



mibuso.com

# INSTALLING AND CONFIGURING SQL SERVER FOR MICROSOFT DYNAMICS NAV

Alain Krikilion – mibuso.com / QuantiQ



# ABOUT ME

Alain Krikilion



C/AL developer, NAV-DBA, mibuso.com moderator, Microsoft Dynamics NAV MVP

Worked with NAV in Belgium since 1999, in Italy since 2002 and now in the UK for QuantiQ since April 2015

Mibuso : krika

Twitter : @alakri

Blog : <http://mibuso.com/blogs/kriki/> => <https://krikinav.wordpress.com/>

# OVERVIEW

- Some questions for you to answer.
- Install SQL 2014
- Configure SQL 2014
- Configure temp DB
- Configure model DB
- Configure E-mail
- Configure SQL Server Agent
- NAV 2009R2 installation info
- NAV 2013/2013R2/2015/2016 installation info
- Create a DB using NAV
- Create/delete users/logins
- Detach/attach
- Backup/restore
- Maintenance plans
- Introduction to Policy Based Management
- SSMS tricks
- Introduction to Extended Events
- Final

# SOME QUESTIONS FOR YOU TO ANSWER

- Who has SQL Server with version x at:

	Portable	Partner servers	Customer servers
SQL2014			
SQL2012			
SQL2008 (R2)			
SQL2005			
SQL2000			
SQL older			

- Who is work for a partner, customer, freelance?
- Who is NAV developer?
- Who is an accidental (NAV-) DBA?
- What is your prime interest : install/configure SQL Server for portable / partner server / customer server

# Install SQL Server 2014



# WHAT IS THE GOAL OF THE INSTALLATION?

	What will be done on the server?	Performance needed?	Security needed?	Backups needed?	Diskspace needed?
Customer Production Server	PRODUCTION!	Yes	Yes	Yes (Full/TL)	Not really
Customer Test Server	Testing before putting objects in production	Depends	Less then Production	No	Depends
Customer performance testing Server	Performance testing before putting objects in production	Yes	Less then Production	No	Depends
Partner development/repository server	Development / testing	No	Less then Production	FULL/DIFF(?)	Yes
Portable as DBA/Expert	Development / testing / TSQL programming / DBA testing	Depends	Windows login is enough	FULL/No(?)	Well ... Yes
Portable as user (functional consultants)	Testing / demo's	No	Windows login is enough	FULL/No(?)	Depends

# BEFORE STARTING THE INSTALL

Question 1:

What is the first step to install SQL Server?

Answer 1:

Prepare your disks for SQL Server!

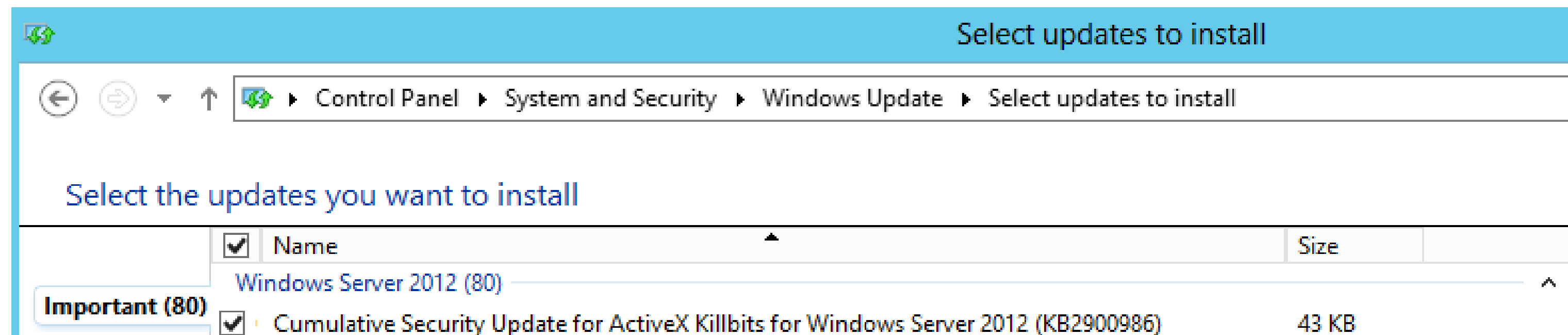
<http://www.midnightdba.com/Jen/2014/04/decreed-set-your-partition-offset-and-block-size-make-sql-server-faster/>

# BEFORE STARTING THE INSTALL

Question 2:

What is the second step to install SQL Server?

Answer 2:



Update your server!



# BEFORE STARTING THE INSTALL






And step 3:

Use high performance power plan (standard is balanced. Also for servers...)

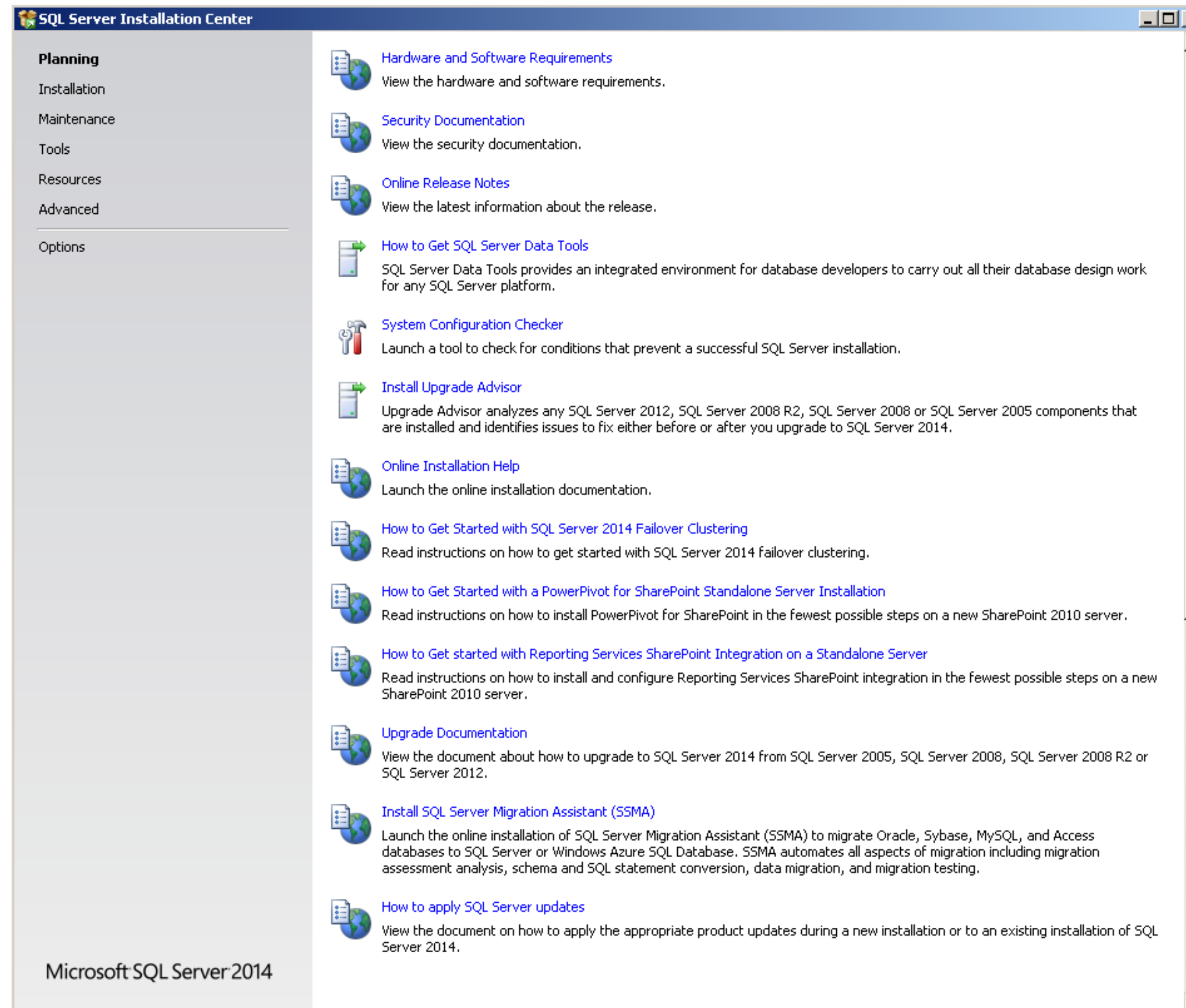
Check:

- Host : Bios
- Host : Windows power plan
- Guest : Bios
- Guest : Windows power plan
- CPU-Z : IF Specification > Core speed THEN ohoh! (<http://www.cpuid.com/softwares/cpu-z.html>)

# INSTALLING SQL SERVER 2014

 1033_ENU_LP	13/04/2014 14:07	File folder	
 redist	13/04/2014 14:08	File folder	
 resources	13/04/2014 14:08	File folder	
 StreamInsight	13/04/2014 14:08	File folder	
 Tools	13/04/2014 14:08	File folder	
 x64	13/04/2014 14:09	File folder	
 autorun.inf	06/02/2014 21:56	Setup Information	1 KB
 MediaInfo.xml	22/02/2014 00:32	XML Document	1 KB
 setup.exe	21/02/2014 14:17	Application	70 KB
 setup.exe.config	17/01/2014 10:27	XML Configuration File	1 KB
 SqlSetupBootstrapper.dll	21/02/2014 14:20	Application extension	193 KB
 sqmapi.dll	21/02/2014 14:20	Application extension	147 KB

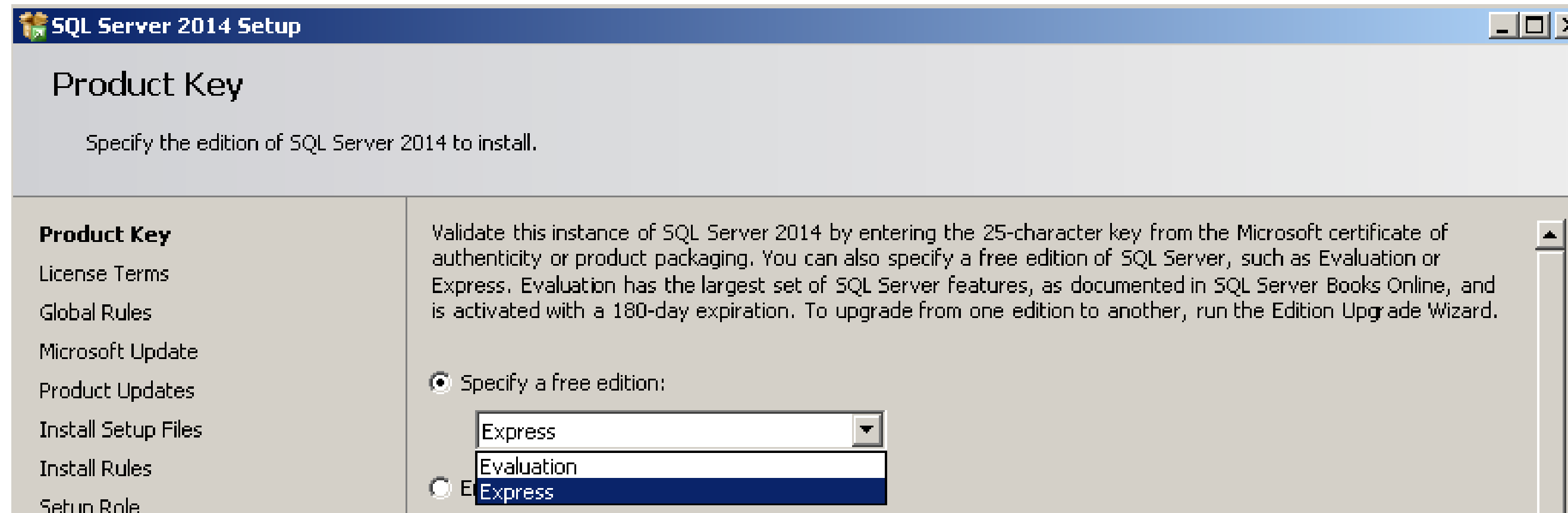
Mouse rightclick => run as administrator



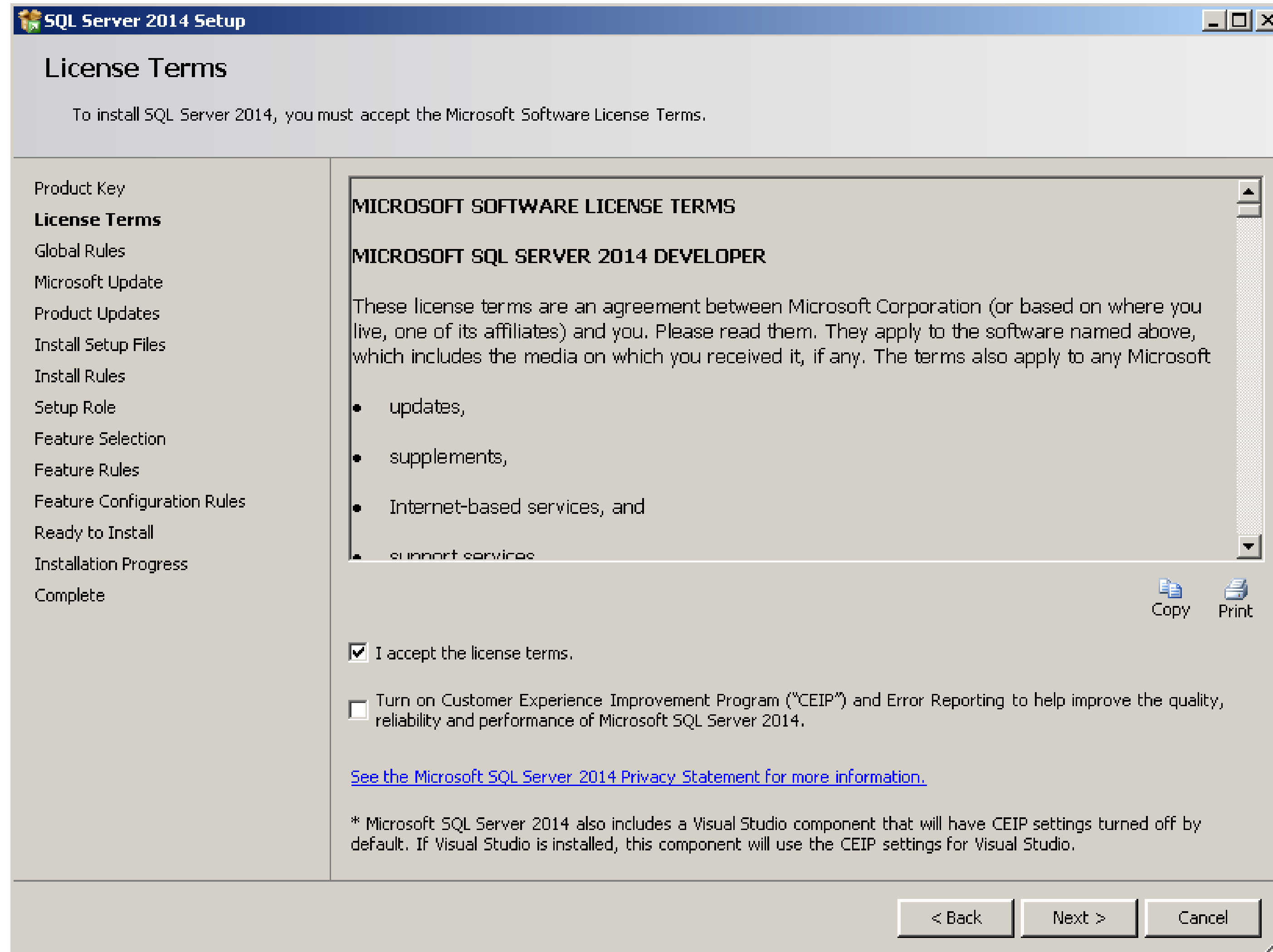




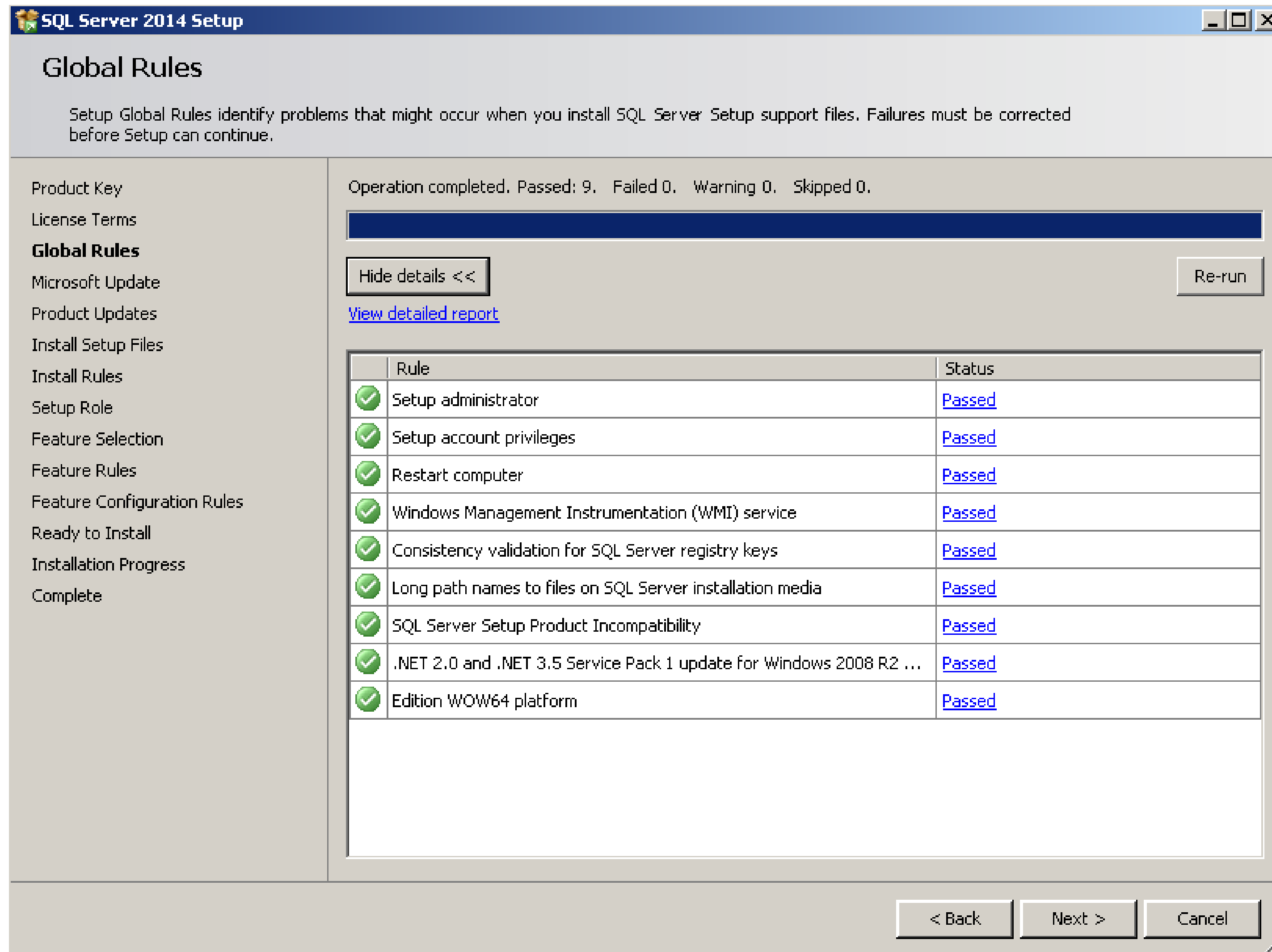
- Don't install multiple SQL Servers on the same machine. They will battle for resources.

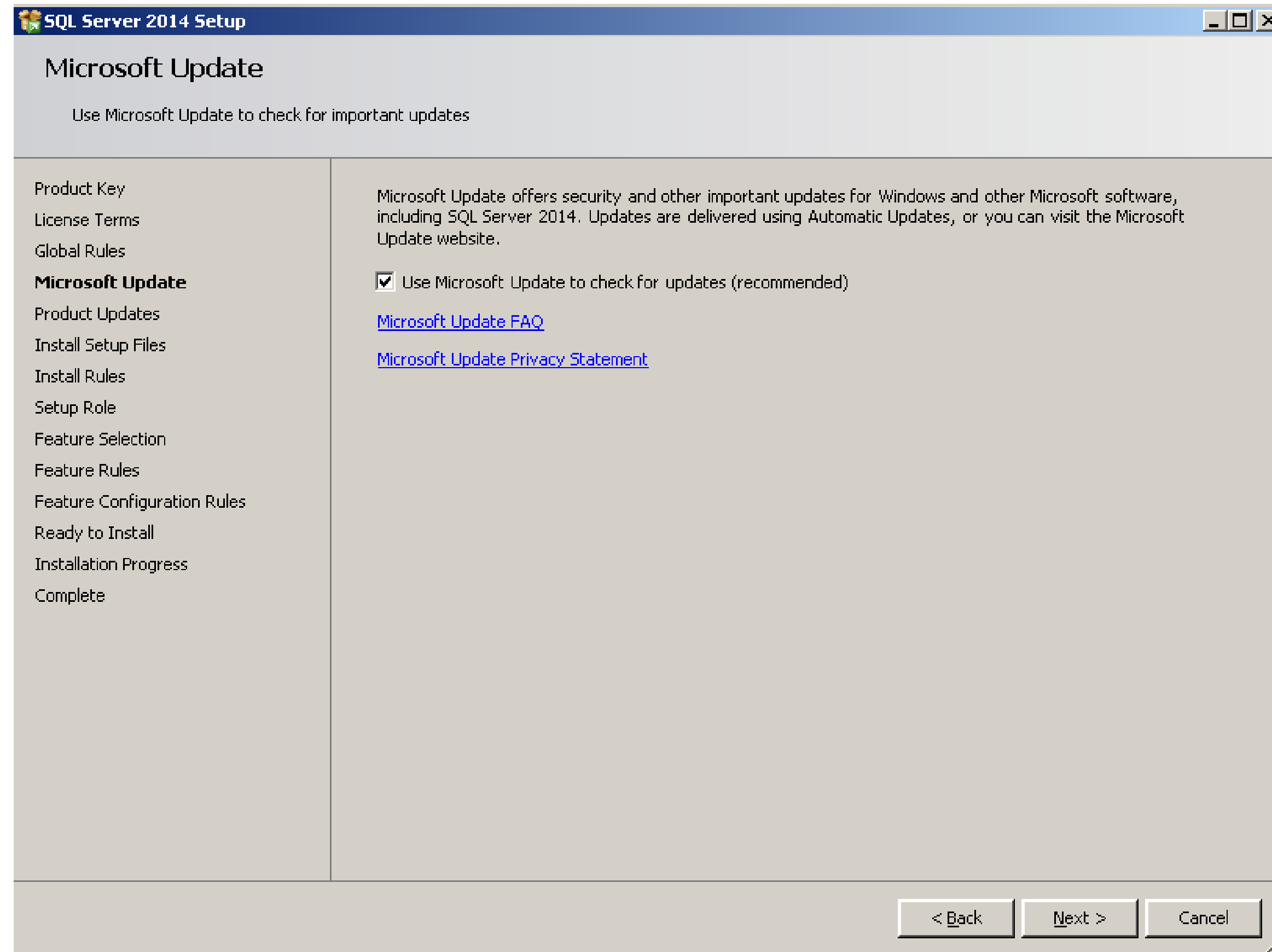


- If you download from MSDN, you have your product key inserted in the download.
- But you can still install as evaluation or express edition
- BTW: Development Edition = (Enterprise Edition - the €/£/\$)









- Since SQL 2012 (I think). It checks for SQL Server service packs that have been released.

**SQL Server 2014 Setup**

## Setup Role

Click the SQL Server Feature Installation option to individually select which feature components to install, or click a feature role to install a specific configuration.

Product Key

License Terms

Global Rules

Microsoft Update

Product Updates

Install Setup Files

Install Rules

**Setup Role**

Feature Selection

Feature Rules

Feature Configuration Rules

Ready to Install

Installation Progress

Complete

☒ **SQL Server Feature Installation**

Install SQL Server Database Engine Services, Analysis Services, Reporting Services, Integration Services, and other features.

☐ **SQL Server PowerPivot for SharePoint**

Install PowerPivot for SharePoint on a new or existing SharePoint server to support PowerPivot data access in the farm. Optionally, add the SQL Server relational database engine to use as the new farm's database server.

☒ Add SQL Server Database Relational Engine Services to this installation.

☐ **All Features With Defaults**

Install all features using default values for the service accounts.

< Back

Next >

Cancel

Help



**SQL Server 2014 Setup**

## Feature Selection

Select the Developer features to install.

Product Key

License Terms

Global Rules

Microsoft Update

Product Updates

Install Setup Files

Install Rules

Setup Role

**Feature Selection**

Feature Rules

Instance Configuration

Server Configuration

Database Engine Configuration

Feature Configuration Rules

Ready to Install

Installation Progress

Complete

**Features:**

Instance Features

- ☒ Database Engine Services
  - ☐ SQL Server Replication
  - ☐ Full-Text and Semantic Extractions for Search
  - ☐ Data Quality Services
  - ☐ Analysis Services
  - ☐ Reporting Services - Native

Shared Features

- ☐ Reporting Services - SharePoint
- ☐ Reporting Services Add-in for SharePoint Products
- ☐ Data Quality Client
- ☒ Client Tools Connectivity
- ☐ Integration Services
- ☒ Client Tools Backwards Compatibility
- ☐ Client Tools SDK
- ☒ Documentation Components
- ☒ Management Tools - Basic
  - ☒ Management Tools - Complete
- ☐ Distributed Replay Controller
- ☐ Distributed Replay Client
- ☒ SQL Client Connectivity SDK
- ☐ Master Data Services

Redistributable Features

**Feature description:**

Includes the Database Engine, the core service for storing, processing and securing data. The Database Engine provides controlled access and rapid transaction processing and also provides rich support for sustaining high availability. The Database Engine also provides support for the utility control point in the SQL Server Utility. Only Database Engine Services and Analysis Services can be clustered.

**Prerequisites for selected features:**

Already installed:

- Windows PowerShell 2.0
- Microsoft .NET Framework 3.5
- Microsoft Visual Studio 2010 Redistributables
- Microsoft Visual Studio 2010 Shell
- Microsoft .NET Framework 4.0

**Disk Space Requirements**

Drive C: 2442 MB required, 76401 MB available

Select All   Unselect All

Instance root directory: C:\Program Files\Microsoft SQL Server\

Shared feature directory: C:\Program Files\Microsoft SQL Server\

Shared feature directory (x86): C:\Program Files (x86)\Microsoft SQL Server\

< Back   Next >   Cancel   Help

SQL Server 2014 Setup

## Instance Configuration

Specify the name and instance ID for the instance of SQL Server. Instance ID becomes part of the installation path.

Product Key  
License Terms  
Global Rules  
Microsoft Update  
Product Updates  
Install Setup Files  
Install Rules  
Setup Role  
Feature Selection  
Feature Rules  
**Instance Configuration**  
Server Configuration  
Database Engine Configuration  
Feature Configuration Rules  
Ready to Install  
Installation Progress  
Complete

☒ Default instance  
☐ Named instance: MSSQLSERVER

Instance ID: MSSQLSERVER

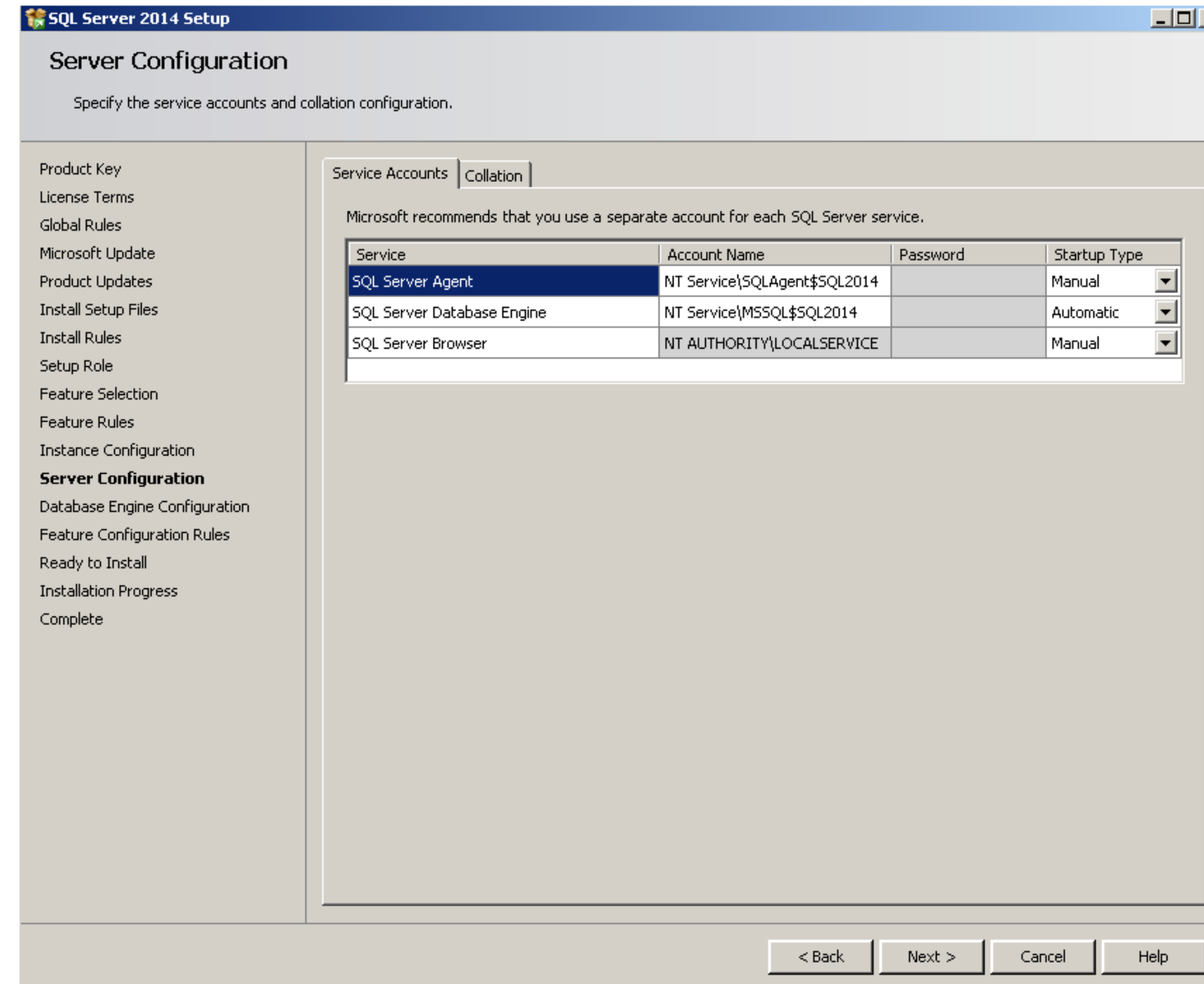
SQL Server directory: C:\Program Files\Microsoft SQL Server\MSSQL12.MSSQLSERVER

Installed instances:

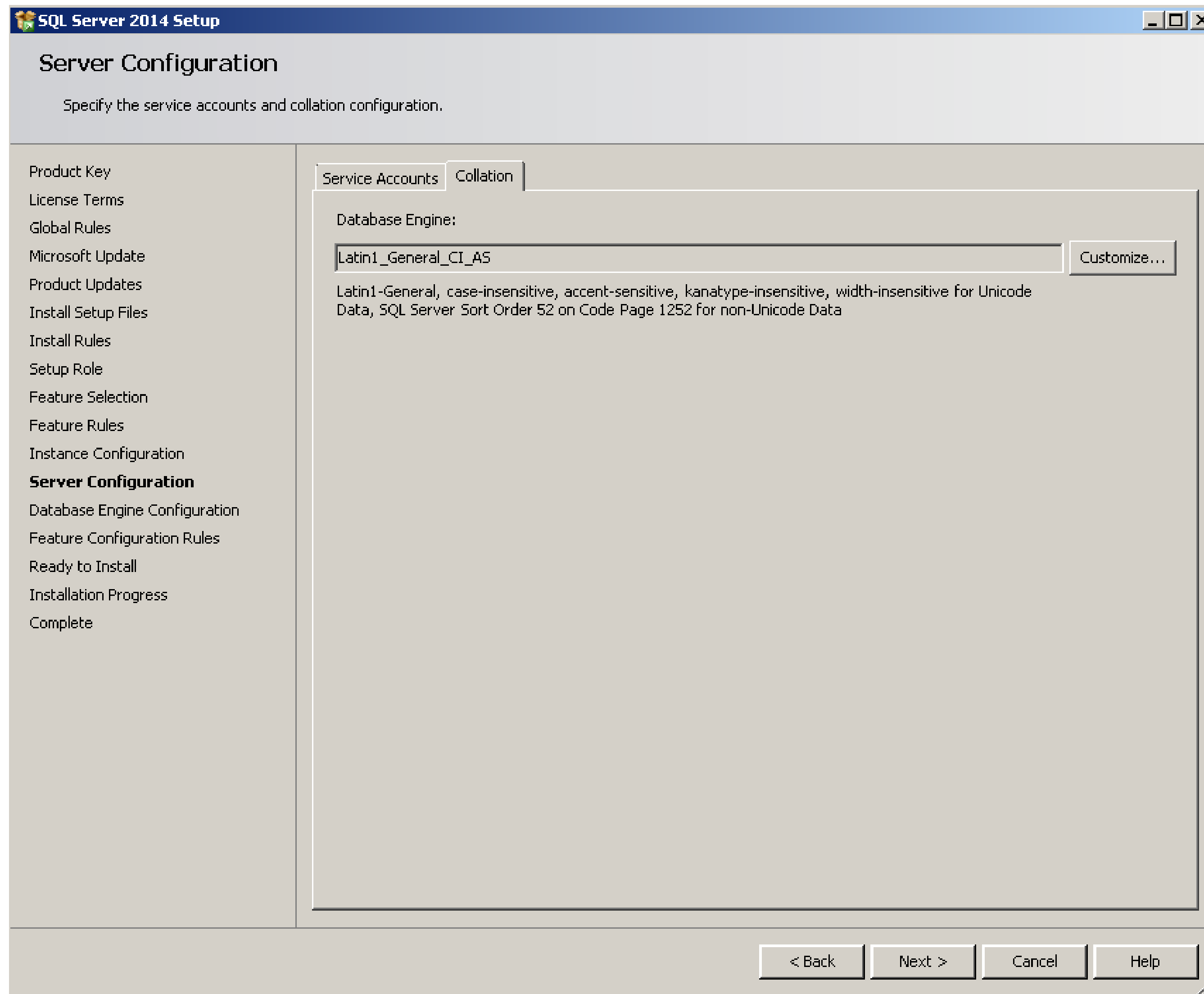
Instance Name	Instance ID	Features	Edition	Version
MSSQLSERVER	MSSQL11.MSSQLSERV...	SQLEngine,SQLEngine\...	Developer	11.0.2100.60
<Shared Components>		SSMS, Adv_SSMS, Con...		11.0.2100.60

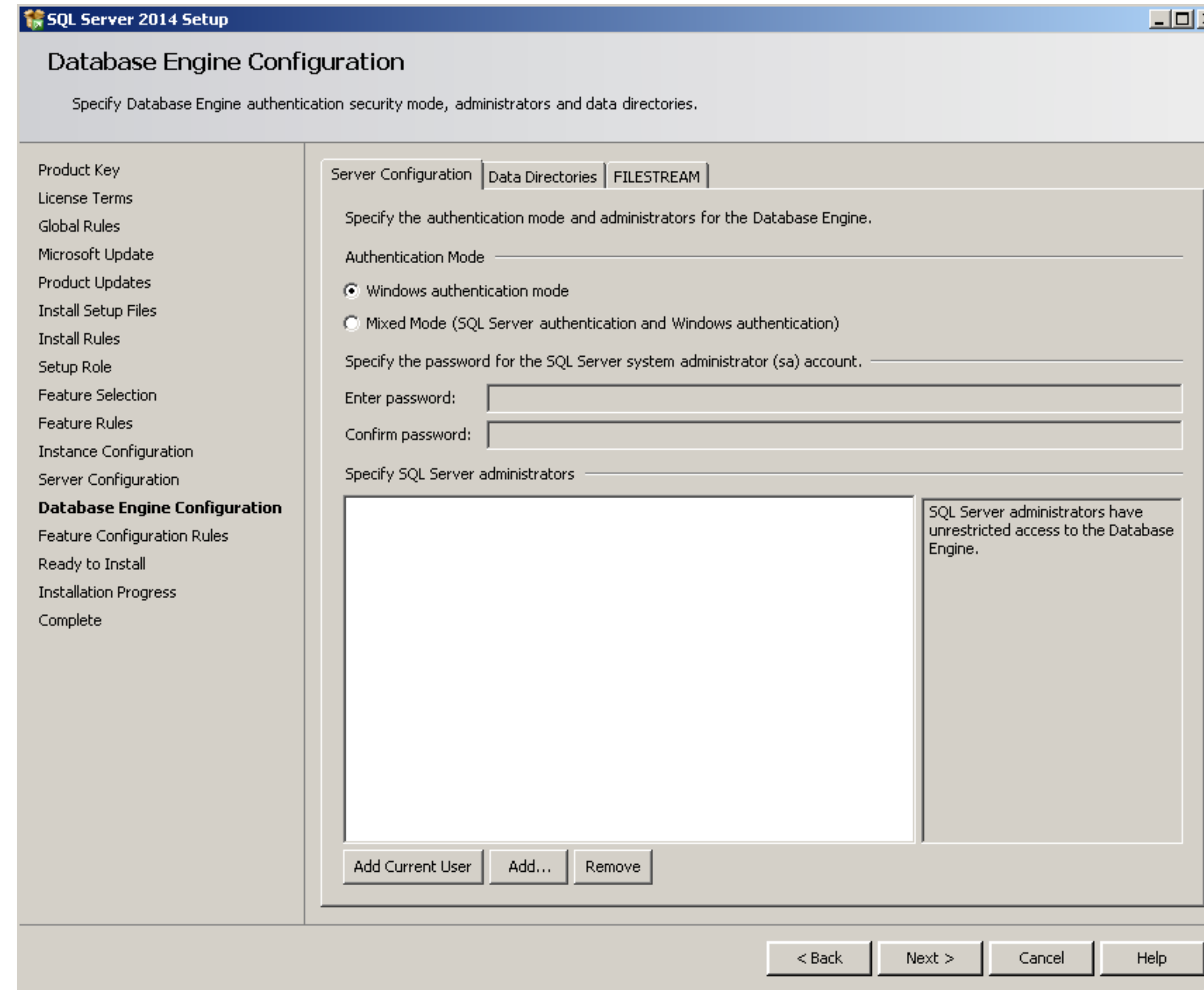
< Back   Next >   Cancel   Help

- This is the default.
- SQL Server browser:
  - Browsing a list of available servers
  - Connecting to the correct server instance
  - Connecting to dedicated administrator connection (DAC) endpoints
  - [http://technet.microsoft.com/en-us/library/ms181087\(v=SQL.105\).aspx](http://technet.microsoft.com/en-us/library/ms181087(v=SQL.105).aspx)
- Best practices: every service has his domain-account with only permissions that are needed. So NO domain-admin permissions. Not even server admin permissions.

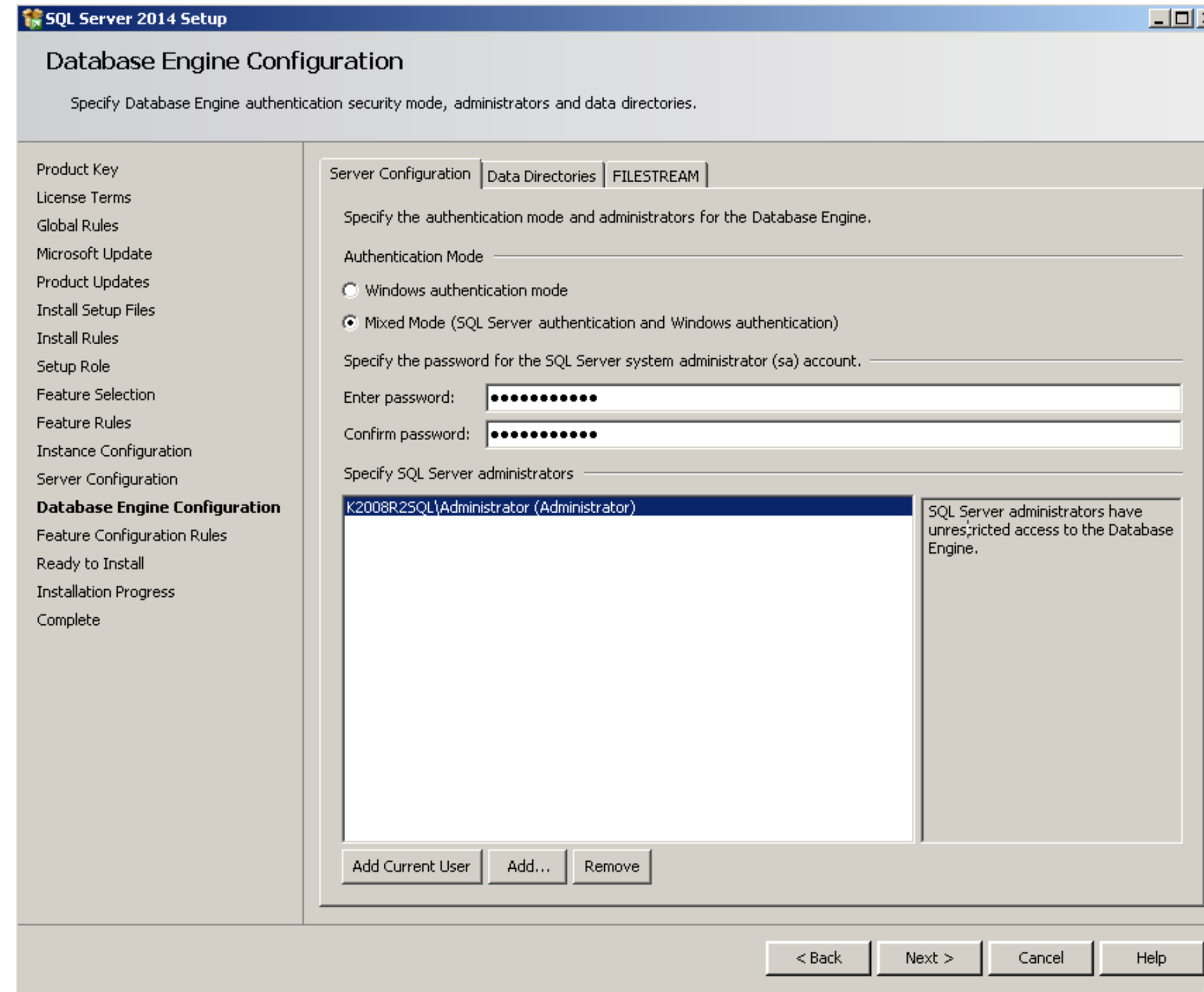








- Best practice : "Windows authentication mode" because it is more secure. SQL Server authentication passwords go over the wire(less) as plain text.

