



A DBVISIT WHITE PAPER

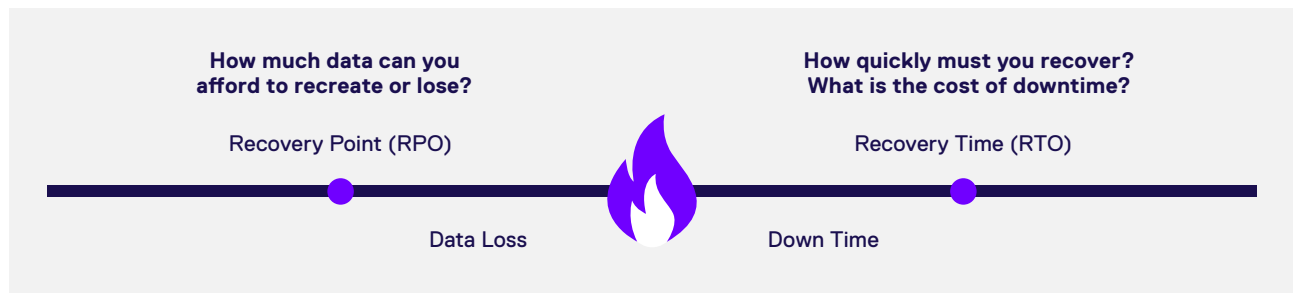
DEPLOYING GOLD STANDARD DISASTER RECOVERY FOR SQL SERVER

Exploring the smarter alternative to Always On Availability
Groups and Log Shipping for DR on SQL Server

THE IMPORTANCE OF UNDERSTANDING YOUR RTO AND RPO REQUIREMENTS

Recovery Point Objective (RPO) and Recovery Time Objective (RTO) are two of the most important parameters of a disaster recovery or data protection plan. These objectives guide enterprises to choose an optimal backup and disaster recovery approach, to meet their business needs.

When assessing your DR requirements it is essential that you deploy a Disaster Recovery approach to meet your RTO/RPO requirements, across a variety of failure scenarios, ranging from server outages to natural disasters, through to malicious user activities.



SQL SERVER DISASTER RECOVERY OPTIONS

Traditionally, SQL Server users have had the three primary methods of implementing and managing disaster recovery processes (Not including Mirroring as it is now end of life).

1. **Log Shipping**
2. **Always on Availability Groups (AG)**
3. **Clustering**

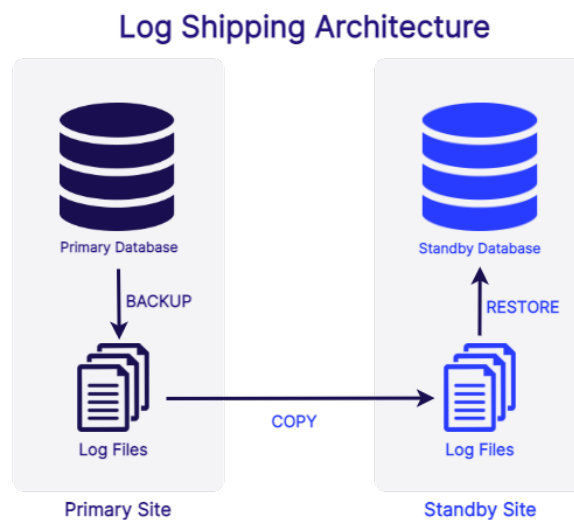
Now there is a better way - Dbvisit Standby MultiPlatform.

LOG SHIPPING

Log Shipping is a technique that involves two or more SQL Server instances and the copying of a transaction log file from a primary SQL Server database to a secondary database (preferably at a remote location for resilience). At the secondary server, the copied transaction log backups are restored to the warm secondary database.

Basic steps of Log Shipping

1. Backing up the transaction log file from one or more databases on the primary SQL Server instance.
2. Copying the transaction log backup file across the network to one (or more) secondary SQL Server instances.



