ERVER\MSSQL\DATA\ | DB.ndf
Add
Remove
Connection
Server: WIN-LE7NJABSM0I
Connection: sa
View connection properties
Progress
Ready
OK
Cancel
4 Items

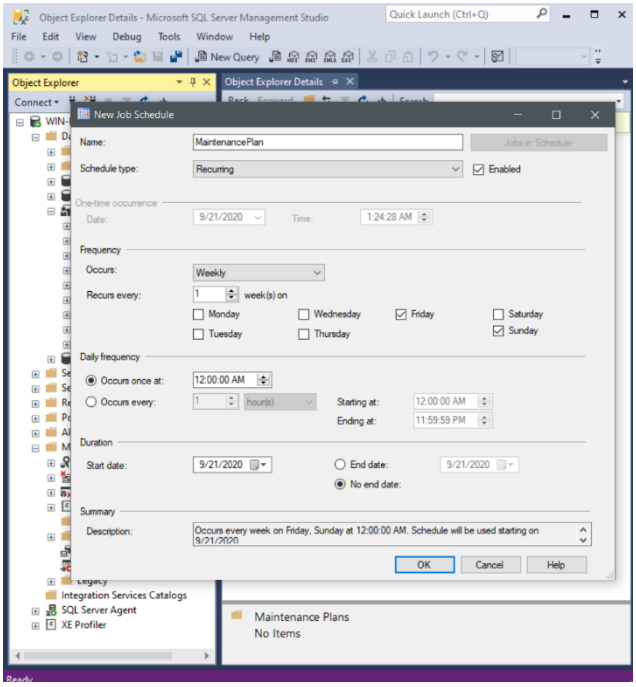
2.

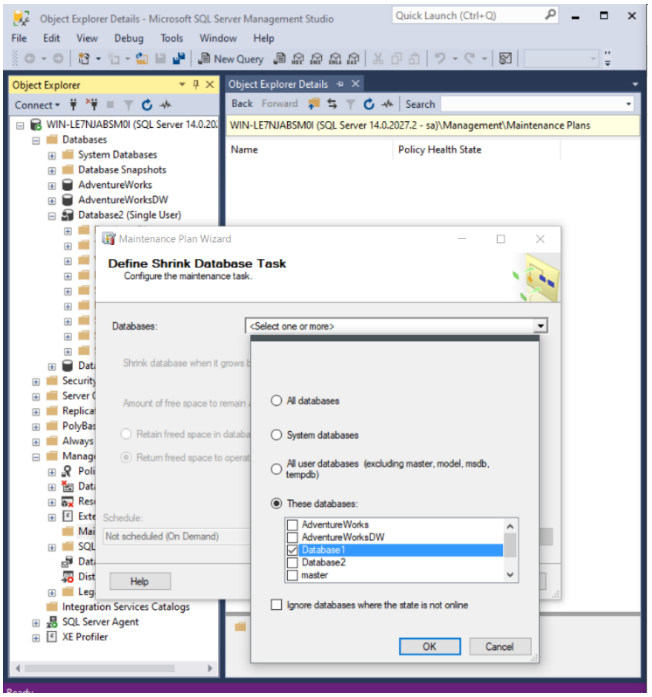

Object Explorer Details - Microsoft SQL Server Management Studio
File Edit View Debug Tools Window Help
New Query
Object Explorer
Object Explorer Details
New Database
Select a page
General
Options
Filegroups
Script
Help
Database name:
Database2
Owner:
<default>
Use full-text indexing
Database files:
File Name
Database2 3QL14.MSSQLSERVER\MSSQL\DATA\ Database2.mdf
Database2_l... 3QL14.MSSQLSERVER\MSSQL\DATA\ DB2.ldf
Connection
Server:
WIN-LE7NJABSM0I
Connection:
sa
View connection properties
Progress
Ready
Add
Remove
OK
Cancel