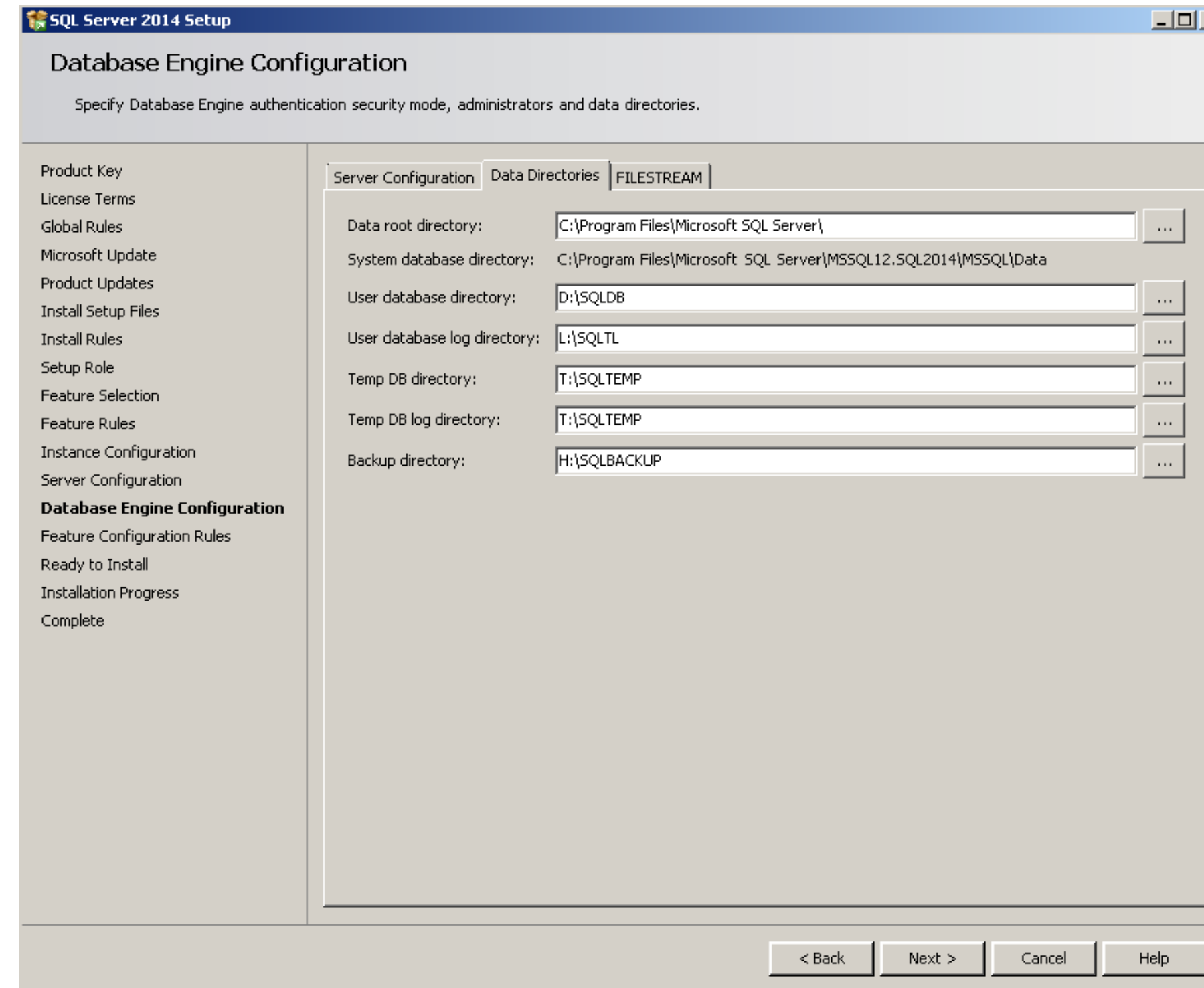


- Best practice bis: use mixed mode with a password like this "g1vdW85njMOLyXoczaGF" together with the name of the account (avoid "sa"). Write it on some paper and in a sealed envelop and in a safe. And only use it case of emergency. And when you use it, change it and best on the server itself.



- Did I already tell you that paranoia is NOT a defect but a quality in a DBA? As a DBA you are the gatekeeper of the data of your company (or your customer).

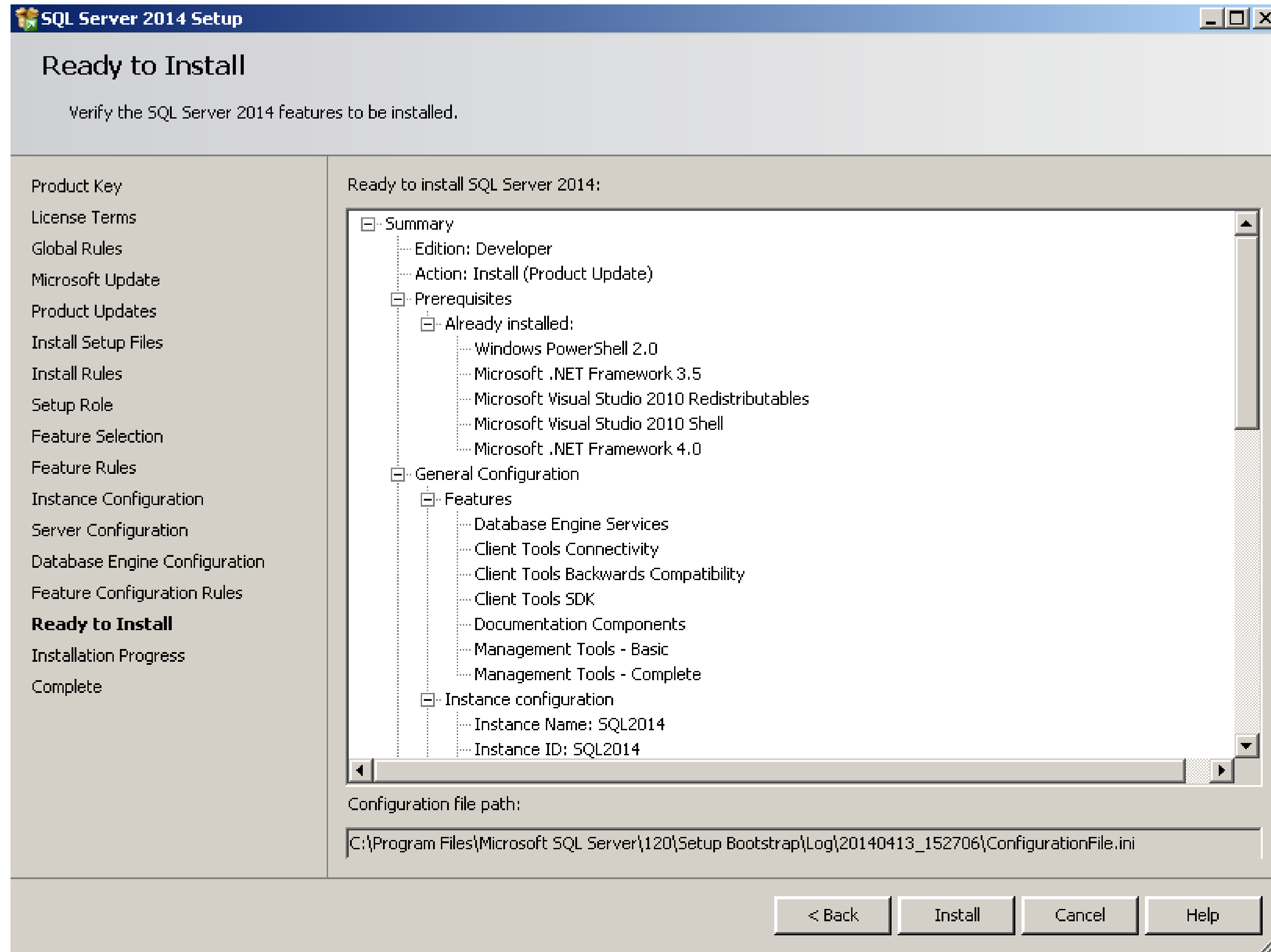


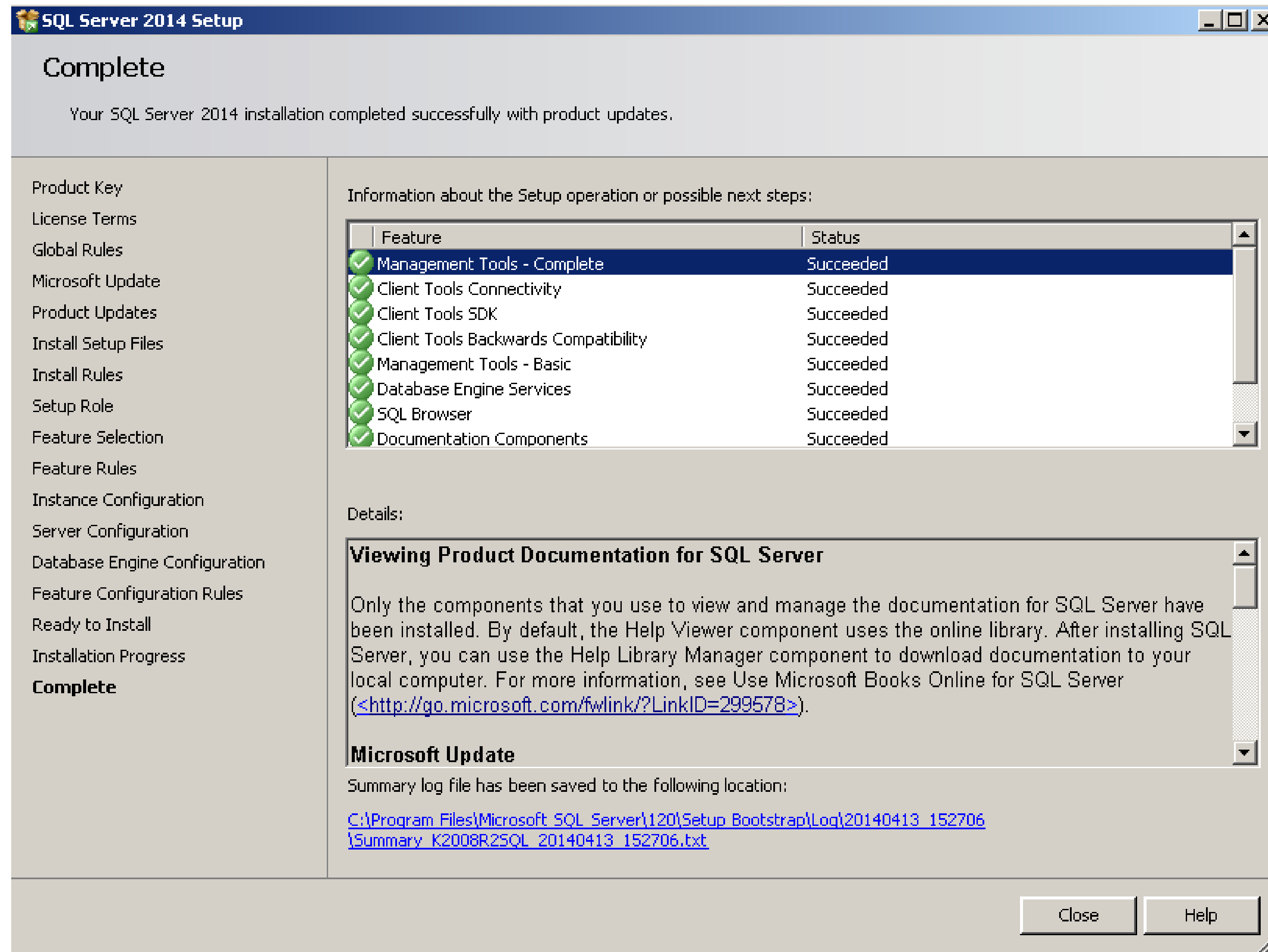


Ideally!

But with virtualized on non-dedicated SAN-disks, it loses importance. But best create different disks to separate the files.

Best is that each database has its own TL-disk.





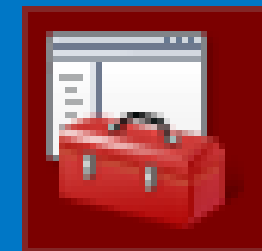
# Configure SQL Server 2014






# Configure SQL Server 2014 Configuration Manager

## Microsoft SQL Server 2014

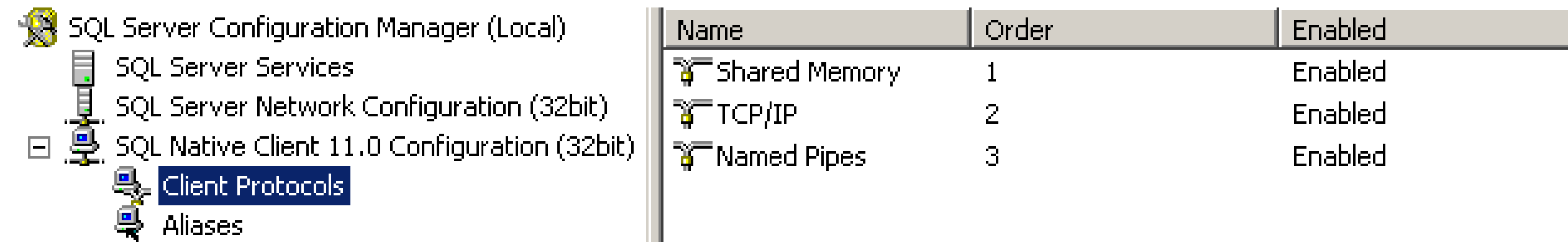
-  Download Microsoft SQL Server Compact
-  SQL Server 2014 Import and Export Data (3
-  SQL Server 2014 Import and Export Data (6
-  SQL Server 2014 Management Studio
-  Analysis Services
-  Configuration Tools
-  SQL Server 2014 Configuration Manager



SQL Server 2014 Configuration  
Manager

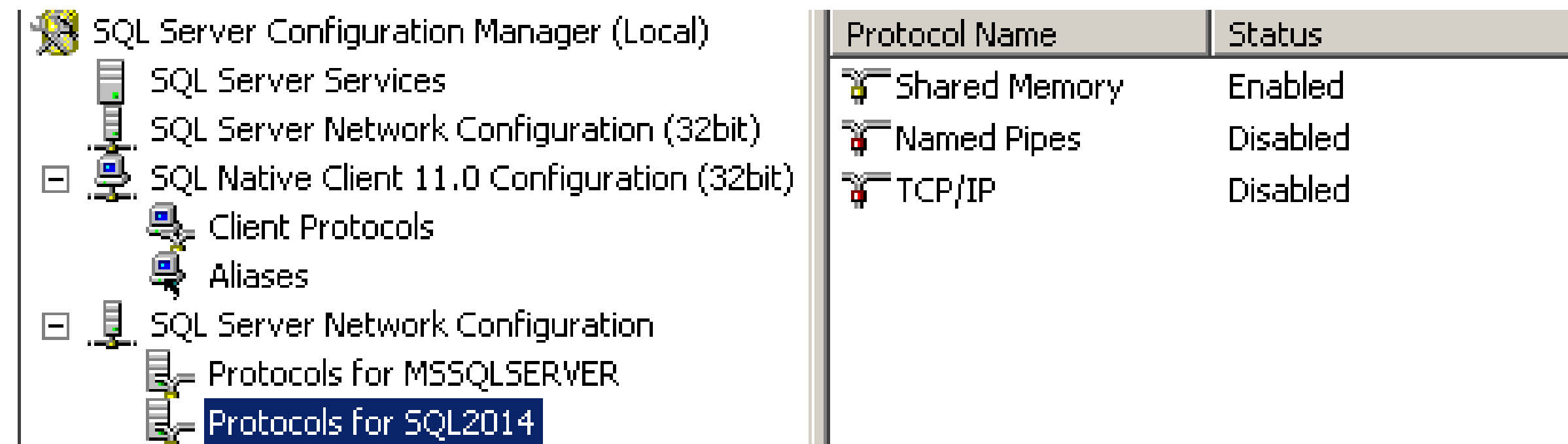
 SQL Server (MSS...	Running	Automatic	NT Service\MSSQLSERVER	1084	SQL Server
 SQL Server Browser	Stopped	Manual	NT AUTHORITY\LOCALSERVICE	0	
 SQL Server Agent...	Running	Automatic	NT Service\SQLSERVERAGENT	1872	SQL Agent

- Have a domain logon for both SQL Server and SQL Server Agent. Preferably different logons with only permissions/shares that are needed but nothing more.

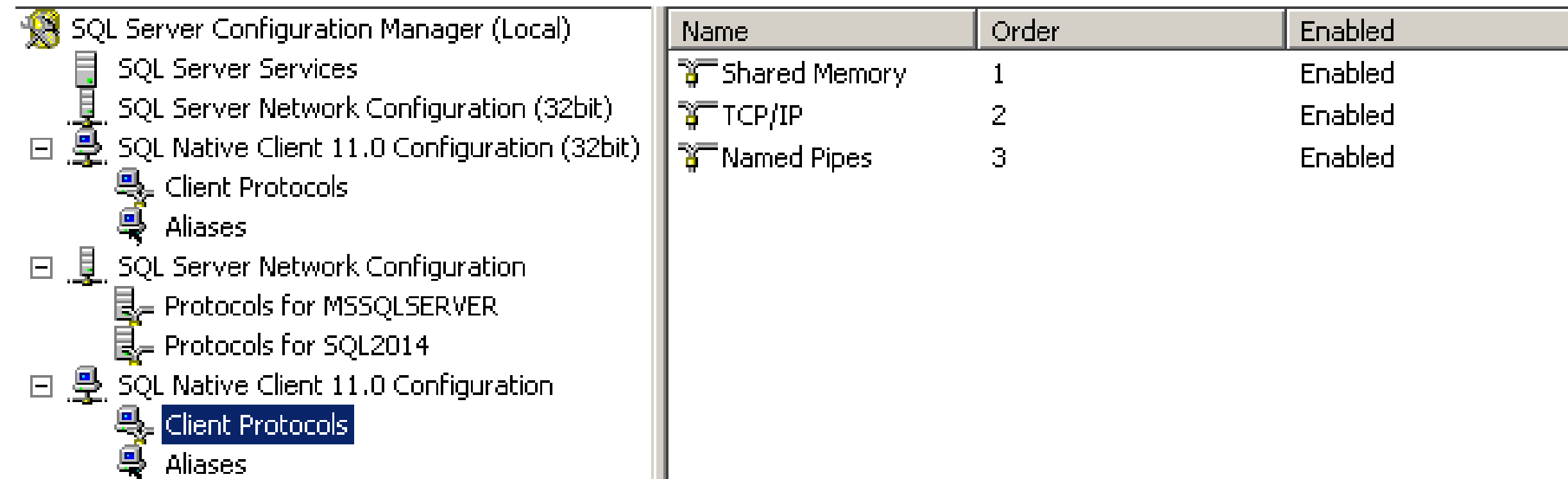


- Shared Memory
  - Simplest
  - Fastest
  - BUT ONLY SAME COMPUTER!
- TCP/IP
  - Most popular protocol
  - fast
- Named Pipes
  - LAN only
  - Slower than TCP/IP on slow networks
  - Fast on same computer
  - Disable it





- TCP/IP is disabled by default??????



- Disable Named Pipes
- Aliases can be used to give your SQL server also another name. Can be useful when you change server, but some applications cannot be easily changed to point to the new server.

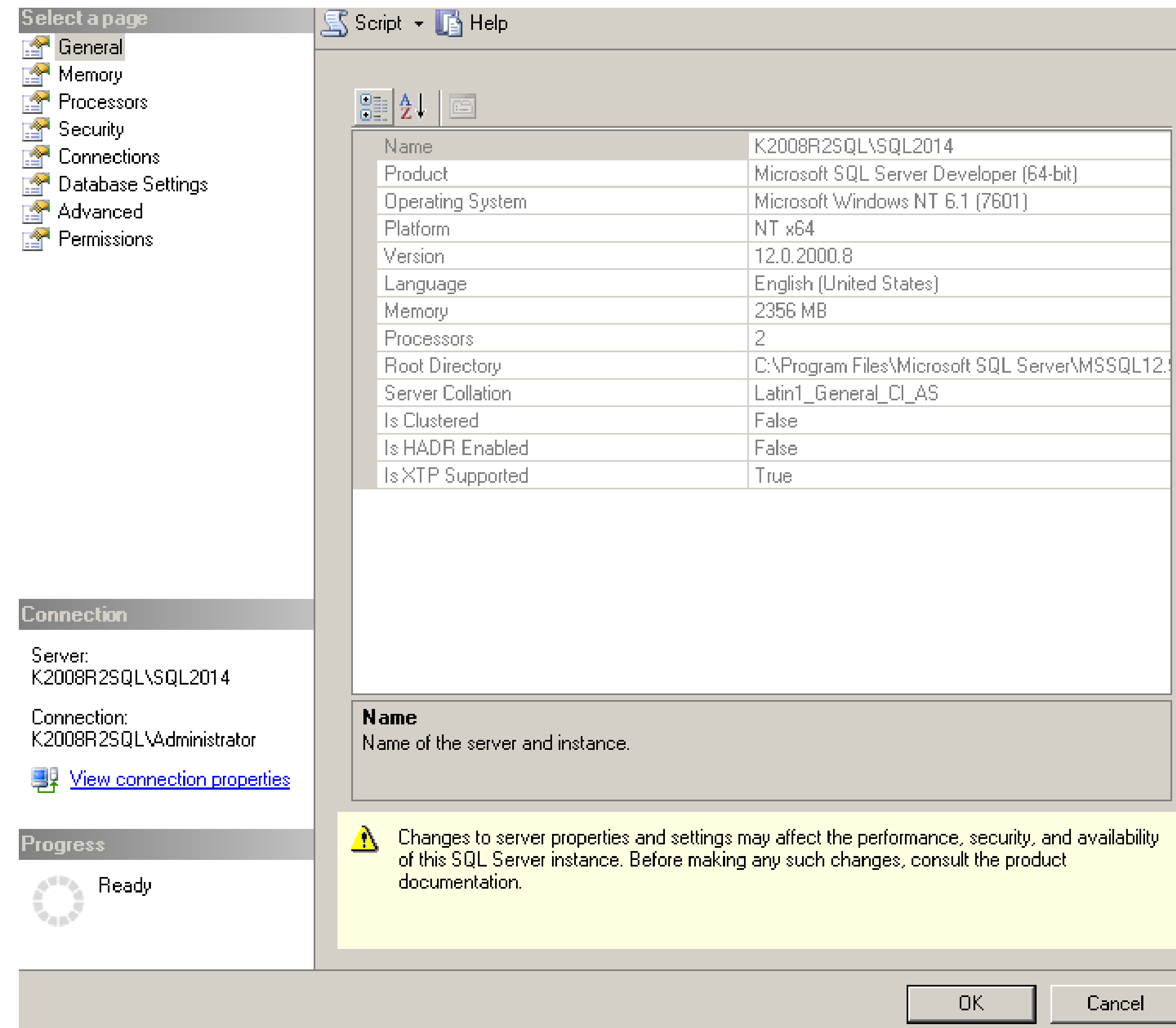


- After changing something in the Configuration Manager, you need to restart the SQL Server service.

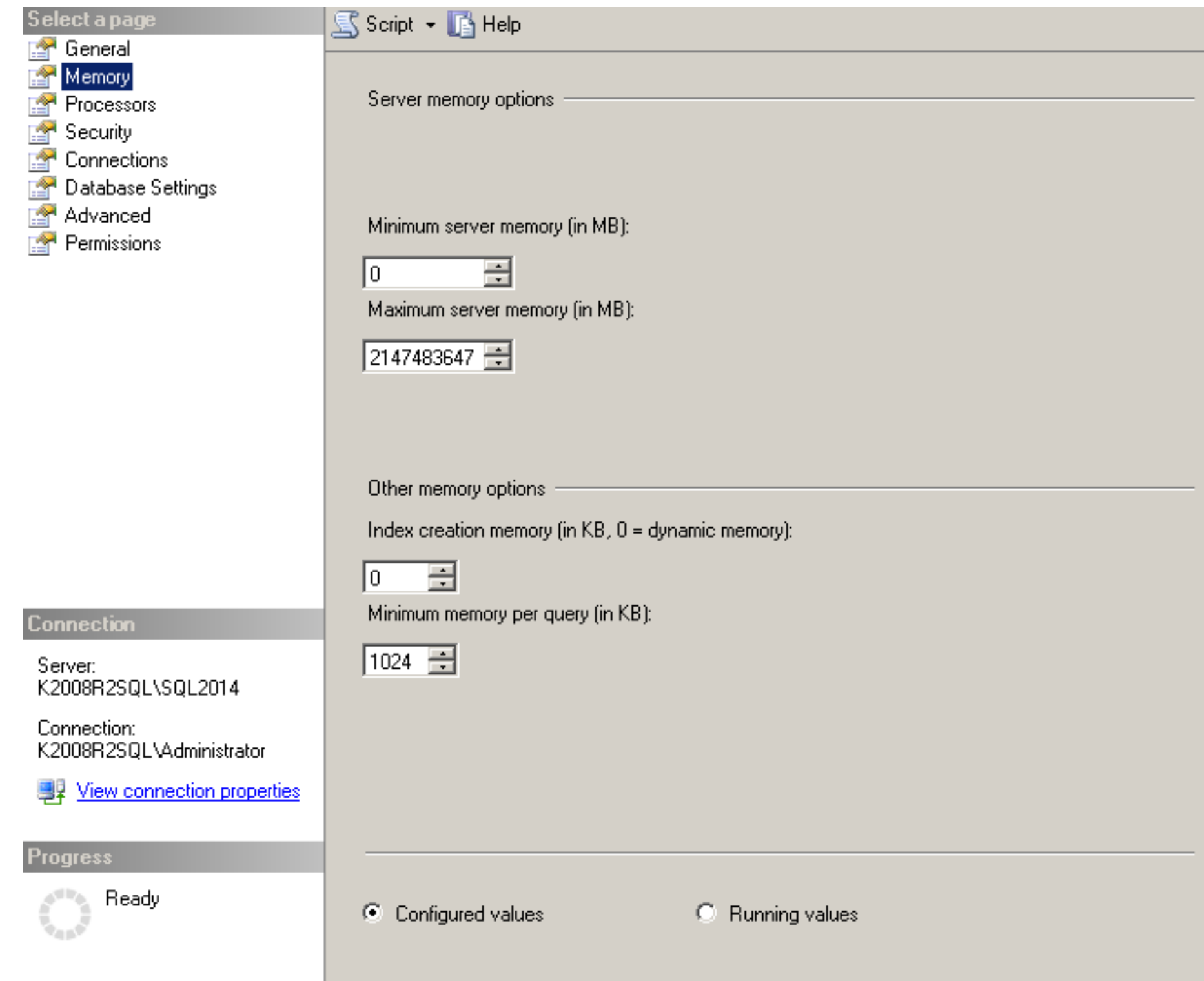
# Configure SQL Server 2014

## SQL Server Properties

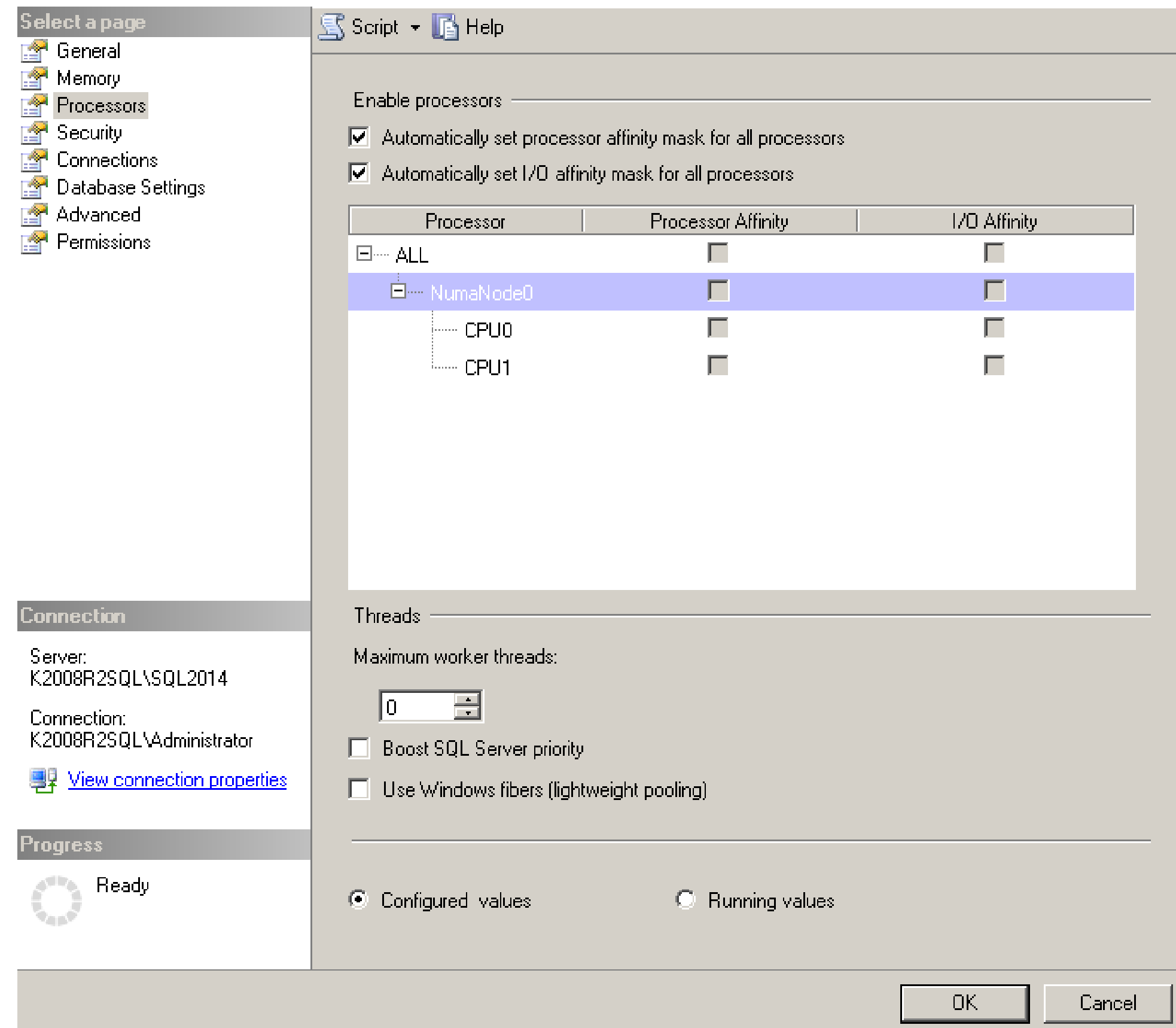




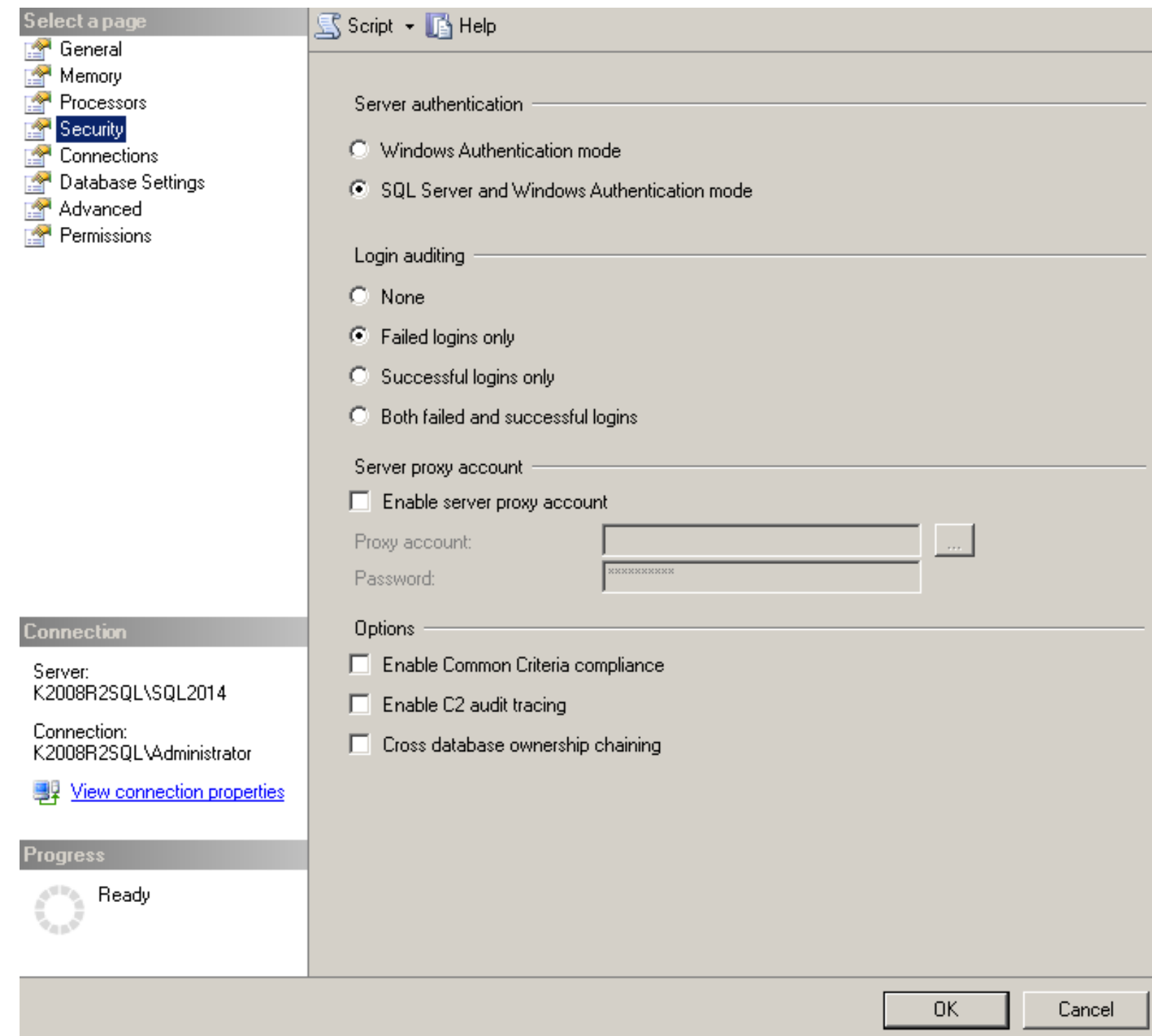
- XTP = eXtreme Transaction Processing = Hekaton = In-memory tables ≠ PIN-ning tables



- Minimum/Maximum Server Memory
- Physical Server with ONLY SQL Server: same values. Leave 1.5 GB for the system on 4GB, 2GB on 8GB, 4GB on 16GB
- VM: Minimum < Maximum : give the host the possibility to take some memory. Generally I take Minimum = Maximum / 2



- Touch only if said so by Microsoft Support



- Best would be Windows Authentication only because SQL Server Authentication sends PW's unencrypted. But other systems (Unix,...) don't know Windows Authentication. And it can be used as a last resort.



Select a page

- General
- Memory
- Processors
- Security
- Connections**
- Database Settings
- Advanced
- Permissions

Script Help

Connections

Maximum number of concurrent connections (0 = unlimited):

0

☐ Use query governor to prevent long-running queries

0

Default connection options:

- ☐ implicit transactions
- ☐ cursor close on commit
- ☐ ansi warnings
- ☐ ansi padding
- ☐ ANSI NULLS
- ☐ arithmetic abort
- ☐ arithmetic ignore

Remote server connections

☒ Allow remote connections to this server

Remote query timeout (in seconds, 0 = no timeout):

600

☐ Require distributed transactions for server-to-server communication

☒ Configured values ☐ Running values

OK Cancel

Connection

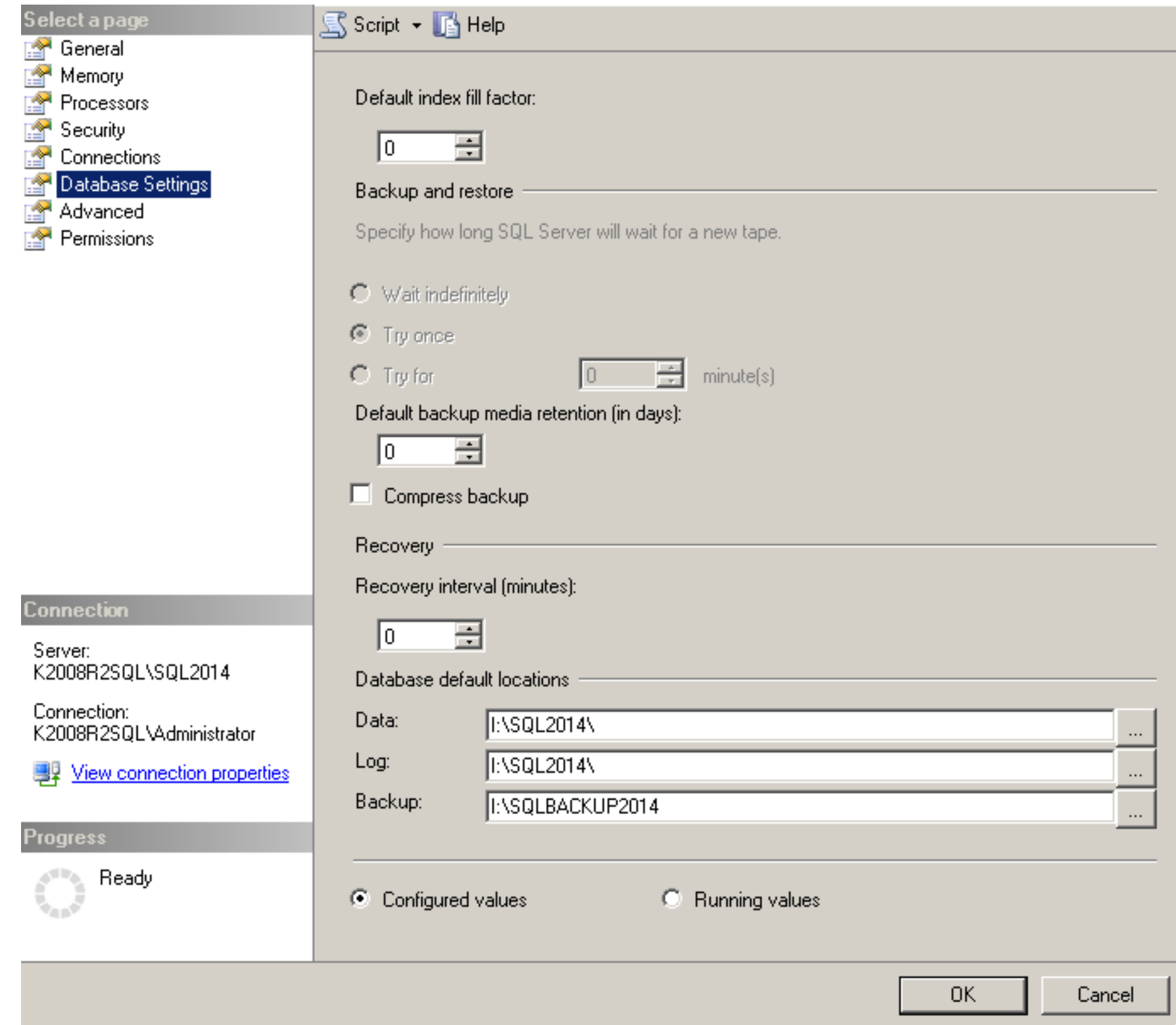
Server:  
K2008R2SQL\SQL2014

Connection:  
K2008R2SQL\Administrator

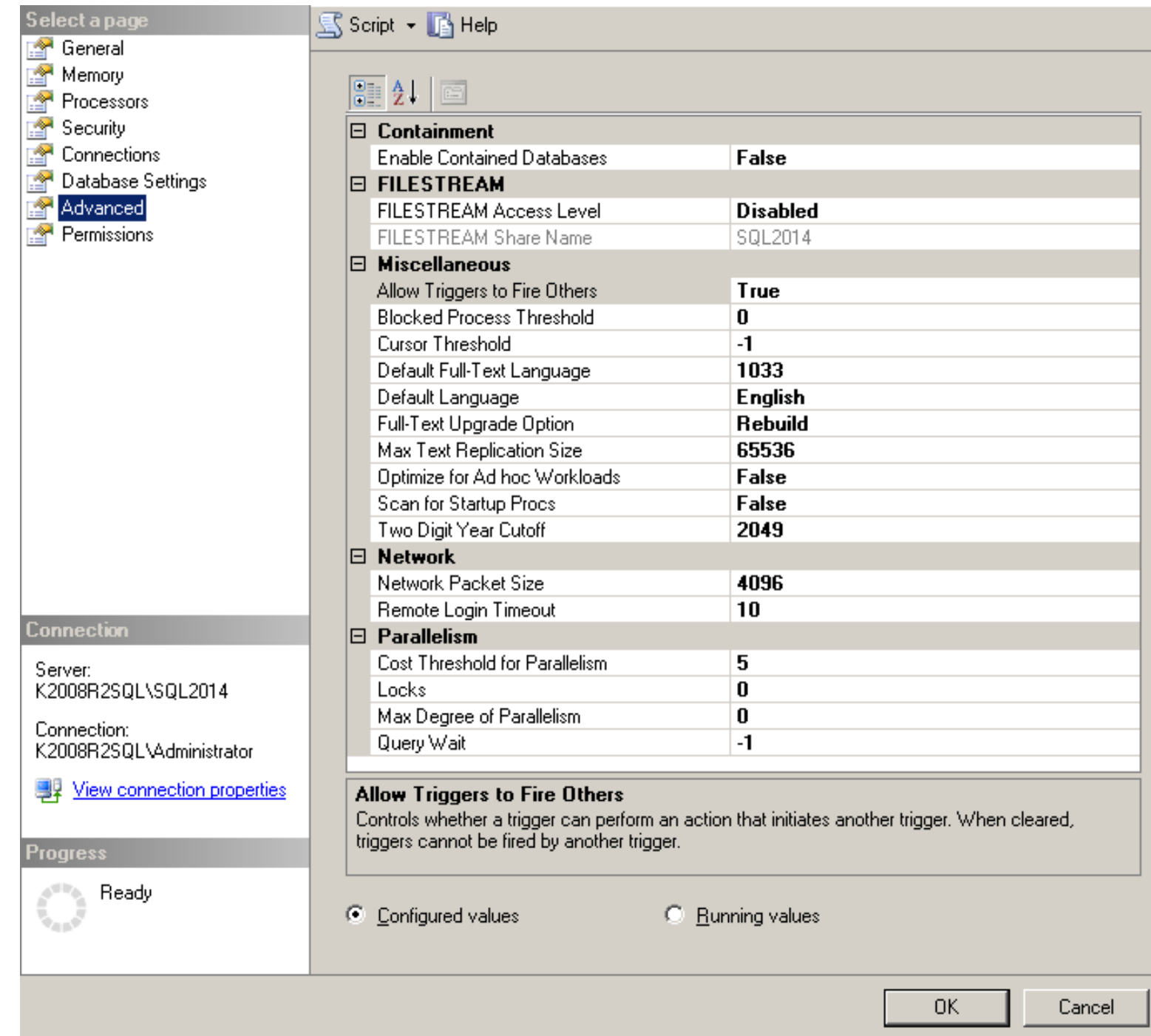
[View connection properties](#)

Progress

Ready



- Default Index Fill Factor (<> Leave % Free Space in Maintenance plan). Put to 90% for production and 0% for partner server dev machines.
- Compress Backup = Yes
- Database default locations: best different physical disks. Otherwise use different logical disks.



- Optimize for Ad hoc Workloads=Yes
- Cost Threshold for Parallelism = 50
- Max Degree of Parallelism = 2 for NAV2013+ (max have of max no. of cores!) and 1 for Pre NAV2013

Select a page

- General
- Memory
- Processors
- Security
- Connections
- Database Settings
- Advanced
- Permissions

Script Help

Logins or roles: Search...