3. Restoring the transaction log backup file to the database on the secondary SQL Server instances.

Strengths & Weaknesses of Log Shipping

It is generally agreed that Log Shipping is an easy to implement, reliable (when functioning correctly), and low bandwidth method for Disaster Recovery on SQL Server. However, Log Shipping also lacks critical features for a modern DR strategy, such as automated failover, planned switchovers, intuitive troubleshooting, or integration with scripts or APIs.

While Log Shipping is relatively easy to set up, it can be challenging to manage over longer time periods. If things go wrong, then the complexity of unpicking the process often means that it is simpler to tear everything down and start again from scratch – this is not an efficient or low risk solution.

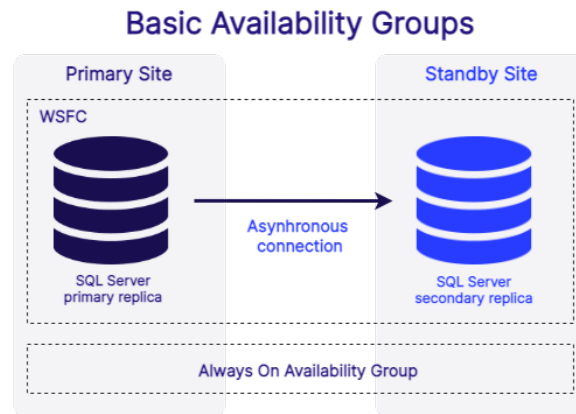
Basic Always On Availability Groups (AG)

Always On Availability Groups have been available as an Enterprise Edition functionality since 2012, however we will focus on Basic Always On Availability Groups (AGs) that were introduced for Standard Edition customers in SQL Server 2016.

Basic AGs provide high availability and disaster recovery across a replicated environment. There are two availability modes that control how the data is replicated between primary and secondary replicas. It is important to note that the mode selected has a large impact on the available functionality of the Basic Availability Groups:

Asynchronous-commit mode: the primary commits transactions without waiting for the acknowledgement from the secondary replica. This minimizes latency on the secondary database, but makes it possible for some data loss. It also reduces the functionality available, removing automatic failovers and planned manual switchovers with forced failover being the only option.

Synchronous-commit mode: before committing transactions, the primary replica waits for acknowledgment from the secondary replica. This mode ensures that fully committed transactions are safe. However, it comes at a cost of increased latency. This is particularly relevant when it comes to a physically separate data centre that should be implemented for a resilient disaster recovery architecture.



Strengths & Weaknesses of Basic AGs on SQL Server

For Disaster Recovery, the secondary (standby) server should be in a geographically distant region to provide resilience against data centre issues and regional disasters. In such situations, synchronous replication between primary and standby is difficult and expensive to implement without incurring performance issues. As such, asynchronous AGs are therefore frequently used. However, the use of asynchronous AGs for increased resilience limits the functionality and usability, with essential features like automated failovers, planned switchovers, and rollbacks no longer available.

Besides the well-known limitation that each Basic Always On Availability Group can only protect a single database, working with AGs can also be a challenge when performing routine database maintenance. For example, performing a switchover for a software upgrade could mean hours of work.

AGs require a cluster manager to operate. On Windows this is done with Windows Server Failover Cluster. In Linux you can use Pacemaker. This adds additional administrative overhead and increases the configuration complexity.

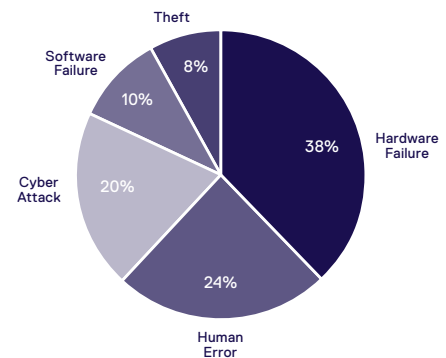
WHAT IS GOLD STANDARD DR?

In today's modern data-driven world, a DR strategy must ensure business continuity no matter what type of event strikes the organization.

A well-rounded DR strategy (what we call Gold Standard DR)

encompasses much more than just the recovery aspect.