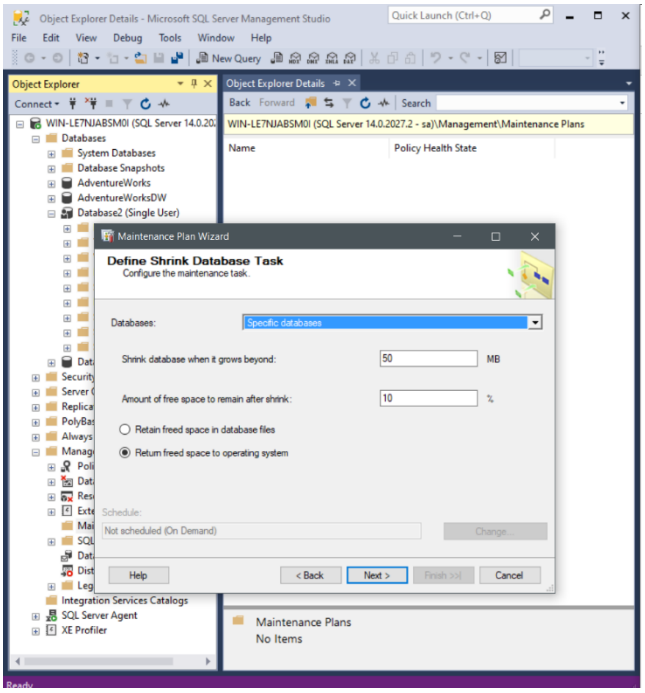

Object Explorer Details - Microsoft SQL Server Management Studio
Quick Launch (Ctrl+Q)
File Edit View Debug Tools Window Help
New Query
Object Explorer
Object Explorer Details
New Database
Select a page
General
Options
Filegroups
Script
Help
Collation:
<default>
Recovery model:
Full
Compatibility level:
SQL Server 2017 (140)
Containment type:
None
Other options:
Database Scoped Configurations
Legacy Cardinality Estimation OFF
Legacy Cardinality Estimation For Secondary PRIMARY
Max DOP 0
Max DOP For Secondary
Parameter Sniffing ON
Parameter Sniffing For Secondary PRIMARY
Query Optimizer Fixes OFF
Query Optimizer Fixes For Secondary PRIMARY
FILESTREAM
FILESTREAM Directory Name
FILESTREAM Non-Transacted Access Off
Misc
AllowScripting True
HideFileSettings False
Miscellaneous
Allow Snapshot Isolation False
Allow Snapshot Isolation
Connection
Server:
WIN-LE7NJABSM0I
Connection:
sa
View connection properties
Progress
Ready
OK
Cancel
Databases
5 Items
Ready

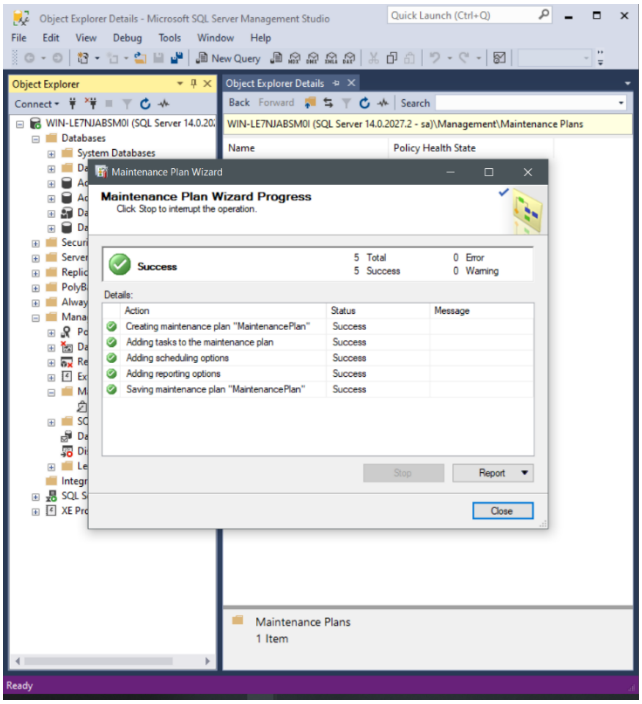

Object Explorer Details - Microsoft SQL Server Management Studio
Quick Launch (Ctrl+Q)
File Edit View Debug Tools Window Help
New Query
Object Explorer
Object Explorer Details
New Database
Select a page
General
Options
Filegroups
Script
Help
Collation:
<default>
Recovery model:
Full
Compatibility level:
SQL Server 2017 (140)
Containment type:
None
Other options:
Parameterization Simple
Quoted Identifiers Enabled False
Recursive Triggers Enabled False
Trustworthy False
VarDecimal Storage Format Enabled True
Recovery
Page Verify CHECKSUM
Target Recovery Time (Seconds) 60
Service Broker
Broker Enabled False
Honor Broker Priority False
Service Broker Identifier 00000000-0000-0000-0000-000000000000
State
Database Read-Only False
Database State NORMAL
Encryption Enabled False
Restrict Access SINGLE_USER
MULTI_USER
SINGLE_USER
RESTRICTED_USER
Restrict Access
Connection
Server:
WIN-LE7NJABSM0I
Connection:
sa
View connection properties
Progress
Ready
OK
Cancel
Databases
5 Items