Name	Type
##MS_AgentSigningCertificate##	Login
##MS_PolicyEventProcessingLogin##	Login
##MS_PolicySigningCertificate##	Login
##MS_PolicyTsqlExecutionLogin##	Login
##MS_SmoExtendedSigningCertificate##	Login
##MS_SQLAuthenticatorCertificate##	Login
##MS_SQLReplicationSigningCertificate##	Login
##MS_SQLResourceSigningCertificate##	Login
K2008R2SQL\Administrator	Login
NT AUTHORITY\SYSTEM	Login
NT Service\MSSQL\$SQL2014	Login

Permissions for ##MS\_AgentSigningCertificate##:

Explicit Effective

Permission	Grantor	Grant	With Grant	Deny
Administer bulk oper...		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alter any availability ...		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alter any connection		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alter any credential		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alter any database		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alter any endpoint		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alter any event notif...		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alter any event sess...		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alter any linked server		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alter any login		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Connection

Server:  
K2008R2SQL\SQL2014

Connection:  
K2008R2SQL\Administrator

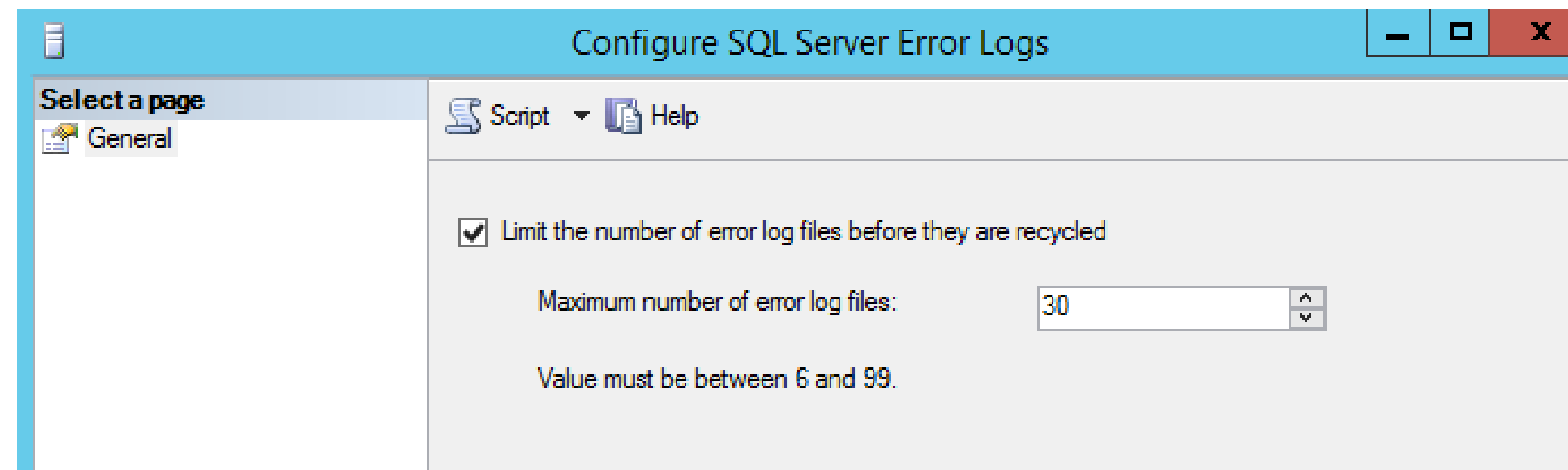
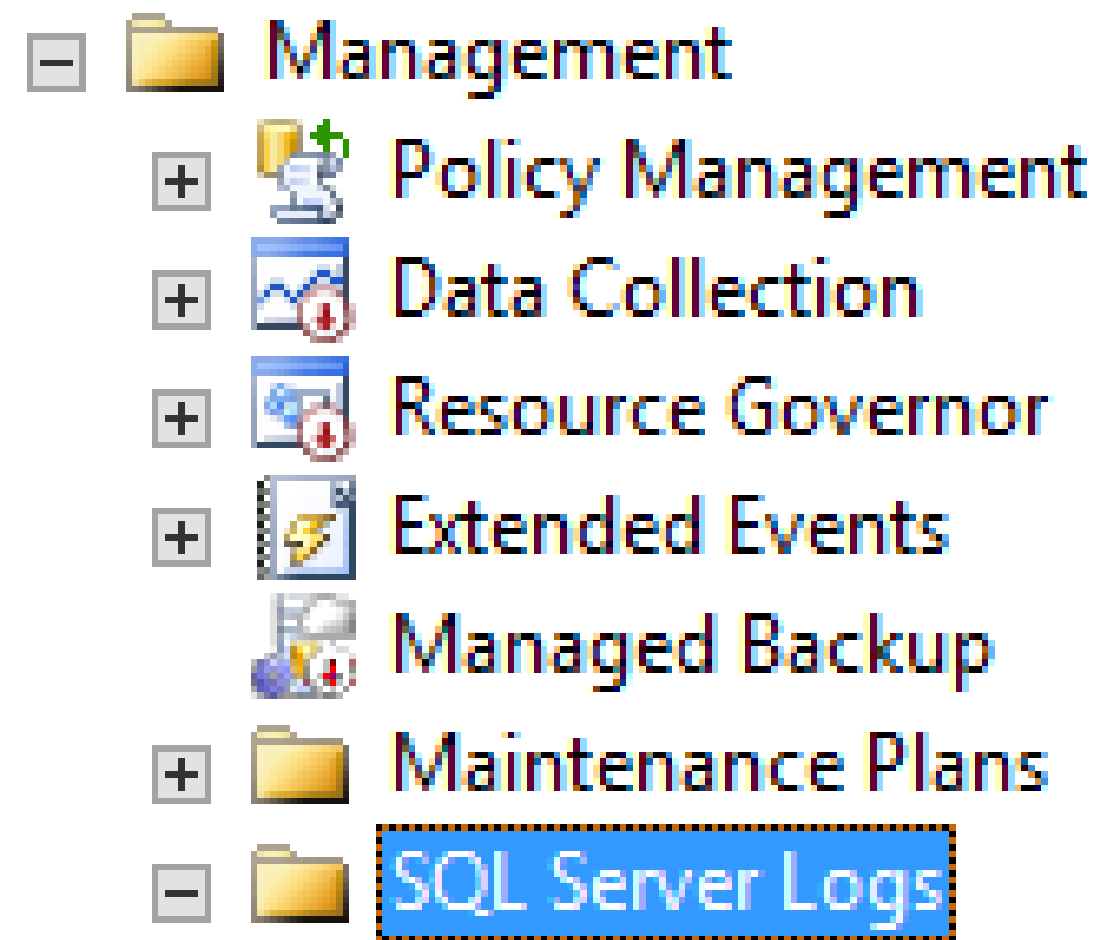
[View connection properties](#)

Progress

Ready

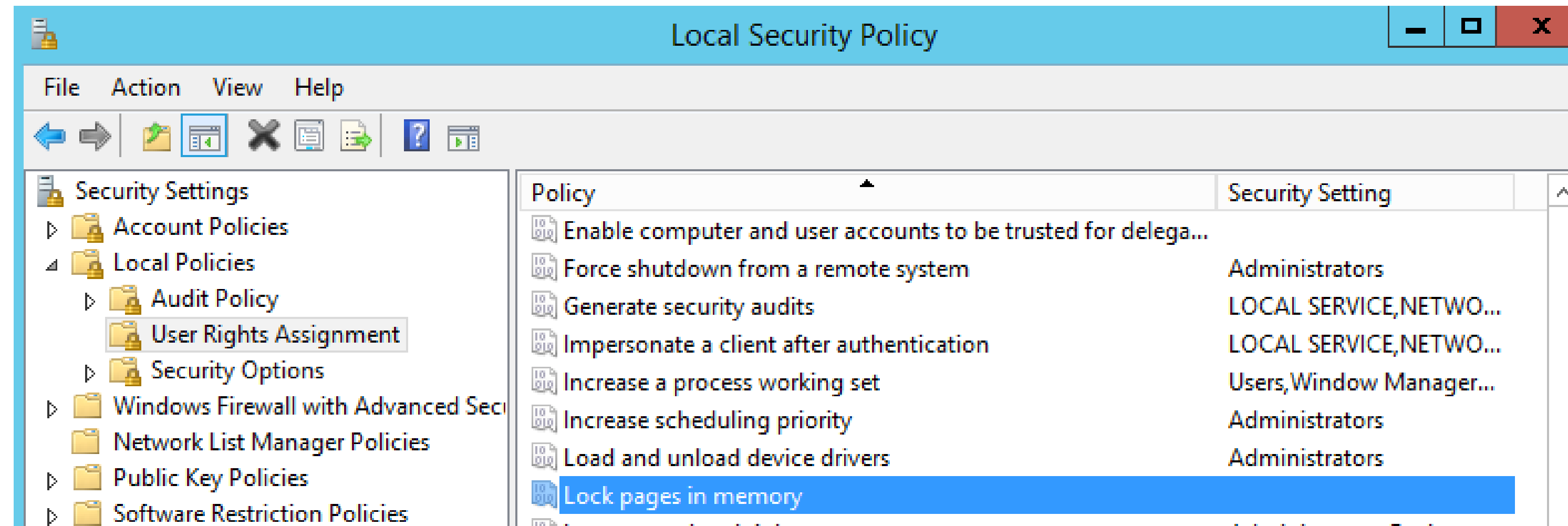
OK Cancel



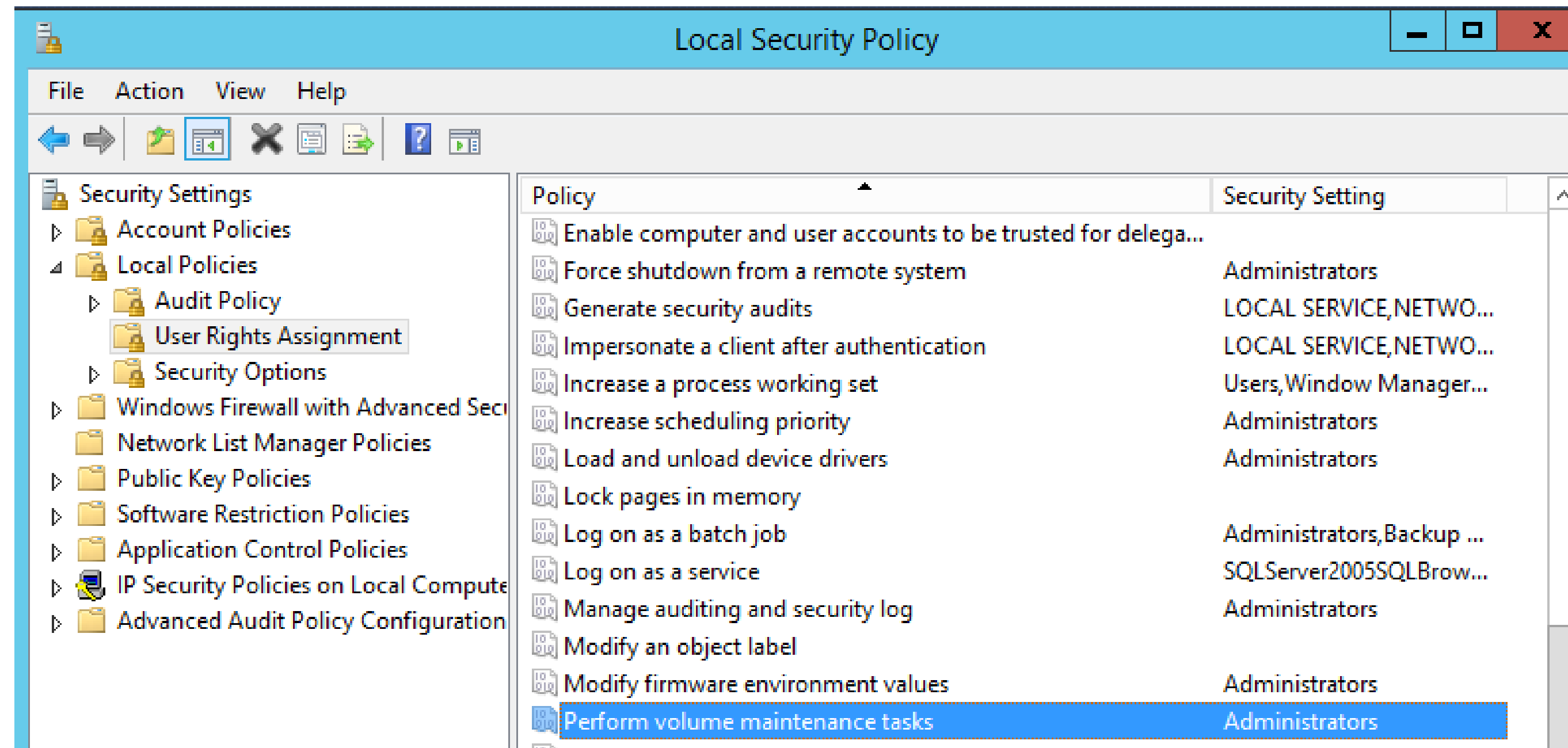


- And create a weekly job to cycle the errorlog: `sp_cycle_agent_errorlog`. This we will do later in the workshop.

# Configure SQL Server 2014 Local Security Policy



- Use the login used for the SQL Server service.
- Avoids that Windows swaps the buffer to disk.
- Does NOT avoid that VMWare swaps the buffer to disk!

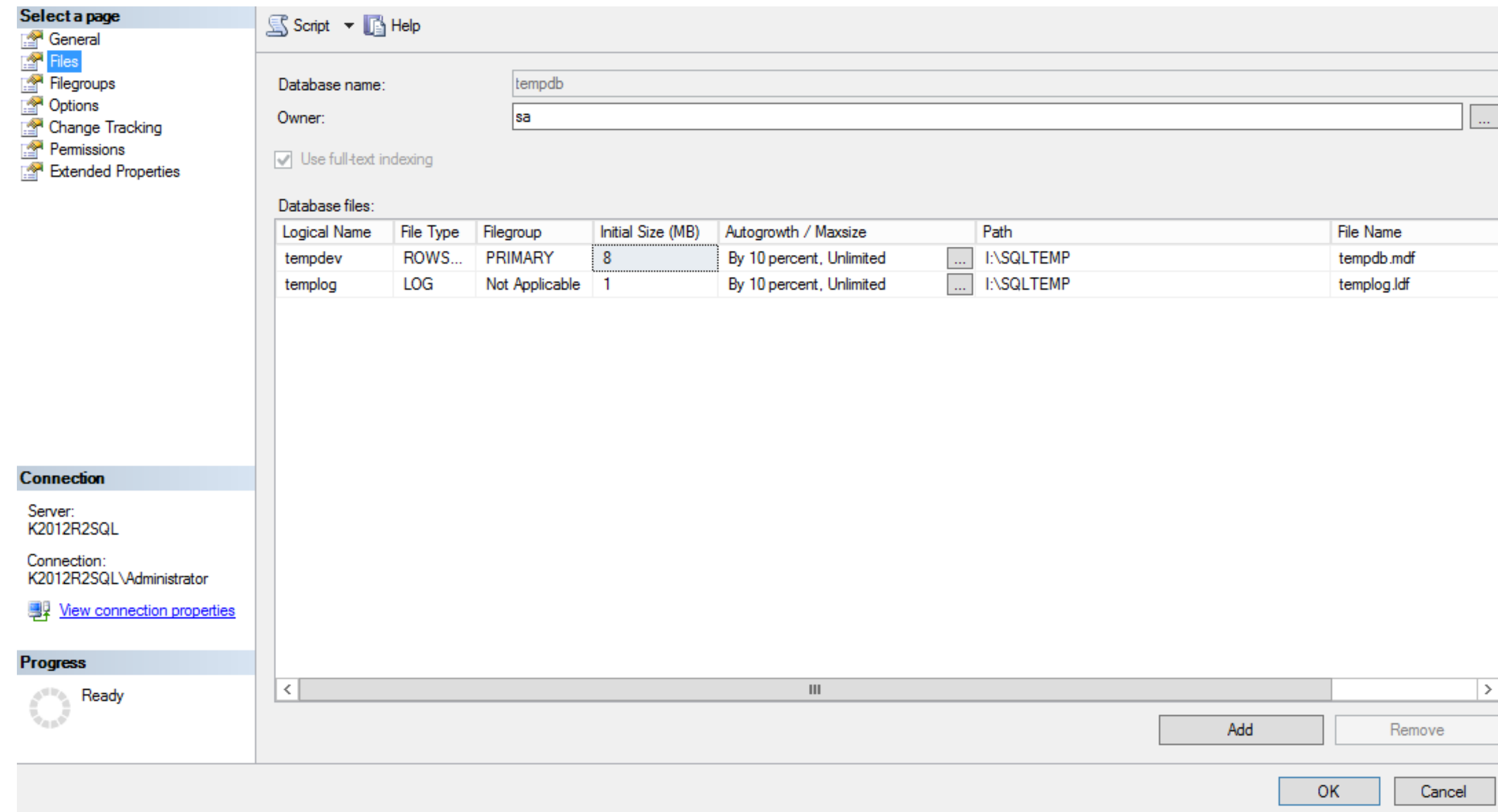


- Use the login used for the SQL Server service.
- It makes the creation/size-increments of the database faster, also restores. But NOT the creation/size-increments of the transactionlog file.

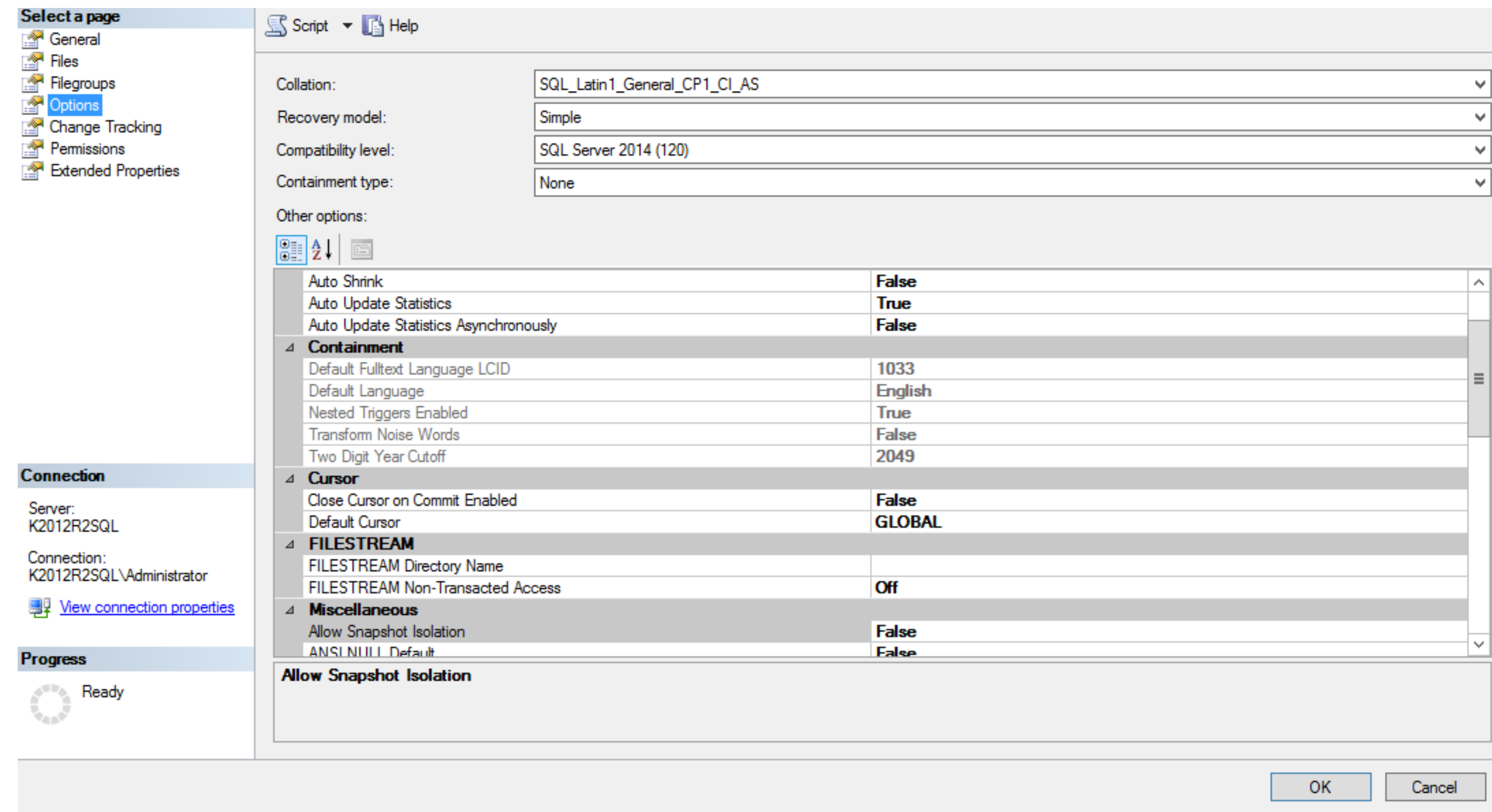


# Configure Temp DB

- What is the temp DB?
  - Used for temporary tables (NOT the NAV temporary tables) and table variables.
  - Used for sorting results if the memory allocated by SQL for a query is not enough. Having up-to-date statistics helps to avoid this!
  - Rebuild index. You can tell SQL to use the temp DB to sort the data. This can speed up the rebuild if the temp-DB files are on different physical disks than the ones from the DB who's tables/indexes are being rebuild.
  - Never backup or rebuild or defrag.



- Pregrow files
- Multiple DB-files if needed (NAV is not really a problem)
- Autogrowth : 50 MB (personal preference. But AVOID %!)

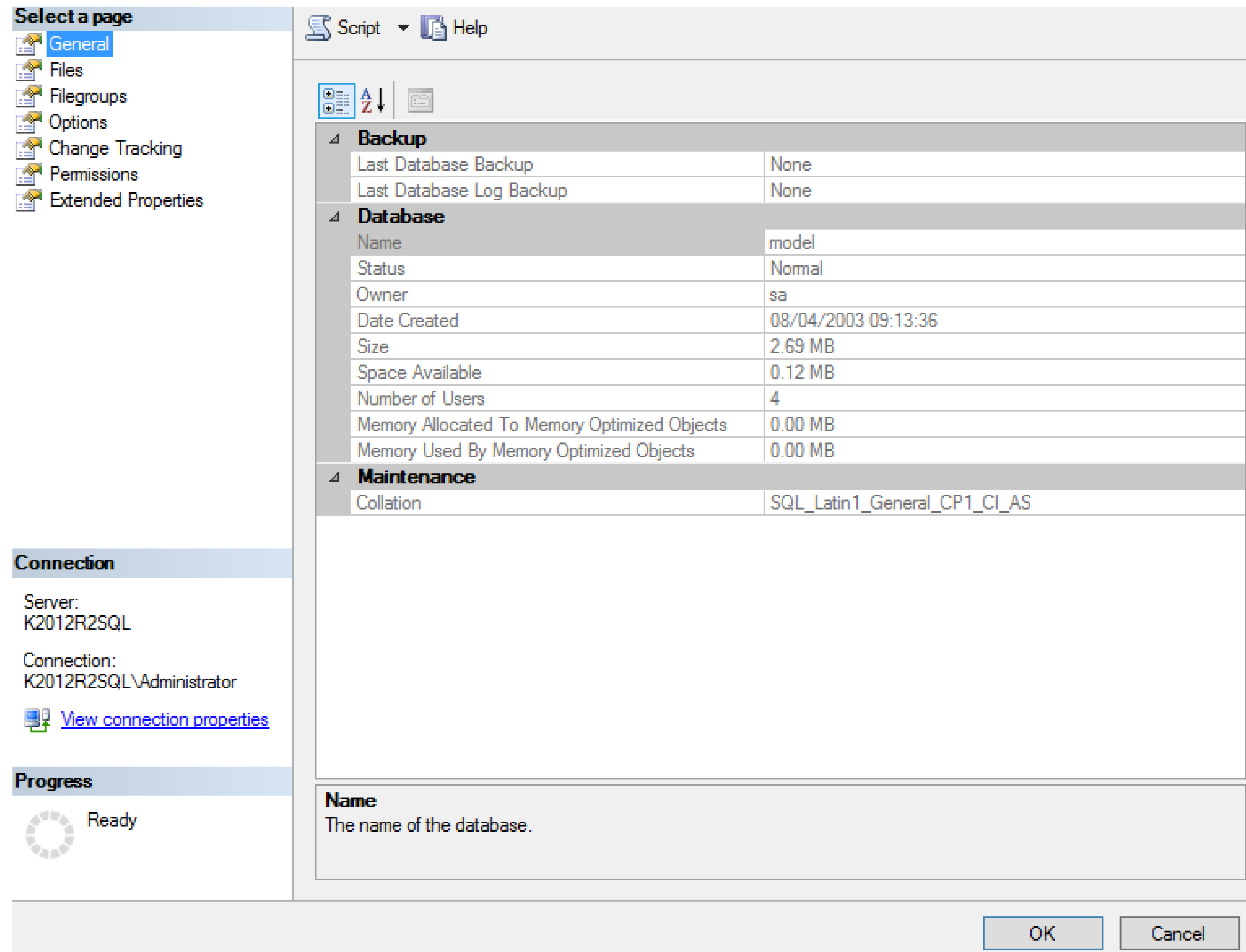


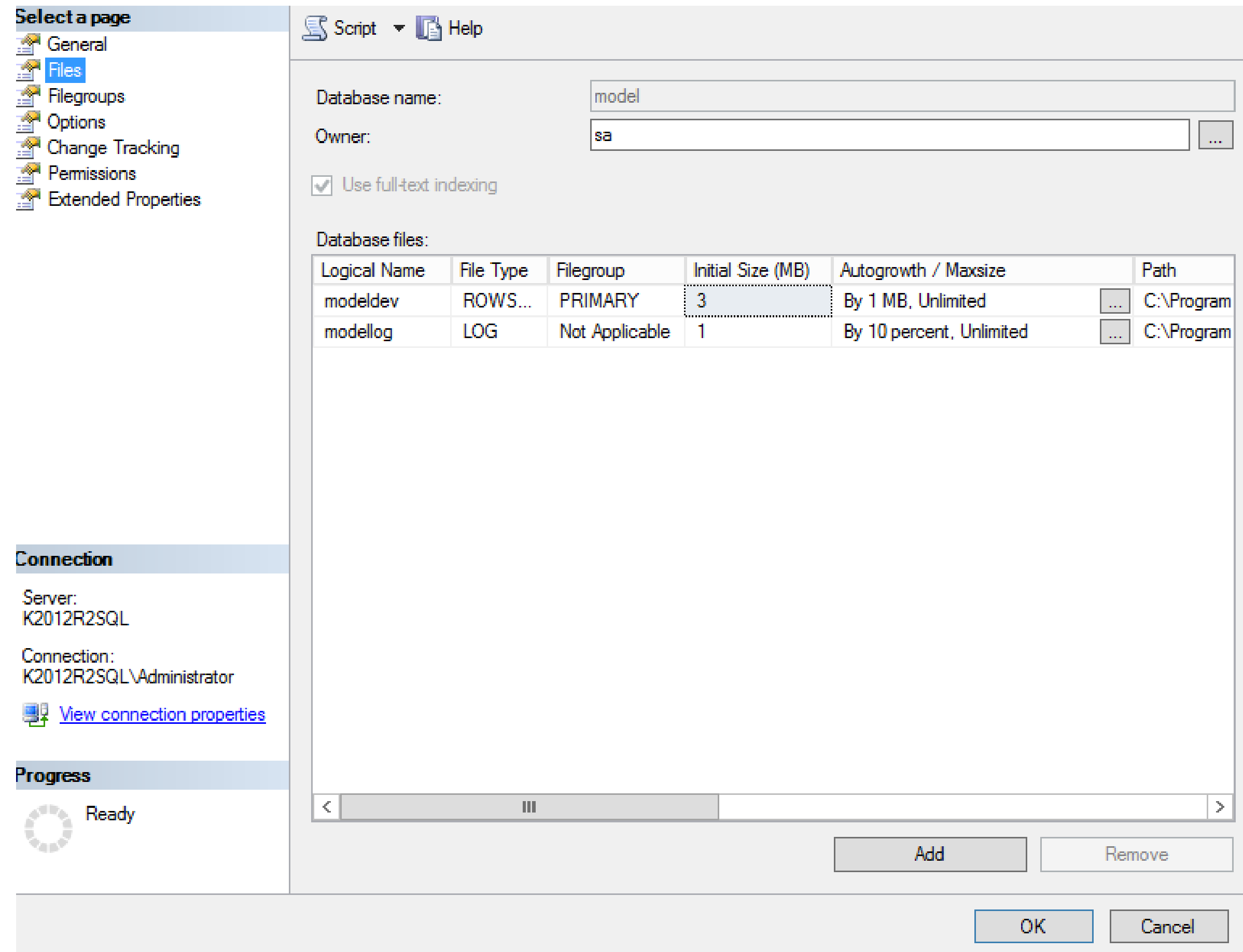
- Auto Update Statistics Asynchronously = False. If true, it will probably be done when it doesn't serve anymore.



# Configure Model DB

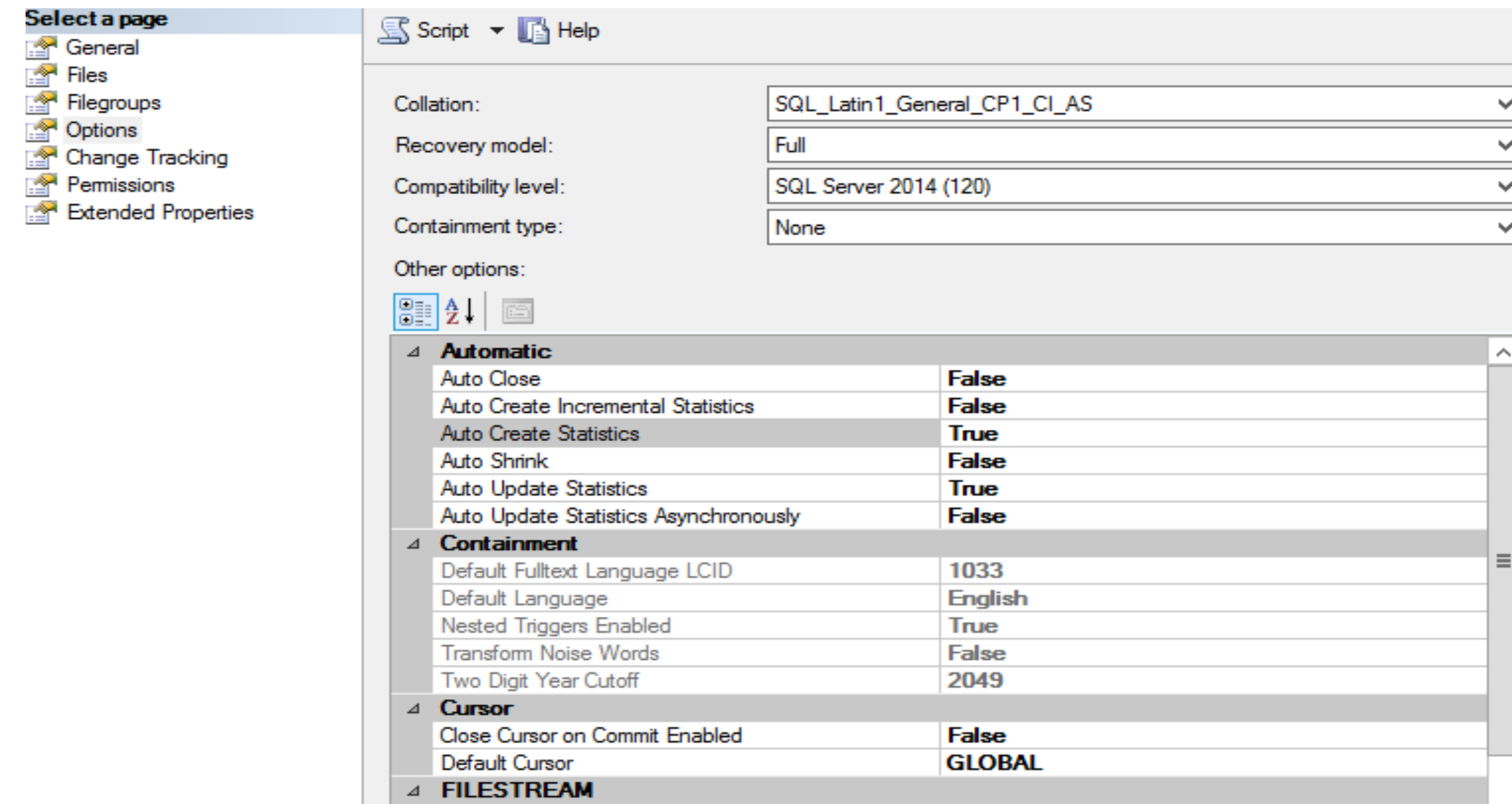
- What is the model DB?
  - When you create a new DB (not from a backup), SQL server makes a copy from the model DB.
  - So configure the model DB like you would like any new DB.
  - Full backup once a day.





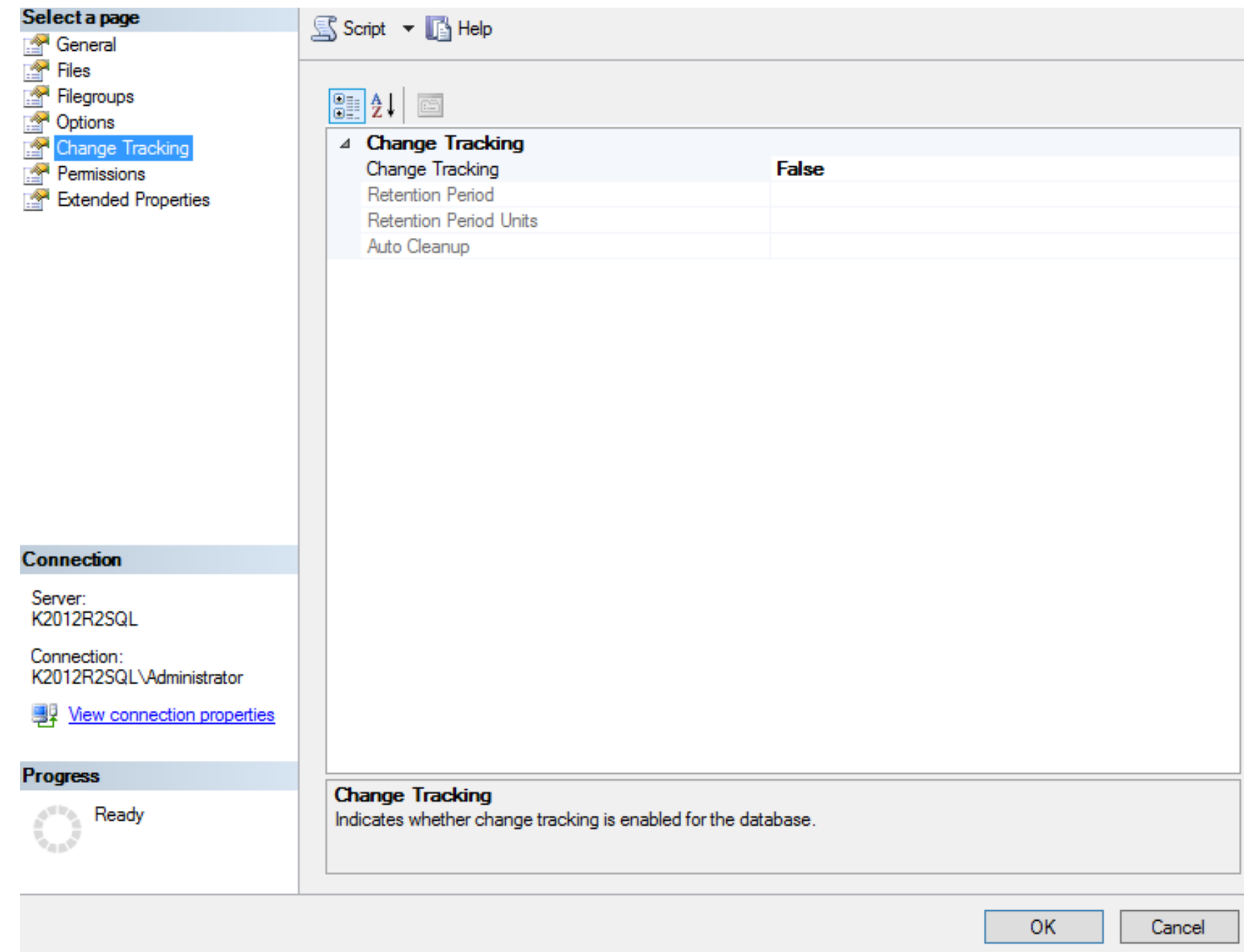
- 50 MB autogrowth (personal preference. But AVOID %!)



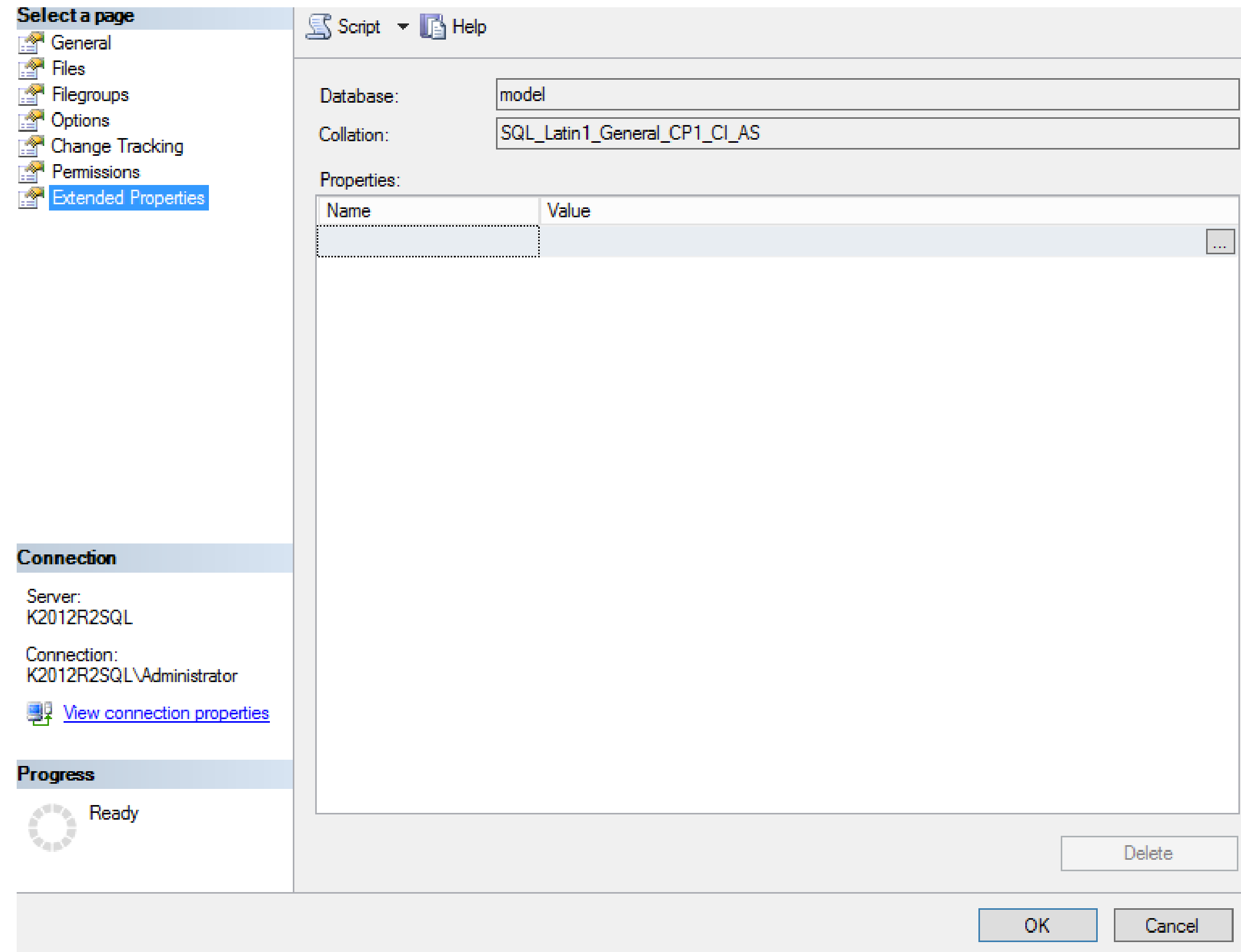


- Automatic:
  - Auto Close: NEVER
  - Auto Create Statistics: no if you have a good maintenance plan
  - Auto Shrink: NEVER
  - Auto Update Statistics : no if you have a good maintenance plan
  - Auto Update Statistics Aynchronously : no if you have a good maintenance plan

- Recovery Model: Simple. If you forget to change it, at least your transaction log does not explode. And if you try to do TL backups, you get errors to remind you.
- Compatibility level: most recent
- Delayed Durability = Disabled. Enable only when you really need it (SQL2014!).
- Page Verify = Checksum



- CT = Change Tracking: tracks that a change is happened but not the data that was changed.
- CDC=Change Data Capture ; asynchronous process that reads the transactionlog file and changes are saved in other tables ; ENTERPRISE FEATURE
- More info : [http://technet.microsoft.com/en-us/library/cc280519\(v=SQL.105\).aspx](http://technet.microsoft.com/en-us/library/cc280519(v=SQL.105).aspx)

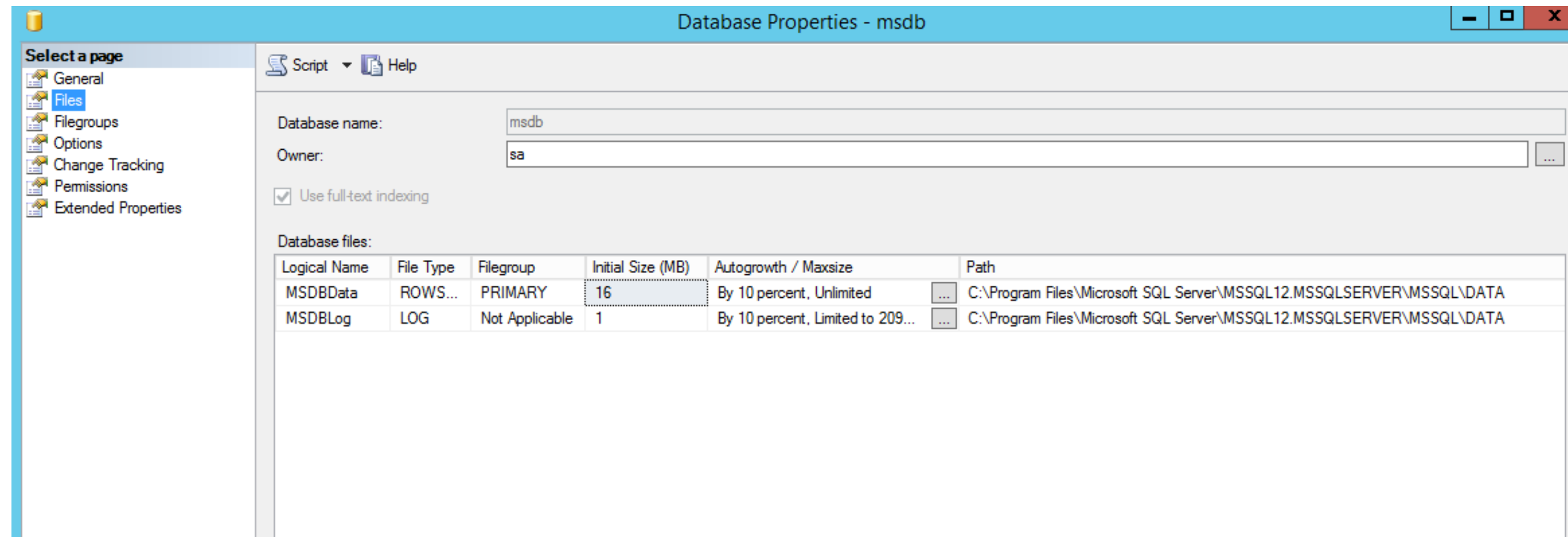


- All SQL objects have Extended Properties (+- NAV Documentation Section).



# Configure msdb DB

- What is the msdb DB?
  - Contains your SQL Server Agent jobs, Maintenance plans, Backup-restore-history.
  - Backup once a day.



- Guess what?
- 50 MB autogrowth (personal preference. But AVOID %!)