- DR Testing to ensure that all systems can successfully be recovered.
- Continual verification of the standby database, to ensure the database will successfully failover when needed.
- Planned switchover and rollback to accommodate rolling upgrades, etc.
- Automation of repeatable processes, to ensure consistency and reliability.
- Monitoring and Notifications, so that administrators are notified when events occur that require attention.
- Fast troubleshooting tools.



Additionally, organizations should deploy their standby database in a different region to ensure that they can failover in the event of regional event such as a natural disaster or internet cable breakdown. This same strategy should be applied to organizations that are deployed within a cloud service provider (CSP). **While some CSPs now provide Multiple Availability-Zones as an High Availability strategy, that does not address region outages.**

Gold Standard DR is just as applicable when an organization has deployed their infrastructure in-the-cloud.

IS CLOUD MIGRATION THE EASY ANSWER?

The short answer is no. No cloud platform is immune to downtime. It is not uncommon for entire regions to go down, even for the big players such as Azure, AWS and Google Cloud. You still need effective Disaster Recovery.

Whilst CSPs offer High Availability (HA) environments, moving to the Cloud does not just magically fix availability problems. The cloud is vulnerable to both downtime and performance issues.

CSPs do not natively offer resilient Disaster Recovery for databases. Unfortunately, most people are less protected than they think. Whether on-premise, hybrid or in the cloud, it is still essential that you deploy Disaster Recovery that meets your RTO/RPO needs.

For business-critical databases, cloud service providers (CSPs) recommend that you deploy an out-of-region DR solution.

Multi-region replication is recommended by CSPs but can be difficult to implement for databases without the help of specialist software like Dbvisit Standby.

The bottom line is that even in the cloud you are still responsible for implementing a DR solution to meet your RPO/RTO goals. If you do not, you are liable for losses - not the cloud provider.

TAKING A DIFFERENT APPROACH - WHAT IS STANDBYMP?

Going beyond basic Log Shipping and AGs, StandbyMP is enterprise-class Disaster Recovery for Oracle SE and Microsoft SQL Server that prioritizes database integrity, disaster resiliency, recovery speed, and ease of use - delivered from a common user interface. The software can be deployed on-premises, in the cloud, or as a hybrid to achieve Gold Standard Disaster Recovery no matter your license type, number of databases, or experience.

- Remove complexity and risk by managing your Disaster Recovery from one central console.
- Speed up with multi database actions, guided workflows, and one-click actions.
- Simplify with intelligent standby creation, automated failover, and user replication.
- Do more with zero-data-loss planned switchovers, read-only access and more.

		SQL SERVER LOG SHIPPING	BASIC AVAILABILITY GROUPS <small>ASYNCHRONOUS COMMIT MODE</small>	STANDBYMP FOR SQL SERVER
EFFICIENT CREATION	No architecture changes	●	○ WSFC REQUIRED ETC	●
	Efficient guided creation	○	●	●
	Easy simultaneous creation	○	○ ONE DB PER AG	●
	Transportable media support	●	○	●
STREAMLINED MAINTENANCE	Realtime notifications	●	●	●
	Zero loss planned switchovers	○	○ ONLY SYNCHRONOUS	● GRACEFUL SWITCHOVER
	Auto standby creation on DB creation	○	○	●
	Facilitates DR Testing	○	○	● ONE-CLICK READ ONLY MODE
	Easy resynchronization	○	○	● ONE-CLICK ACTION
FAST & EASY TO USE	Login replication	○	○	●
	Central control center	○	○ MANY AGS, AND WSFC	●
	Multi-DB actions	○	○ ACT ON ONE AG AT A TIME	● AND ACROSS INSTANCES
HIGH RESILIENCY AND MINIMAL DATA LOSS	Detailed central task history	○	○	●
	Offsite standby support	●	●	●
	Dual standby support	●	○	●
FAST RECOVERY	Good RPO	● <5MIN	● <5MIN	● <5MIN
	Automated failover	○ FORCED FAILOVER	○ FORCED FAILOVER PER AG	●
	Good RTO	● FEW MIN	● FEW MIN	● FEW MIN
OTHER FEATURES	API Support	○	○	●
	Multi-platform support	○	○	●
	Low bandwidth architecture	●	○	●

Improve Creation Speed and Efficiency

Both Log Shipping and StandbyMP have the benefit of being easy to implement without additional requirements, such as windows failover clusters, and they support a wide range of versions.

