



**Backup & Maintenance
(BM)
Jobs**

GRIP ON SOL

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1 Backup & Maintenance Jobs

- **DBBackup**
- **LogBackup**
- **CheckDB**
- **Optimise**
 - **Rebuild Index**
 - **Update Statistics**

The Backup & Maintenance (BM) jobs are needed for continuity, consistency and performance.

Recommended documentation

Doc-Tab	Title
Jobs	Jobs & Queues
Jobs	Schedules
Jobs	QGrip Backup Encryption

Queue

- **BackupMaintenance (BM)**

The jobs are running from the Backup Maintenance (BM) queue.

The BM jobs should be scheduled but can also be triggered manually with a job request.

2 BM Jobs - Priority

When a Job is pushed on the Queue the priority will be determined. When job 'start after' is equal, the job with the highest priority will be picked up first. The Priority is the sum of the JobType priority and the Environment priority.

JobType	Prio- Requested	Prio- Scheduled
LogBackup	100	50
DBBackup	90	40
Optimise	80	30
CheckDB	70	20
Verify	60	10

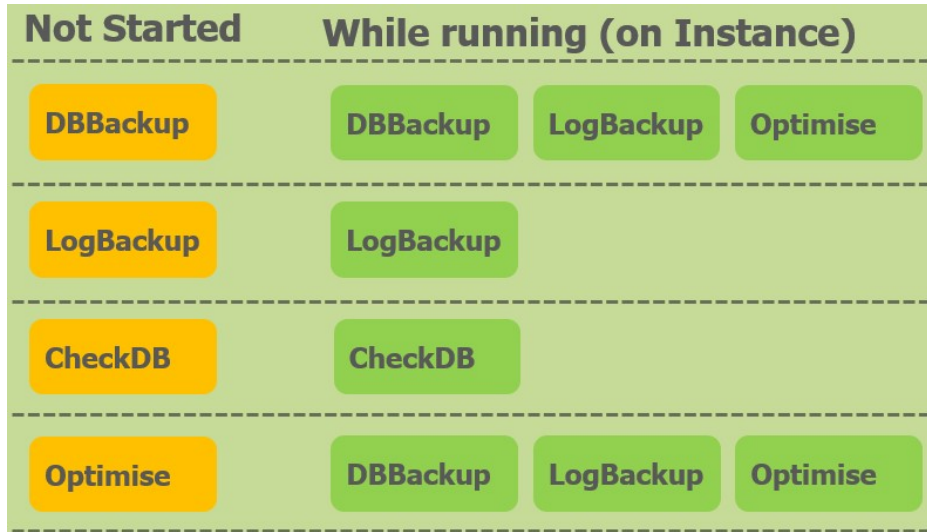
Environment	Prio
Production	6
Integration	5
Acceptance	4
Test	3
UnitTest	2
Develop	1

Examples:

Requested DBBackup Production Database: $90 + 6 = 96$

Scheduled DBBackup Acceptance Instance: $40 + 4 = 44$

3 Parallel Jobs



These rules apply to both scheduled and requested jobs.

All jobs will be prevented from starting if the same job is already running on the Instance.

DBBackup will not start until a running LogBackup or Optimise job has finished.

Optimise will not start until a running DBBackup or LogBackup job has finished.

Sometimes, the Optimise job of a database, runs longer than expected and will prevent the DBBackup from starting. You are advised to schedule the Optimise job *after* the DBBackup, at least in the production environment.

4 Job execution

4.1 Scope

- **Scheduled**
 - Instance
 - + All Databases
- **Requested (User)**
 - Instance
 - + Specific Database

When a job is executed, it is always started on Instance level. The Instance will be locked from other parallel jobs as described in the prior section. If the job is scheduled, it will run on all Databases on the Instance. If the job is requested, it will only run on the database specified in the request.