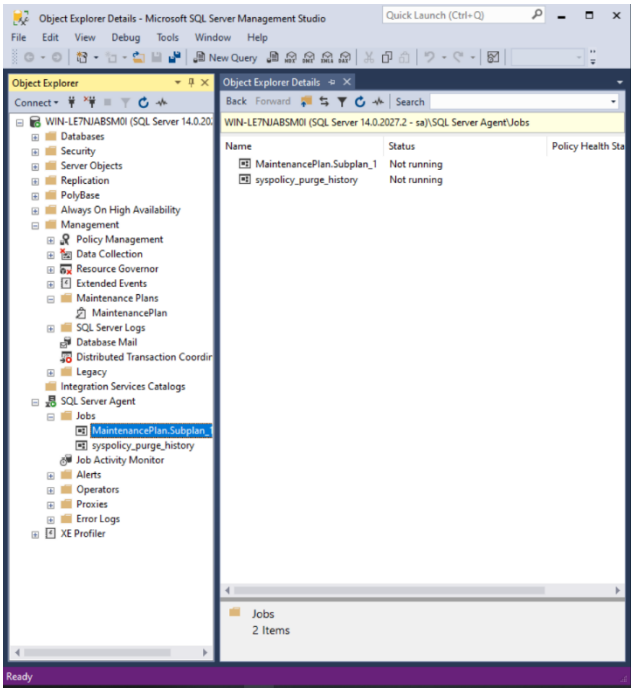
3.

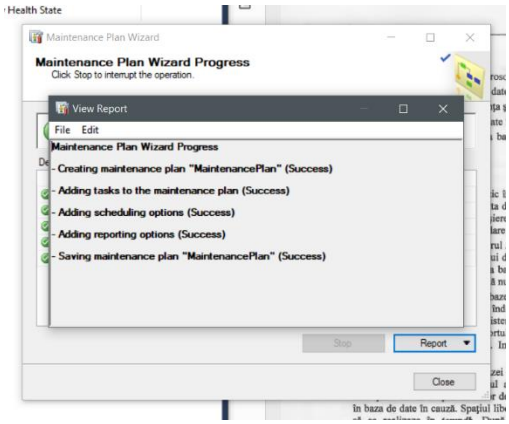

Object Explorer Details - Microsoft SQL Server Management Studio
New Job Schedule
Name: MaintenancePlan
Schedule type: Recurring
Enabled
Frequency
Occurs: Weekly
Recurs every: 1 week(s) on
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
Daily frequency
Occurs once at: 12:00:00 AM
Occurs every:
Starting at: 12:00:00 AM
Ending at: 11:59:59 PM
Duration
Start date: 9/21/2020
End date:
No end date:
Summary
Description: Occurs every week on Friday, Sunday at 12:00:00 AM. Schedule will be used starting on 9/21/2020
OK
Cancel
Help
Maintenance Plans
No Items

