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Introduction

This *Tech Note* describes configuration points for optimizing Microsoft SQL Server performance and management when it is installed on the Galaxy Repository (GR) Node.

Application Versions

- Wonderware Application Server 3.1 SP3 P1 and later
- Microsoft SQL Server 2005 and later

Configuration List

- Anti-Virus Exclusions
- General Settings
- System Database Settings
- Galaxy Database Settings
- Proxy Polling Settings
- Maintenance Plan

Anti-Virus Exclusions

Ensure the Exclusions list includes Windows Temp files.

For example, you want to set up the following (this example uses McAfee):

- In the VirusScan Console, click Task, then On-Access Scanner Properties
- Click All Processes and click the Exclusion tab.
- Click the Exclusions button, then click Add.
- Add the C:\windows\temp\ directory (Figure 1 below)

Other Recommended Exclusions:

file:///Cl/inetpub/wwwroot/t002617/t002617.htm[5/4/2012 1:01:52 PM]

- Program Files\ArchestrA\Framework\Bin\CheckPointer
- Program Files\ArchestrA\Framework\Bin\GalaxyData
- Program Files\ArchestrA\Framework\Bin\GlobalDataCache
- Program Files\ArchestrA\Framework\Bin\Cache
- Documents and Settings\All Users\Application
- Data\ArchestrA (default setting, specified on WinPlatform editor's General page, History Store Forward Directory option)

vhat to exclude	
By name/location (can inclue	de wildcards * or ?):
C:\Windows\Temp\	Browse
Also exclude subfolders	
By file type (can include wild Select	cards * or ?):
By file age:	Minimum age in days:
Modified v	
Eiles protected by Windows	File Protection
Vhen to exclude	
On read	

General Settings

SQL Server Processors

Uncheck Processor **0** – The IDE/aaGR will run best when SQL Server is not using this Processor.

Select a page	🖾 Script 👻 🚺 Help					
Memory Processors Security	Enable processors					
Connections	Processor	Processor Affinity	1/O Affinity	•		
Patabase Settings	CPU0	(m)				
Advanced	CPU1		V			
- Permissions	CPU2			245		
	CPU3		V	-		
	CPU4		V			
	CPU5	v				
	CPU6		V			
	CPU7			-		
Connection	Maximum worker threads:					
Server: IOMLKF0077D	0 🔄					
Connection: CORP\vichl	Use Windows fibers (lightwe	ight pooling)				
View connection properties						
Progress	2					
Ready	Onfigured values	© <u>R</u> unning values				
			ОК	Cancel		

FIGURE 2: UNCHECK CPU "O"

SQL Server Memory Settings

By default, the SQL Server installation will set the RAM utilization to a very large number (2 Terabytes).

- SQL may give memory back to a process if requested.
- It is highly recommended to clamp the SQL Server maximum memory to at least 70% of the maximum available RAM (Figure 3 below).

Select a page	Script - 🖪 Help		
General Memory Processors Security Connections Database Settings Advanced Permissions	Server memory options Use AWE to allocate memory Minimum server memory (in MB): Maximum server memory (in MB): 4096		
Connection	Other memory options Index creation memory (in KB, 0 =	= dynamic memory):	
Server: IOMLKF0077D Connection: CORP\richl	Minimum memory per guery (in Ki	3):	
Progress	-		
Ready	Onfigured values	© <u>R</u> unning values	
			OK Cancel

FIGURE 3: SET MAXIMUM MEMORY USAGE

General SQL Server Database Settings

- Change the Default index fill factor from ${\bf 0}$ to ${\bf 80}.$

Server Properties - IOMLKF00	
Select a page	Script 👻 🚺 Help
Memory Processors Security Connections Database Settings Advanced Permissions	Default index fill factor: 80 Backup and restore Specify how long SQL Server will wait for a new tape. Wait indefinitely If y once Try for Default backup media retention (in days): Image: Compress backup
Connection	Recovery interval (minutes):
Server: IOMLKF0077D	0
Connection: CORP\vichl	Database default locations Data: C:\Program Files (x86)\Microsoft SQL Server\MSSQL10.MSSQLSERVER\M
	Log: C:\Program Files (x86)\Microsoft SQL Server\MSSQL10.MSSQLSERVER\M
Progress	
Ready	<u>C</u> onfigured values <u>Running values</u>
	OK Cancel

FIGURE 4: DATABASE SETTINGS -> DEFAULT INDEX FILL FACTOR

System Database Settings

Master Database Settings

• Verify the configuration of the database files.