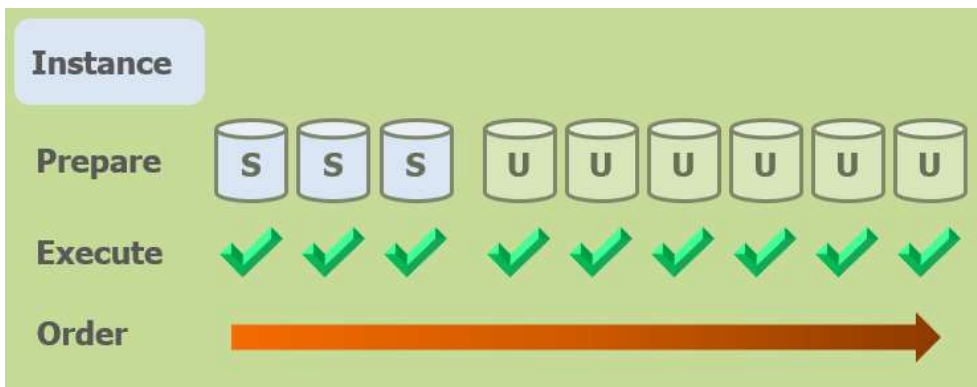
- **Instance Job History**
 - Database Job History
 - Database Job History
 - Database Job History

In the History of the job as you will have both Instance History and Database History.

- **Instance Job History (Optimise Job)**
 - Database Job History
 - Index Job History
 - Index Job History
 - Index Job History

An Optimise job goes even deeper and does also have Index history.

4.2 Scheduled Job

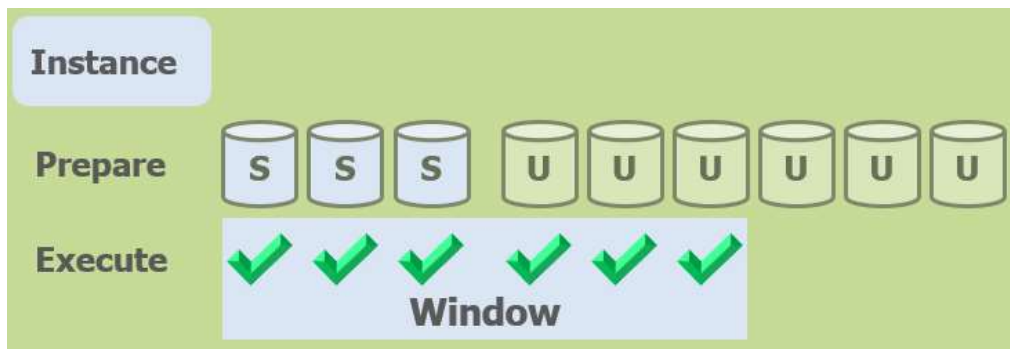


When a scheduled job is executed on an Instance, it will first prepare by lining up the databases. The lining up is alphabetically but the system databases (master, model, msdb) are always first. The job will be executed on the databases, one-by-one.

4.3 Scheduled Job - Pause & Resume

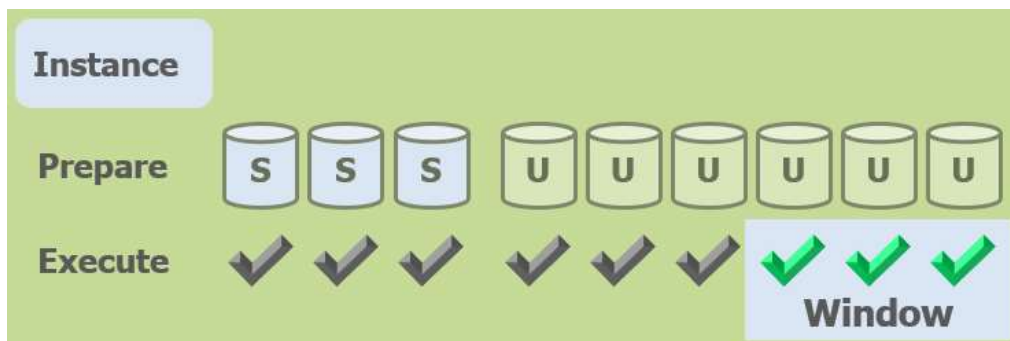
- Only for**
 - CheckDB
 - Optimise

Pause & Resume only applies to the CheckDB and Optimise jobs. All other jobs will always finish for all databases.