# Configure and test Email



- Create an app-password for your google-account. You'll use it later with your email-account in SQL Server.
- <https://www.google.com/settings/security>

Password ⓘ

Password

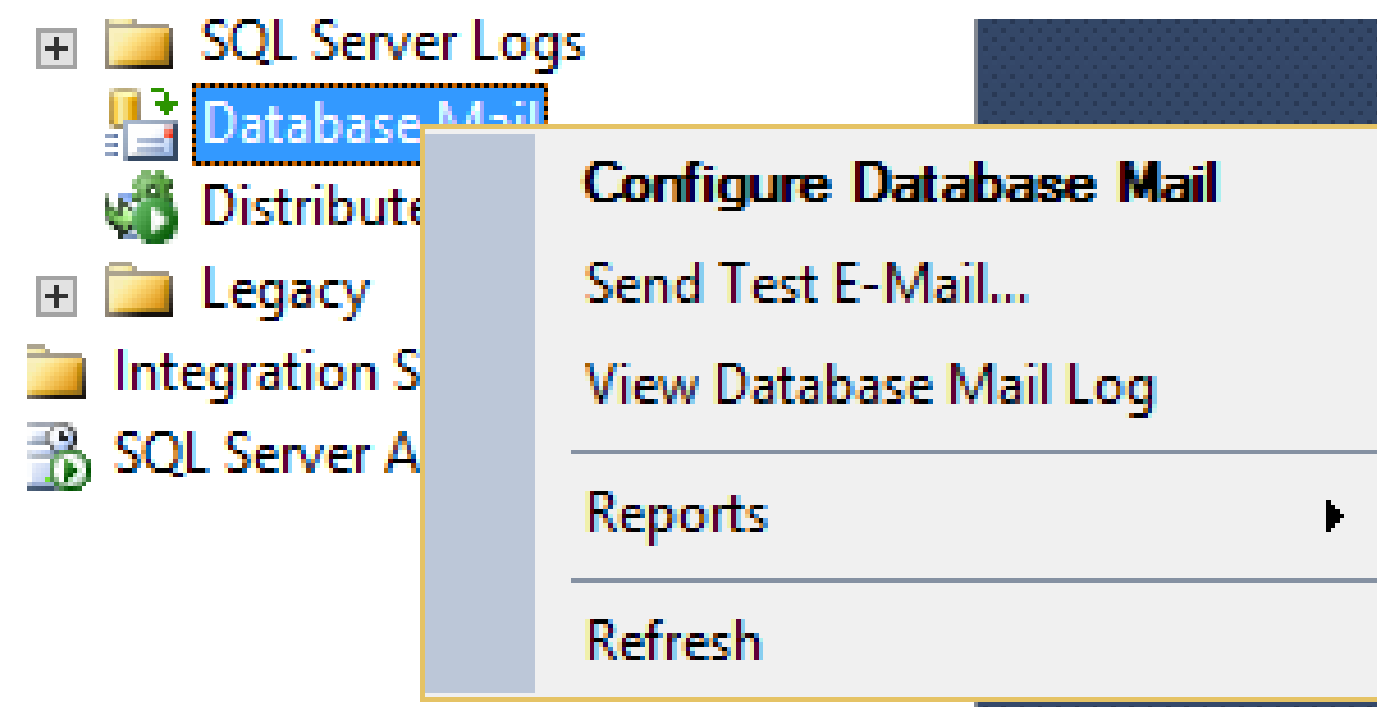
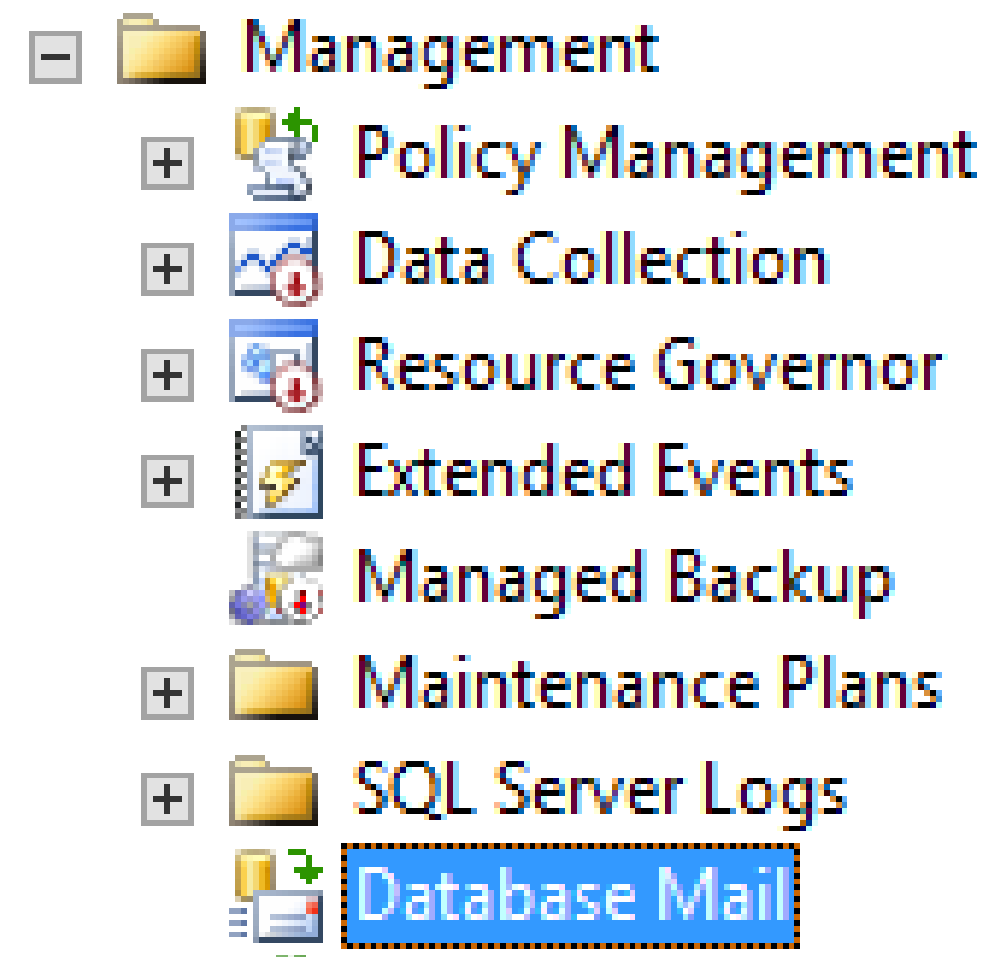
[Change password](#)

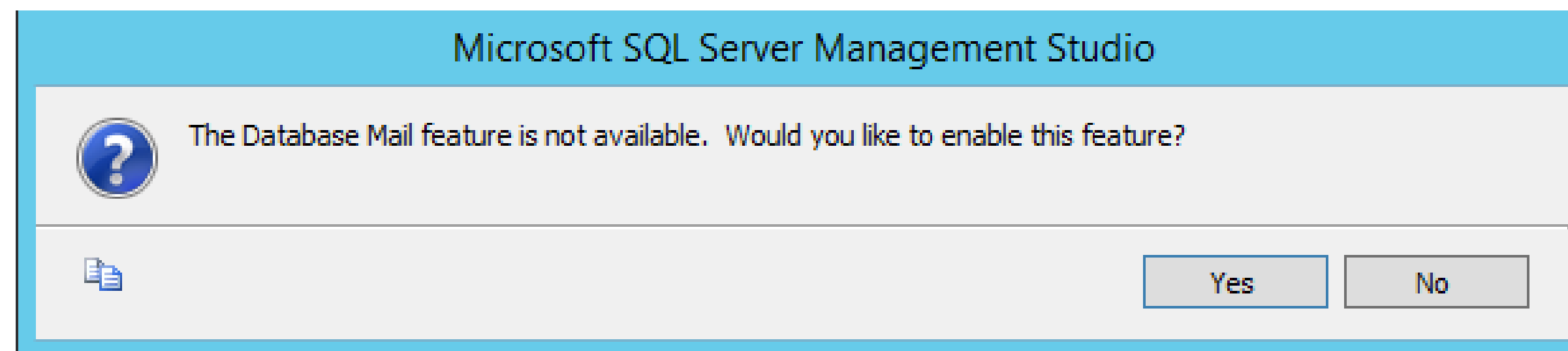
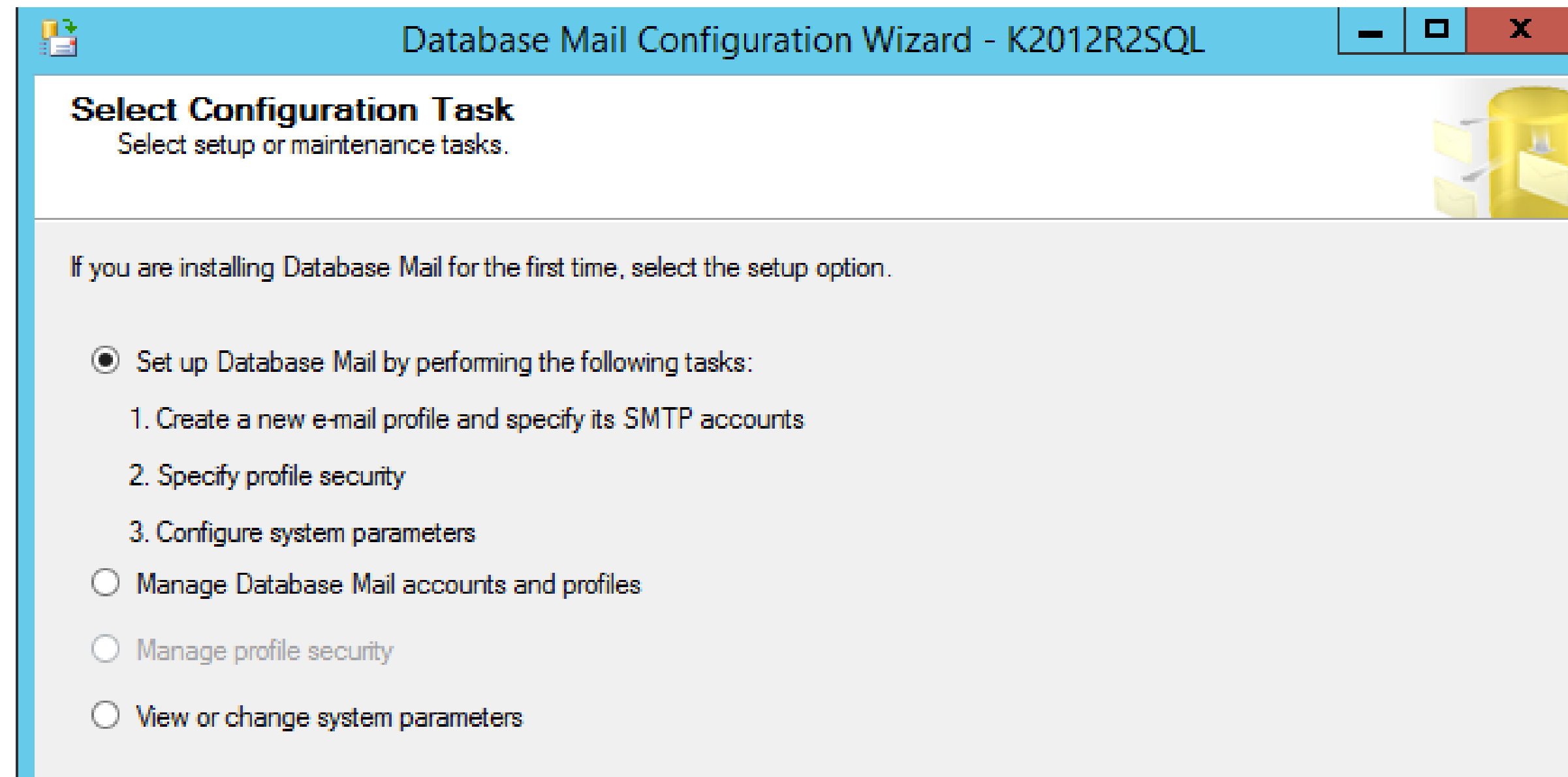
2-step Verification

Enabled [Settings](#)

App passwords

[Settings](#)





Database Mail Configuration Wizard - K2012R2SQL

### New Profile

Specify the profile name, description, accounts, and failover priority.

Profile name:

Description:

A profile may be associated with multiple SMTP accounts. If an account fails while sending an e-mail, the profile uses the next account in the priority list. Specify the accounts associated with the profile, and move the accounts to set the failover priority.

SMTP accounts:

Priority	Account Name	E-mail Address
1	[REDACTED]	[REDACTED]



Database Mail Configuration Wizard - NAVTECHDAYS2015

### Manage Existing Account

Choose the account to view, change, or delete.

Account name: SQLNAV Delete

Description:

Outgoing mail server (SMTP)

E-mail address: [REDACTED]

Display name: NAVSQLSERVER\_NAVTECHDAYS

Reply e-mail:

Server name: smtp.gmail.com Port number: 587

☒ This server requires a secure connection (SSL)

SMTP Authentication

☐ Windows Authentication using Database Engine service credentials

☒ Basic authentication

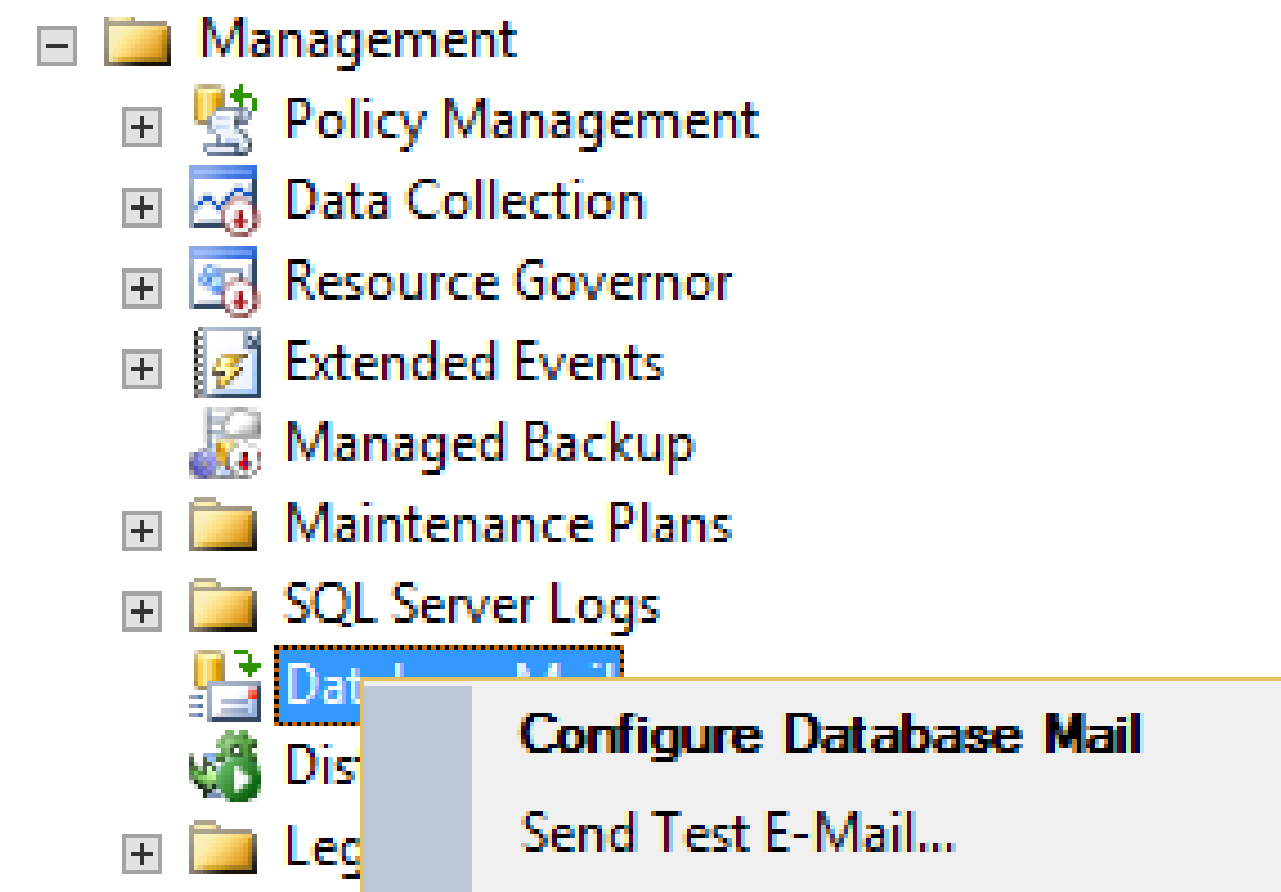
User name: [REDACTED]

Password: \*\*\*\*\*

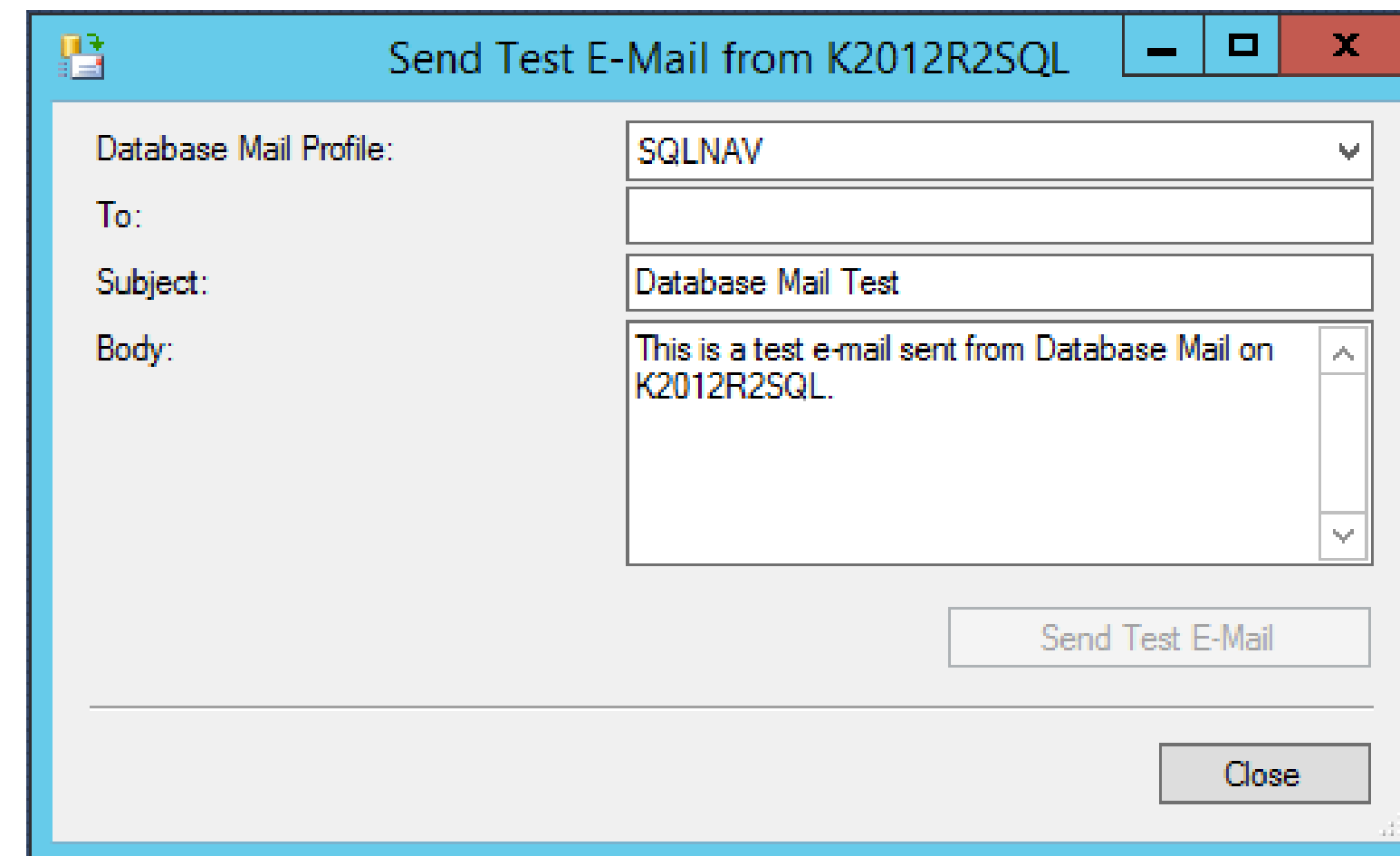
Confirm password: \*\*\*\*\*

☐ Anonymous authentication

Help < Back Next > Finish >> Cancel



- Test Email

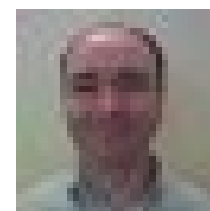


- And if all works fine

## Database Mail Test



Inbox x



NAVSQLSERVER\_NAVTECHDAYS <[REDACTED]>

to me ▾

This is a test e-mail sent from Database Mail on NAVTECHDAYS2015.

**New Operator**

Select a page

- General
- Notifications

Script Help

Name: DBA ☒ Enabled

Notification options

E-mail name:

Net send address:

Pager e-mail name:

Pager on duty schedule

	Workday begin	Workday end
<input type="checkbox"/> Monday		
<input type="checkbox"/> Tuesday		
<input type="checkbox"/> Wednesday		
<input type="checkbox"/> Thursday		
<input type="checkbox"/> Friday	08:00:00	18:00:00
<input type="checkbox"/> Saturday	08:00:00	18:00:00
<input type="checkbox"/> Sunday	08:00:00	18:00:00

Connection

Server: K2012R2SQL

Connection: K2012R2SQL\Administrator

[View connection properties](#)

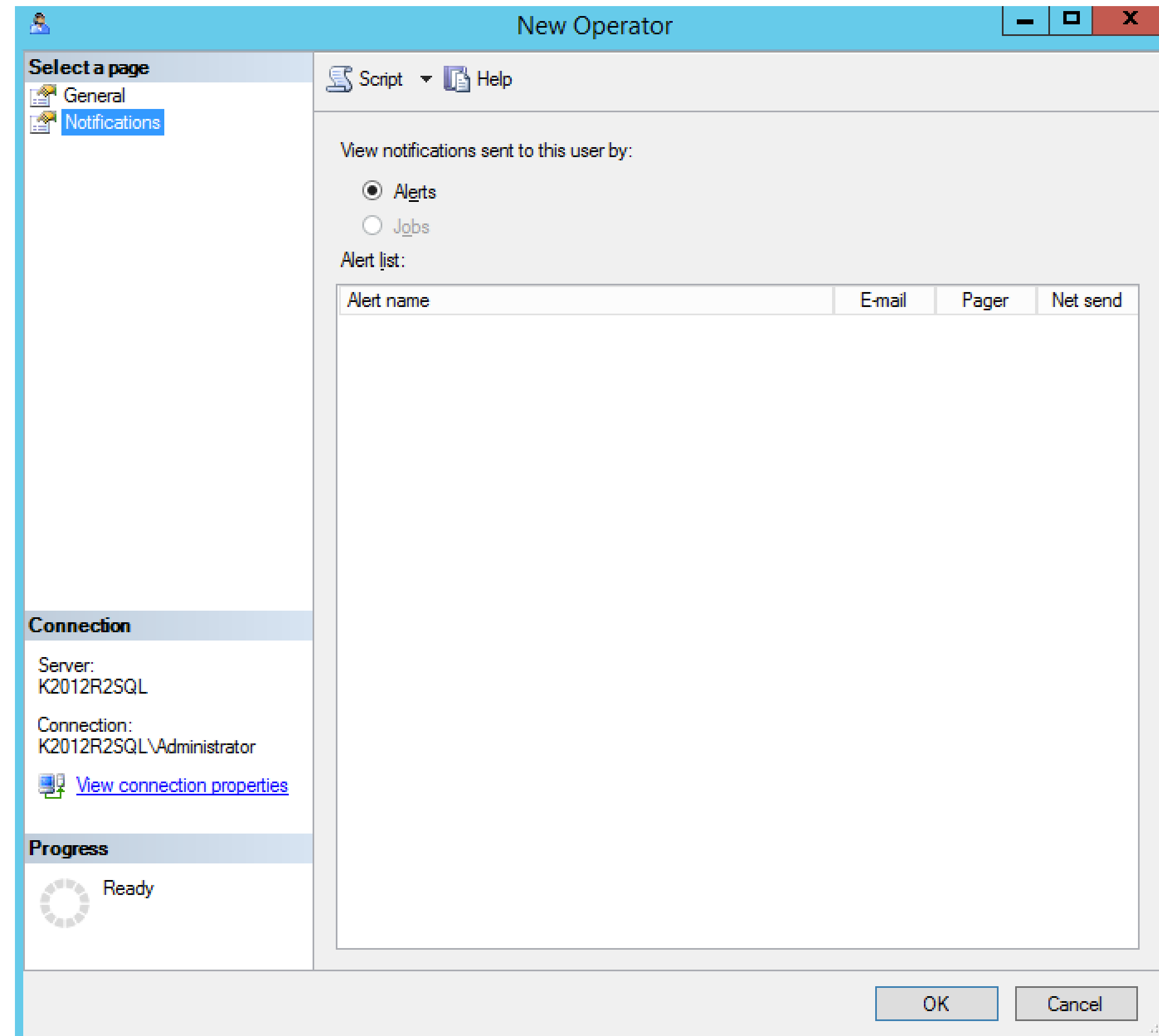
Progress

Ready

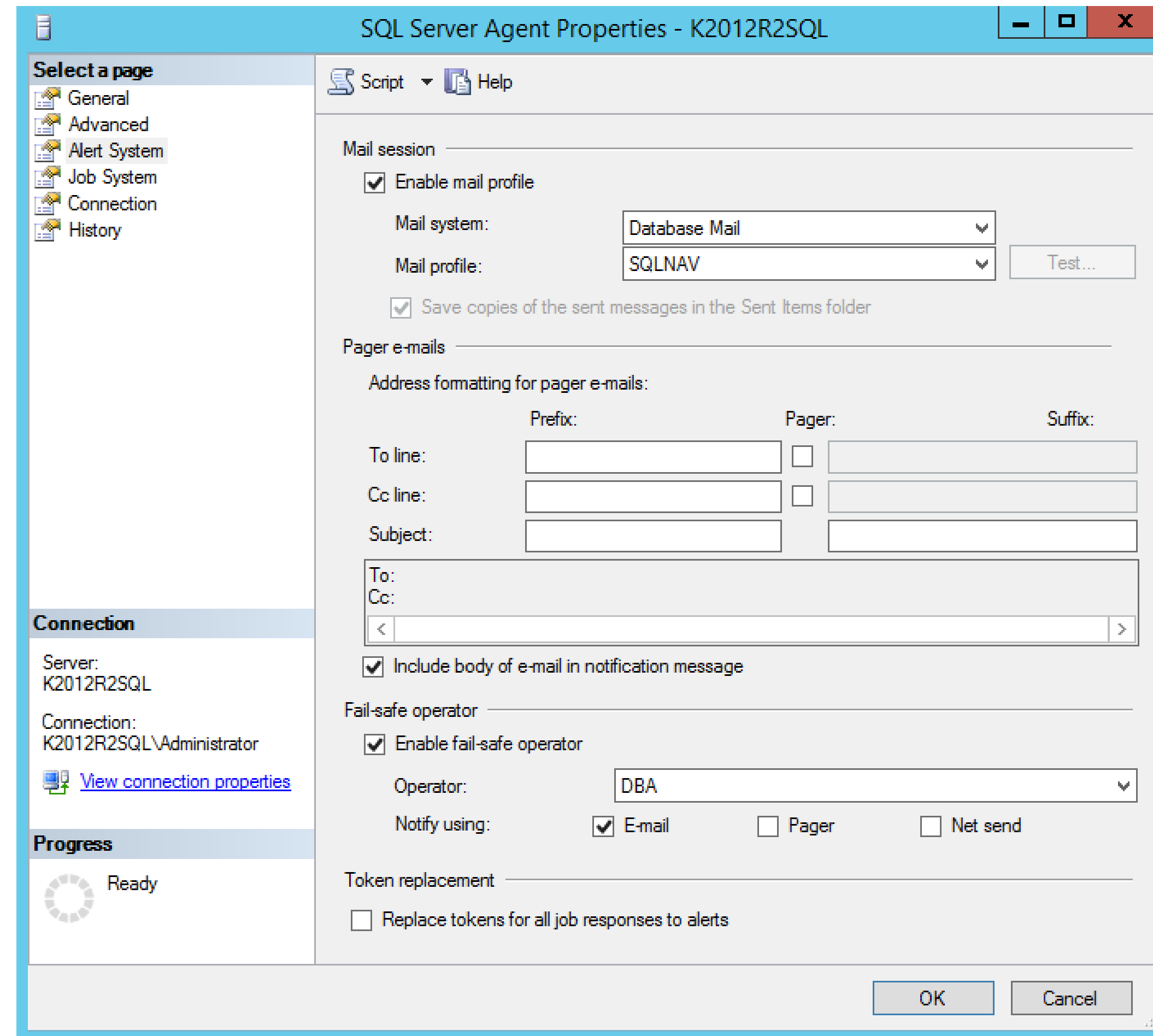
OK Cancel

- Create an Operator (can be an email-group)





- No alerts or jobs yet that are using this account



- SQL Server Agent Properties

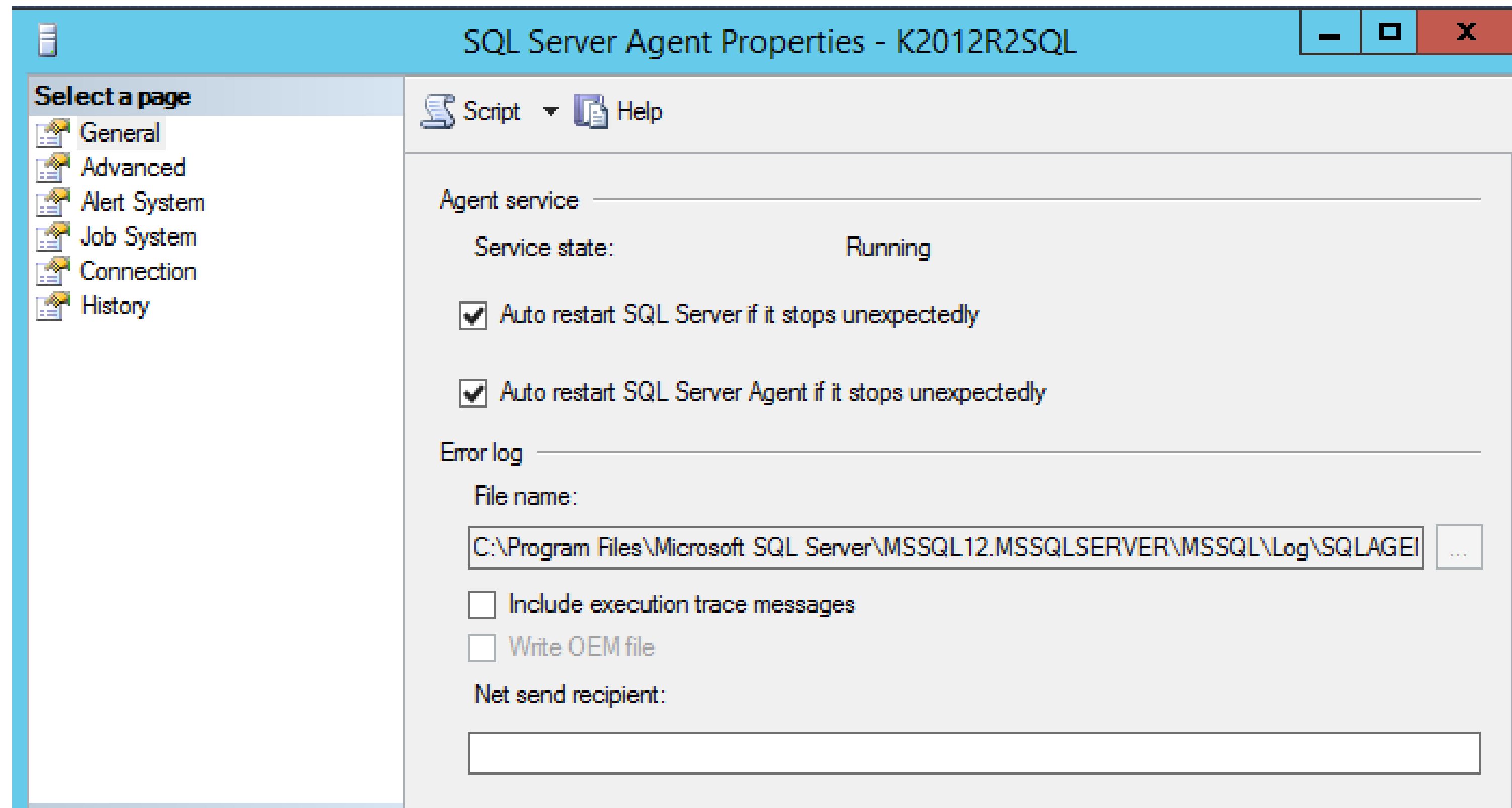




- I need to restart SQL Server Agent. Otherwise email doesn't work!



# Configure SQL Server Agent



SQL Server Agent Properties - K2012R2SQL

Select a page

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

Script Help

SQL Server event forwarding

☐ Forward events to a different server

Server:

Events:

☒ Unhandled events

☐ All events

If event has severity at or above:

001 - Miscellaneous System Information

Idle CPU condition

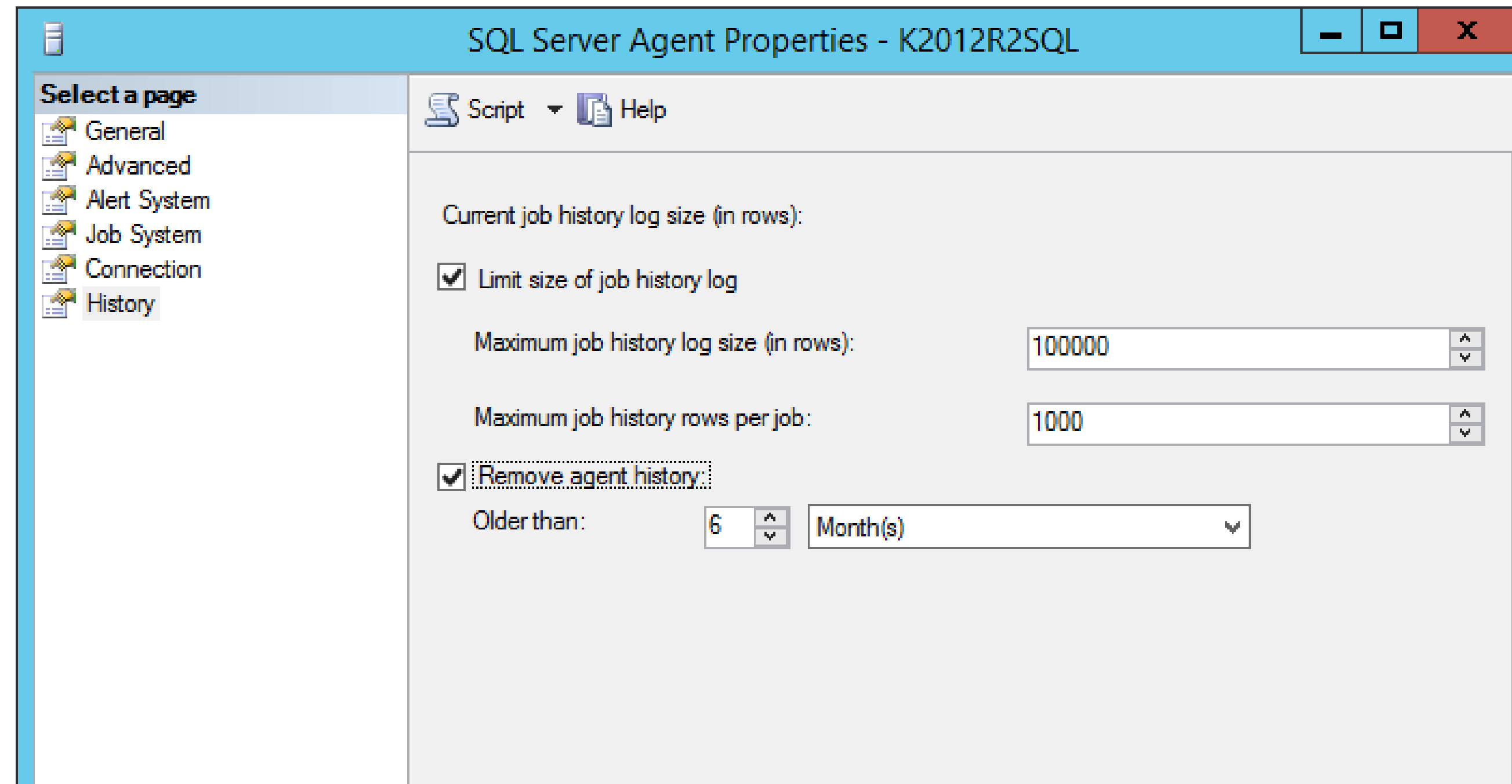
☐ Define idle CPU condition

Average CPU usage falls below: 10 %

And remains below this level for: 600 seconds

Connection

Server: K2012R2SQL

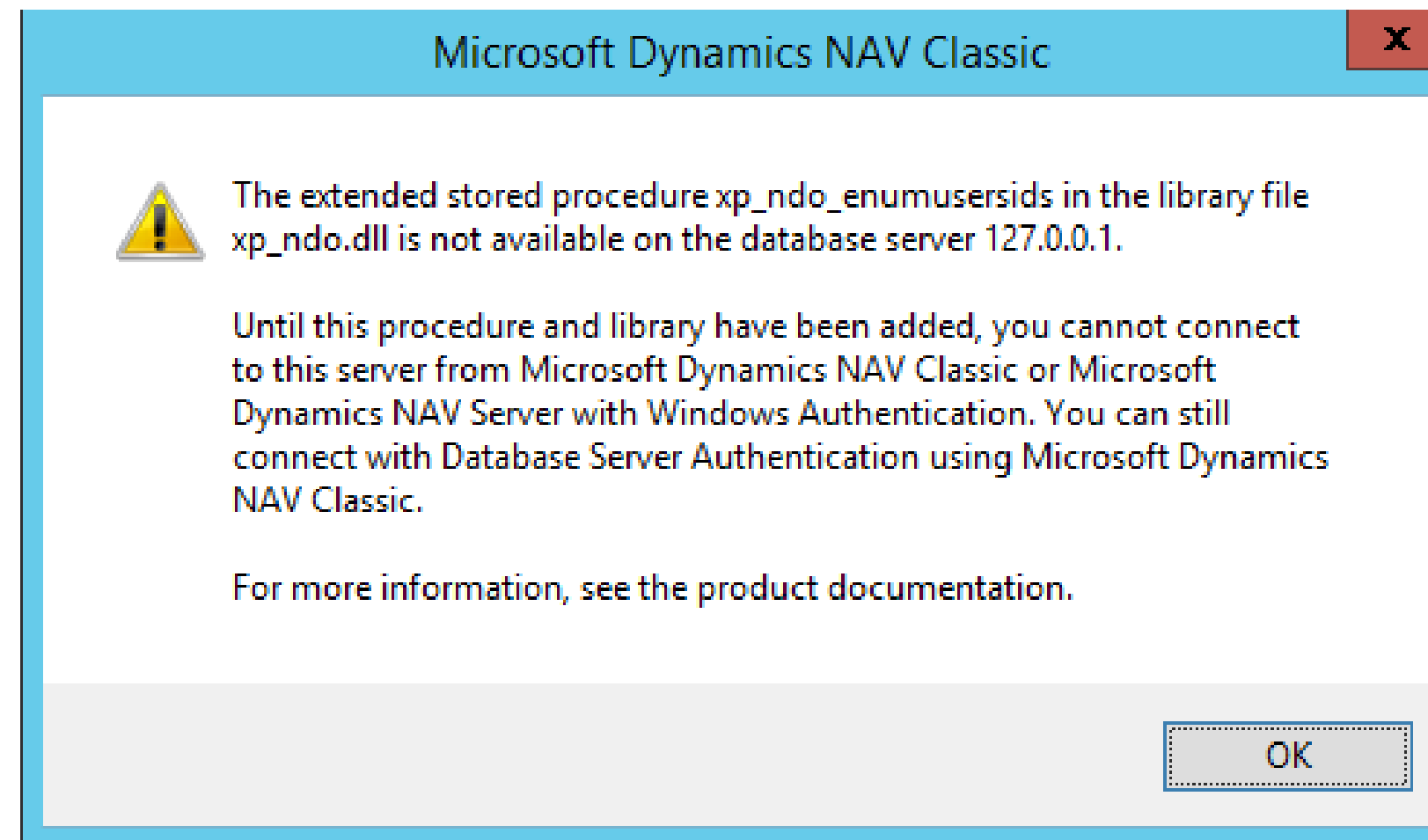


- We can have a job that runs once a day
- We can have a job that runs every minute
- Not cleaning means that msdb DB will grow a lot and get slower. This can impact also on SQL backups started by SQL Server agent.



- Some SQL Server alerts
  - Error 823, 824, 825
  - Severities 19-25 are ... well ... severe
- CREATE\_CRITICAL\_ALERTS.sql

# NAV 2009R2 Installation info



- Classic message when using Windows login
  - ....\SQLDatabase\PFiles\Microsoft Dynamics NAV\60\Database\xp\_ndo\_x64.dll
  - rename to xp\_ndo.dll
  - Put it in "C:\Program Files\Microsoft SQL Server\MSSQL12.MSSQLSERVER\MSSQL\Binn"
  - ADD\_XP\_NDO\_DLL.sql
- Extended stored procedure = a stored procedure NOT programmed in TSQL.

# NAV 2013/2013R2/2015/2016

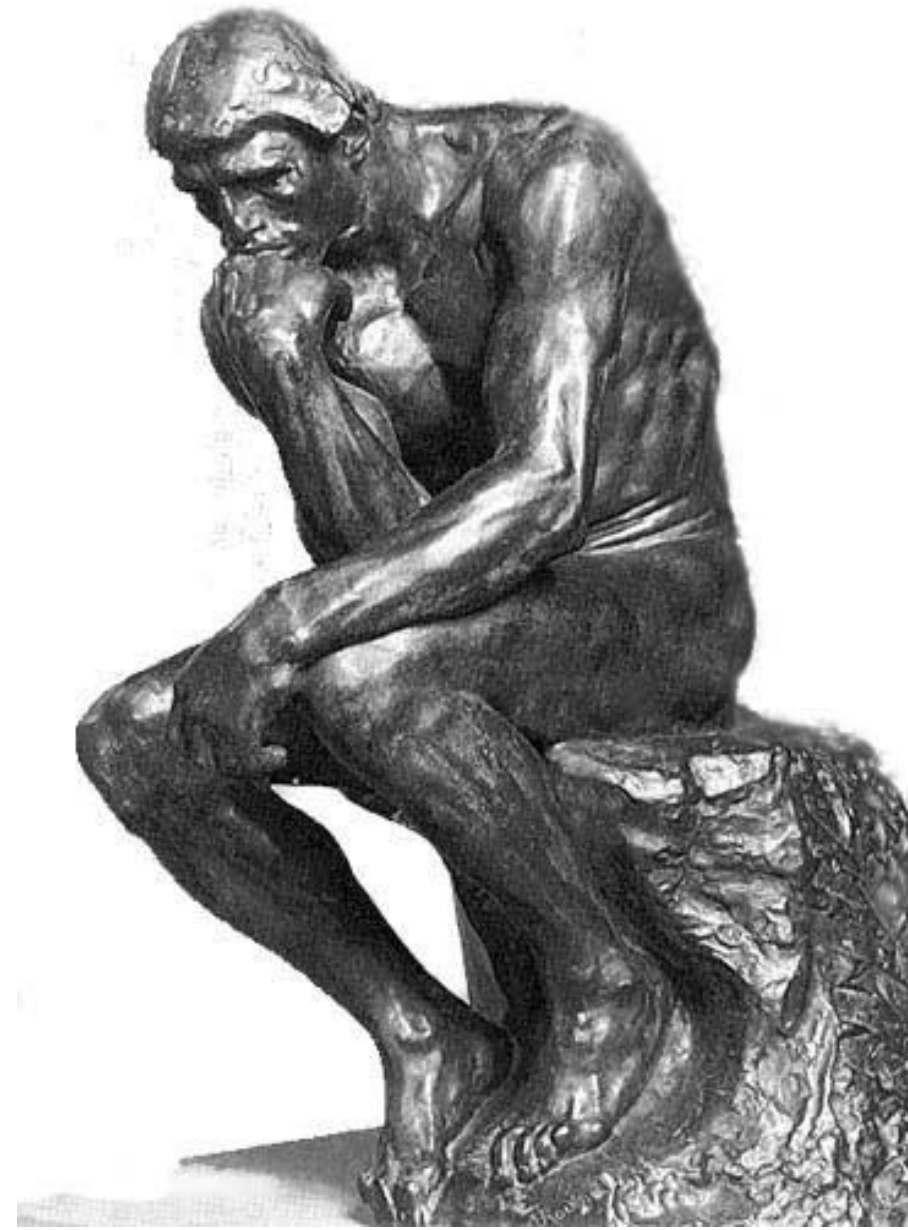
## Installation info



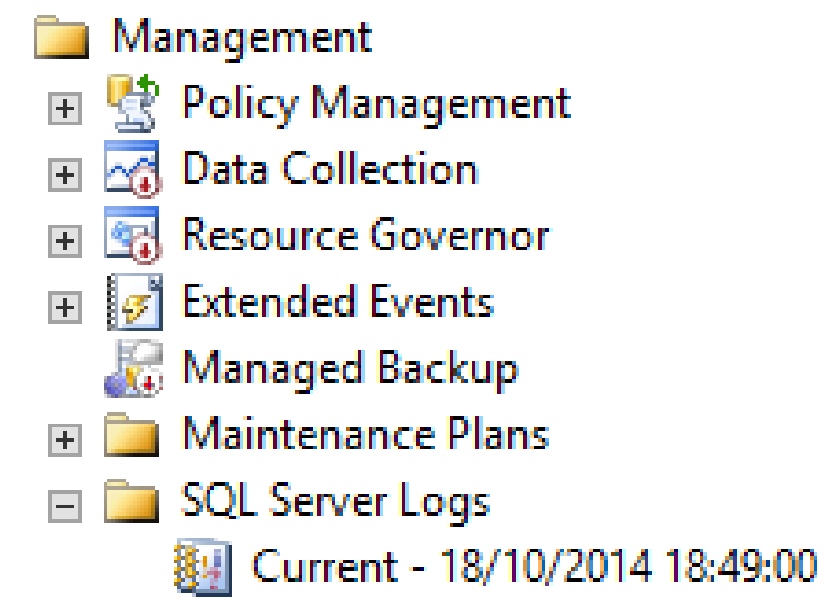
- NAV Server does not start. Eventlog =>

```
Server instance: DynamicsNAV90  
Tenant ID: nav-systemapplication  
The connection to SQL server could not be established  
Database server: NAVTECHDAYS2015\NAVDEMO  
Database name: Demo Database NAV (9-0).
```

- SQL server started?
  - Ok!
- Database exists?
  - Ok!
- Proper permissions?