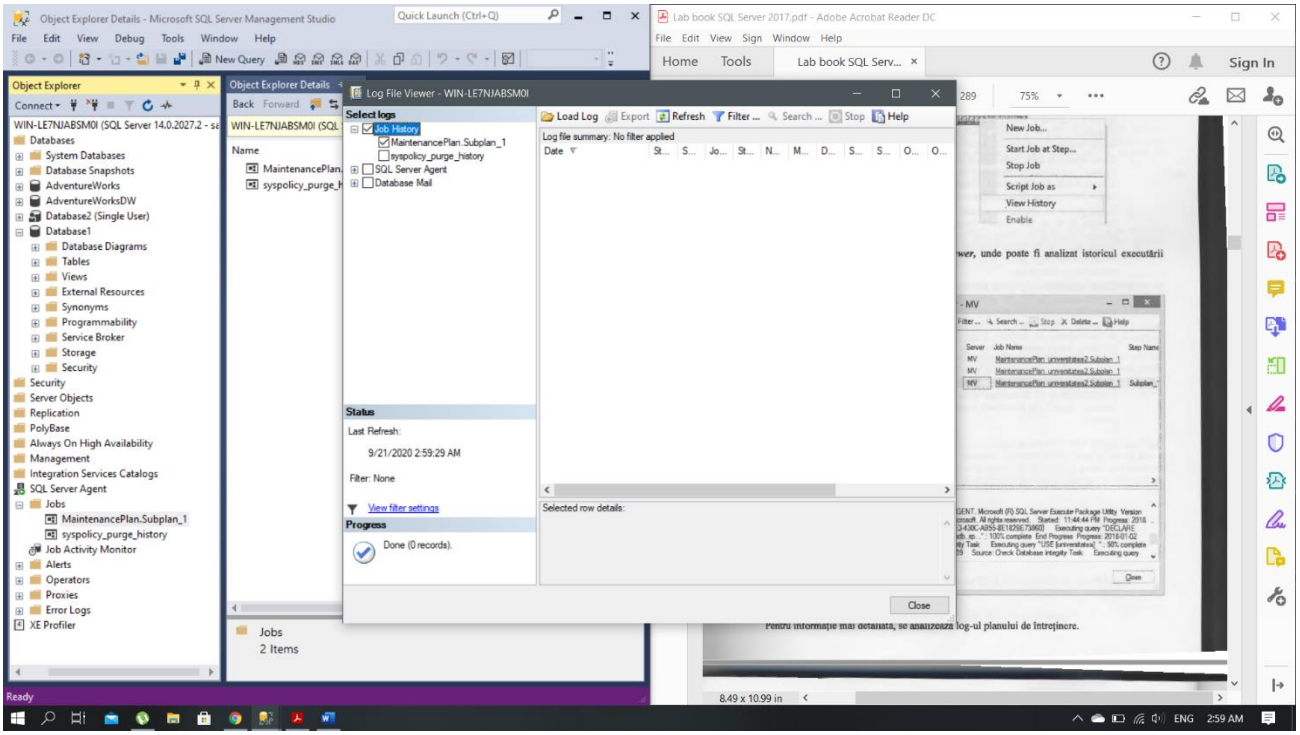

Object Explorer Details - Microsoft SQL Server Management Studio
Maintenance Plan Wizard
Define Shrink Database Task
Configure the maintenance task.
Databases:
<Select one or more>
All databases
System databases
All user databases (excluding master, model, msdb, tempdb)
These databases:
AdventureWorks
AdventureWorksDW
Database1
Database2
master
Ignore databases where the state is not online
OK
Cancel
WIN-LE7NJABSM0I (SQL Server 14.0.2027.2 - sa)\Management\Maintenance Plans
Name
Policy Health State


Object Explorer Details - Microsoft SQL Server Management Studio
Maintenance Plan Wizard
Define Shrink Database Task
Configure the maintenance task.
Databases: Specific databases
Shrink database when it grows beyond: 50 MB
Amount of free space to remain after shrink: 10 %
Retain freed space in database files
Return freed space to operating system
Schedule: Not scheduled (On Demand)
Help
< Back
Next >
Finish >>|
Cancel
Maintenance Plans
No Items

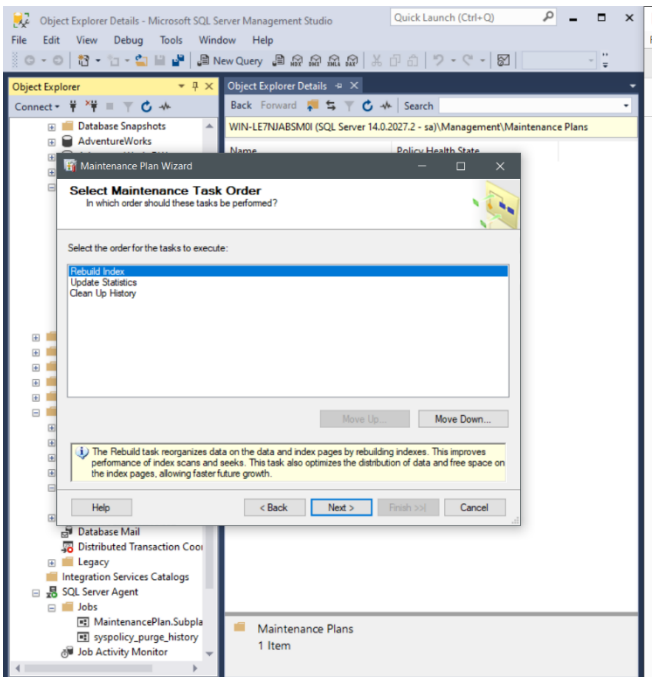

Object Explorer Details - Microsoft SQL Server Management Studio
Maintenance Plan Wizard
Maintenance Plan Wizard Progress
Click Stop to interrupt the operation.
Success
5 Total
5 Success
0 Error
0 Warning
Details:
Action
Status
Message
Creating maintenance plan "MaintenancePlan"
Adding tasks to the maintenance plan
Adding scheduling options
Adding reporting options
Saving maintenance plan "MaintenancePlan"
Success
Stop
Report
Close
Maintenance Plans
1 Item
Ready