Pause

After lining up the database, QGrip will execute the job on the databases one-by-one. Before starting the database job, QGrip will check if the current time is still within the defined window (Start-End). If not, the job will be paused until the next window start (next day).



Resume

Then the job is Resumed, QGrip will start processing the still to do databases. When the job is completely finished, it will be rescheduled using the *initial* Run After Date.

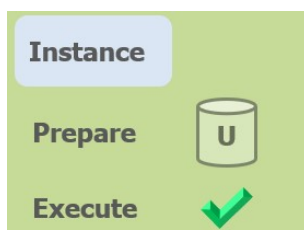
Note

Once QGrip has started a job on a database, the job will always finish. If large databases and/or indexes causes problems, they can be excluded from the job as described in a section below.

4.4 Requested Job

- **Specific Database**
- **Window irrelevant**
- **Excluded irrelevant**

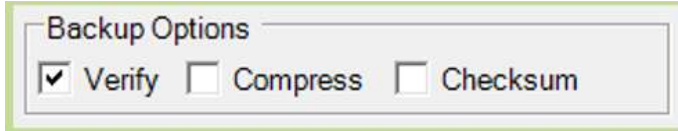
A requested job is for a specific database and the Window is irrelevant. Even if a database has been Excluded from a certain job type, the job can still be triggered with a request.



When a requested job is executed on an Instance, only the specific database will be lined up and the job executed on it.

5 Job Definition

5.1 Backup Options



For both DBBackup and LogBackup, options can be enabled.

Verify Backup

This option will verify the backup. To prevent that the backup jobs are being delayed, a separate Verify-Backup job will be pushed on the queue with low priority when the backup job has finished at Instance level. The Delete Backup files job keeps track of Backup files that still need to be verified to ensure that needed backup files are not deleted.

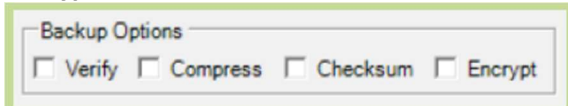
Compress

SQL Server compresses the file before it is written to disk. This does increase CPU usage but normally shortens the backup time as less needs to be written to disk.

Checksum

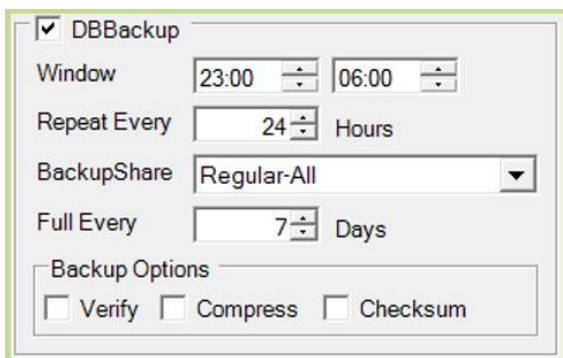
Checksum value is recorded into each page of the backup file. This does slow down the backup significantly.

Encrypt



If QGrip Backup Encryption has been enabled, you will also see the Backup Option 'Encrypt'. Encryption is only applicable for SQL Server 2014 and will automatically be hidden for lower versions.

5.2 DBBackup



Definition Scheduled DBBackup jobs

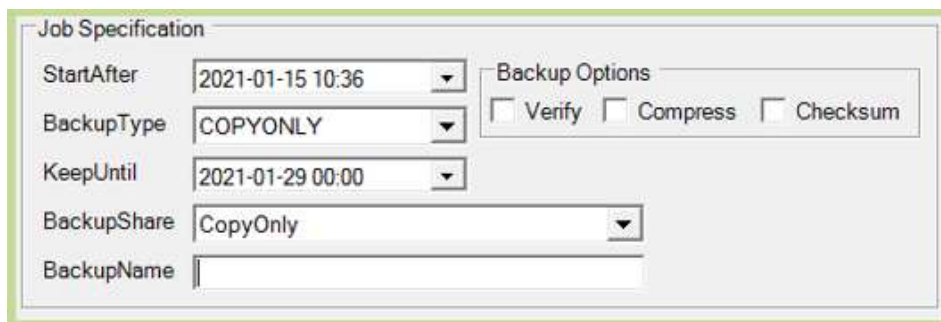
DBBackup can be either a Diff (Differential) or Full but the default is Diff. QGrip will decide when a Full backup should be made. DBBackup of databases on an Always On cluster is always Full_CopyOnly.