- NAV server is using "Network Service".
- Is NAV reaching my SQL Server or not?
- Does that user have permissions to login into SQL Server?
- Does that user have permissions to use that database?
- How to check that?



Selected row details:

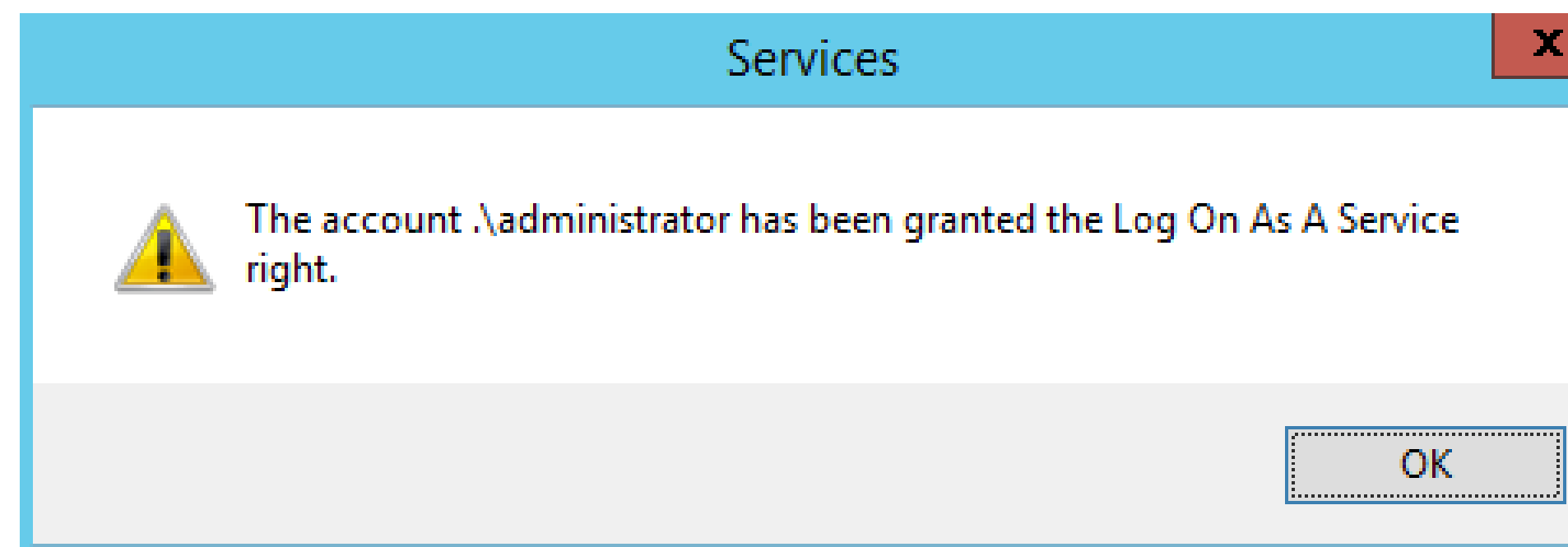
Date	19/10/2014 14:22:31
Log	SQL Server (Current - 18/10/2014 18:49:00)
Source	Logon
Message	Login failed for user 'WORKGROUP\K2012R2SQL\$'. Reason: Could not find a login matching the name provided. [CLIENT: <local machine>]

- NAV server is reaching SQL Server but SQL Server :





- Create a domain login for NAV and use that login.
- Trick without creating a domain user : Create a local user on all computers with SAME name and SAME password.
- Using the login in the service, you will get this message:



- No. Administrator is NOT a good account! But you need to give the account administrator rights on the computer (for a local account and different servers). But use another accountname and a strong password.



# Create a NAV DB

## NAV 2009R2

**Select Server**

General Advanced

Server Type . . . . . ☐ Database Server for Microsoft ...  
☒ Microsoft SQL Server

Server Name . . . . . 127.0.0.1

Authentication . . . . . Windows Authentication

User ID . . . . .

Password . . . . .

OK Cancel Help

**Select Server**

General Advanced

Net Type . . . . . TCP/IP Sockets

OK Cancel Help

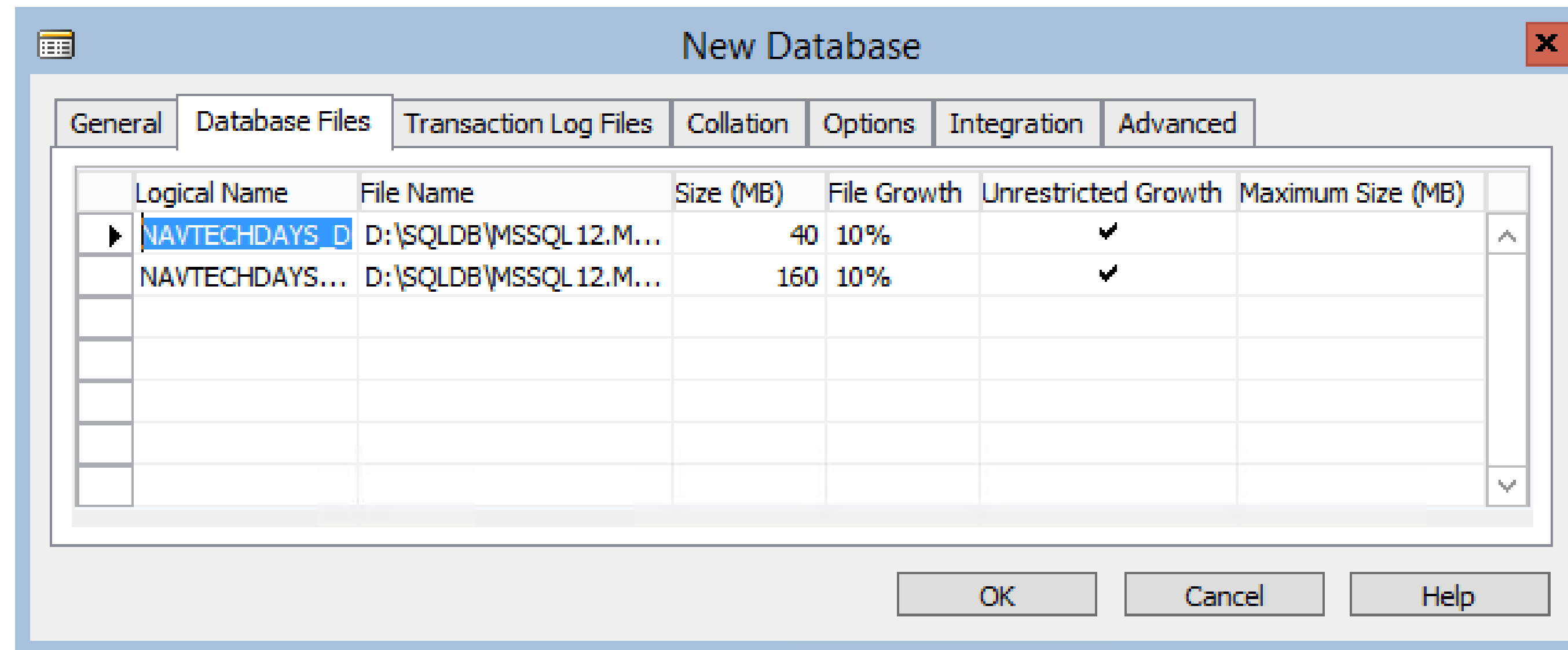
**New Database**

General | Database Files | Transaction Log Files | Collation | Options | Integration | Advanced

Server Name . . . . . 127.0.0.1

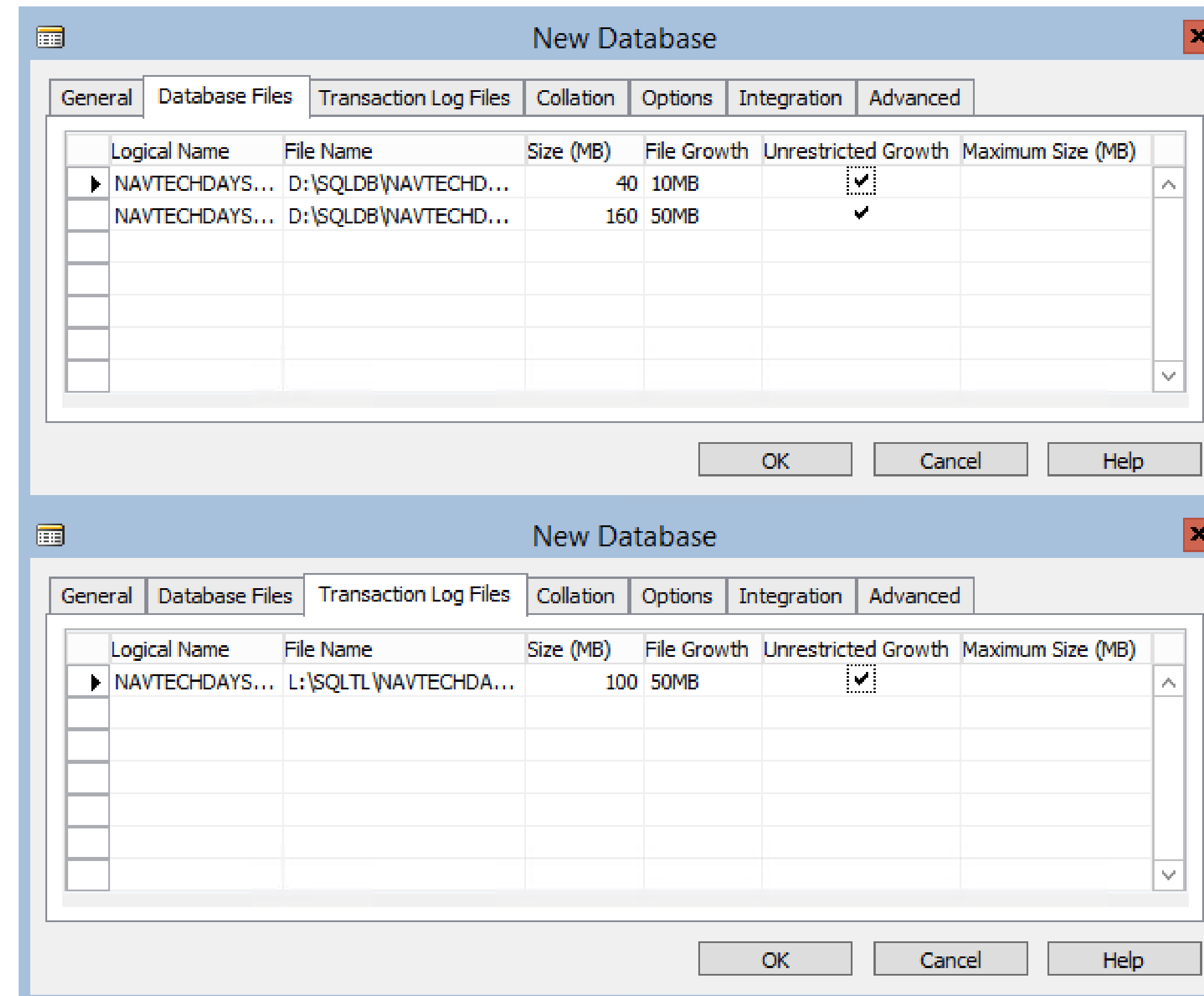
Database Name . . . . . NAVTECHDAYS2009R2

OK Cancel Help



- Didn't we put some other default subdirectories in SQL Server?
- NAV does not take the defaults from SQL Server.





- Customer server: see later in SQL for more

**New Database**

General Database Files Transaction Log Files **Collation** Options Integration Advanced

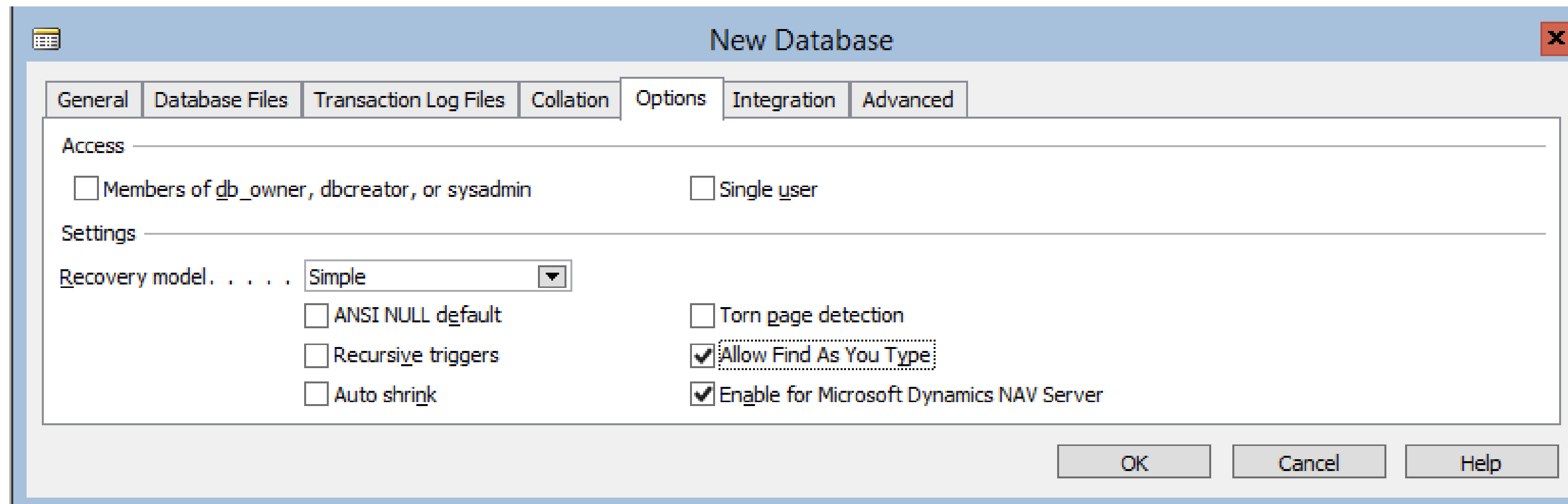
Collation Type. . . . . ☒ Windows Collation ☒ Validate Collation  
☐ SQL Collation

Collation Description. . . Afrikaans, Basque, Catalan, Dutch, English, Faeroese, German

☐ Binary  
☒ Case-sensitive  
☒ Accent-sensitive

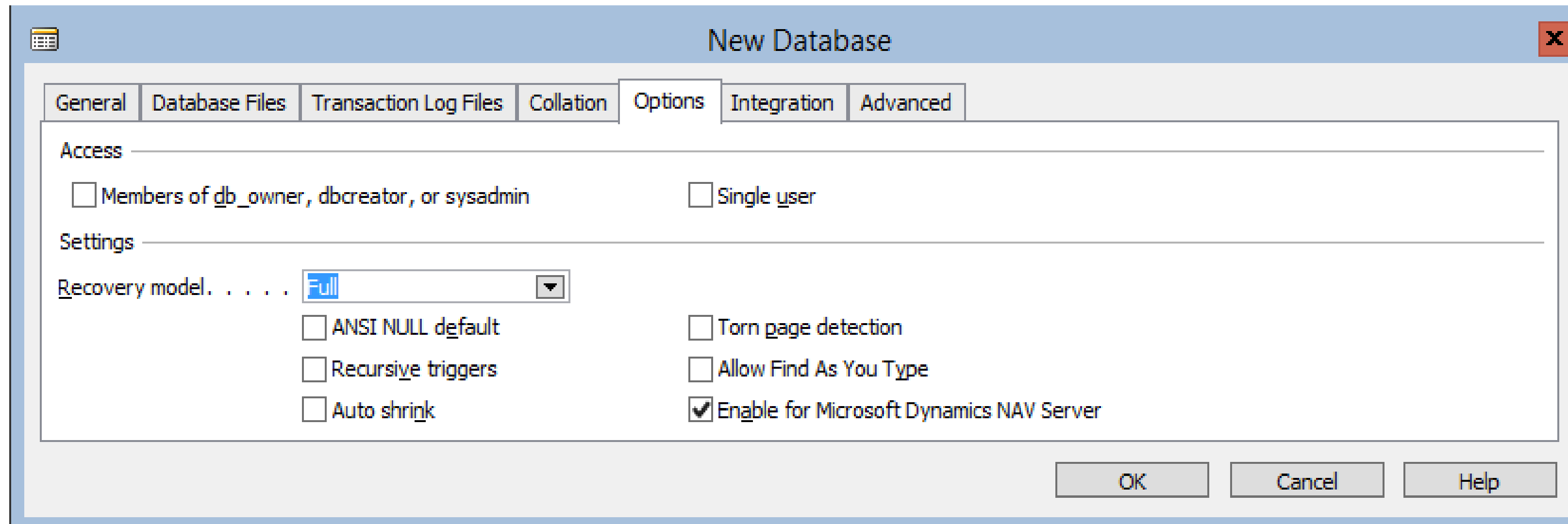
OK Cancel Help

- PC and partnerserver:



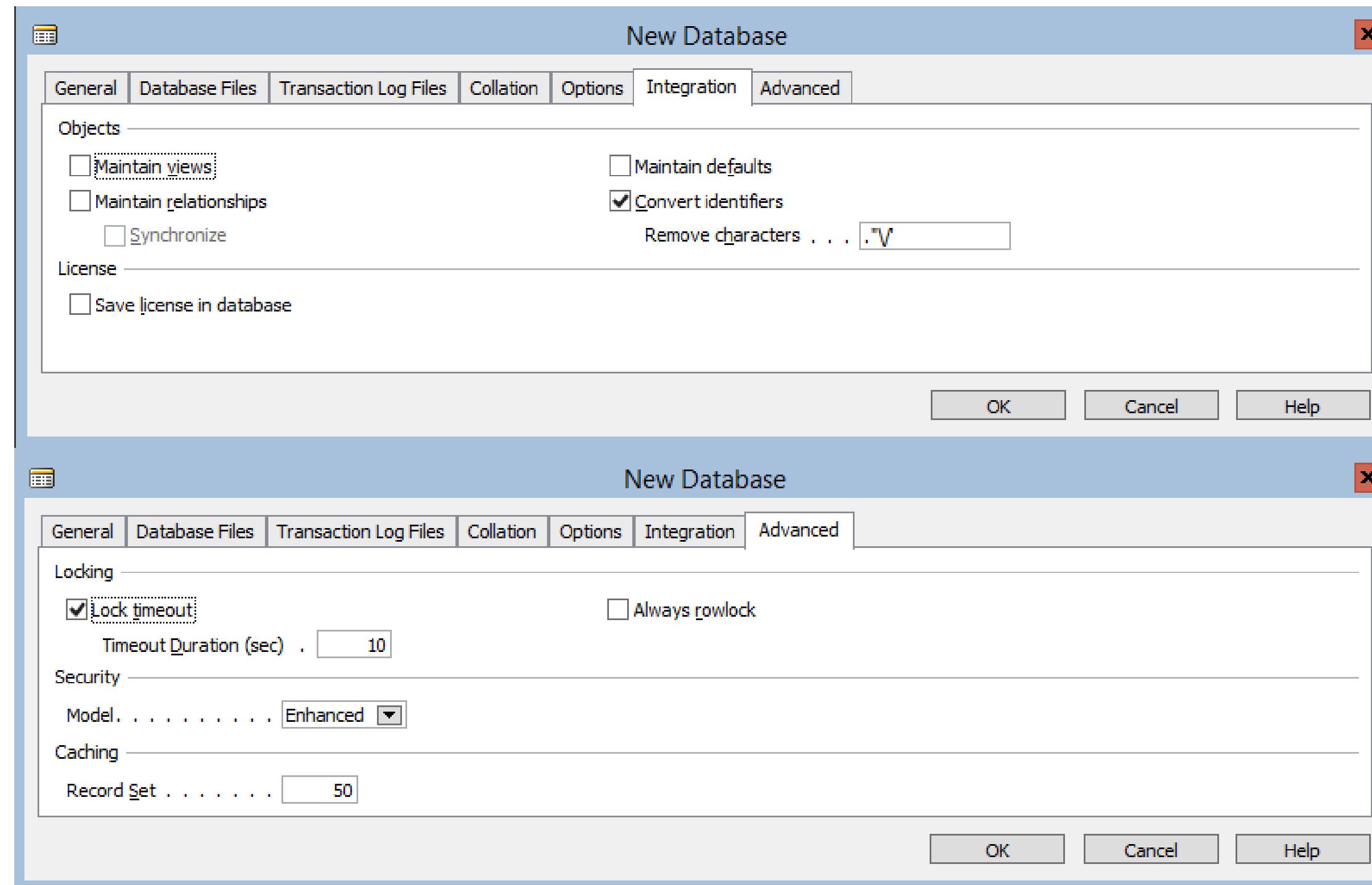
- Torn page detection : was good for SQL 2000 but should disappear now. It always should be Checksum!

- For customer PROD server



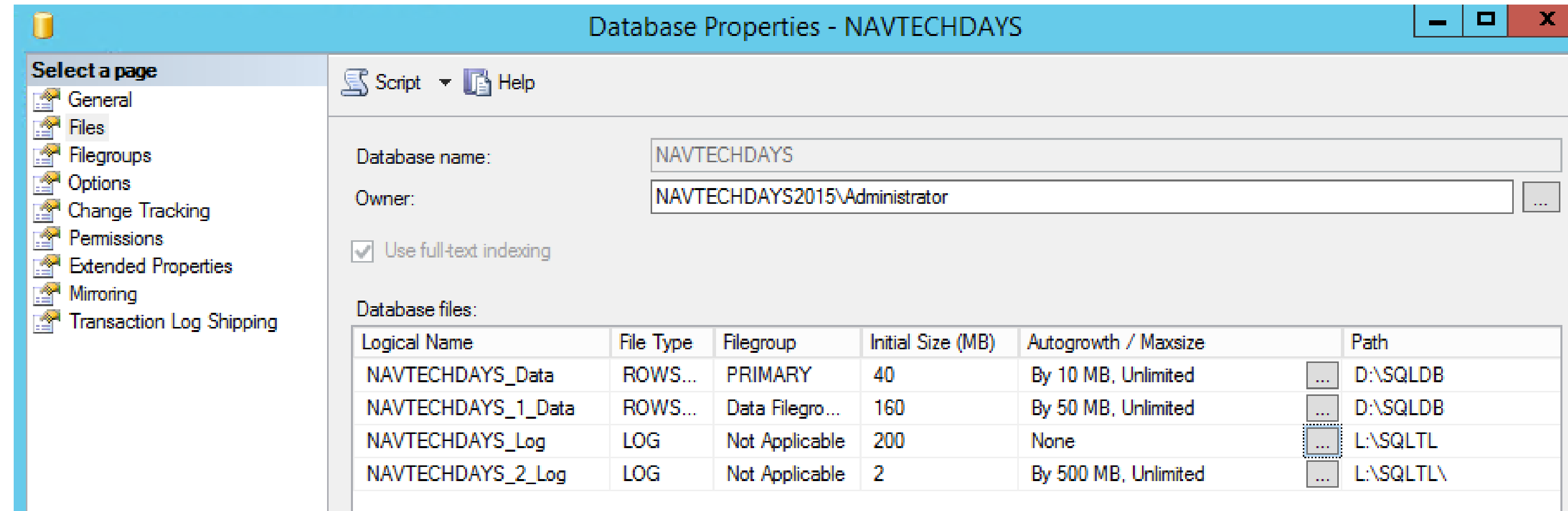
- Recovery models: see later
- Allow Find as You Type = FALSE





- Lock timeout duration (sec) : you might put it to 30
- Always Rowlock : Less locking, more memory for locks. Can be slower. Can be faster. Can be the same.
- Security Model : Simple. No need to Synchronize

- SQL Server DB properties for Customer Production DB.



- Data file: big enough to contain 2 years of data without growing.
- 2 Logfiles?
  - Main log file is fixed, unmovable, does not change, defragged, big enough to contain the rebuild index changes to the DB without growing.
  - Second log file (=overflow log) serves in case the logfile must grow. Can be shrinked afterwards after you discovered why it grew and fixed the problem.

- SQL Server DB properties for partner server (or PC) DB

Automatic	
Auto Close	False
Auto Create Incremental Statistics	False
Auto Create Statistics	True
Auto Shrink	True
Auto Update Statistics	True
Auto Update Statistics Asynchronously	True

- Customer Production:

Automatic	
Auto Close	False
Auto Create Incremental Statistics	False
Auto Create Statistics	False
Auto Shrink	False
Auto Update Statistics	False
Auto Update Statistics Asynchronously	False

- You need a good maintenance plan

- For all servers

<b>Miscellaneous</b>	
Allow Snapshot Isolation	False
ANSI NULL Default	False
ANSI NULLS Enabled	False
ANSI Padding Enabled	False
ANSI Warnings Enabled	False
Arithmetic Abort Enabled	False
Concatenate Null Yields Null	False
Cross-database Ownership Chaining Enabled	False
Date Correlation Optimization Enabled	False
Delayed Durability	Disabled
Is Read Committed Snapshot On	False
Numeric Round-Abort	False
Parameterization	Simple
Quoted Identifiers Enabled	False
Recursive Triggers Enabled	False
Trustworthy	False
VarDecimal Storage Format Enabled	True
<b>Recovery</b>	
Page Verify	CHECKSUM
Target Recovery Time (Seconds)	0

- Delayed Durability
  - SQL2014 Standard Edition
  - Like COMMIT cache in native DB



# Create a NAV DB

## NAV 2016

Select Server

General Advanced

Server Name . . . . . 127.0.0.1

Authentication . . . . . Windows Authentication

User ID . . . . .

Password . . . . .

OK Cancel Help

Select Server

General Advanced

Net Type . . . . . TCP/IP Sockets

OK Cancel Help

- And for the rest: only the differences between NAV2009R2 and NAV2016

**New Database**

General Database Files Transaction Log Files Collation Options Integration Advanced

Server Name . . . . . localhost

Database Name . . . . . NAVTECHDAYS\_NAV2016

OK Cancel Help

**New Database**

General Database Files Transaction Log Files Collation Options Integration Advanced

Language . . . . . Afrikaans, Basque, Catalan, Dutch, English, Faroese, German, Indonesian, Italian, Portuguese

☐ Binary

☒ Case-sensitive

☒ Accent-sensitive

Validation

☒ Validate Collation

OK Cancel Help

**New Database**

General Database Files Transaction Log Files Collation Options Integration Advanced

Access

☐ Single user

Settings

Recovery model. . . . Full

☐ ANSI NULL default ☐ Torn page detection

☐ Recursive triggers ☐ Auto shrink

OK Cancel Help

**New Database**

General Database Files Transaction Log Files Collation Options Integration Advanced

Objects

Convert identifiers. . . . .["V%"]

License

☐ Save license in database

OK Cancel Help



**New Database**

General Database Files Transaction Log Files Collation Options Integration **Advanced**

Locking

☒ Lock timeout

Timeout Duration (sec) .

Designer

Start ID (UidOffset) . . .

OK Cancel Help

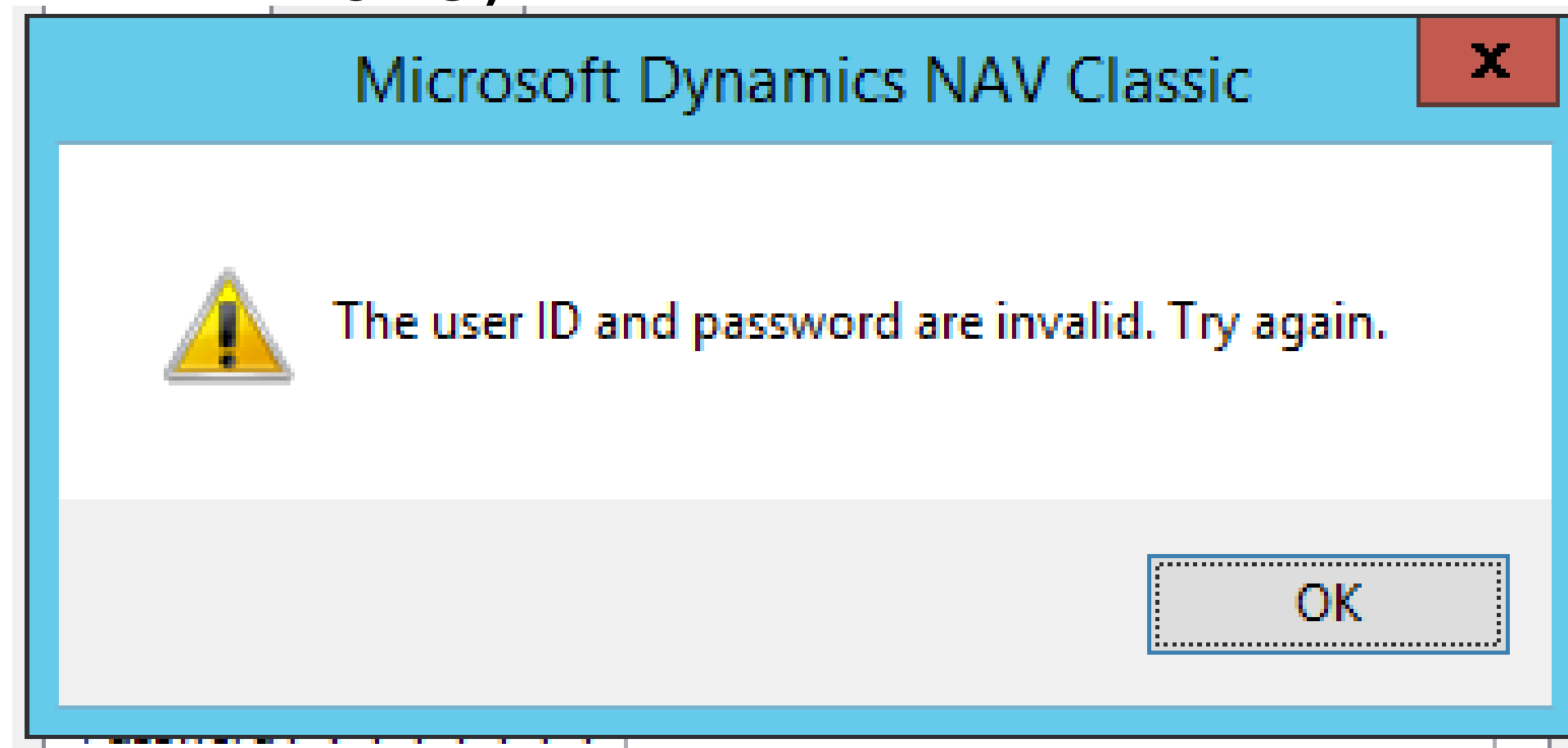
# Create/Delete Logins/Users

- What is the difference between a Login and a User?
  - Login grants you entry in SQL Server. Info saved in master DB.
  - User grants you entry in a DB. Info saved in the DB.

- Let's get to work and create a new user for NAV2009 or NAV2013+ development environment!
- Create a user ...\\NAVTD1 in windows (using Computer Management)
- Run a program as another user: "RUNAS /user:...\\NAVTD1 finsql.exe" (go first to the NAV-subdir)  
(Open and change and run run\_finsql\_exe\_as\_user\_NAVTD1.cmd)
  - Windows trick : Shift+rightclick on the finsql.exe shows you also the Run as ...option
- Get a list of databases NAV (if you can...) (no. You can't...)
- Create login ...\\NAVTD1 in SQL and add the login as user to database NAVTECHDAYS\_2016 in SQL  
(use the GUI or this script:CREATE\_NAVTD1\_IN\_SQL.sql)
- Dbowner is needed for developer and people that must import/change tables.
  - BUT... a dbowner CAN DELETE THE DB! Using or not using NAV to delete the DB!
- Normal users:
  - Public is enough for classic client! For 2013+, SQL Server doesn't even need to know them.



- If you have this error (PRE NAV2013)



you have a NAV security problem, not a SQL problem.

- Clean out the NAV security tables
- CLEAN\_NAV\_SECURITY\_TABLES.sql

- Let's create (and fix) a common error with SQL security and Windows Logins
  - Create a user ...\\NAVTD2 in windows (using Computer Management)
  - Create Windows login "...\\NAVTD2" in NAVTECHDAYS2009R2. NAV will create the LOGIN and the USER in the database in SQL (CREATE\_NAVTD2\_IN\_SQL.sql)
  - Delete Windows user in NAVTECHDAYS2009R2. It does delete the USER in the database in SQL but NOT the LOGIN
  - Recreate the user in NAV
  - Delete the LOGIN (NOT the USER) using SSMS! (the USER in the database will NOT be deleted!)
  - Now we recreate the login in SQL with the same name. We add it to NAVTECHDAYS2009R2. SCRIPT the creation (CREATE\_NAVTD2\_IN\_SQL.sql) , but do not run it from the GUI!!!!!!
  - Now we run the script step by step
    - "CREATE USER [...\\NAVTD2] FOR LOGIN [...\\NAVTD2]" gives error:  
Msg 15023, Level 16, State 1, Line 1  
User, group, or role '...\\NAVTD2' already exists in the current database
    - Because the user already exists in the DB! But if we check the properties of the login, it is all ok
  - Problem created ... and ... fixed

- Let's create (and fix) a another common problem with SQL security and SQL Logins
  - Create a SQL LOGIN "NAVTD3" using SSMS (CREATE\_NAVTD3\_IN\_SQL.sql)
  - Delete the LOGIN using SSMS
  - Recreate a SQL LOGIN "NAVTD3" using SSMS (CREATE\_NAVTD3\_IN\_SQL.sql). SCRIPT the creation, but do not run it from the GUI!!!!!!
  - Now we run the script step by step
    - " CREATE USER [NAVTD3] FOR LOGIN [NAVTD3] " gives error:

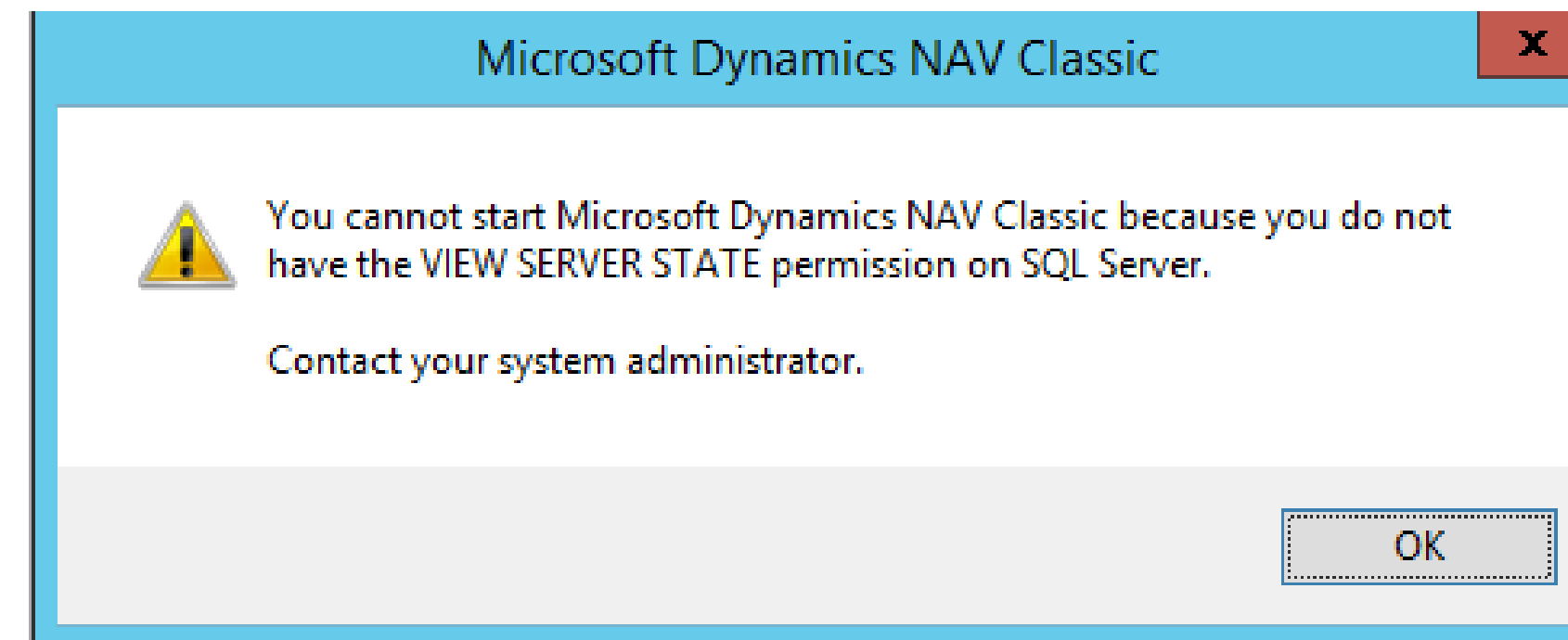
Msg 15023, Level 16, State 1, Line 7

User, group, or role 'NAVTD3' already exists in the current database.

- The USER in NAVTECHDAYS\_2016 has the same name, but NOT the same SID. So for SQL it is another USER
- Delete the USER in NAVTECHDAYS\_2016. And retry the script
- Problem solved



- Another regularly occurring problem:



- Fix:

USE master

GRANT VIEW SERVER STATE to [...\NAVTD1]

OR

USE master

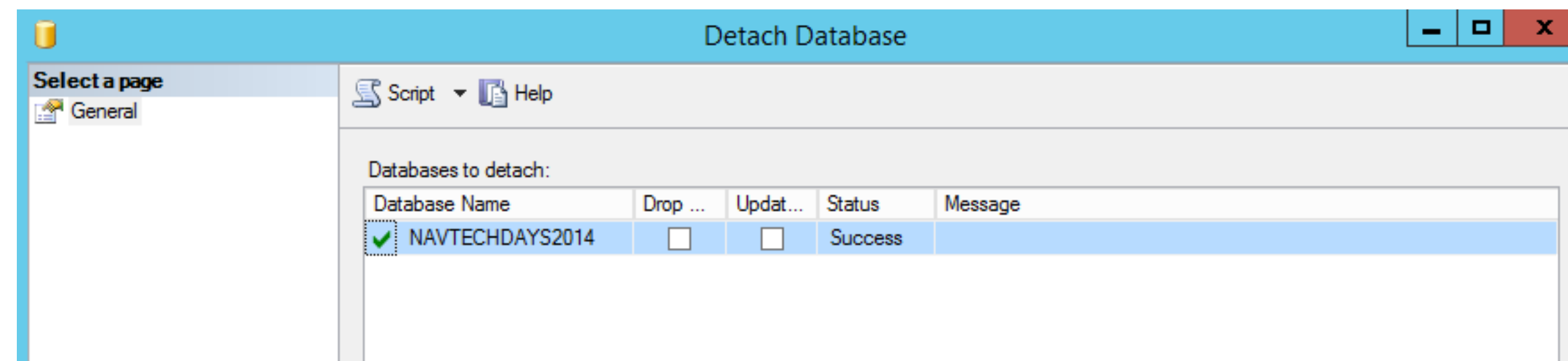
GRANT VIEW SERVER STATE to public



- Create a login for a NON-NAV user
  - Preferably a Windows user. SQL user passwords are in clear over the wire(less) (No problem for NAV2013)
  - Public server role!
  - Try to give permission on the object(s) that needs to be read or written. Otherwise:
    - db\_datareader if only reads are needed
    - db\_datawriter if also writes are needed
    - NO dbowner!
    - And even less giving admin role!