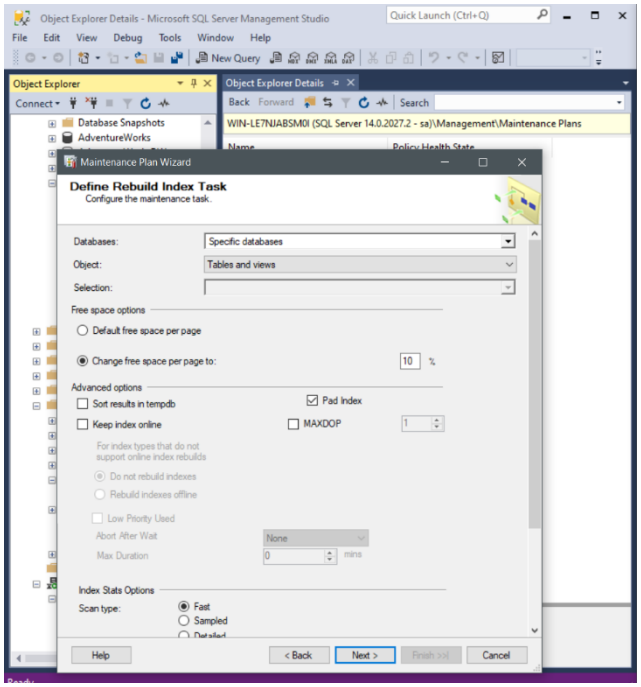

Object Explorer Details - Microsoft SQL Server Management Studio
Quick Launch (Ctrl+Q)
File Edit View Debug Tools Window Help
New Query
Object Explorer
Connect
WIN-LE7NJABSM0I (SQL Server 14.0.20
Databases
Security
Server Objects
Replication
PolyBase
Always On High Availability
Management
Policy Management
Data Collection
Resource Governor
Extended Events
Maintenance Plans
MaintenancePlan
SQL Server Logs
Database Mail
Distributed Transaction Coordir
Legacy
Integration Services Catalogs
SQL Server Agent
Jobs
MaintenancePlan.Subplan_
syspolicy_purge_history
Job Activity Monitor
Alerts
Operators
Proxies
Error Logs
XE Profiler
Object Explorer Details
Back Forward Search
WIN-LE7NJABSM0I (SQL Server 14.0.2027.2 - sa)\SQL Server Agent\Jobs
Name
Status
Policy Health Sta
MaintenancePlan.Subplan_1 Not running
syspolicy_purge_history Not running
Jobs
2 Items
Ready

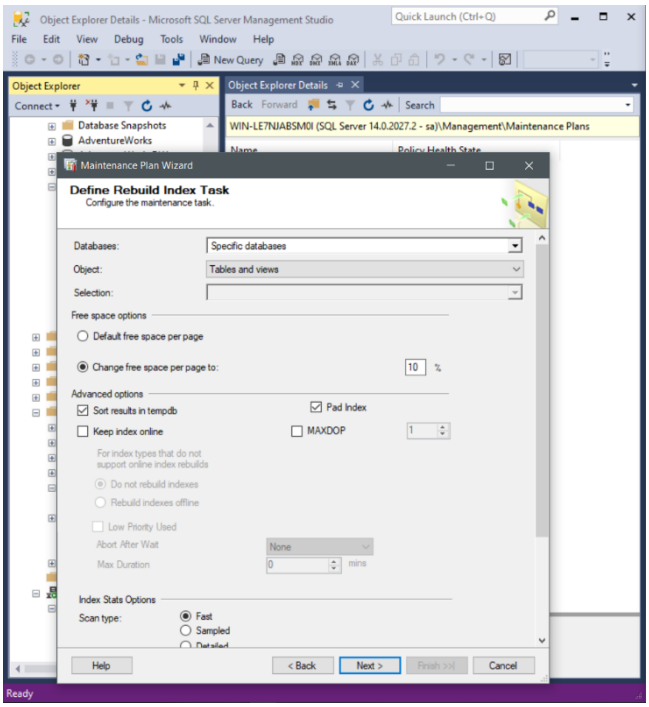

Health State
Maintenance Plan Wizard
Maintenance Plan Wizard Progress
Click Stop to interrupt the operation.
View Report
File Edit
Maintenance Plan Wizard Progress
- Creating maintenance plan "MaintenancePlan" (Success)
- Adding tasks to the maintenance plan (Success)
- Adding scheduling options (Success)
- Adding reporting options (Success)
- Saving maintenance plan "MaintenancePlan" (Success)
Stop
Report
Close
în baza de date în cauză. Spațiul liber