The master database will always be backup with a Full backup.

Backup Types

Backup Type	Used when
Diff	This is the default
Full	- No Full Backup yet - Scheduled (Full every x days) - Last Diff > 10 minutes and > 70 % of Full backup
Full_CopyOnly	Always On Cluster

5.2.1 Requested DBBackup



When manually requesting DBBackup, additional backup types are available:

- **Archive**
- **CopyOnly**
- **BaseLine**

All types initiate full copy only backups but with a different label/purpose. Additional input:

- Keep Until date (when can the file be deleted)
- Backup Share (separate share is needed for these backups)
- Backup Name (optional)

5.2.2 Distribution of Full/Diff DBBackup

For larger databases, the FULL backup will put more pressure on network, instance and backup share. If FULL backups run for all Databases on all Instance on the same weekday, the DBBackups will take much longer. Ideally, the FULL and DIFF backups are spread over the weekdays giving an even load throughout the week. When you activate DBBackup schedule for a new Instance, a FULL backup will be made of all its Databases. Mostly, this will even out with time but you can influence it.

Schedule activation

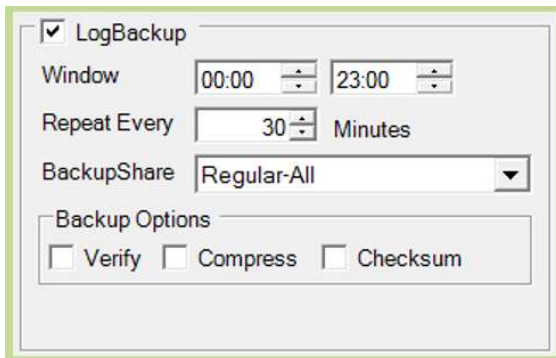
Do not activate the DBBackup schedule for all new Instances on the same weekday but spread it out over the week.

Force Full next run

You can change the FULL backup day of Instances by using Bulk Edit: Instance-Schedule

You can change the FULL backup day of Instance and/or Database by using Default Backup Types.

5.3 LogBackup



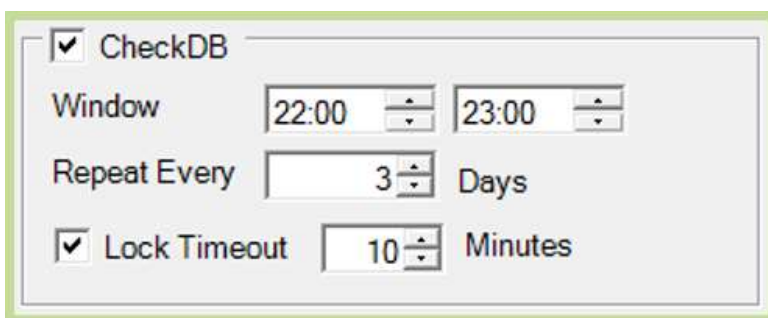
Definition Scheduled LogBackup jobs

LogBackup is only made of Databases with Recovery Model Full or Bulk-logged. Before a LogBackup is made, a check will be done to verify that there is a Full backup of the Database. If that is not the case, the LogBackup will be skipped in this run but a request for a Full backup will automatically be requested.

Backup Types

Backup Type	Used when
Tran	This is the default
Full	If no full backup is yet available, the database will be skipped for LogBackup and a DBBackup-Full will automatically be requested by QGrip.
Full_CopyOnly	Always on Cluster If no Full_CopyOnly backup is yet available, the database will be skipped for LogBackup and a DBBackup-Full_CopyOnly will automatically be requested by QGrip.

5.4 CheckDB



Lock Timeout – Max wait-time when locked

The standard SQL Server DBCC CHECKDB with all error messages is used. The output of a Check DB job is stored as a binary file in the QGrip database.