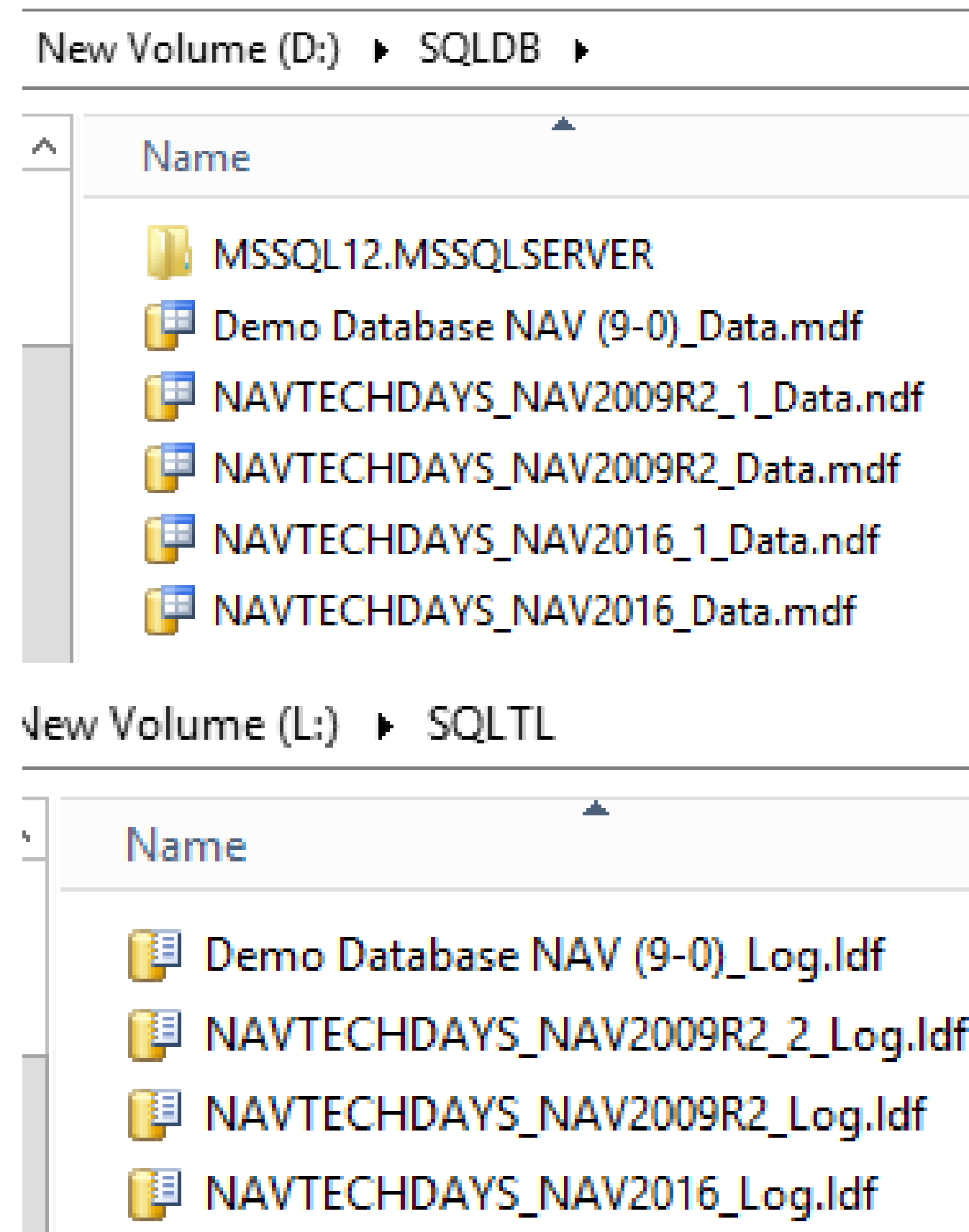
# Attach/Detach databases

- Rightclick your database => tasks => detach



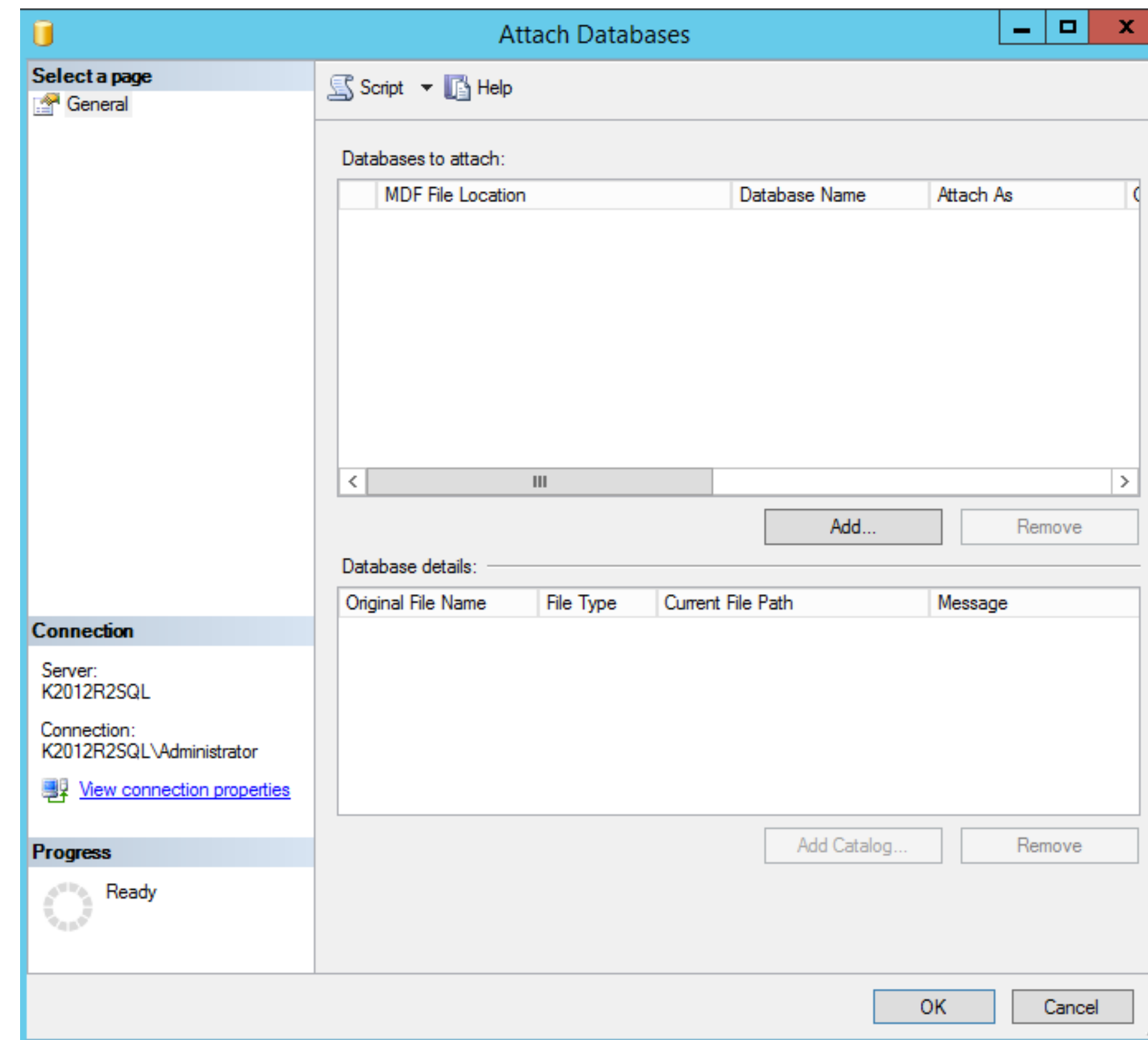
- It removes the database from SQL Server but does NOT delete the files

- Rename the files to NAVTECHDAYS\_2009R2\_...





- Rightclick on Databases => tasks => Attach



- Add => select the renamed database
- IMPORTANT : check the permissions of the files. SQL server user must have access to them!

Script Help

Databases to attach:

	MDF File Location	Database Name	Attach As	Owner	Status
	D:\SQLDB\NAVTECHDAYS_NAV...	NAVTECHDAYS	NAVTECHDAYS	NAVTECHDAY...	

< ||| >

Add... Remove

"NAVTECHDAYS" database details:

Original File Name	File Type	Current File Path	Message
NAVTECHDAYS_Data.mdf	Data	D:\SQLDB\NAVTECHDAYS_Data.mdf	Not Found
NAVTECHDAYS_Log.ldf	Log	L:\SQLTL\NAVTECHDAYS_Log.ldf	Not Found
NAVTECHDAYS_1_Data.ndf	Data	D:\SQLDB\NAVTECHDAYS_1_Data...	Not Found
NAVTECHDAYS_2_Log.ldf	Log	L:\SQLTL\NAVTECHDAYS_2_Log.ldf	Not Found

Add Catalog... Remove

- Change the name of the database.
- Change the current file path.
- And it would be better to change the owner to sa.

Databases to attach:

MDF File Location	Database Name	Attach As	Owner	Sta
D:\SQLDB\NAVTECHDAYS_NAV... <input type="button" value="..."/>	NAVTECHDAYS20...	NAVTECHDAYS_NAV2009R2	sa	

< ||| >

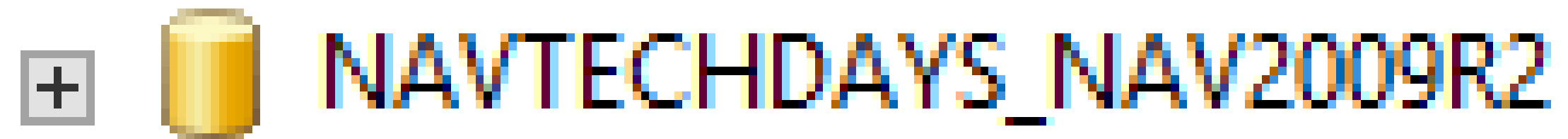
"NAVTECHDAYS2009R2" database details:

Original File Name	File Type	Current File Path	Message
NAVTECHDAYS_NAV2009...	Data	D:\SQLDB\NAVTECHDAYS_NAV2009R2_Data.mdf <input type="button" value="..."/>	
NAVTECHDAYS_NAV2009...	Log	L:\SQLTL\NAVTECHDAYS_NAV2009R2_Log.ldf <input type="button" value="..."/>	
NAVTECHDAYS_NAV2009...	Data	D:\SQLDB\NAVTECHDAYS_NAV2009R2_1_Data.ndf <input type="button" value="..."/>	
NAVTECHDAYS_NAV2009...	Log	L:\SQLTL\NAVTECHDAYS_NAV2009R2_2_Log.ldf <input type="button" value="..."/>	

< ||| >

- Hit OK

- And if it is really ok





# Backup/Restore

# BEFORE STARTING:

Open the script CREATE\_SOME\_BACKUPS.sql.

Create the necessary subdirs.

Run script CREATE\_SOME\_BACKUPS.sql and let it run. We will use the backups later to restore them. They should work on all versions and editions.

# KINDS OF BACKUP

- Company : NAV only (and not all builds of NAV2013R2 have it).
- full : NAV and SQL (SQL backups data and indexes ; NAV ONLY backups data)
- differential : all changes since last FULL backup
- transaction log : all changes since last TL backup (or first full backup)
- tail-log backup : is a transaction log backup but done when you database has become corrupt and maybe offline BUT your transactionlog-file is intact!  
(<http://www.sqlskills.com/blogs/paul/disaster-recovery-101-backing-up-the-tail-of-the-log/>)
- partial backup : This allows you to backup the PRIMARY filegroup, all Read-Write filegroups and any optionally specified files.
- file backup or filegroup backup : if you have a BBBBIIIIIGGGGG database, you can divide it in different database files in different filegroups and backup only 1 of them.
- mirror backup : with only 1 command, you make the backup in different locations (Enterprise Edition!)
- copy-only backup : a backup that will NOT be considered for restoring the backups. Started with SQL2005 BUT the toggle was NOT in the GUI!

# WHY BACKUP?

We don't need backups. We have perfect hardware, SAN snapshots, clustering, mirroring, transaction log shipping, magic.

We have the perfect hardware that will never fail.

You still have a problem: you have developers that sometimes do something they shouldn't.....

BTW: "perfect" doesn't exist.



# A FEW THINGS TO KNOW ABOUT BACKUPS

- Restore backups ONLY from versions that are older (up to 3 major versions : so a SQL 2000 backup can be restored in SQL2005, SQL2008, SQL2008R2 but NOT IN SQL 2012 or SQL 2014. If you want to do it, restore in SQL2008R2 and back it up and then restore it in SQL 2014)
- Compressed backups, cannot be restored in SQL Server Express
- Backup of a database with Enterprise-Edition features (eg. a compressed table) cannot be restored in a standard edition or express edition server.
- Compressed backups are faster to do than NON-compressed backups. Invest some extra CPU-cycles to save disk IO and space (and network IO).
- Dedupe does NOT beat compressed backups because of reduced network IO.

# RECOVERY MODELS OF SQL SERVER

- Simple : Everything is written in transaction-log before the COMMIT is confirmed. But once the data is in the DB, space will be re-used. You still need transactionlog space for the currently ongoing transactions!
- Full : Everything is written in transaction-log before the COMMIT is confirmed. Space will be re-used ONLY when a transactionlog backup has been done.
- Bulk-Logged : this is used for bulk operations like bulk-insert (NOT the NAV bulk-insert!), indexrebuild.

# BACKUP MYTH BUSTING 1/2

- Backuping locks the database. SQL backup does not NOT place any locks. You can see DB-performance degradation because of disk IO to read data and disk IO for writing (you should place your backups on other disks or have a dedicated network for it).
- Backups messes up the buffer pool, flushing hot pages out of memory.
- If you have a lot of data in the transactionlog, you can do a full/diff backup to clear it.
- Switching from full to bulk-logged breaks the transaction chain
- Bulk-logging makes the transactionlog backup smaller.
- Full/diff backup does not backup transactions created during the backup.
- Backups test checksums : NO. Only using the WITH CHECKSUM option. But that does not mean you don't need to do a test restore!
- A transactionlog backup always clears the log.
- I should shrink the database before FULL backup to make the backup smaller.



# BACKUP MYTH BUSTING 2/2

- The best way to recover from a disaster is always a restore.
- Master, msdb, model DB don't need to be backed up.
- You should always plan a good backup strategy for a production server. => ...
  - Actually, you should plan a good restore/recovery strategy.
- No transaction log backups for me because my SQL server is too busy.
- No need for transaction log backups, I have a full backup every day.
- I can save multiple backups in the same backup-file. Backup with compression and backup with NO-compression CANNOT be saved in the same file.
- After a backup without errors, I have a valid backup, so I can delete the previous ones.
- Nothing is better than a SQL server backup. =>
  - Actually, this is NOT a myth!



# TRANSACTION LOG MYTH BUSTING

- Multiple transactionlogfiles will increase performance
- Simple recovery model does never grow my transaction log
- BLOBS,TRUNCATE TABLE, DROP TABLE are not logged in the transactionlog backup.
- Once I put my DB in Full Recovery Model, I can start making transactionlog backups.

# EXERCISE : RESTORE DATABASE BACKUPS

You'll have some errors if you don't have SQL2014 Develop/Enterprise Edition.

Let's restore the databases in subdir "TO\_COMPRESS\_OR\_NOT\_TO\_COMPRESS"

Backups have been done with SQL Server 2012 Developer Edition.

# RECOVERY/RESTORE STRATEGIES

- No need. Test environment and we can always rebuild it.
- I can lose a few days of data
- I can lose a day of data
- I can lose a few hours of data
- I can lose an hour of data
- I can lose a few minutes of data
- I CANNOT lose a second of data
- I CANNOT lose a second of data and I cannot lose a second of system stop => 1M €£\$ range!

# BACKUP STRATEGIES

- Never
- 1 full a day
  - I use this on my portable!
- 1 full a week and 1 diff a day
  - For partners with lots of databases.
- 1 full a day and 1 diff every few hours
  - Customer production with DBA that has very basic knowledge of SQL Server.
- 1 full a day and 1 diff every few hours and every 5 minutes a TL backup.
  - Very active customer production database.



# RESTORE THE BACKUPS WE CREATED BEFORE

- Database=>Tasks=>Restore

Destination

Database:

Restore to:

Restore plan

Backup sets to restore:

Restore	Name	Component	Type	Server	Database	Position	First LSN	Last LSN
<input checked="" type="checkbox"/>	20000_BACKUP_RESTORE-Full Database Back...	Database	Full	K2012R2SQL	BACKUP_RESTORE	1	32000000025900043	320000000027
<input checked="" type="checkbox"/>	22000_BACKUP_RESTORE-Diff Database Back...	Database	Differential	K2012R2SQL	BACKUP_RESTORE	1	32000000034200006	320000000034
<input checked="" type="checkbox"/>	22100_BACKUP_RESTORE-TL Database Backup	Log	Transaction ...	K2012R2SQL	BACKUP_RESTORE	1	32000000032900001	320000000034
<input checked="" type="checkbox"/>	22200_BACKUP_RESTORE-TL Database Backup	Log	Transaction ...	K2012R2SQL	BACKUP_RESTORE	1	32000000034900001	320000000035

- Not all backups are in the restore

# RESTORE NOTES

- Open the script "RESTORE\_BACKUP\_RESTORE.sql". This contains the restore commands for ALL the backups we did before.
- We do NOT have a restore log-command in the script. I just tried it out with only RESTORE DATABASE and it also works for transaction logs.
- Restoring COPY-ONLY backups create some problems with DIFF backups.
- COPY-ONLY backups are shown in the GUI!
- Even if I mix all backups, it does NOT destroy my complete restore process. It just gives an error and goes on.
- IMPORTANT : If you miss a TL backup and do NOT have a FULL or DIFF backup to cover it, you can't restore any further.
- In the end, you can just launch the RESTORE DATABASE without backupfile to put the backup back online
- During the restore process, your database has "(Restoring...)" in the name.
- Give it a try restoring the database in different ways

# INITIALIZING TRANSACTIONLOG BACKUPS

Let's use SIMPLE\_2\_FULL\_WITH\_TRANSACTIONLOG\_BACKUPS.sql

# INITIALIZING TRANSACTIONLOG BACKUPS: WHAT DID WE LEARN?

Putting your DB in FULL recovery model does NOT mean it is in FULL recovery model. It remains in SIMPLE recovery model UNTIL the NEXT FULL/DIFF backup!



# WHAT BACKUPS/RESTORES HAVE BEEN DONE?

This script gives info about all the backups and restores that have been done.

SHOW\_BACKUP\_RESTORE\_HISTORY.sql

# Maintenance

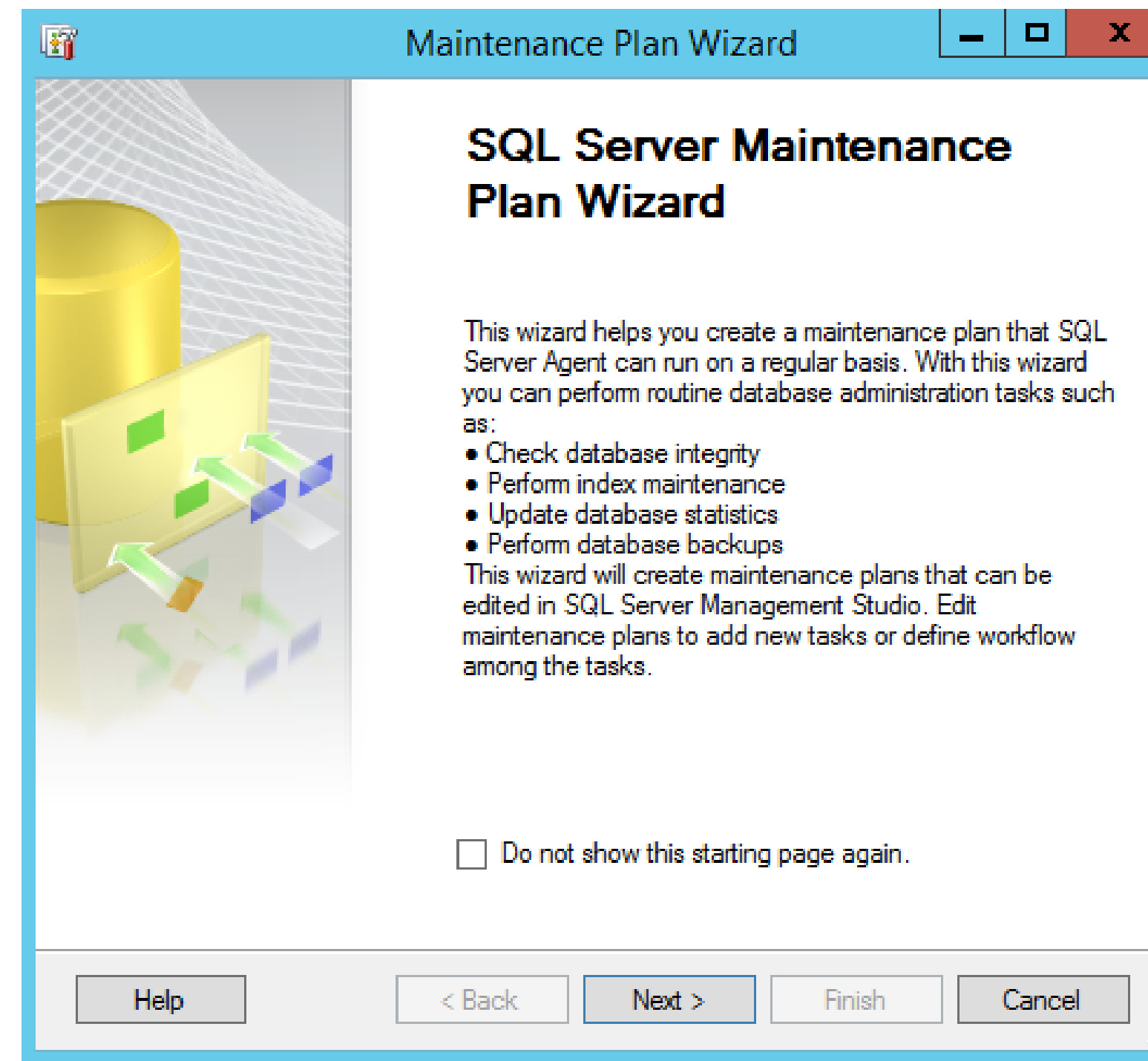
# MAINTENANCE USING...

- No maintenance
  - PRO: Easier than this....
  - CONTRO: Do I really need to explain this?
- Maintenance plan wizard
  - PRO: Easy and fast, point and click
  - CONTRO: limited control
- Maintenance plan designer
  - PRO: Still easy, point and click, Some more control
  - CONTRO: still limited control
- SQL Server Agent
  - PRO: full control
  - CONTRO: not so easy
- Windows Scheduler using powershell or sqlcmd.exe
  - PRO: works also with Express Edition
  - CONTRO: complicated. Create .tsql files and run them using sqlcmd.exe or using powershell or using command files

# Maintenance

## Using the wizard





Maintenance Plan Wizard

**Select Plan Properties**  
How do you want to schedule your maintenance tasks?

Name: NAVTECHDAYS\_MP\_WIZARD

Description:

Run as: SQL Server Agent service account

☐ Separate schedules for each task  
☒ Single schedule for the entire plan or no schedule

Schedule:  
Not scheduled (On Demand) Change...

Help < Back Next > Finish Cancel

**New Job Schedule**

Name:

Schedule type:  ☒ Enabled

One-time occurrence

Date:  Time:

Frequency

Occurs:

Recurs every:  week(s) on

☐ Monday ☐ Wednesday ☐ Friday ☐ Saturday  
☐ Tuesday ☐ Thursday ☒ Sunday

Daily frequency

☒ Occurs once at:   
☐ Occurs every:  hour(s) Starting at:   
Ending at:

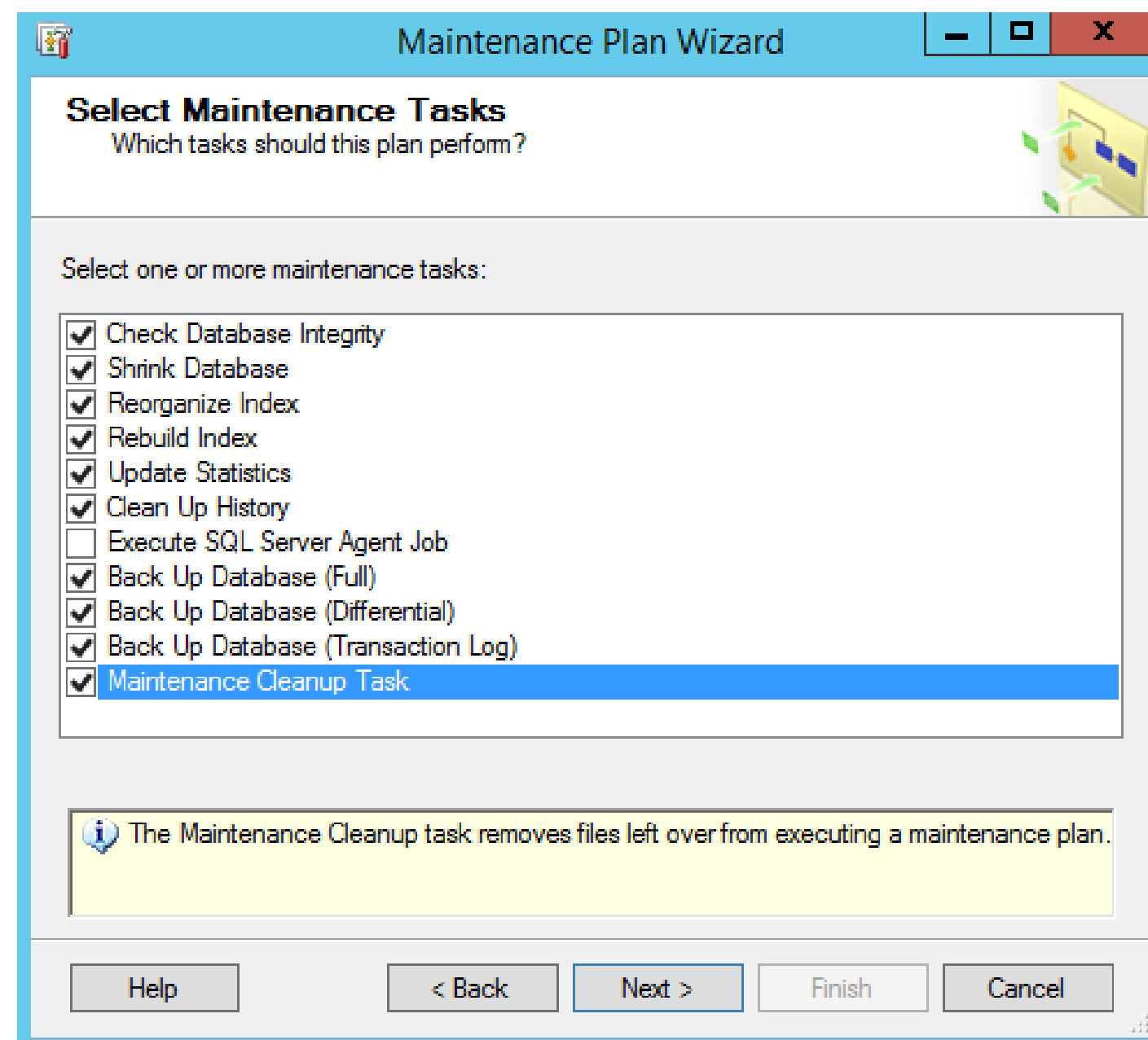
Duration

Start date:    
☐ End date:    
☒ No end date:

Summary

Description:

# WHAT IS BAD IN THIS PLAN?



- SHRINK. Never shrink a DB.
- Reorganize index (bad and not bad) => use rebuild
- Update statistics (depends) => rebuild recreates them with 100% sampling
- Differential backup=> put in other maintenance plan
- Transaction log backup => put in other maintenance plan (Can be useful just after the rebuild to clean the transactionlog)




Maintenance Plan Wizard

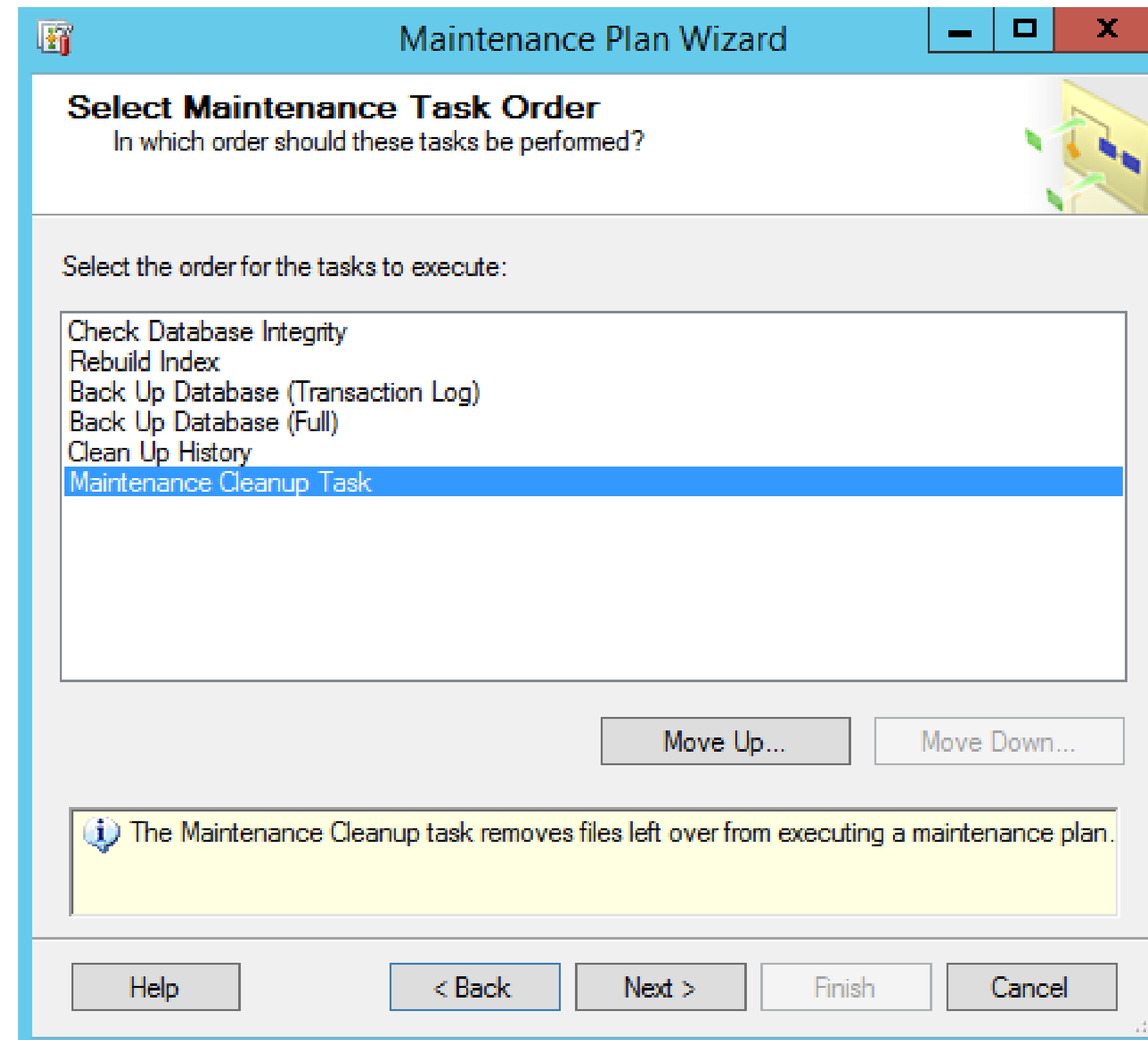
**Select Maintenance Tasks**  
Which tasks should this plan perform?

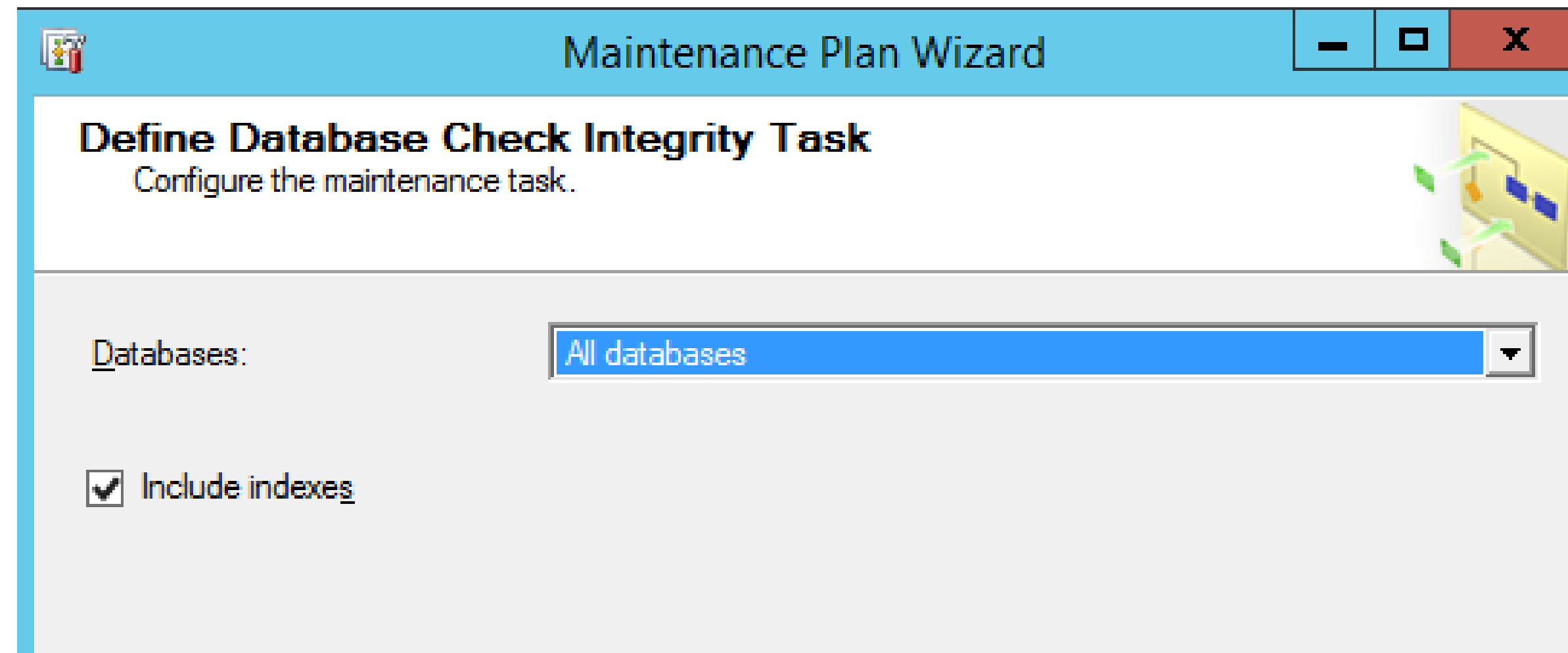
Select one or more maintenance tasks:

- ☒ Check Database Integrity
- ☐ Shrink Database
- ☐ Reorganize Index
- ☒ Rebuild Index
- ☐ Update Statistics
- ☒ Clean Up History
- ☐ Execute SQL Server Agent Job
- ☒ Back Up Database (Full)
- ☐ Back Up Database (Differential)
- ☒ Back Up Database (Transaction Log)
- ☒ Maintenance Cleanup Task

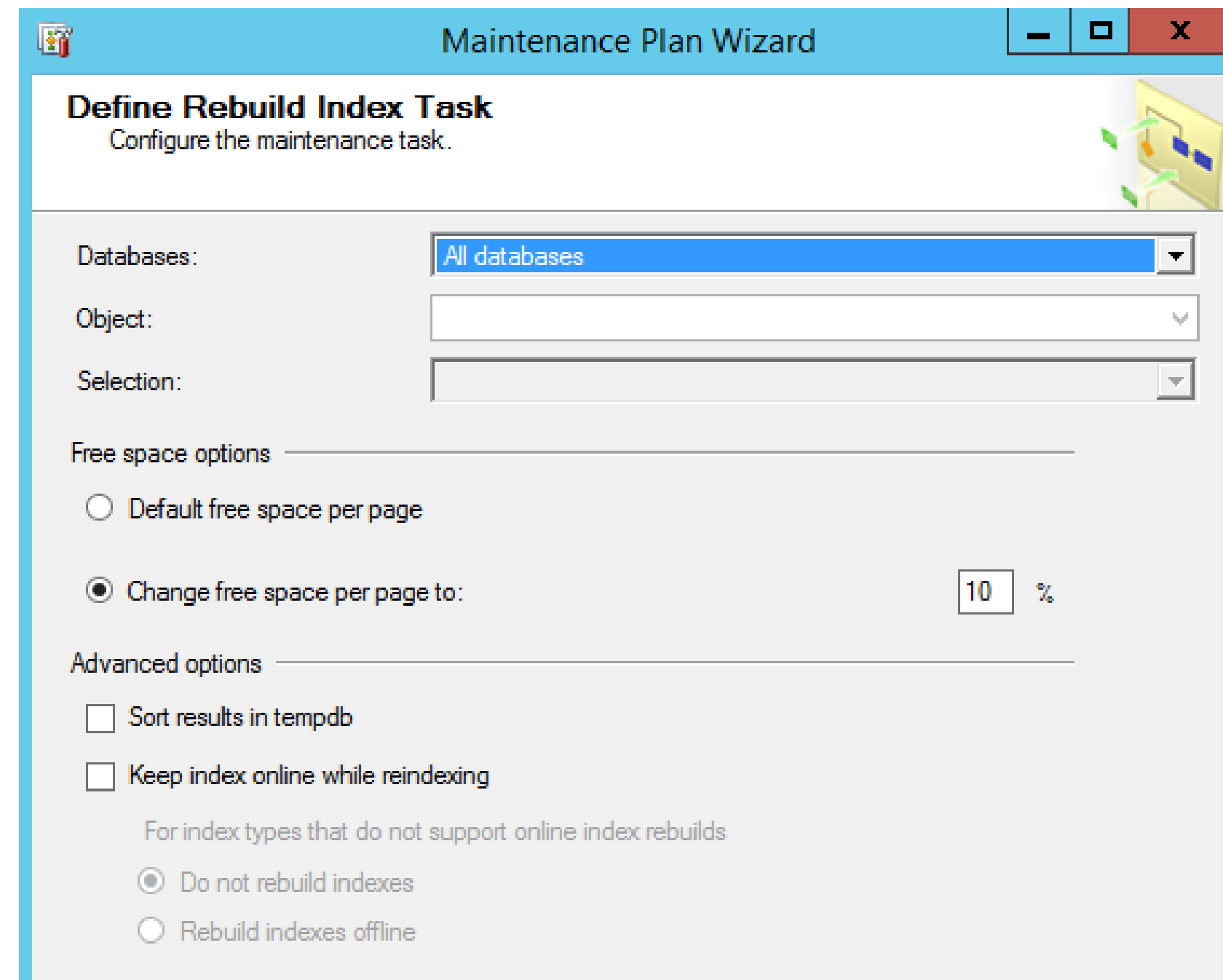
 The Back Up Database (Transaction Log) task allows you to specify the source databases, destination files or tapes, and overwrite options for a transaction log backup.

[Help](#) [< Back](#) [Next >](#) [Finish](#) [Cancel](#)





- Include master, msdb, model!
- Exclude indexes if you are going to rebuild the indexes.



- Change free space per page to 10% = 90% fill factor!
- "Sort results in tempdb". Can speed up if they have different physical disks. TempDB must be big enough to contain the data.
- "Keep index online while reindexing": Enterprise Edition!



Maintenance Plan Wizard

### Define Back Up Database (Transaction Log) Task

Configure the maintenance task.

General Destination Options

Backup type: Transaction Log

Database(s): Specific databases

Backup component

☒ Database

☐ Files and filegroups:

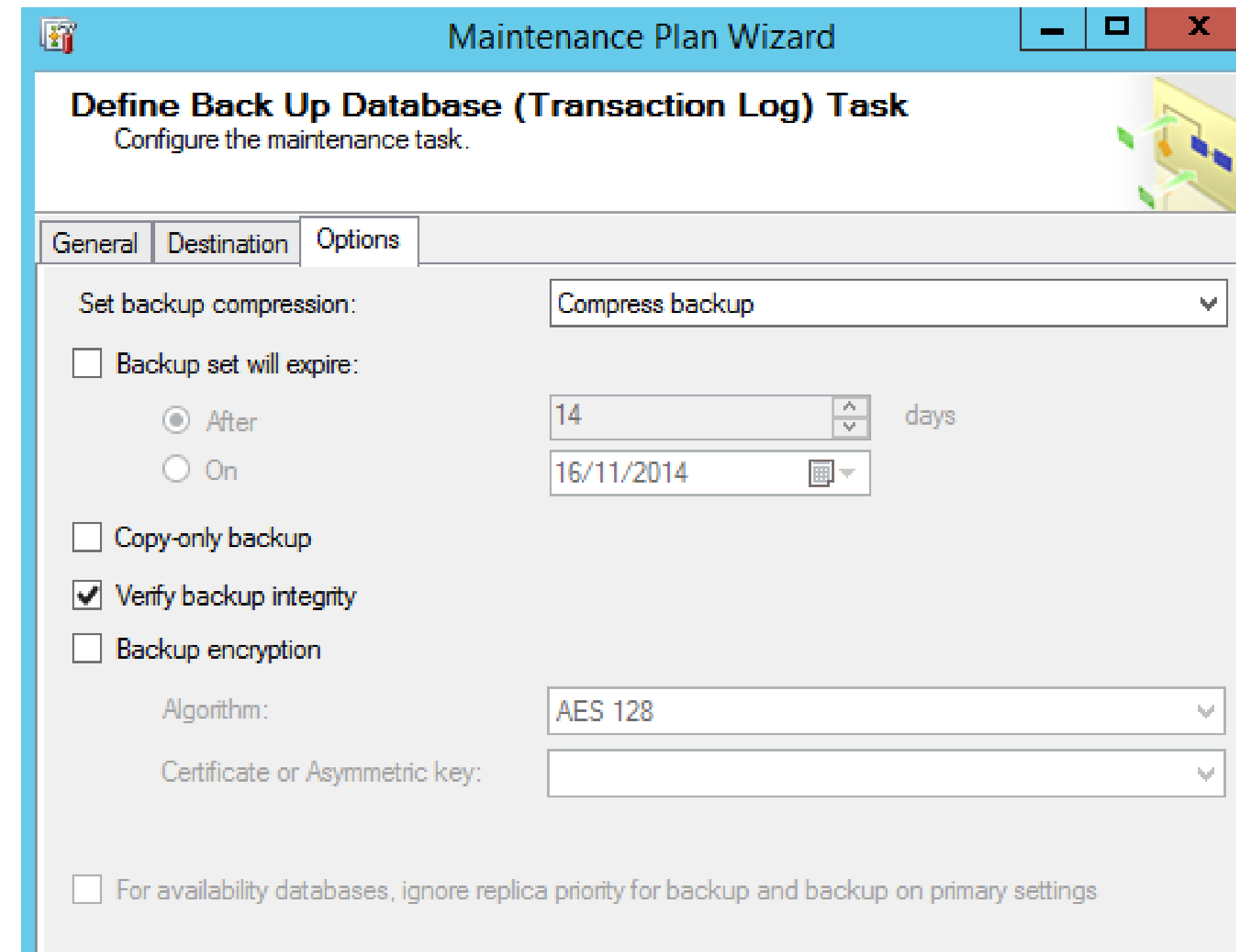
Back up to: Disk

Disk  
Tape  
URL

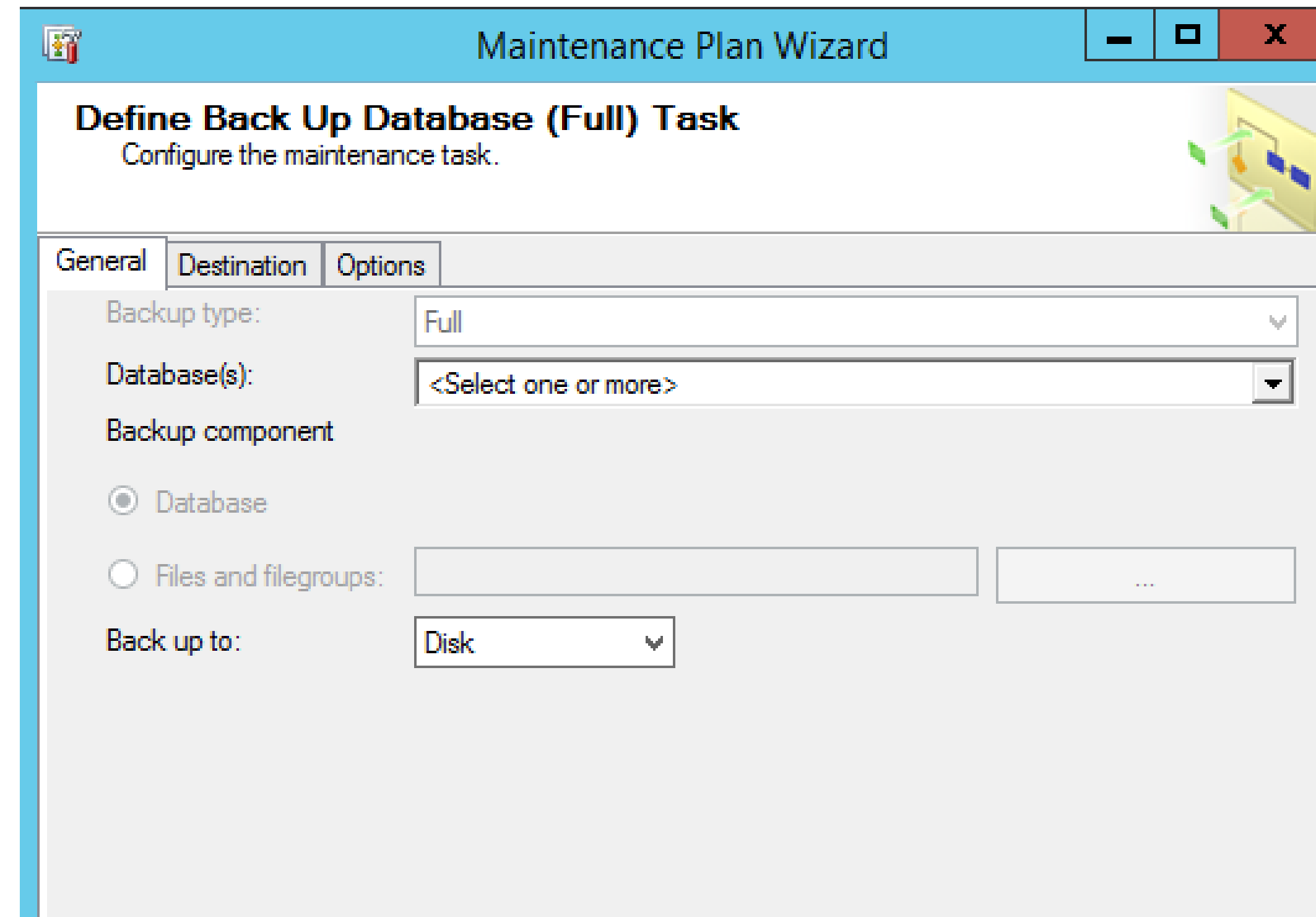
# WHERE DO YOU WRITE YOUR BACKUP?