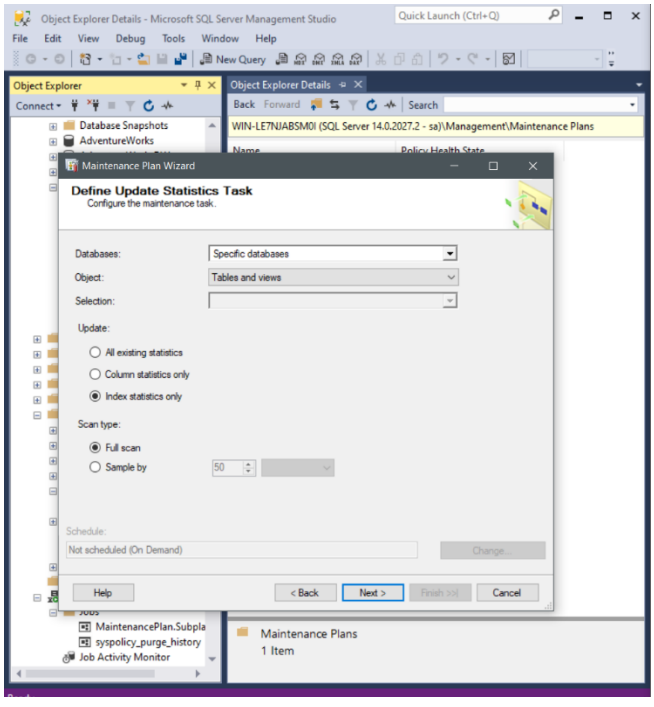

Object Explorer Details - Microsoft SQL Server Management Studio
Log File Viewer - WIN-LE7NJABSM0I
Select logs
Job History
MaintenancePlan.Subplan_1
syspolicy_purge_history
SQL Server Agent
Database Mail
Load Log
Export
Refresh
Filter ...
Search ...
Stop
Help
Log file summary: No filter applied
Date
Status
Last Refresh:
9/21/2020 2:59:29 AM
Filter: None
View filter settings
Progress
Done (0 records).
Selected row details:
Close
Lab book SQL Server 2017.pdf - Adobe Acrobat Reader DC
Home Tools
Sign In
New Job...
Start Job at Step...
Stop Job
Script Job as
View History
Enable
Pentru informații mai detaliate, se analizează log-ul planului de întreținere.
8.49 x 10.99 in
ENG
2:59 AM

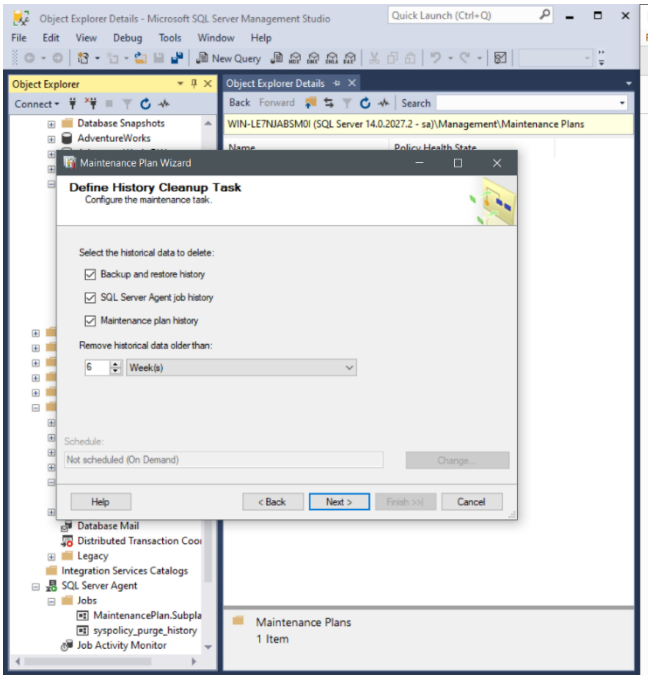
4.

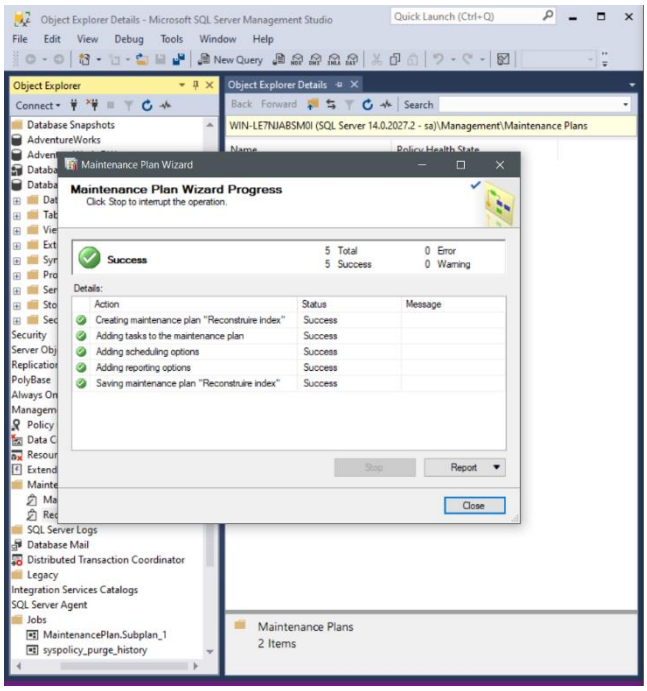

Object Explorer Details - Microsoft SQL Server Management Studio
Maintenance Plan Wizard
Select Maintenance Task Order
In which order should these tasks be performed?
Select the order for the tasks to execute:
Rebuild Index
Update Statistics
Clean Up History
Move Up...
Move Down...
The Rebuild task reorganizes data on the data and index pages by rebuilding indexes. This improves performance of index scans and seeks. This task also optimizes the distribution of data and free space on the index pages, allowing faster future growth.
Help
< Back
Next >
Finish >>|
Cancel
Maintenance Plans
1 Item