StandbyMP goes beyond this to improve creation speed and efficiency. Unlike Log Shipping where each standby database must be individually created, Standby's guided process can create all of your standby databases across multiple instances with just a few clicks. Moreover, built-in pre-checks detect errors before creation, not after - saving you both time and patience!

Streamline Maintenance Tasks

Gold Standard Disaster Recovery must help in patching and ongoing DR testing, as well as make general maintenance tasks quick and easy, while reducing any potential downtime. StandbyMP streamlines day-to-day maintenance activities:

- Zero data-loss graceful switchovers: This advanced switchover functionality allows you to switch your primary database to your secondary server and back again without any interruption of Log Shipping (even with multiple standby databases). This makes it perfect for the facilitation of DR Testing or patching.
- Auto standby creation on DB creation: When a new database is added to the primary instance, it will be automatically detected, a new standby database created, and Log Shipping initiated without any input from the DBA.
- One-click maintenance actions: StandbyMP facilitates testing with a one-click read-only mode, prevents the need to rebuild the standby database with one-click resynchronization, and ensures logins are replicated across instances with login replication.

Automate Failover

Addressing the largest weakness of Log Shipping, StandbyMP brings a fully featured Observer that can automate failover and run specific scripts after failover (such as starting the application server). The Observer also provides real-time detailed notifications on the dashboard, as well as to Slack and email. You can also orchestrate your failovers, failing over multiple databases at the same time or in series using the multi-database actions or observer scripts.

Ease of Operation

It is no use having Disaster Recovery that is "great on paper" but in reality is difficult and unreliable - forcing DBAs into unintuitive workflows and creating confusion at the worst possible time. Like scripting, complex workflows create risk by creating a dependence on key employees, constraining response times and flexibility, increasing training requirements, introducing opportunities for error, and reducing DBA productivity. While GUI based, neither Log Shipping nor Basic Availability Groups feature intuitive and fast workflows for management or troubleshooting. They require administration of either individual log shipping jobs or individual availability groups, making management tedious.

Other Challenges of Log Shipping and Availability Groups:

- Troubleshooting Log Shipping is difficult and results in users frequently rebuilding their standby, leaving them unprotected with reduced database performance.
- Availability Groups resynchronization due to infrastructure issues.
- Adapting Availability Groups to network changes.
- Reconfiguration of asynchronous availability groups following failover.

A CENTRAL CONSOLE TO BRING CLARITY

StandbyMP is the only choice offering a single control center to create, view, and manage all your disaster recovery configurations. The control center also provides detailed event information and common-sense guidance to help fast troubleshooting, and ensure your databases are always protected.