The screenshot shows the 'Maintenance Plan Wizard' window, specifically the 'Define Back Up Database (Transaction Log) Task' step. The window has a title bar with standard Windows controls. Below the title bar, the text 'Configure the maintenance task.' is displayed. The 'General' tab is selected, showing options for backup configuration. A list box for backup files is empty, with 'Add', 'Remove', and 'Contents' buttons to its right. Below this, a dropdown menu for 'If backup files exist:' is set to 'Append'. Two radio buttons are present: 'Create a backup file for every database' (selected) and 'Create a sub-directory for each database' (unselected). The 'Folder:' field contains 'T:\SQLBACKUP' with a browse button. Below this are fields for 'SQL credential:', 'Azure storage container:', 'URL prefix:' (containing 'https://<StorageAccount>.blob.core.windows.net/'), and 'Backup file extension:' (containing 'tm').

- Preferably another logical disk
- Preferably another physical disk
- Preferably another server
- Preferably another room
- Preferably another building
- Preferably another city
- Preferably another continent
- Preferably another planet (future feature!)




- Verify checks if what is written in the file is the same as what was in the DB. It does NOT substitute an integrity check or "Database Integrity"="Checksum"!



- Why Full backup directly after the transaction log backup? Faster restore : previous TL backup will be big, it ONLY serves to avoid re-inializing the TL backup. For restore, I will use the FULL backup and all TL backups AFTER it.



 Maintenance Plan Wizard

### Define Back Up Database (Full) Task

Configure the maintenance task.

General Destination Options

☐ Back up databases across one or more files:

Add  
Remove  
Contents

If backup files exist: Append

☒ Create a backup file for every database

☐ Create a sub-directory for each database

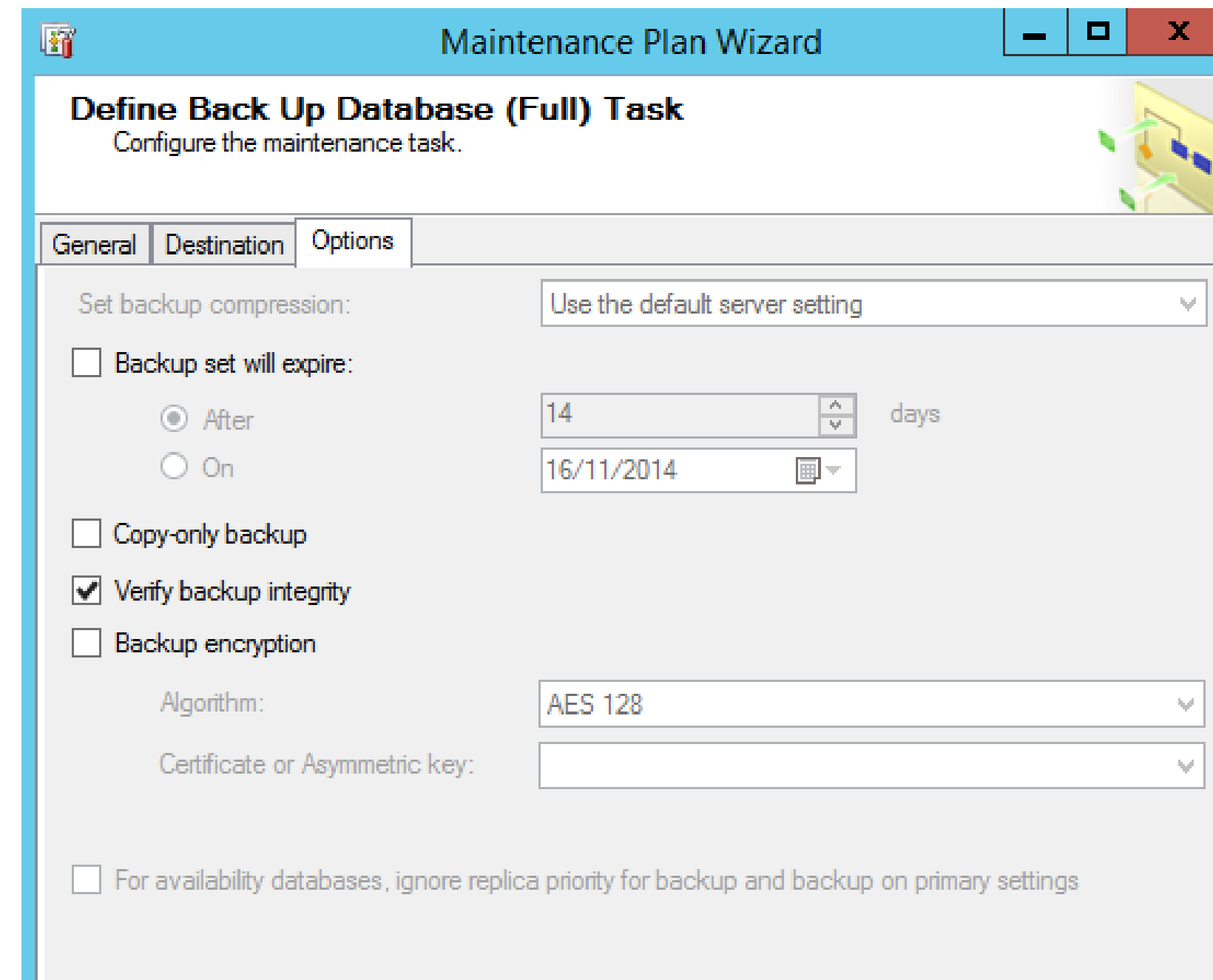
Folder: T:\SQLBACKUP

SQL credential: Create...

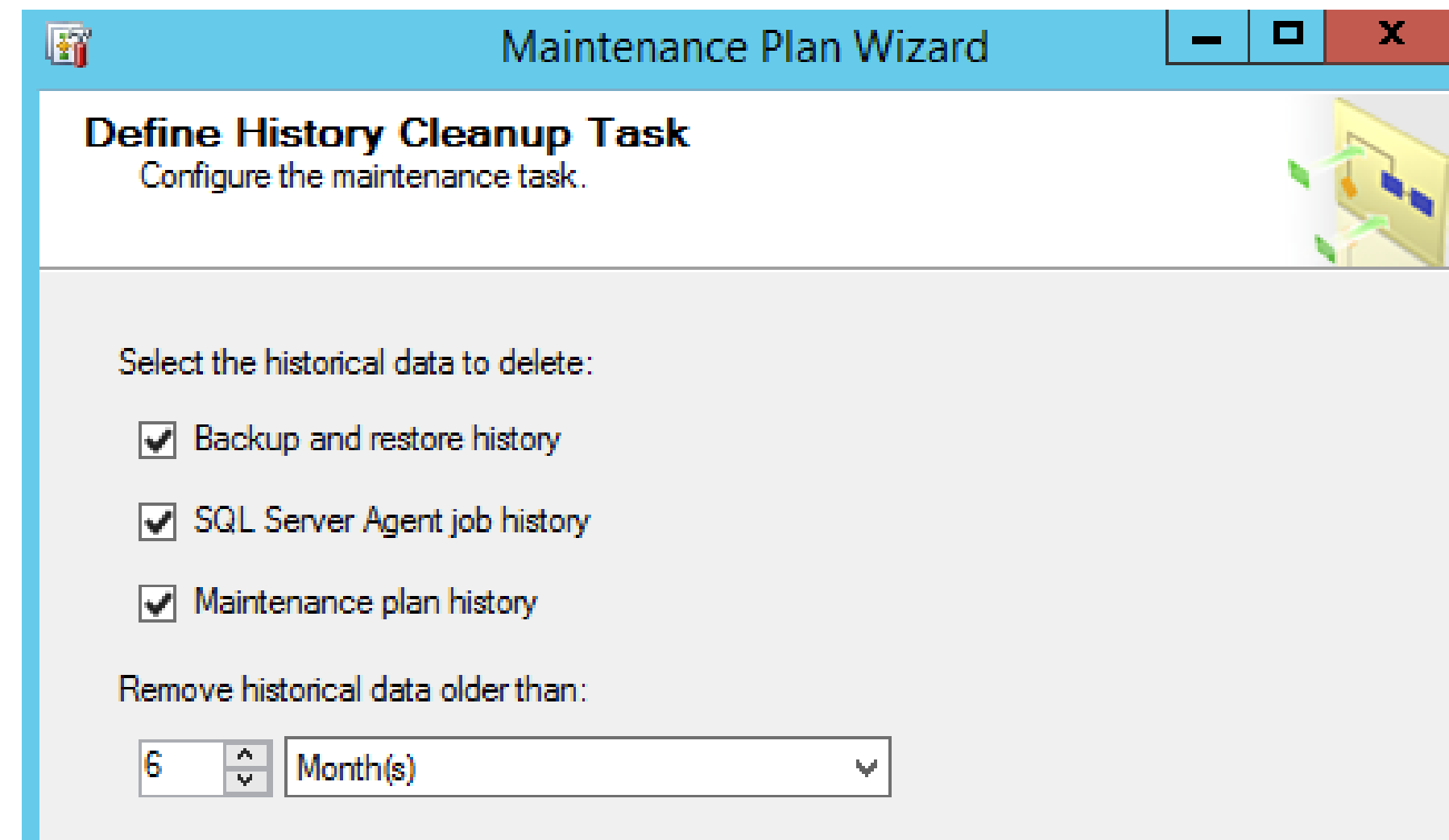
Azure storage container:

URL prefix: https://<StorageAccount>.blob.core.windows.net/

Backup file extension: bak



- BTW: Maintenance Plan Wizard has some bugs: I should be able to change the compression!




- Keep your msdb-DB small. Too many data in it and your backups/maintenance plans go slower. Msdb is also badly indexed.

The screenshot shows the 'Maintenance Plan Wizard' window, specifically the 'Define Maintenance Cleanup Task' step. The window has a blue title bar and a light gray background. The title bar contains the text 'Maintenance Plan Wizard' and standard window controls (minimize, maximize, close). The main area is titled 'Define Maintenance Cleanup Task' with the subtitle 'Configure the maintenance task.' and a small icon of a folder with arrows. The configuration options are as follows:

- Delete files of the following type:**
  - ☒ Backup files
  - ☐ Maintenance Plan text reports
- File location:**
  - ☐ Delete specific file
    - File name: [text box] [...]
  - ☒ Search folder and delete files based on an extension
    - Folder: [I:\SQLDB] [...]
    - File extension: [bak]
    - ☐ Include first-level subfolders
- File age:**
  - ☒ Delete files based on the age of the file at task run time
    - Delete files older than the following:
      - [2] [Week(s)]

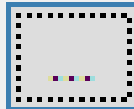
- And my .trn backups????? => You can't : you need to use the Maintenance Plan editor.
- BTW: file extensions : work only for log and bak and trn.



 Maintenance Plan Wizard — □ ✕

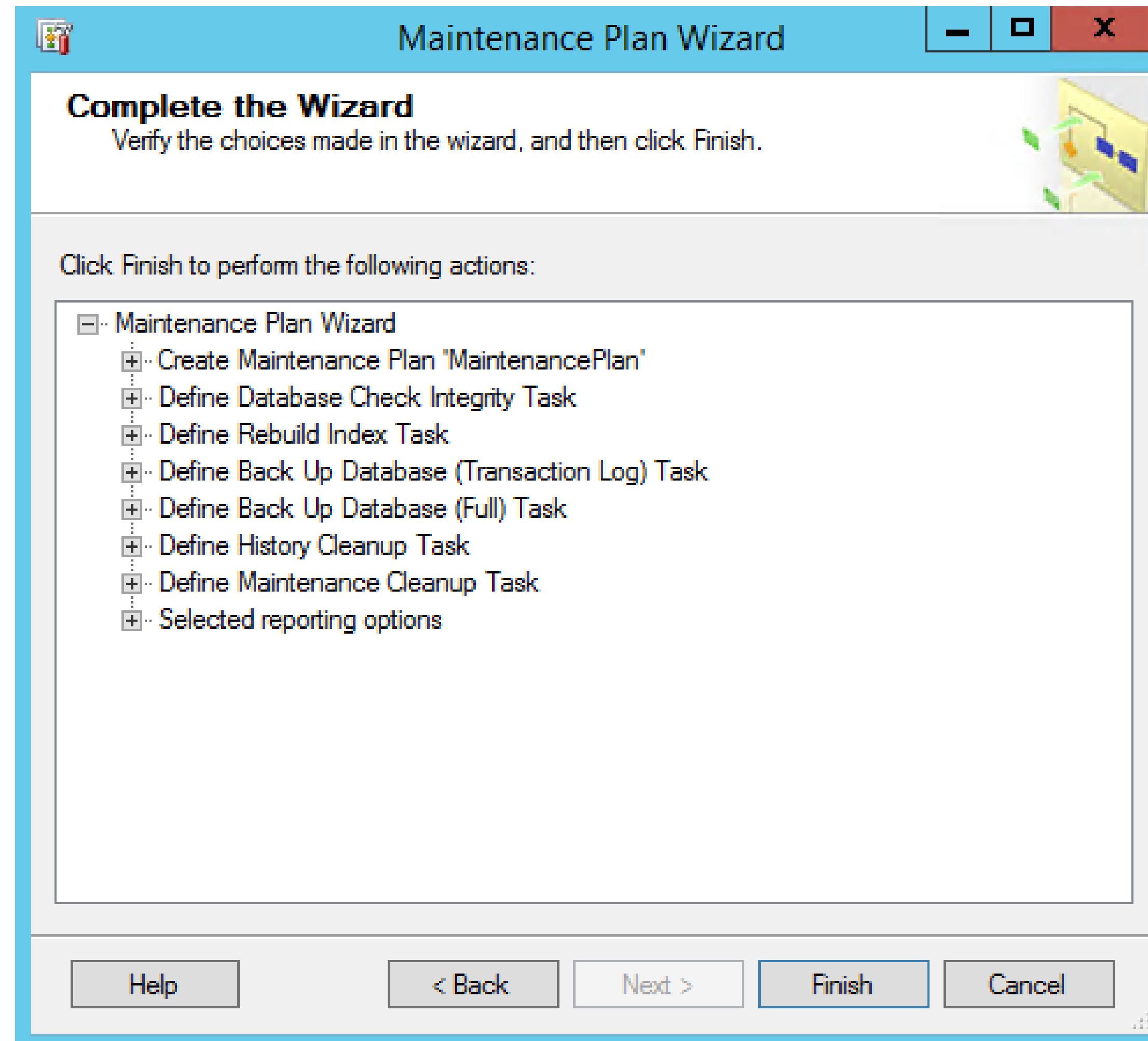
**Select Report Options**  
Select options for saving or distributing a report of the maintenance plan actions.

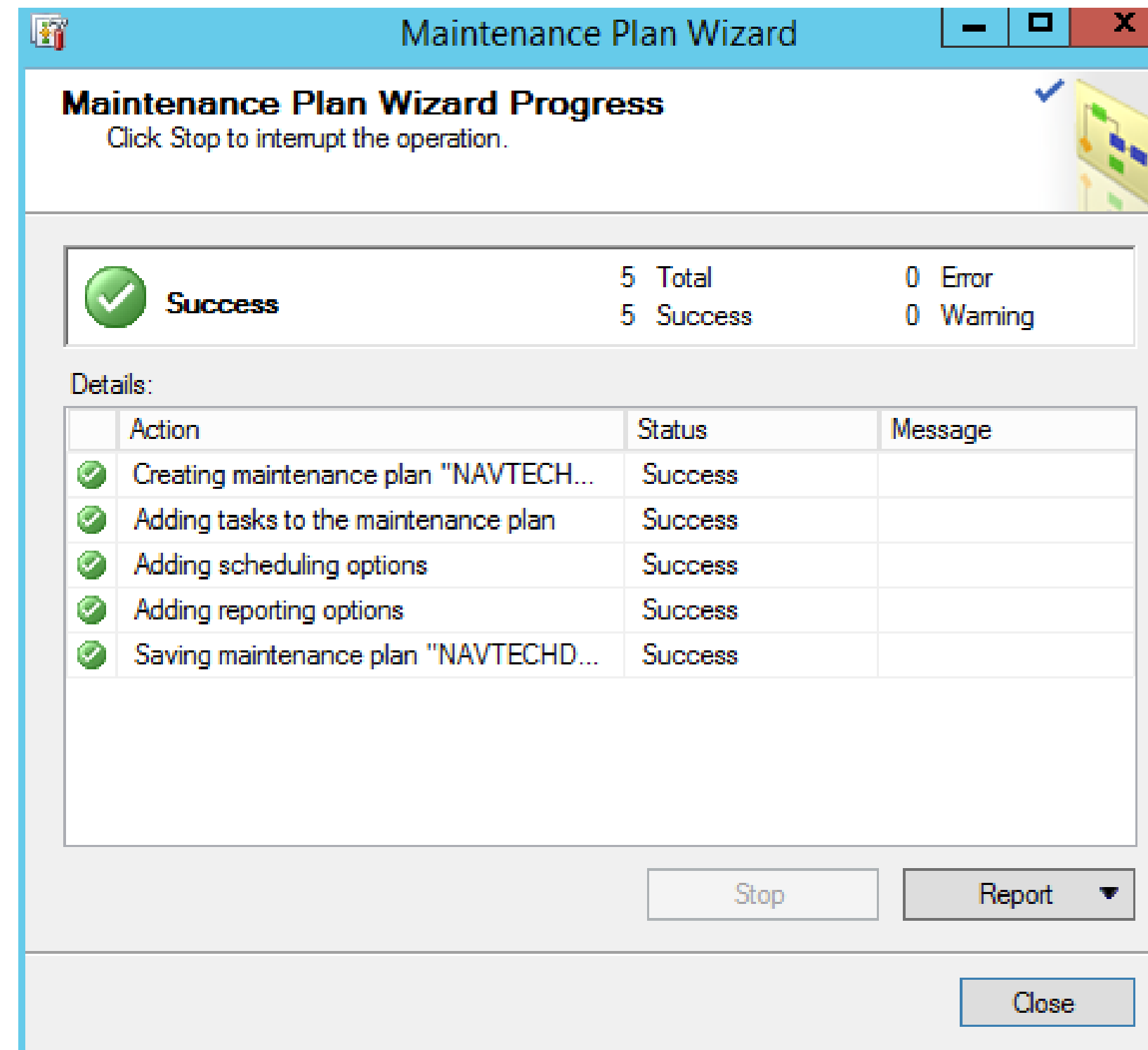
☒ Write a report to a text file

Folder location:  

☐ E-mail report

To:





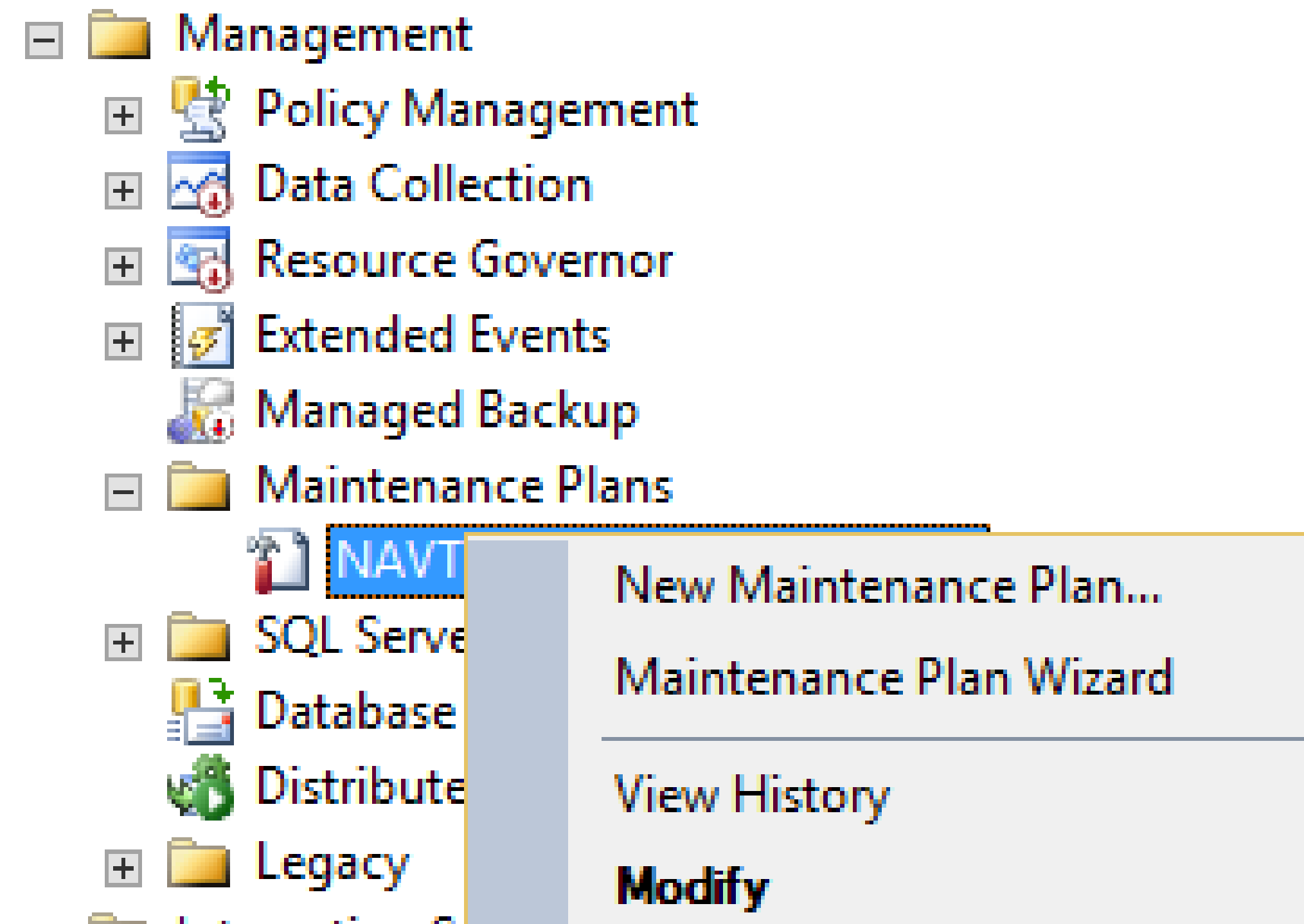
- Management
  - + Policy Management
  - + Data Collection
  - + Resource Governor
  - + Extended Events
  - Managed Backup
  - Maintenance Plans
    - NAVTECHDAYS\_MP\_WIZARD
  - + SQL Server Logs
  - Database Mail
  - Distributed Transaction Coordinator
  - + Legacy
- + Integration Services Catalogs
- SQL Server Agent
  - Jobs
    - NAVTECHDAYS\_MP\_WIZARD.Subplan\_1
    - syspolicy\_purge\_history

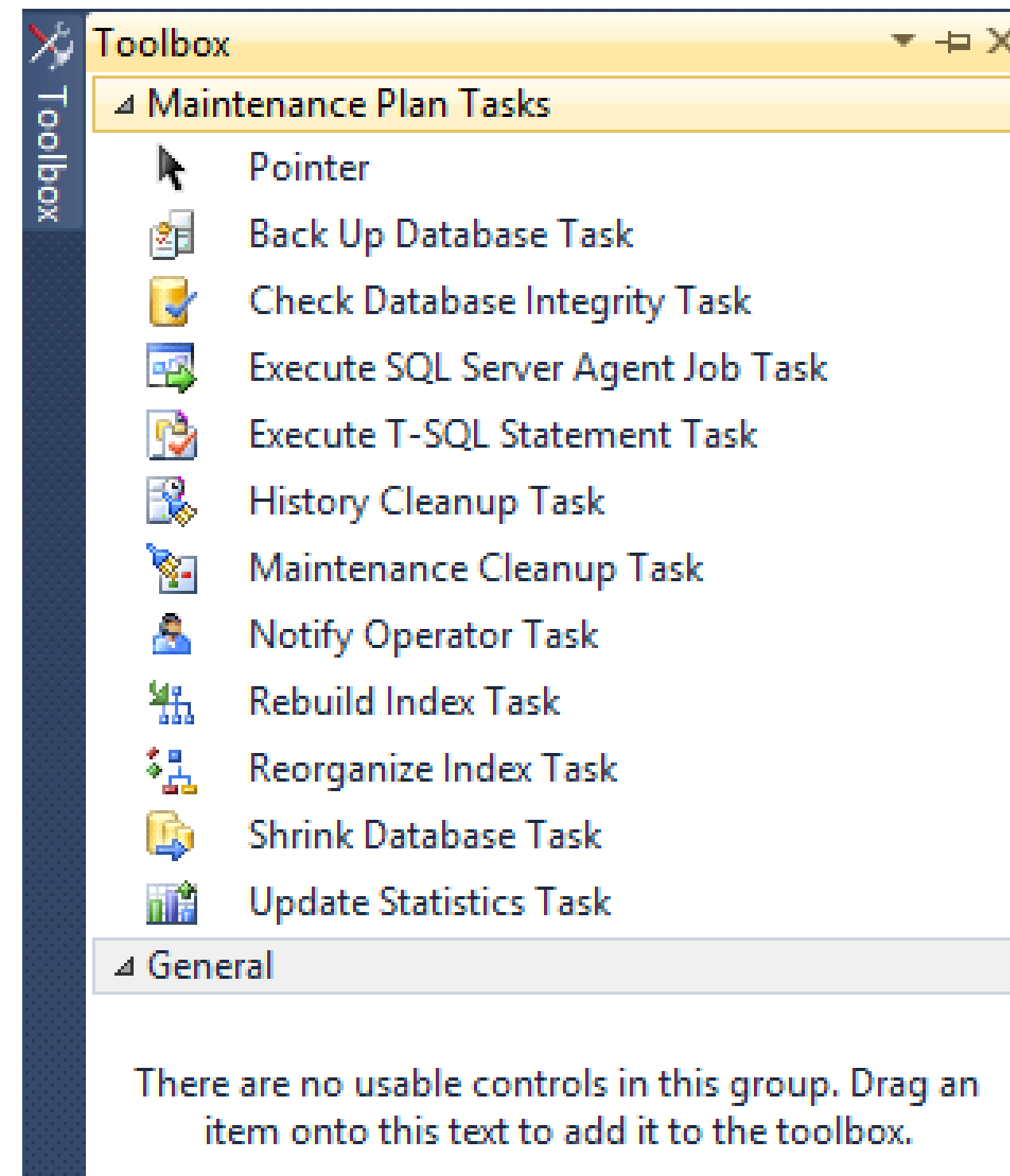


# Maintenance

## Using the plan designer

- We need to add a task to clean up the old TL-backups!





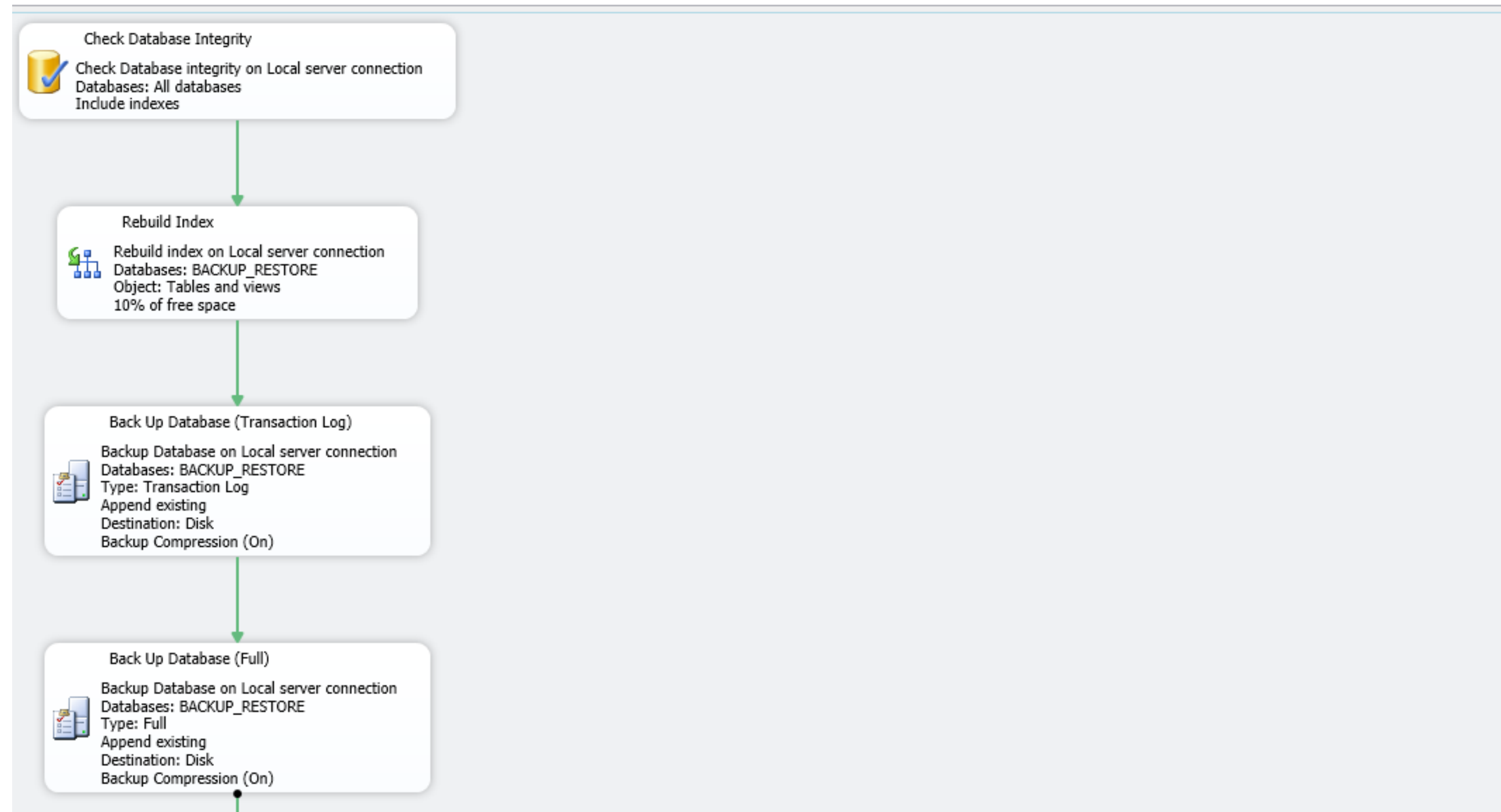
- Execute T-SQL Statement Task does not exist in the Wizard!

Add Subplan | Manage Connections ... | Servers ...

Name: NAVTECHDAYS2014\_MP\_WIZARD

Description:

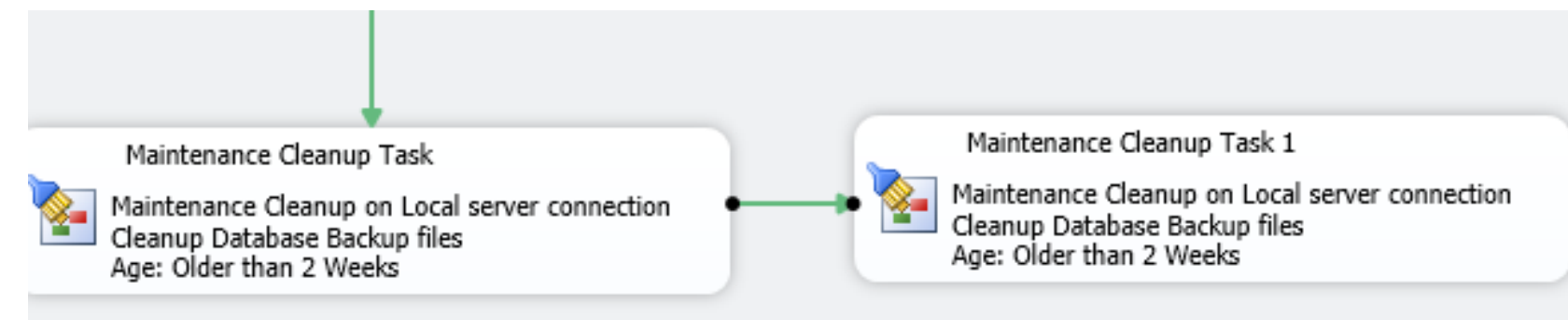
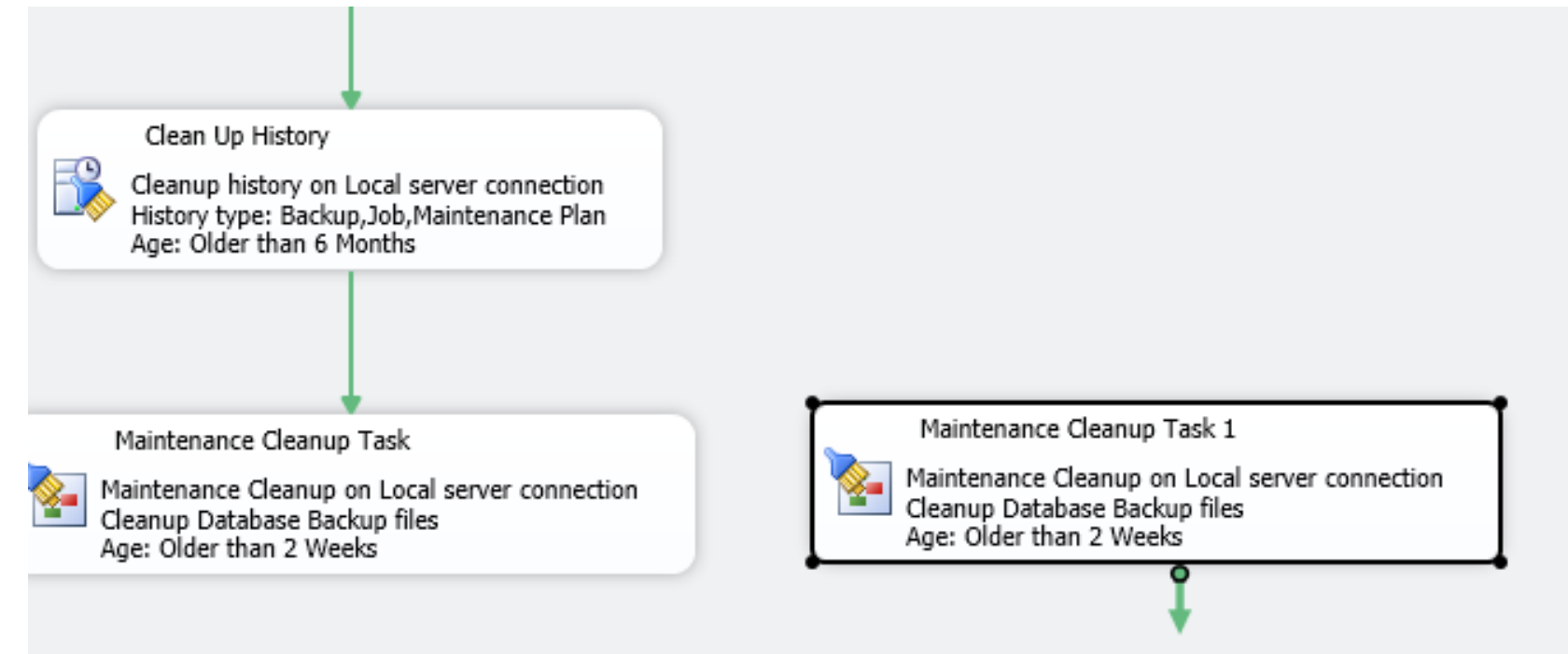
Subplan	Description	Schedule	Run as
Subplan_1		Occurs every day at 22:00:00. Schedule wil...	SQL Server Agent service account





- Lets create a task to clean the transaction log backups (file extension .trn) and put it after the clean up of the .bak files.

The screenshot shows the 'Maintenance Cleanup Task' dialog box. The 'Connection' is set to 'Local server connection'. Under 'Delete files of the following type:', 'Backup files' is selected. Under 'File location:', 'Search folder and delete files based on an extension' is selected. The 'Folder' is 'T:\SQLBACKUP' and the 'File extension' is empty. The 'Include first-level subfolders' checkbox is unchecked. Under 'File age:', 'Delete files based on the age of the file at task run time' is checked. The 'Delete files older than the following:' section shows '2' in the spinner box and 'Week(s)' in the dropdown. At the bottom are buttons for 'OK', 'Cancel', 'View T-SQL', and 'Help'.



Precedence Constraint Editor

A precedence constraint defines the workflow between two executables. The precedence constraint can be based on a combination of the execution results and the evaluation of expressions.

Constraint options

Evaluation operation: Constraint

Value: Success

Expression:  ... Test

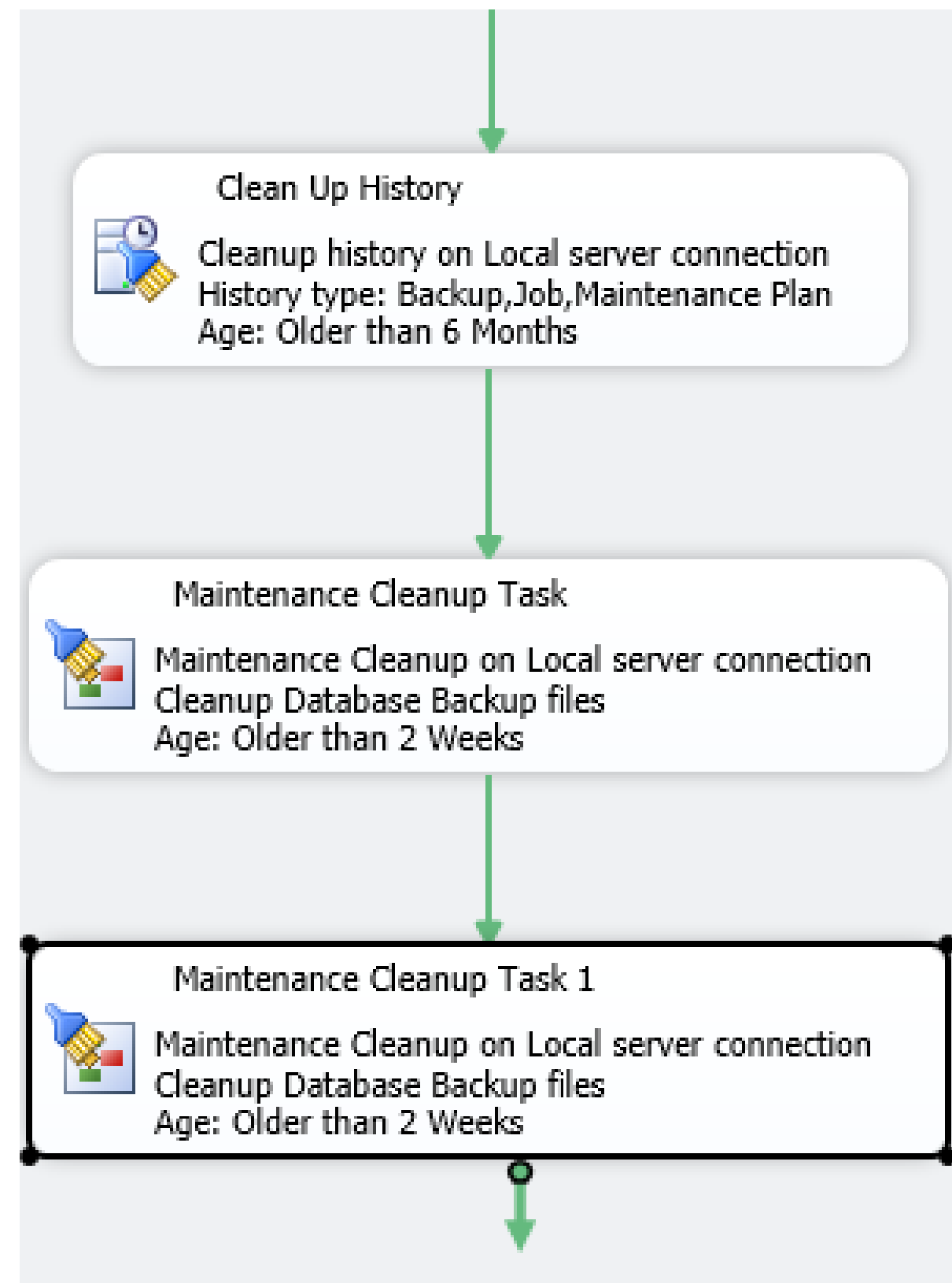
Multiple constraints

If the constrained task has multiple constraints, you can choose how the constraints interoperate to control the execution of the constrained task.