Select a page	Script 👻 🚺	Help				
General Files Filegroups Change Tracking Permissions Extended Properties	Database name: Qwner: Que full text i	ndexing	master sa			
	Database files:	Dia Trac	Classica	Initial Case (MD)	A account.	Dette
	Logical Name	Pile Type		Initial Size (MB)	Autogrowth By 200 MB uprestricted arouth	Path
	mastion	Log	Not Apolicable	100	By 200 percent uprestricted growth	C:\Program Files (x86)\Microsoft SQL S
Connection						
IOMLKF0077D						
Connection: CORP\richl						
View connection properties						
Progress						
Ready	•		m			Add <u>R</u> emove
						OK Cancel

FIGURE 5: MASTER AND MASTLOG DB FILE CONFIGURATION SETTINGS

- Modify the database files to minimize fragmentation.
- Change the initial file size to **100MB** for both database and transaction log
- Increase the file growth to a fixed size such as **200MB** (Figure 6 below):

Change Autogrowth for mastlog	×
Enable Autogrowth	
File Growth	
○ In <u>P</u> ercent	10
In <u>Megabytes</u>	200 🖨
Maximum File Size	
Restricted File Growth (MB)	100
Our Content of Cont	
	OK Cancel

FIGURE 6: AUTOGROWTH CONFIGURATION

For example:

- If you have a database that is 50 MB in original size, enabling file growth by 10% will grow the database file increments of 5MB each time. If your resulting database is 400MB, you then have the database file partitioned many times.
- If instead you enable the database growth by size, you will have a resulting database file that is partitioned only 4 times in this case.

TempDB

• Configure the same settings for the **tempdb** (IMPORTANT).

C						
General	Script 🝷 🚺	Help				
Files Filegroups	Database <u>n</u> ame:		tempdb			
Change Tracking	<u>O</u> wner:		sa			(***)
Permissions	🔽 Use full-text i	ndexing				
	Database files:					
	Logical Name	File Type	Filegroup	Initial Size (MB)	Autogrowth	Path
	tempdev	Rows	PRIMARY	200	By 200 MB, unrestricted growth	C:\Program Files (x86)\Microsoft SQL S
	templog	Log	Not Applicable	200	By 200 MB, unrestricted growth	C:\Program Files (x86)\Microsoft SQL S
Connection						
Server: IOMLKF0077D						
Connection: CORP/vichl						
Wew connection properties						
Progress						
Ready	•		m			

FIGURE 7: TEMPDB SETTINGS

- Ensure the Recovery mode is set to Simple.
- (Optional) Move the tempDB path to a different physical hard disk

```
USE master
GO
ALTER DATABASE tempdb
MODIFY FILE (NAME = tempdev, FILENAME = 'D:TempDBtempdb.mdf')
GO
ALTER DATABASE tempdb
```

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Galaxy Database Settings

For your database (Galaxy database, example: PT_Master):

- Configure the initial size to **500MB** for both MDF and LDF.
- Configure the autogrowth to **500MB** for both MDF and LDF. This helps reduce fragmentation.