5.5 Optimise

Option	Parameter	Description
RebuildIndex		Rebuild index or not
	Frag %	Fragmentation percentage, default 30
	Min Pages	Minimal number of pages, default 1000
	Max Pages	Maximum number of pages, unlimited = (-1)
	Sort in Tempdb	Default, in memory
Update Stats		Update Statistics of not
	Mod %	Modification Percentage, default 30
	Sample %	Sample percentage, default 30
	Level	Index, Columns of Index+Columns
At partition level		
Lock Timeout		Max wait-time when locked

6 Always On - Jobs

- **DBBackup & LogBackup**
 - Preferred Replica
- **CheckDB**
 - All Replicas, per Instance
- **Optimise**
 - Primary Replica

In an Always On cluster, the DBBackup and LogBackup will run on the Preferred Replica as defined in the availability group of the database. CheckDB can run on all Replicas and run per Instance. The Optimise job will only run on the Primary Replica.

7 Default DBBackup – Full

Force Full Backup of Database

- Always (Until rule is removed)
- NextRun (Just for next Run)

QGrip offers functionality to overrule the default differential backup with a Full backup. The rule for Full backup of a database (or all databases on an Instance) can be set permanently (Always) or just for the Next Run.

The master database will always be backup with a Full backup by default and cannot be added. Databases in an Always On cluster cannot be forced to Full backup.

8 Exclude Job & Index

QGrip offers functionality to exclude databases from scheduled jobs. It is also possible to exclude indexes from the optimise job.

8.1 Exclude Database Job

Excluding a database from a job, it is only excluded for the Scheduled job. The job can still be triggered for the database by Requesting the job manually.



A database can be excluded from one or more scheduled jobs.

Exclude Jobs

DBBackup LogBackup

CheckDB Optimise

By excluding DBBackup, the LogBackup will also be excluded.



Databases in an Always On cluster must be excluded on each Replica separately. Except for the CheckDB job, make sure that this really is what you want.

8.2 Exclude Optimise Index



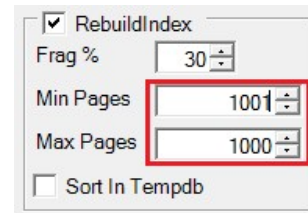
By excluding an Index from rebuild in the optimise job, it is always excluded; scheduled and requested.



When Excluding indexes in a database in an Always On cluster, the index will be Excluded during the optimise job on all replicas.

To determine which Indexes need rebuild is an expensive action. To avoid that you need to collect indexes for exclusion, QGrip collects information about all indexes during the Optimise job. If you suspect that there are indexes that are too large for rebuild and should be excluded, you should do the following:

1. The first time you run the Optimise job, set Min Pages > Max Pages
2. QGrip will collect information about the Indexes but no rebuild will take place
3. Exclude the indexes that are too large for rebuild.
4. Change the Rebuild index parameters (Min/Max Pages).



9 Retry Action - Failed Job

If a Backup & Maintenance job fails, QGrip will try to correct the error by requesting a “Retry” job within x minutes. Retry actions have been initially defined for the Errors/Job Types listed below. You can edit, delete and add new retry actions using the QGrip-UI:

- Admin -> Jobs -> Retry Action - Failed Job

Part of Error Message	JobType	Retry-JobType	Start
no current database backup	LogBackup-TRAN	DBBackup-FULL	Immediate
current database backup does not exist	DBBackup-DIFF	DBBackup-FULL	Immediate
The backup or restore was aborted	DBBackup-DIFF	DBBackup-DIFF	wait 60 min
The backup or restore was aborted	DBBackup-FULL	DBBackup-FULL	wait 60 min

Retry failed jobs Always On

Part of Error Message	JobType	Retry-JobType	Start
The backup or restore was aborted	DBBackup-FULL_COPYONLY	DBBackup-FULL_COPYONLY	wait 60 min
Instance is no longer preferred replica	DBBackup-FULL_COPYONLY	DBBackup-FULL_COPYONLY	wait 15 min

In the Error message of the originally failed jobs, the following prefix will be show if a RETRY attempt has been made:

RETRY with DBBackup-FULL Start Immediate, for ERROR: [Original Error Message]

RETRY with DBBackup-FULL Start after 60 minutes, for ERROR: [Original Error Message]