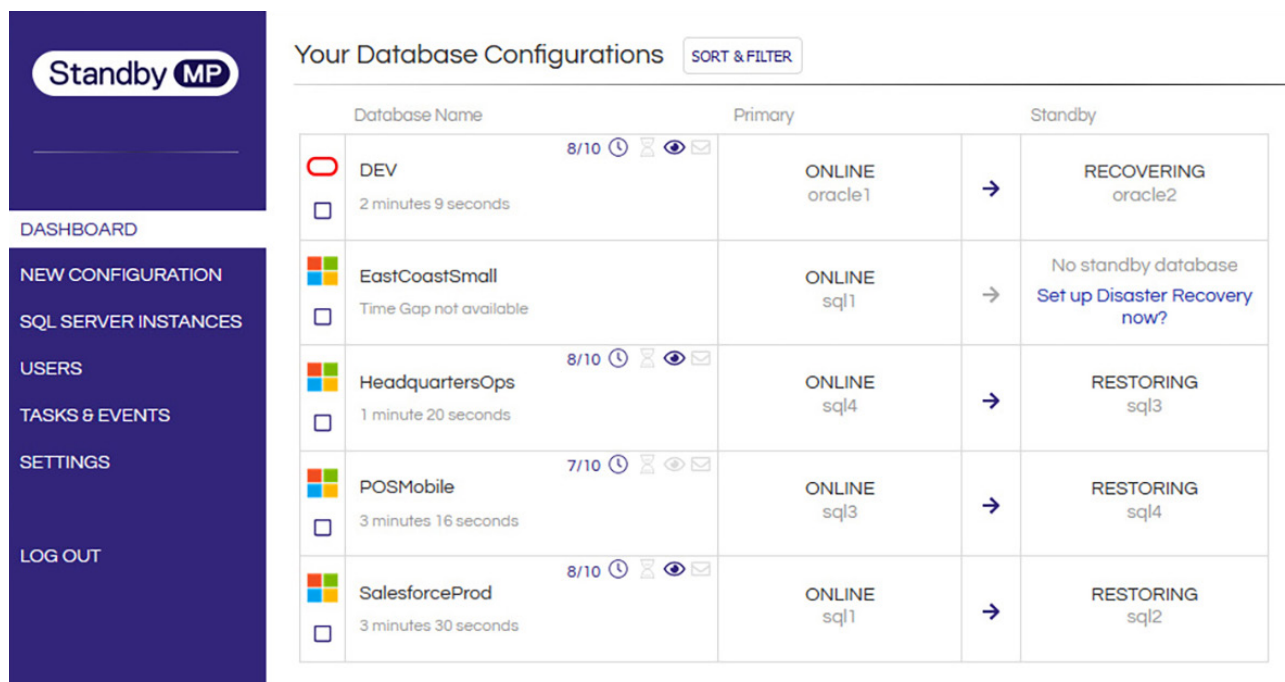
MultiPlatform Disaster Recovery

For organizations with both SQL Server and Oracle Databases (and soon PostgreSQL), you can view and control both your SQL Server and Oracle DR configurations from the single Control Center. This ensures Gold Standard Disaster Recovery is implemented across all databases and enables DBAs to work across platforms in the event of a disaster.

Fast, intuitive workflows

An intuitive GUI, guided workflows, and one-click actions make DR accessible for all:

- View DR configuration status from a single unified dashboard.
- Automate failover (or one-click failover).
- **Gracefully switchover** and roll-back (one-click action).
- Automate standby creation whenever a new DB is created.
- **Perform actions simultaneously** across multiple databases.



The screenshot displays the StandbyMP dashboard interface. On the left is a dark blue sidebar with navigation options: DASHBOARD, NEW CONFIGURATION, SQL SERVER INSTANCES, USERS, TASKS & EVENTS, SETTINGS, and LOG OUT. The main content area is titled "Your Database Configurations" and includes a "SORT & FILTER" button. Below the title is a table with columns for "Database Name", "Primary", and "Standby".

Database Name	Primary	Standby
<input type="checkbox"/> DEV 8/10 2 minutes 9 seconds	ONLINE oracle1	RECOVERING oracle2
<input type="checkbox"/> EastCoastSmall Time Gap not available	ONLINE sql1	No standby database Set up Disaster Recovery now?
<input type="checkbox"/> HeadquartersOps 8/10 1 minute 20 seconds	ONLINE sql4	RESTORING sql3
<input type="checkbox"/> POSMobile 7/10 3 minutes 16 seconds	ONLINE sql3	RESTORING sql4
<input type="checkbox"/> SalesforceProd 8/10 3 minutes 30 seconds	ONLINE sql1	RESTORING sql2

EASILY RESPOND TO THE UNEXPECTED WITH STANDBYMP

As database Disaster Recovery experts for over 15 years, we have seen it all, and we know what works and what is needed. To ensure you can deal with the unexpected when it happens, we have built unique functionality:

- **Resynchronize your standby** in a single click
- Clearly see problems in real-time
- **One-click standby activation**
- Access detailed logs for fast issue resolution

Dbvisit StandbyMP delivers many benefits for resilient and dependable DR on Microsoft SQL Server, simplifying the ongoing management of DR task and providing added functionality. See it for yourself by downloading a fully-featured [trial](#), taking a [test drive](#) or organise a POC with our technical team by contacting them [here](#).



info@dbvisit.com | dbvisit.com

dbvisit.com/our-solutions