Change Autogrowth for Galaxy	×
Enable Autogrowth	
File Growth	
In <u>Percent</u>	10
In <u>Megabytes</u>	500 🚔
Maximum File Size	
<u>Restricted File Growth (MB)</u>	100
Unrestricted File Growth	
	OK Cancel

FIGURE 8: AUTOGROWTH SETTING FOR GALAXY DB

General	🖾 Script 👻 🚺	Help				
Files Files Options Change Tracking Permissions Extended Properties Mirroring	Database name: Owner: O Use full-text in Database files:	ndexing	Galaxy CORP\rich	I		
Transaction Log Shipping	Logical Name	File Type	Filegroup	Initial Size (MB)	Autogrowth	Path
	Galaxy	Rows	PRIMARY	500	By 500 MB, unrestricted growth	C:\Program Files (x86)\Microsoft SQL S
	Galaxy_log	Log	Not Applicable	500	By 500 MB, restricted growth to 2	C:\Program Files (x86)\Microsoft SQL S
Connection Server:						
Connection Server: IOMLKF0077D						
Connection Server: IOMLKF0077D Connection: CORP\vichl						
Connection Server: IOMLKF0077D Connection: CORP\vichl						
Connection Server: IOMLKF0077D Connection: CORP\vichl						

FIGURE 9: GALAXY DATABASE AND GALAXY_LOG DB

• Ensure recovery mode is set to **Simple** and stop/restart SQLServer.

Proxy Polling Settings

The following setting determines how often to refresh the IDE Galaxy Tree.

We do not recommend changing unless a big operation is going to occur like importing thousands of objects or migrating. The setting should be file:///Cl/inetpub/wwwroot/t002617/t002617.htm[5/4/2012 1:01:52 PM]

reset when finished, otherwise when you perform operations the tree will not display the correct state, such as Checked in.

• Change the setting in the registry (as follows), to 10 seconds

Windows Registry Editor Version 5.00

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ArchestrA\Framework] "ProxyPollingRate"=dword:00002710 (10000)

• Set it to normal:

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ArchestrA\Framework]
"ProxyPollingRate"=dword:000001f4 (500)
```

Maintenance Plan

Create a Maintenance Plan in the Object explorer under Management. Run this task weekly to keep the database running smoothly.

The following graphics show recommended settings for the SQL Server Maintenance Plan.

🖃 🚞 Management		
🕀 🔮 Policy Managemen	t	
🕀 🖂 Data Collection		
🕀 🔄 Resource Governor		
🖃 🚞 Maintenance Plane		_
👔 Maintenanc	New Maintenance Plan	
🕀 🧰 SQL Server Log:	Maintenance Plan Wizard	
👫 Database Mail 🖓 Distributed Trai	View History	
🕀 🧰 Legacy	Reports	•
SQL Server Agent	Refresh	

FIGURE 10: CREATE MAINTENANCE PLAN

🛐 Maintenance Plan Wizard	
Select Maintenance Tasks Which tasks should this plan perform?	1 des
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 Check Database Integrity task performs internal consistency checks of the index pages within the database.	he data and
<u>H</u> elp < <u>B</u> ack <u>N</u> ext > <u>B</u> inish	Cancel

FIGURE 11: MAINTENANCE PLAN WIZARD: SELECT TASKS

Maintenance Plan Wizard	
Select Maintenance Task Order In which order should these tasks be performed?	· Con
Select the order for the tasks to execute:	
Check Database Integrity Shrink Database Rebuild Index Update Statistics	
Clean Up History Maintenance Cleanup Task	
Move Up	Move Down
The Check Database Integrity task performs internal consistency check index pages within the database.	ks of the data and
Help < Back Next > Enish	Cancel

Figure 12: Maintenance Task Order

j Maintenance Plan Wizard	1	
Define Database Cl Configure the maintenance	heck Integrity Task ætask.	
<u>D</u> atabases:	Specific databases	
✓ Include indexes		

FIGURE 13: SELECT DB FOR MAINTENANCE

Maintenance Plan Wiza	rd		- O X
Define Shrink Dat Configure the maintena	abase Task nce task.		No.
<u>D</u> atabases:	Specific databases		•
Shrink database when i	t grows beyond:	500	МВ
Amount of free space to	re <u>m</u> ain after shrink:	20	%
<u>R</u> etain freed space i	n database files		
Return freed space to the sp	to operating system		
Schedule:			
Not scheduled (On Demand)		<u>C</u> hange
Help	< <u>B</u> ack <u>N</u> ext >	Einish >>	Cancel

FIGURE 14: CONFIGURE SHRINK TASKS

Maintenance Plan V	Vizard	- • • ×
Define Rebuild Configure the maint	Index Task enance task.	
Databases:	Specific databases	
<u>O</u> bject:	Tables and views	•
Selection:		
Free space options		
 Reorganize pages Change free space 	with the default amount of free space e per page percentage to:	. *
Advanced options		
Sort results in tem	pdb	
Eeep index online	while reindexing	
Schedule: Not scheduled (On Dem	and)	<u>C</u> hange
Help	< <u>B</u> ack Next	> Enish >> Cancel

FIGURE 15: CONFIGURE REBUILD INDEX TASK

🛐 Maintenance Plan Wizard		- 0 ×
Define Update Statist Configure the maintenance to	ti cs Task ask.	
Databases:	Specific databases	
<u>O</u> bject:	Tables and views	
Selection:		
Update:		
 All existing statistics 		
Column statistics only		
Index statistics only		
Scan type:		
<u>Full scan</u>		
Sample by	50 🔄 👻	
Schedule:		
Not scheduled (On Demand)		Ghange
Help	< Back Next > Enish >>	Cancel

FIGURE 16: DEFINE UPDATE STATISTICS TASKS

Maintenance Plan Wizard	
Define History Cleanup Task Configure the maintenance task.	· Jan
Select the historical data to delete:	
Backup and restore history	
SQL Server Agent job history	
Maintenance plan history	
Remove historical data older than:	
4	
Schedule:	
Not scheduled (On Demand)	Change
<u>H</u> elp < <u>B</u> ack <u>N</u> ext > Enis	h >> Cancel

FIGURE 17: DEFINE HISTORY CLEANUP TASK

Maintenance Plan Wizard	
Complete the Wizard Verify the choices made in the wizard, and then click Finish.	J.
Click Finish to perform the following actions:	
 Maintenance Plan Wizard Create Maintenance Plan 'MaintenancePlan' Define Database Check Integrity Task Define Shrink Database Task Define Rebuild Index Task Define Update Statistics Task Define History Cleanup Task Define Maintenance Cleanup Task Selected reporting options 	
Help < Back Next > Finish	Cancel

FIGURE 18: COMPLETE TASK DEFININTION

When you complete the Task Definintion, the Maintenance Plan appears in the Jobs folder of the SQL Server Agent (Figure 19 below).



FIGURE 19: SQL SERVER AGENT JOB

1. Right-click the Maintenance Plan and click **Properties**, then **Schedules/New**.

Job Properties - Maintenance	Plan.Subp	lan_1		
Select a page	Script	🔻 📑 Help		
Schedules	edules Schedule <u>list:</u>			
Notifications	ID	Name		Ena
Connection				
Server: IOMLKF0077D				
Connection: CORP\vichl				
View connection properties				
Progress				
Ready		<u>V</u> ew	<u>P</u> ick	

FIGURE 20: CREATE A NEW JOB SCHEDULE

2. Set up the schedule according to your needs.

<u>N</u> ame:	Maintenance Jobs in Schedule
<u>S</u> chedule type:	Recurring
)ne-time occurrence	
<u>D</u> ate:	2/24/2012 ▼ <u>Time</u> : 2:33:10 PM 🛬
Frequency	
O <u>c</u> curs:	Weekly
Recurs every:	1 🗼 week(s) on
	Monday Mednesday Friday Saturday
	Thursday Thursday Sunday
Daily frequency	
Occurs once at:	3:00:00 AM
Occurs every:	1 hour(s) - Starting at: 12:00:00 AM
	Ending at: 11:59:59 PM
Duration	
Start date:	2/24/2012 □▼ ◎ End date: 2/24/2012 □▼
	No end date:
Summary	
Summary Description:	Occurs every week on Sunday at 3:00:00 AM. Schedule will be used starting on 2/24/2012.

FIGURE 21: JOB SCHEDULE CONFIGURATION

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file:///Cl/inetpub/wwwroot/t002617/t002617.htm[5/4/2012 1:01:52 PM]

Back to top

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