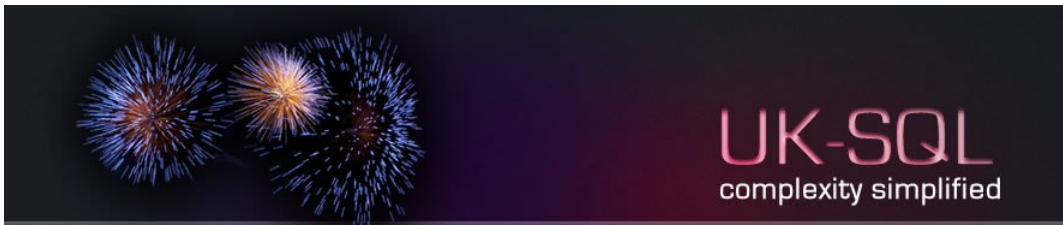


UK-SQL MIRRORING – AN INTRODUCTION

SQL SERVER MIRRORING INFORMATION TEMPLATE

27 April 2010





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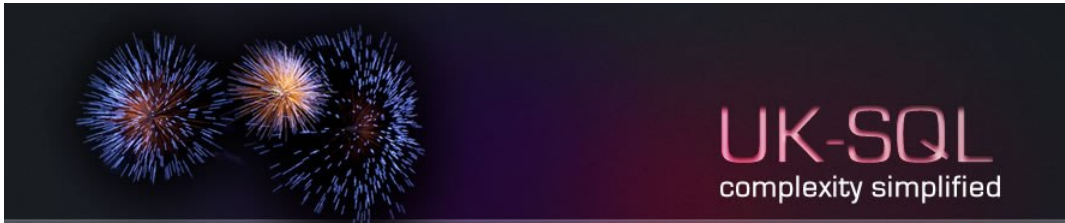
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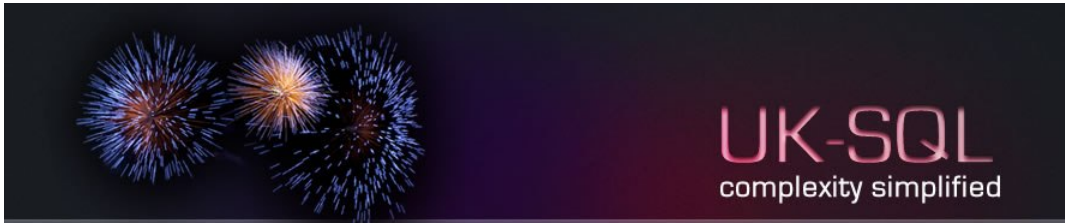
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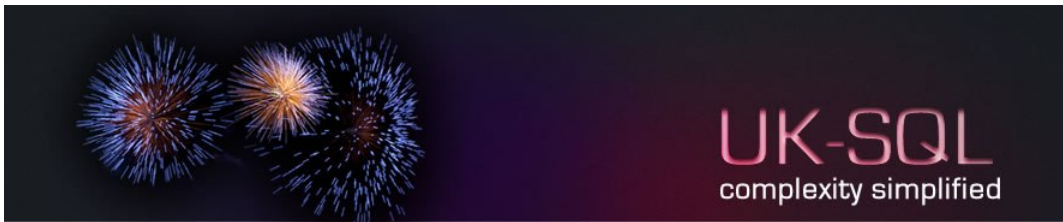
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1 Mirroring Overview

This document outlines the core framework and necessary database commands involved with creating SQL Server Database Mirroring. Mirroring is only available in SQL Server 2005 and SQL Server 2008.

1.1 Introduction

Database mirroring is a high availability solution at the database level and is split across 2 instances (3 if incorporating a witness) the principal and the mirror were only one partner in the mirroring configuration can perform the principal role at any one time. Database mirroring works by maintaining 2 copies of a single database. The transaction log activity on the principal database is sent over a mirroring session to the log on the mirror database. A failover between principal and mirror or mirror and principal is known as role reversal or role switching.

1.2 Guidelines

System databases **cannot** be mirrored.

All instances that are configured in a database mirroring configuration as either principal or mirror both **must** be either SQL Server 2005 or SQL Server 2008 Enterprise/Evaluation/Developer/Standard Edition(s).

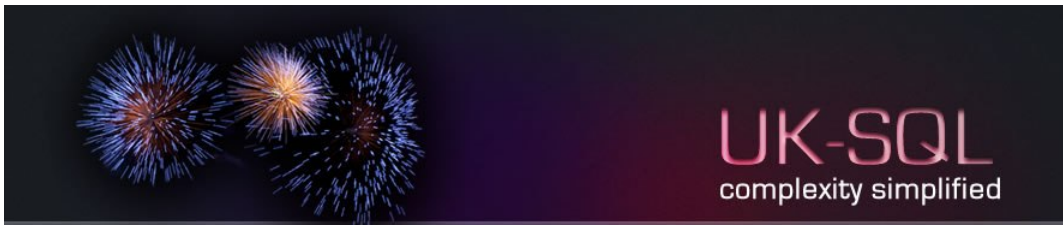
All SQL Server editions **must** be at a minimum of Service Pack Level 2.