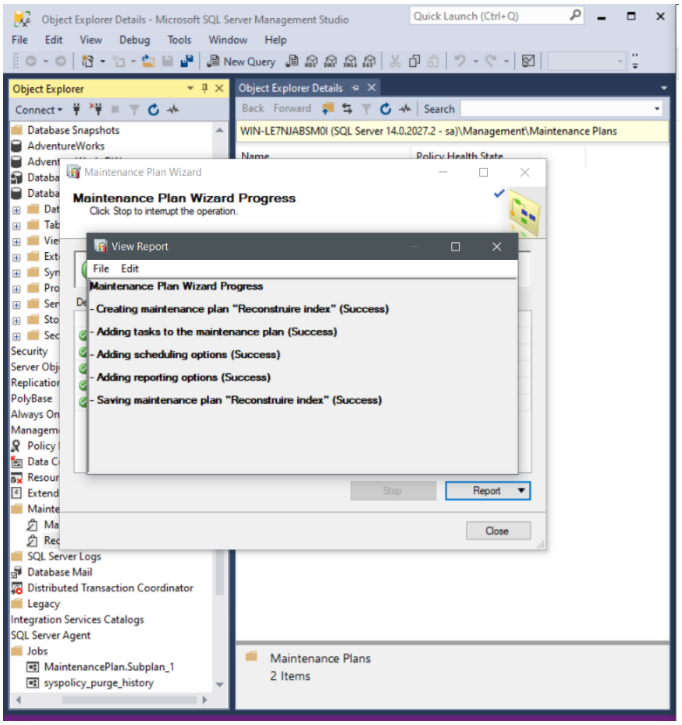

Object Explorer Details - Microsoft SQL Server Management Studio
Maintenance Plan Wizard
Define Rebuild Index Task
Configure the maintenance task.
Databases:
Specific databases
Object:
Tables and views
Selection:
Free space options
Default free space per page
Change free space per page to:
10
%
Advanced options
Sort results in tempdb
Pad Index
Keep index online
MAXDOP
1
For index types that do not support online index rebuilds
Do not rebuild indexes
Rebuild indexes offline
Low Priority Used
Abort After Wait
None
Max Duration
0
mins
Index Stats Options
Scan type:
Fast
Sampled
Help
< Back
Next >
Finish >>|
Cancel