☒ Logical AND. All constraints must evaluate to True

☐ Logical OR. One constraint must evaluate to True

OK Cancel Help





# Maintenance

## Using SQL Server Agent Jobs

New Job

Select a page

- General
- Steps
- Schedules
- Alerts
- Notifications
- Targets

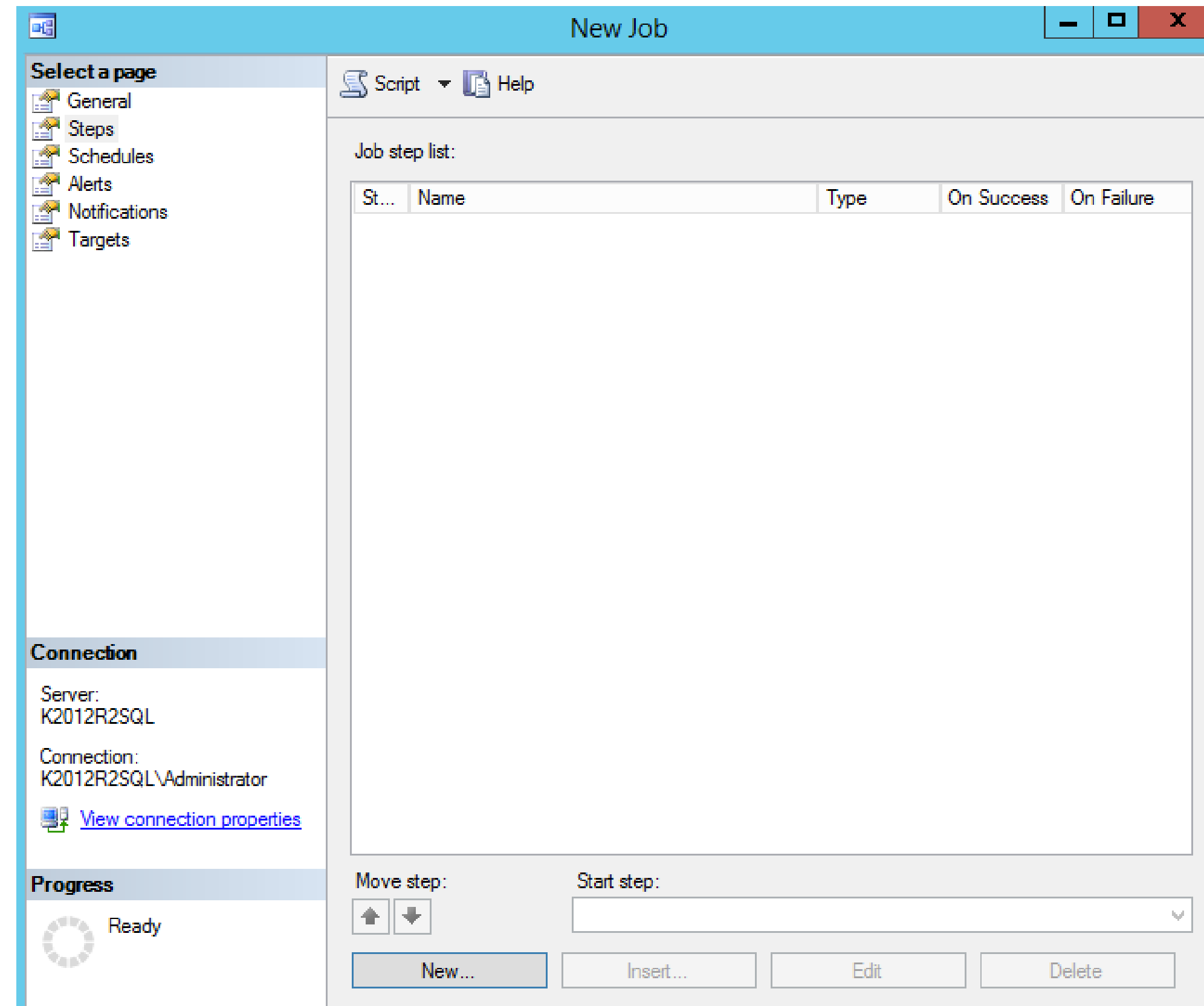
Script Help

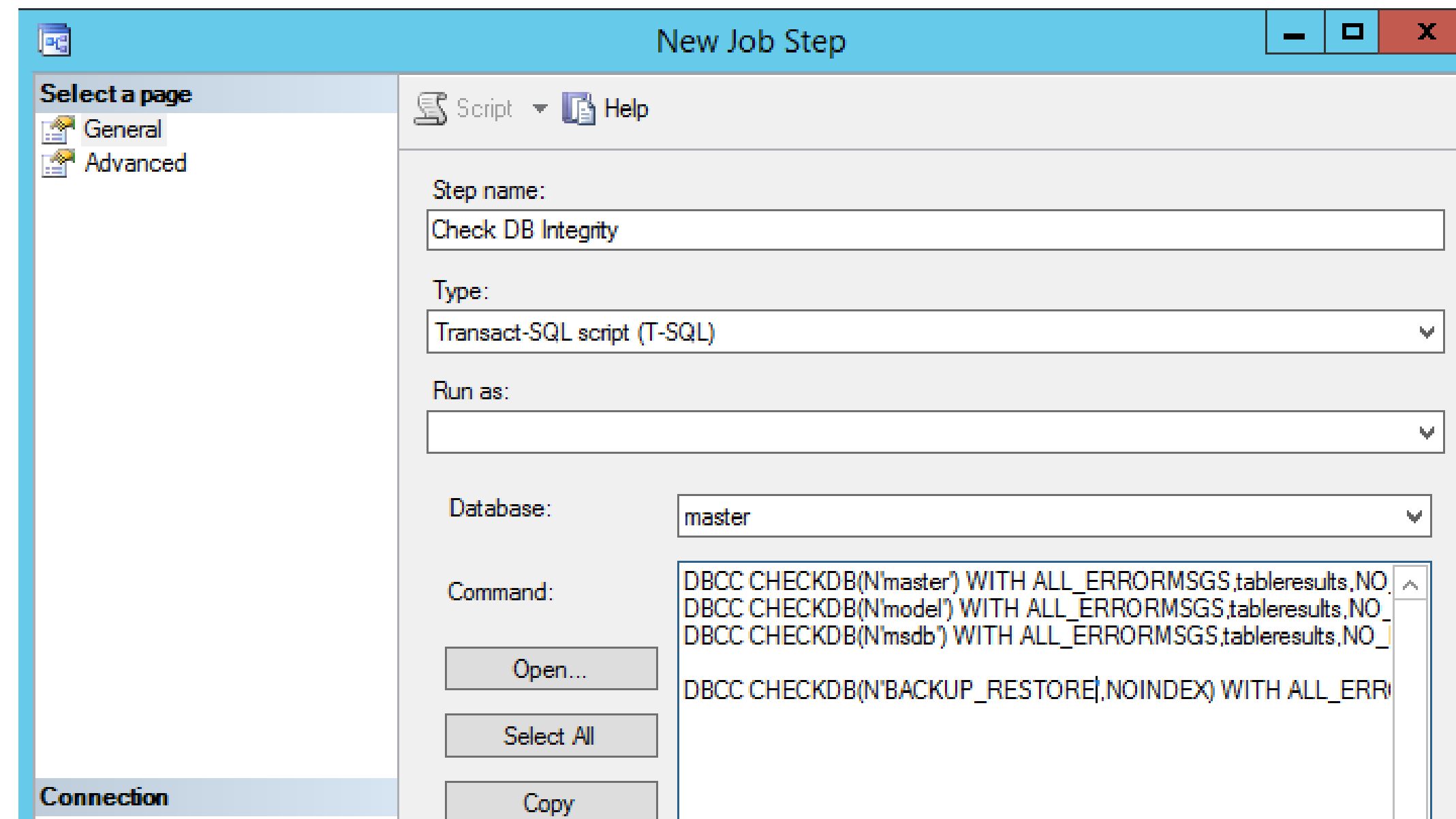
Name: NAVTECHDAYS\_SSA\_JOB

Owner: sa

Category: [Uncategorized (Local)]

Description:





- I don't know about you, but I am already tired of it ...
- Open file "NAVTECHDAYS\_MAINTENANCE.sql" and run it. It will create the maintenance plan.



# THE MAINTENANCE JOB

- Open the maintenance job to change parameters.
- Run the maintenance job to see if it works or has errors.
- With errors? How to fix them? See history of the job.
- SQL Server Agent does not seem to delete the files. Why? Because it has no permissions in that subdir!

# TRANSACTIONLOG BACKUP JOB

- Easiest is to have 1 file per day with all TL-backups of that day in it.
- Open file "NAVTECHDAYS\_TLBACKUP.sql"

# SCHEDULES

- Each schedule has its ID
- You can reuse a schedule if you want, but I recommend not to do it

# 10'S OR 100'S OF DB'S OF A PARTNER

- No need for super performance, but you need disk space
- No need for TL backups : 1 backup each evening should be enough (an extra backup at midday?)
- Compress table/indexes
- Shrink (!) your databases (autoshrink might be valid in this case)
- 1 full backup a week
- 1 diff backup a day



# **JOBS FOR 10'S OR 100'S OF DB'S**

- BETTER FOREACHDB.sql : creates stored procedure in master
- BACKUP\_FULL\_ALL\_DATABASES\_.sql
- BACKUP\_DIFF\_ALL\_DATABASES\_.sql
- dba\_indexDefrag\_sp.sql
- RUN\_dba\_indexDefrag\_sp.sql
- REBUILD\_INDEXES\_WITH\_COMPRESSION.sql

BUT now we CAN have a problem. If a backup fails, we don't know. The script goes on with the other databases like it should.

=> solution : PBM

# Introduction to Policy Based Management

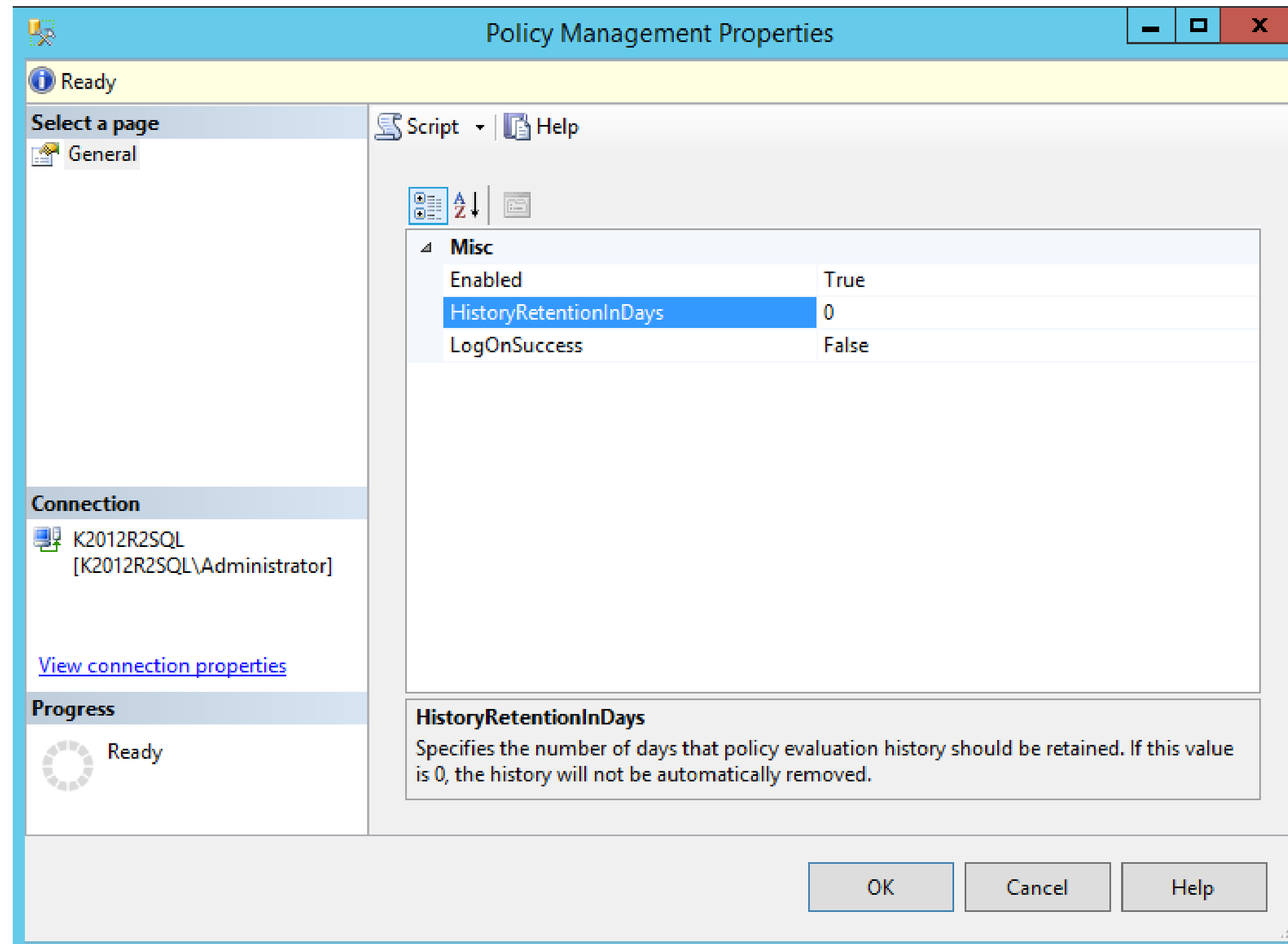
# WHAT IS PBM?

- Policy-Based Management is a system for managing one or more instances of SQL Server. When SQL Server policy administrators use Policy-Based Management, they use SQL Server Management Studio to create policies to manage entities on the server, such as the instance of SQL Server, databases, or other SQL Server objects. (<http://msdn.microsoft.com/en-us/library/bb510667.aspx>)
- Whitepaper : [http://technet.microsoft.com/en-us/library/dd938891\(v=SQL.100\).aspx](http://technet.microsoft.com/en-us/library/dd938891(v=SQL.100).aspx)
- Facets = properties
- Conditions = condition on a certain facet/property or even on some TSQL select or windows check
- Policy = what condition you want to check? On which databases? On which servers?



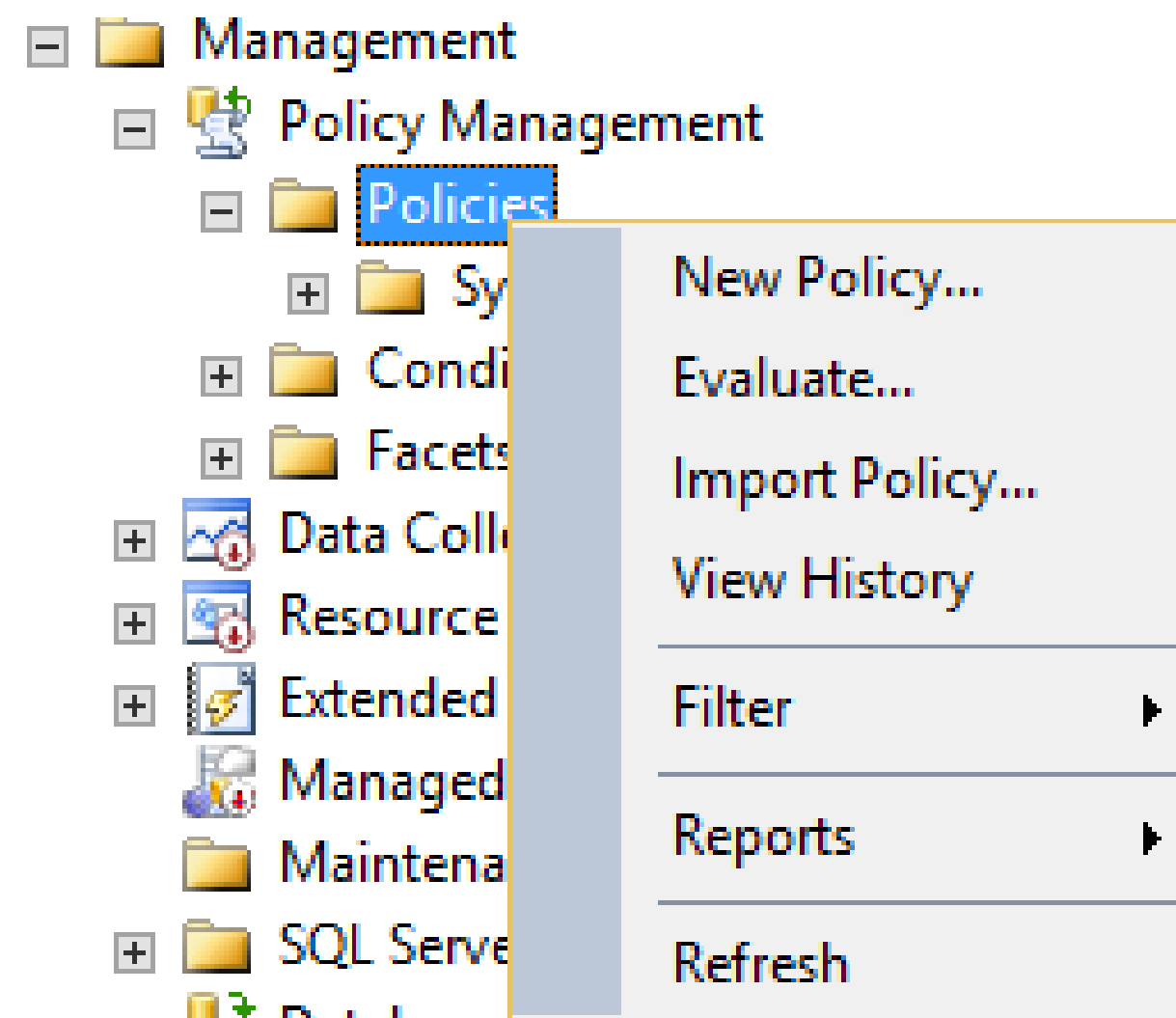
# SOME POLICIES

- All databases must have a recent backup
- All databases must be in simple recovery model
- There must be enough disk space available
- The databases may NOT contain too much unused space
- The transactionlog may NOT contain too much unused space
- The owner of the databases must be sa
- Only sa, ....., ..... must be defined as admin in SQL Server
- There must be enough beer available in the refrigerator



- 3 months should be ok

- Import default policies



- C:\Program Files (x86)\Microsoft SQL Server\120\Tools\Policies\DatabaseEngine\1033
  - Last Successful Backup Date.xml
  - Also on USB-stick

# IF YOU HAVE MULTIPLE SQL SERVERS

- Combine PBM with CMS (Central Management Server)
- CMS : one ~~ring~~ server to control them all.



# SSMS Tricks

# VARIA

- Create yourself a tools DB in which you put all your views, stored procedures, data, .....
- Other scripts : create a library of the ones that might be useful to you
- add "-NOSPLASH" to the SSMS shortcut

# OBJECT EXPLORER

- Tools=>Options
- Menu's
- Registered Servers
- Color code in connection string for registered servers
- Tables/Views => FILTER them
- View => template explorer
- Switch active window : (SHIFT+)CTRL+TAB or (SHIFT+)CTRL+F6
- scripting multiple objects : F7 => select them and script them

# EDITOR

- Copy block of code : alt+mouse or shift+alt+cursor keys (CTRL+C,CTRL+X,DEL)
- Split your editor like in word (splitter control at right upper corner, Windows=>split/remove split)
- FIND:CTRL+F
- Incremental find:CTRL+I : find as you type
- Close editor window : CTRL+F4



# TSQL

- Change database context : CTRL+U
- hide results pane : CTRL+R
- always use ; at the end of a command. Generated TSQL does not have that! Some commands NEED the previous command to end with a ; like the Common table expression "WITH ...".
- Change output to table, to flatfile, ....
- F5 to run a query or run selected code
- refresh intellisense cache: CTRL+SHIFT+R
- select a table, view, stored procedure and hit alt+F1 to get some info
- doubleclick on the error to take you to the offending code
- (un)indenting code : TAB,SHIFT+TAB
- (un)commenting : CTRL+K THEN CTRL+C ; CTRL+K THEN CTRL+U

# MORE TIPS/TRICKS

- <http://blogs.msdn.com/b/billramo/archive/2009/05/15/dat315-session-review-for-ssms-tips-tricks-session.aspx>
- [http://sqlblog.com/blogs/aaron\\_bertrand/archive/2010/01/04/quick-poll-what-is-your-favorite-management-studio-tip-or-trick.aspx](http://sqlblog.com/blogs/aaron_bertrand/archive/2010/01/04/quick-poll-what-is-your-favorite-management-studio-tip-or-trick.aspx)
- <http://www.mssqltips.com/sqlservertip/2413/sql-server-management-studio-keyboard-shortcuts-part-1-of-2/>
- <http://www.mssqltips.com/sqlservertip/2415/ssms-keyboard-shortcuts-part-2-of-2/>
- <https://www.simple-talk.com/sql/sql-training/ssms-the-query-window-keyboard-shortcuts/>
- [http://www.sqlservercentral.com/articles/Management+Studio+\(SSMS\)/75321/](http://www.sqlservercentral.com/articles/Management+Studio+(SSMS)/75321/)
- <http://blog.sqlauthority.com/2012/07/07/sql-server-ctrlshift-shortcut-to-select-code-between-two-parenthesis/>
- <http://www.brentozar.com/archive/2012/11/sql-server-management-studio-more-than-meets-the-eye/>

# Introduction to Extended Events

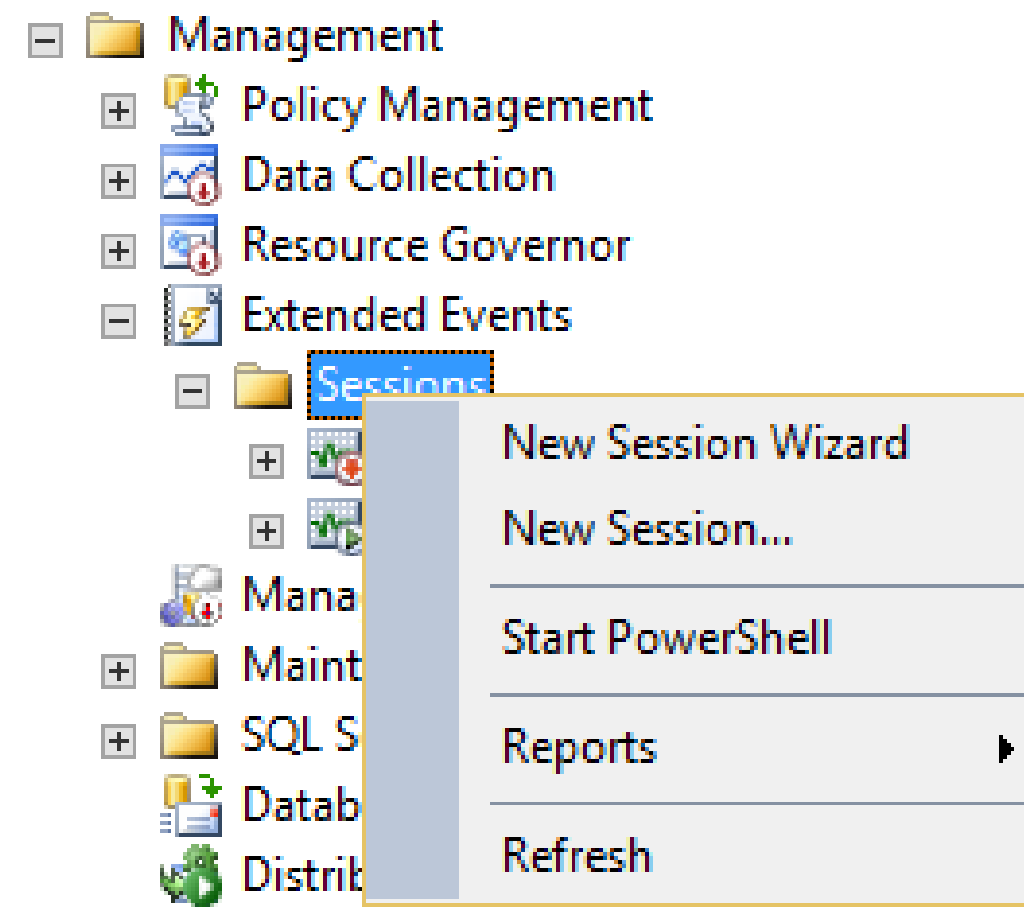
Who knows how to use SQL Server Profiler?

Bad news. It is deprecated. Meaning: in a few versions, it will disappear.



# WHAT ARE EXTENDED EVENTS?

- Exist since SQL 2008
  - ...but only using TSQL commands
- SQL 2012 : finally a GUI
- Lightweight (performance) monitoring system <> SQL Server Profiler
- Inside SSMS



## Set Session Properties

[Introduction](#)

**[Set Session Properties](#)**

[Choose Template](#)

[Select Events To Capture](#)

[Capture Global Fields](#)

[Set Session Event Filters](#)

[Specify Session Data Storage](#)

[Summary](#)

[Create Event Session](#)

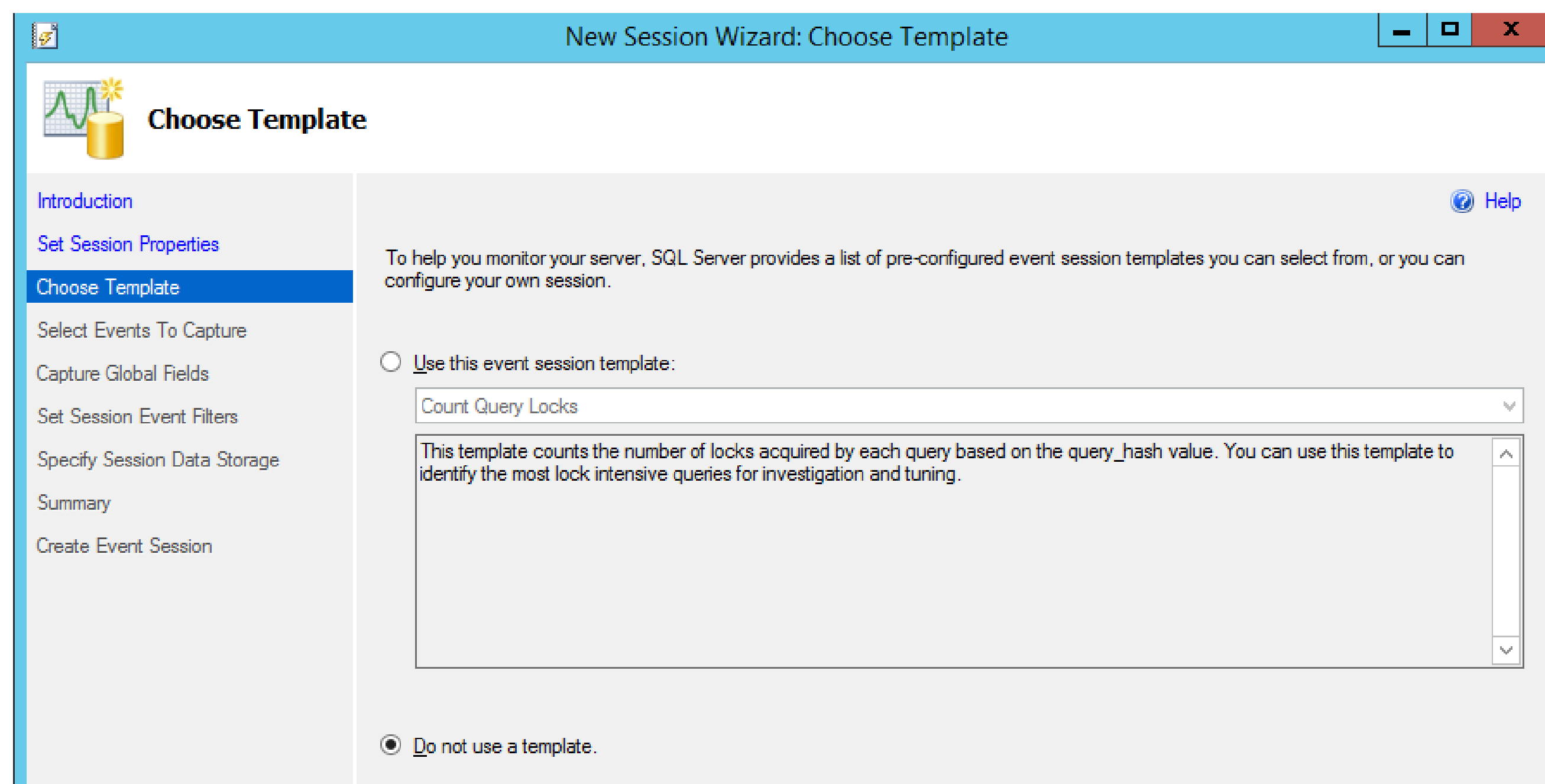
[Help](#)

Enter a name for the event session and the time when you want the session to start.

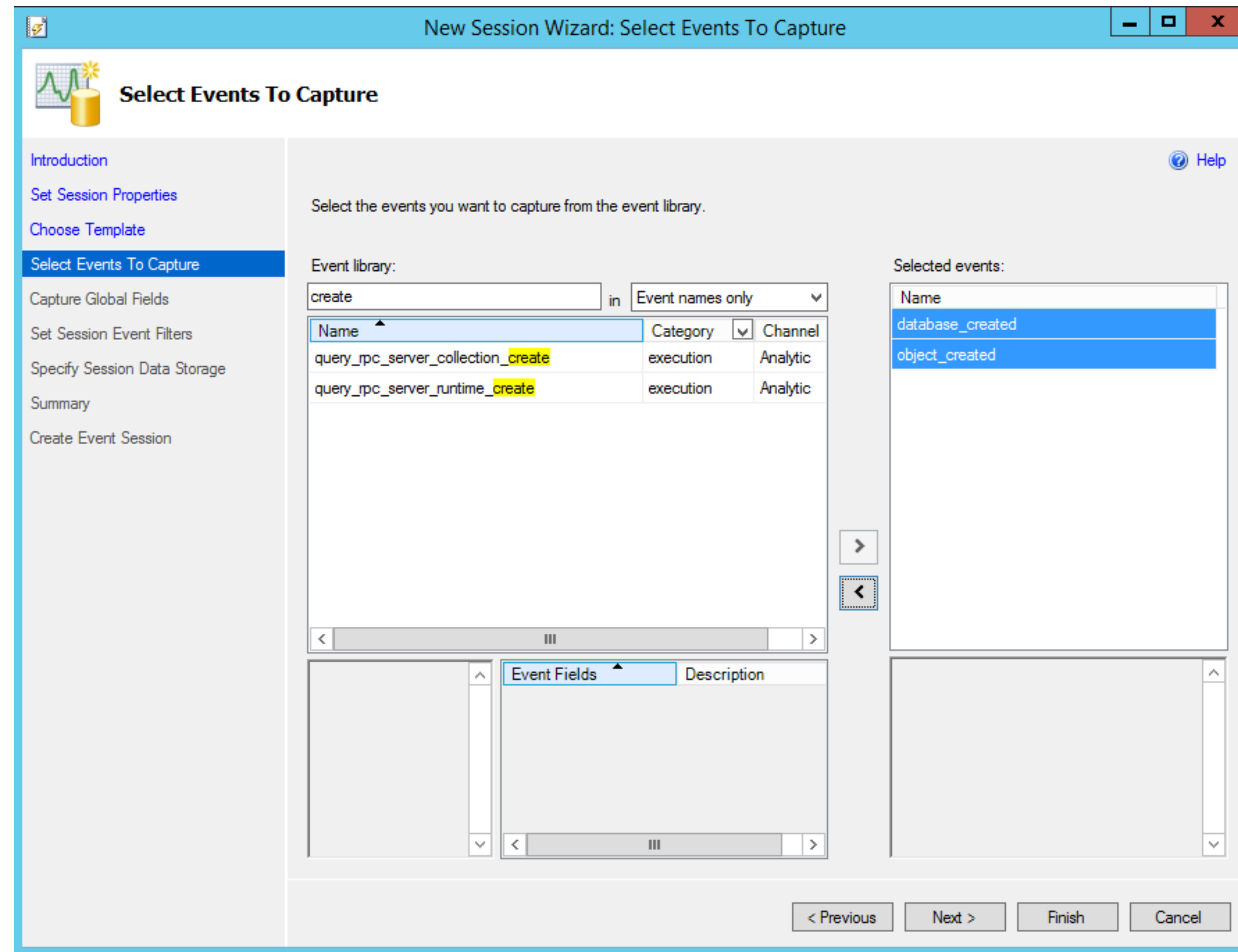
Session name:

Schedule:

☐ Start the event session at server startup.



- Lets check out who creates databases, tables, indexes and when.





New Session Wizard: Capture Global Fields

### Capture Global Fields

Introduction  
Set Session Properties  
Choose Template  
Select Events To Capture  
**Capture Global Fields**  
Set Session Event Filters  
Specify Session Data Storage  
Summary  
Create Event Session

Help

You can capture global fields (also called actions), which are common to all events. Select the global fields you want to capture in this event session.

Name	Description
<input type="checkbox"/> callstack	Collect the current call stack
<input checked="" type="checkbox"/> client_app_name	Collect client application name
<input type="checkbox"/> client_connection_id	Collects the optional identifier provided at connection time by a client
<input checked="" type="checkbox"/> client_hostname	Collect client hostname
<input type="checkbox"/> client_pid	Collect client process ID
<input type="checkbox"/> collect_cpu_cycle_time	Collect the current CPU's cycle count
<input type="checkbox"/> collect_current_thread_id	Collect the current Windows thread ID
<input type="checkbox"/> collect_system_time	Collect the current system time with 100 microsecond precision and interrupt tick resolution
<input type="checkbox"/> context_info	Collect the same value as the CONTEXT_INFO() function
<input type="checkbox"/> cpu_id	Collect current CPU ID
<input type="checkbox"/> database_id	Collect database ID
<input checked="" type="checkbox"/> database_name	Collect current database name
<input type="checkbox"/> event_sequence	Collect event sequence number
<input type="checkbox"/> is_system	Collect whether current session is system
<input type="checkbox"/> last_error	Collects the value of the thread's last Windows error code. This is equivalent to the GetLastError...
<input type="checkbox"/> nt_username	Collect NT username
<input type="checkbox"/> numa_node_id	Collect current NUMA node ID
<input type="checkbox"/> plan_handle	Collect plan handle

< Previous   Next >   Finish   Cancel

New Session Wizard: Capture Global Fields

## Capture Global Fields

Introduction  
Set Session Properties  
Choose Template  
Select Events To Capture  
**Capture Global Fields**  
Set Session Event Filters  
Specify Session Data Storage  
Summary  
Create Event Session

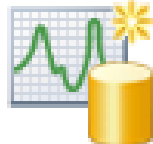
[Help](#)

You can capture global fields (also called actions), which are common to all events. Select the global fields you want to capture in this event session.

Name	Description
<input type="checkbox"/> session_id	Collect session ID
<input type="checkbox"/> session_nt_username	Collect session's NT username
<input type="checkbox"/> session_resource_group_id	Collect current session resource group ID
<input type="checkbox"/> session_resource_pool_id	Collect current session resource pool ID
<input type="checkbox"/> session_server_principal_na...	Collects the name of the Server Principal that originated the session in which the event is bei...
<input checked="" type="checkbox"/> sql_text	Collect SQL text
<input type="checkbox"/> system_thread_id	Collect current system thread ID
<input type="checkbox"/> task_address	Collect current task address
<input type="checkbox"/> task_elapsed_quantum	Collect current task quantum time
<input type="checkbox"/> task_resource_group_id	Collect current task resource group ID
<input type="checkbox"/> task_resource_pool_id	Collect current task resource pool ID
<input type="checkbox"/> task_time	Collect current task execution time
<input type="checkbox"/> transaction_id	Collect transaction ID
<input type="checkbox"/> transaction_sequence	Collect current transaction sequence number
<input type="checkbox"/> tsql_frame	Collect the sql_handle for the current batch with line number, statement offsets and nesting le...
<input type="checkbox"/> tsql_stack	Collect Transact-SQL stack
<input checked="" type="checkbox"/> username	Collect username
<input type="checkbox"/> worker_address	Collect current worker address

< Previous   Next >   Finish   Cancel

New Session Wizard: Specify Session Data Storage

 **Specify Session Data Storage**

Introduction  
Set Session Properties  
Choose Template  
Select Events To Capture  
Capture Global Fields  
Set Session Event Filters  
**Specify Session Data Storage**  
Summary  
Create Event Session

Help

Specify how you want to collect the data for analysis.

☐ Save data to a file for later analysis (event\_file target).  
This is useful for large data sets and creating historical records.

File name on server:  Browse...

Maximum file size:  MB

☐ Enable file rollover

Maximum number of files:

☒ Work with only the most recent data (ring\_buffer target).  
This is useful for smaller data sets or continuous data collection.

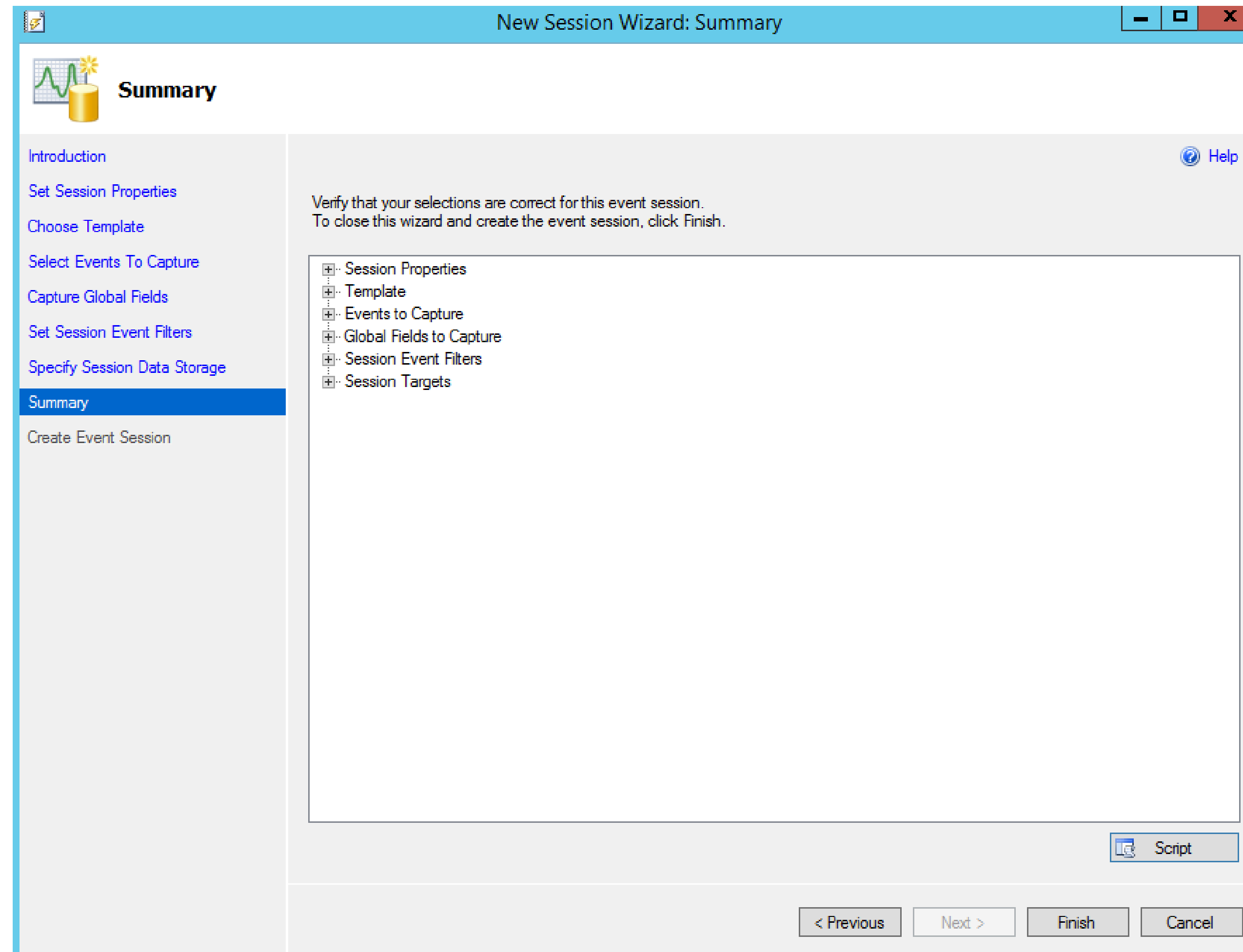
Number of events to keep (0 means unlimited):

Maximum buffer memory size (0 means unlimited):  MB

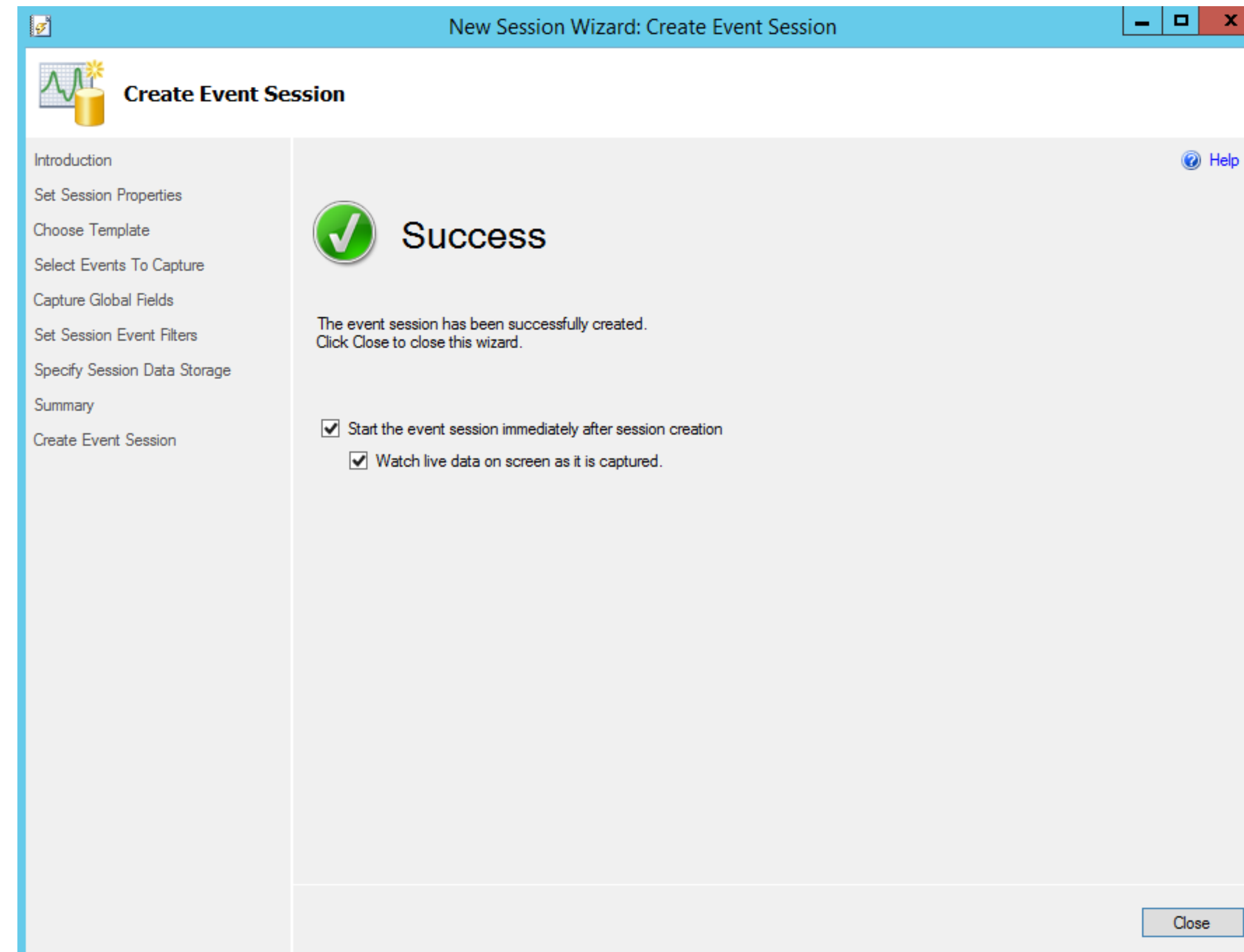
☐ Keep a specified number of events (per type) when the buffer is full.

Number of events to keep (per type):

< Previous   Next >   Finish   Cancel







- CREATE\_EXTENDED\_EVENTS\_SESSION
- Start the event and create a NAV DB

Displaying 167 Events

name	Sort Ascending	
object	Sort Descending	7302030
object	Group by this Column	5006239
database	Calculate Aggregation	5011543
object	Remove this Column	5608721
object	Choose Columns...	6232611
object	Find in this Column...	6375313
object_created		2014-11-11 21:14:19.1252043
object_created		2014-11-11 21:14:19.1256302
object_created		2014-11-11 21:14:19.1313406
object_created		2014-11-11 21:14:19.1473830
object_created		2014-11-11 21:14:19.1478048
object_created		2014-11-11 21:14:19.1570778
object_created		2014-11-11 21:14:19.1579586
object_created		2014-11-11 21:14:19.1603540
object_created		2014-11-11 21:14:19.1614270
object_created		2014-11-11 21:14:19.1623478
object_created		2014-11-11 21:14:19.1623539

Event: object\_created (2014-11-11 21:14:16.7302030)

Details

Field	Value
client_app_name	Microsoft Dynamics NAV Classic client
client_hostname	K2012R2SQL
database_id	10
database_name	
database_name (A...	master
ddl_phase	Begin
index_id	0
object_id	0
object_name	EXTENDED EVENTS01
object_type	DATABASE
related_object_id	0
sql_text	CREATE DATABASE "EXTENDED EVENTS01" ON PRIMARY (NAME="EXTENDED EVENTS01_Data",FILENAME="C:\Program Files\Microsoft SQL Server\MSSQL12.MSSQLSERVER\MSSQL\DATA\...
transaction_id	43354
username	K2012R2SQL\Administrator

# Final

# SOME WEBSITES/BLOGS

Bob Beachemin : <http://www.sqlskills.com/blogs/bobb/>

Brent Ozar : <http://www.brentozar.com/>

Erin Stellato : <http://www.sqlskills.com/blogs/erin/>

Kalen Delaney : [http://sqlblog.com/blogs/kalen\\_delaney/](http://sqlblog.com/blogs/kalen_delaney/)

Kevin Kline : <http://kevinekline.com/>

Kimberly Tripp : <http://www.sqlskills.com/blogs/kimberly/>

Ola Hallengren : <http://ola.hallengren.com/>

Paul Randal : <http://www.sqlskills.com/blogs/paul/>

Sean and Jen : <http://www.midnightdba.com/>



# SOME MORE WEBSITES/BLOGS

<http://itknowledgeexchange.techtarget.com/sql-server/>

<http://sqlperform.com/>

<http://www.idera.com/>

<http://www.quest.com/toad-for-sql-server/>

<http://www.red-gate.com/>

<http://www.sql-server-performance.com/>

<http://www.sqlservercentral.com/>

<http://www.sqlservercentral.com/blogs/>

<http://www.sqlservercentral.com/Articles/Editorial>

<http://www.ssmstoolspack.com/>

<http://www.stryk.info/english/index.html>

# SOME PARTICULAR WEBPAGES

<http://www.brentozar.com/archive/2014/06/sql-server-setup-checklist-free-ebook-download/>

<http://www.mssqltips.com/sqlservertutorial/1/sql-server-backup-options-and-commands/>

<http://www.red-gate.com/community/books/accidental-dba>

<http://www.red-gate.com/community/books/sql-server-backup-and-restore>

<http://www.sqlskills.com/blogs/paul/commonsqlservermyths.pdf>



# Any Questions?



# THANK YOU

WHEN YOU ARE PASSIONATE ABOUT MICROSOFT DYNAMICS NAV | [www.navtechdays.com](http://www.navtechdays.com)





**NAV  
TECH  
DAYS  
2015**

**mibuso.com**

**WHEN YOU ARE PASSIONATE ABOUT MICROSOFT DYNAMICS NAV** | [www.navtechdays.com](http://www.navtechdays.com)

**NAV  
TECH  
DAYS  
2015**

**mibuso.com**