The witness instance **can** be a Free Edition (SQL Server Express).

```
--On the instance  
Select @@version
```

All databases participating in mirroring **must** be at compatibility level 90 or above **and** use the full recovery model.

```
--On the instance  
select ltrim(upper(name)),  
       cast(DATABASEPROPERTYEX (name, 'Recovery') as  
varchar(200)) as model,  
       cmptlevel as compatibility_level  
from master .. sysdatabases with (nolock)
```

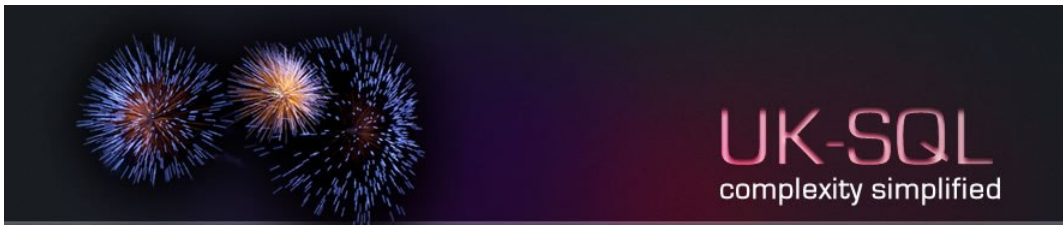


2 Mirroring Connections

2.1 Endpoints

An endpoint is a SQL Server object that enables SQL Server to communicate over the network. For database mirroring, a server instance requires a dedicated database mirroring endpoint and is used exclusively to receive database mirroring connections from other server instances.

The security surrounding an endpoint is either a dedicated windows domain user, a windows administrative user, certification or the sa.



3 Mirroring Operating Modes

Transaction safety is the attribute that controls the operating mode of a SQL Server Database mirroring session.

By default, the level of transaction safety is set to on, **full**.

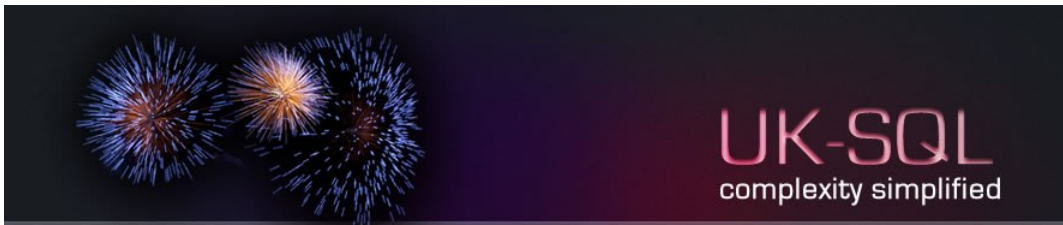
3.1 Asynchronous

When mirroring transaction safety is set to **off** the database mirroring session operates **asynchronously** supporting a single operating mode of high-performance.

```
--On the principal server
use mirrorMe
go
alter database mirrorMe set partner safety off
```

This mode enhances performance at the expense of high availability. High performance mode uses just the principal and mirror servers, no witness, and supports only one form of role switching/role reversal, **forced service**. **Forced service allows possible data loss**. Forcing service is done on the mirror server and is similar to removing mirroring and recovering the former principal.

```
--On the mirror server
use mirrorMe
go
alter database mirrorMe set partner
force_service_allow_data_loss
```



3.2 Synchronous

When transaction safety is set to **full** on the principal server then the database mirroring session operates synchronously. As long as this communications channel is open the logs on the principal and mirror can be hardened and remain synchronised.

```
--On the principal server
use mirrorMe
go
alter database mirrorMe set partner safety full
```

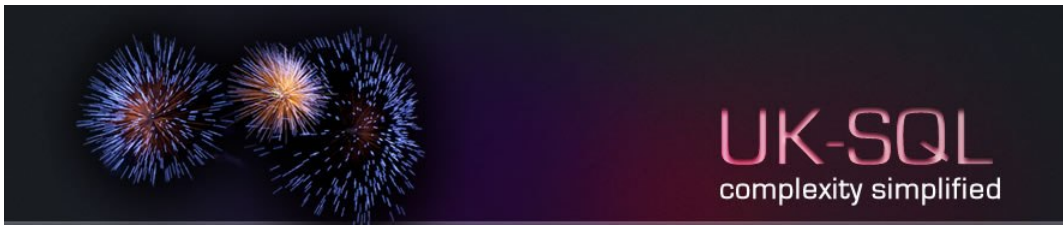
During synchronous mirroring operations a database mirroring session runs in either **high availability** or **high protection** mode depending on the presence of a third server, called a **witness**.

If a witness is used, synchronous sessions run in high-availability mode, and the session supports both automatic and manual failover.

```
alter database mirrorMe set partner failover;
go
```

If a witness is not used, synchronous sessions run in high-protection mode. When the partners are connected, manual failover is supported. If the principal server is lost, service can be forced to the mirror server (with possible data loss if the tail of the transaction log cannot be recovered).

```
--On the mirror server
use mirrorMe
go
alter database mirrorMe set partner
force_service_allow_data_loss
```



4 Mirroring Administration

This section highlights the **main** commands used for managing database mirroring. There may be additional requirements around each command however the core administrative commands are listed below.