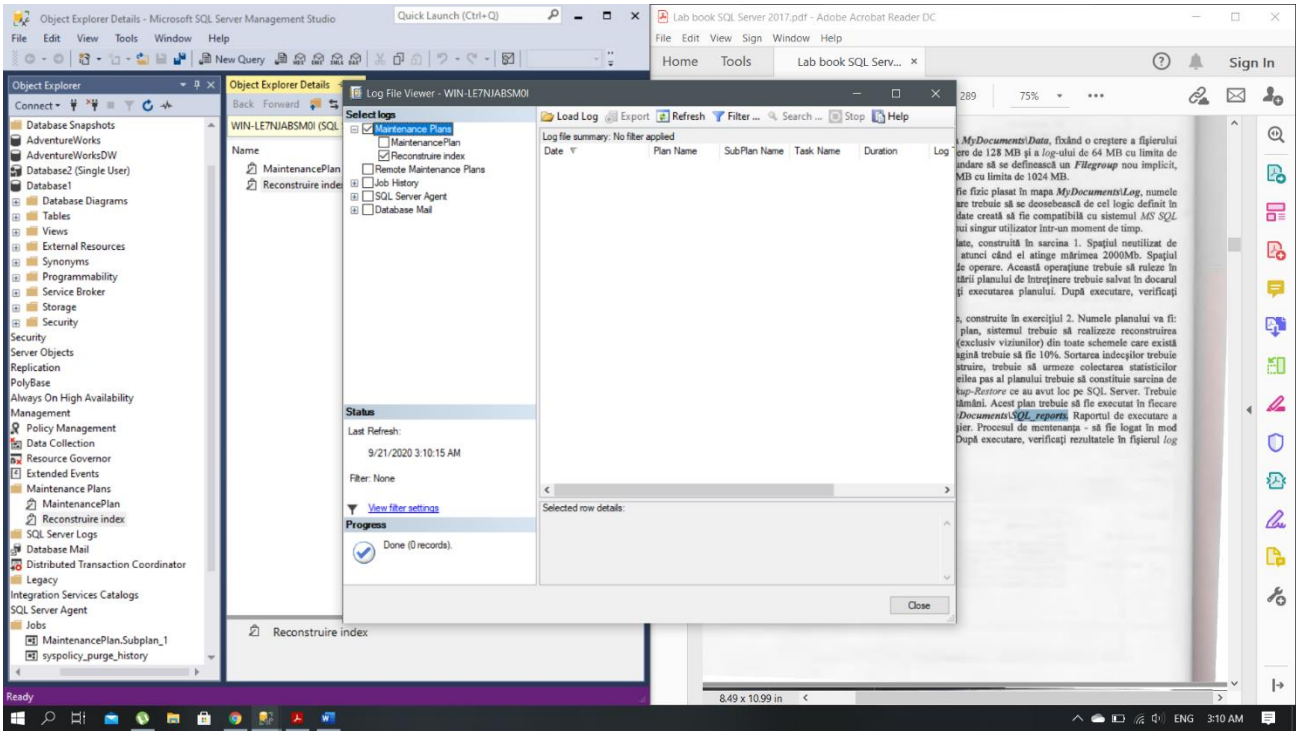

Object Explorer Details - Microsoft SQL Server Management Studio
Maintenance Plan Wizard
Define Rebuild Index Task
Configure the maintenance task.
Databases:
Specific databases
Object:
Tables and views
Selection:
Free space options
Default free space per page
Change free space per page to:
10
%
Advanced options
Sort results in tempdb
Pad Index
Keep index online
MAXDOP
1
For index types that do not support online index rebuilds
Do not rebuild indexes
Rebuild indexes offline
Low Priority Used
Abort After Wait
None
Max Duration
0
mins
Index Stats Options
Scan type:
Fast
Sampled
Help
< Back
Next >
Finish >>|
Cancel
Ready


Object Explorer Details - Microsoft SQL Server Management Studio
Maintenance Plan Wizard
Define Update Statistics Task
Configure the maintenance task.
Databases:
Specific databases
Object:
Tables and views
Selection:
Update:
All existing statistics
Column statistics only
Index statistics only
Scan type:
Full scan
Sample by
50
Schedule:
Not scheduled (On Demand)
Change...
Help
< Back
Next >
Finish >>|
Cancel
Maintenance Plans
1 Item


Object Explorer Details - Microsoft SQL Server Management Studio
Quick Launch (Ctrl+Q)
File Edit View Debug Tools Window Help
New Query
Object Explorer
Connect
Database Snapshots
AdventureWorks
Object Explorer Details
Back Forward Search
WIN-LE7NJABSM0I (SQL Server 14.0.2027.2 - sa)\Management\Maintenance Plans
Name
Policy Health State
Maintenance Plan Wizard
Define History Cleanup Task
Configure the maintenance task.
Select the historical data to delete:
Backup and restore history
SQL Server Agent job history
Maintenance plan history
Remove historical data older than:
6
Week(s)
Schedule:
Not scheduled (On Demand)
Change...
Help
< Back
Next >
Finish >>|
Cancel
Database Mail
Distributed Transaction Coor
Legacy
Integration Services Catalogs
SQL Server Agent
Jobs
MaintenancePlan.Subpla
syspolicy_purge_history
Job Activity Monitor
Maintenance Plans
1 Item


Object Explorer Details - Microsoft SQL Server Management Studio
Quick Launch (Ctrl+Q)
File Edit View Debug Tools Window Help
New Query
Object Explorer
Connect
Database Snapshots
AdventureWorks
Object Explorer Details
Back Forward Search
WIN-LE7NJABSM0I (SQL Server 14.0.2027.2 - sa)\Management\Maintenance Plans
Maintenance Plan Wizard
Maintenance Plan Wizard Progress
Click Stop to interrupt the operation.
Success
5 Total
5 Success
0 Error
0 Warning
Details:
Action
Status
Message
Creating maintenance plan "Reconstruire index"
Success
Adding tasks to the maintenance plan
Success
Adding scheduling options
Success
Adding reporting options
Success
Saving maintenance plan "Reconstruire index"
Success
Stop
Report
Close
Security
Server Obj
Replicatio
PolyBase
Always On
Managem
Policy
Data C
Resour
Extend
Mainte
SQL Server Logs
Database Mail
Distributed Transaction Coordinator
Legacy
Integration Services Catalogs
SQL Server Agent
Jobs
MaintenancePlan.Subplan_1
syspolicy_purge_history
Maintenance Plans
2 Items


Object Explorer Details - Microsoft SQL Server Management Studio
Quick Launch (Ctrl+Q)
File Edit View Debug Tools Window Help
New Query
Object Explorer
Connect
Database Snapshots
AdventureWorks
Object Explorer Details
Back Forward Search
WIN-LE7NJABSM0I (SQL Server 14.0.2027.2 - sa)\Management\Maintenance Plans
Maintenance Plan Wizard
Maintenance Plan Wizard Progress
Click Stop to interrupt the operation.
View Report
File Edit
Maintenance Plan Wizard Progress
- Creating maintenance plan "Reconstruire index" (Success)
- Adding tasks to the maintenance plan (Success)
- Adding scheduling options (Success)
- Adding reporting options (Success)
- Saving maintenance plan "Reconstruire index" (Success)
Stop
Report
Close
Security
Server Obj
Replicatio
PolyBase
Always On
Managem
Policy
Data C
Resour
Extend
Mainte
SQL Server Logs
Database Mail
Distributed Transaction Coordinator
Legacy
Integration Services Catalogs
SQL Server Agent
Jobs
MaintenancePlan.Subplan_1
syspolicy_purge_history
Maintenance Plans
2 Items



Conclusion

Through following the steps described in the book, we managed to create databases, plan the maintenance and the management the of their properties using SQL Server Management Studio tools. In addition, we have learnt about the logical way to organize and maintaine a database.