4.1 Manual Failover

On the current principal issue the following statement. This statement should only be issued if the mirror is synchronised.

```
alter database mirrorMe set partner failover;  
go
```

4.2 Suspension

On the current principal issue the following statement. This statement is generally use to improve performance bottlenecks.

```
use mirrorMe  
go  
alter database mirrorMe set partner suspend;  
go
```

4.3 Resumption

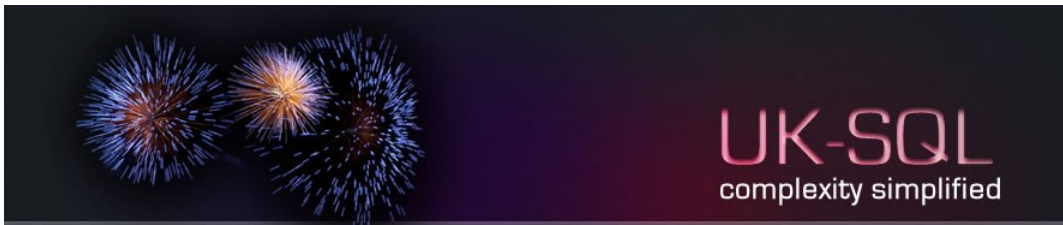
On the current principal issue the following statement. This statement simply resumes mirroring following suspension.

```
use mirrorMe  
go  
alter database mirrorMe set partner resume;  
go
```

4.4 Forced Service

On the current mirror issue the following statement. This statement **will** lose in flight transactions and the tail of the current principal log

```
use mirrorMe  
go  
alter database mirrorMe set partner  
force_service_allow_data_loss;  
go
```



4.5 Remove Mirroring

On either partner issue the following statement. After removing mirroring to resume all outstanding log backups must be applied to the current mirror.

```
alter database mirrorMe set partner off;  
go  
--or  
restore database mirrorMe with recovery;  
go
```

4.6 Remove Witness

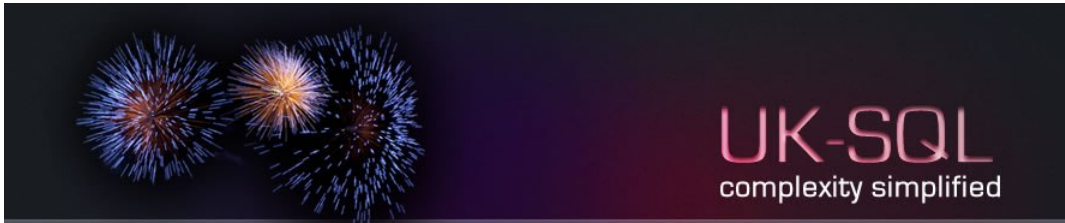
On either partner issue the following statement. Removing the witness changes the mirroring operating mode in accordance with the transaction safety setting. If transaction safety is set to **full** the session uses high-protection synchronous mode. If transaction safety is set to **off** the session operates asynchronously in high-performance mode.

```
alter database mirrorMe set witness off;  
go
```

4.7 Add Witness

On the current principal issue the following statement once the endpoint login and security has been granted. On creating the witness the mirroring operating mode becomes high-safety with automatic failover.

```
alter database mirrorMe  
set witness = 'TCP://SERVERNAME:PORTNO'  
go
```



5 Mirroring Enhancements

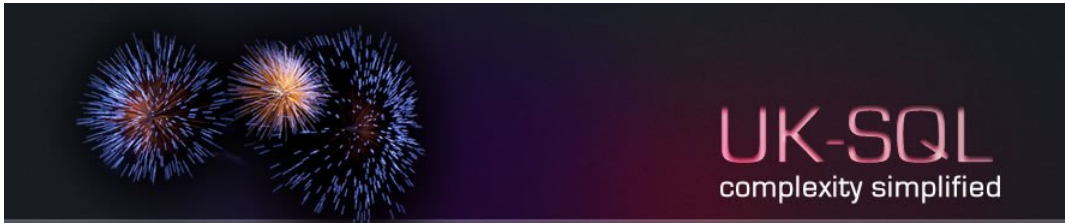
Enhancements are only available to SQL Server 2008 mirroring configurations.

5.1 Log Performance

- Compression of stream data
- Write-ahead on the incoming log stream on the mirror server
- Improved use of log send buffers
- Page read ahead during the undo phase

5.2 Corrupt Pages

- Automatically attempt to fix page errors



6 Mirroring Appendix

6.1 Caveats

- ◆ A database snapshot of the mirror database can only be generated if using the SQL Server 2005/2008 Enterprise Edition.
- ◆ Additional steps after role switching/role reversal are necessary if the mirrored database is encrypted to re enforce encryption.
- ◆ To failover all databases in a database mirroring session requires manually scripting using TSQL in conjunction with SQL AGENT WQL. This option is sometimes preferred to maintain positive identities and underpin business requirements in certain mirroring sessions.