



# Using Infortrend ESVA with Microsoft SQL Server

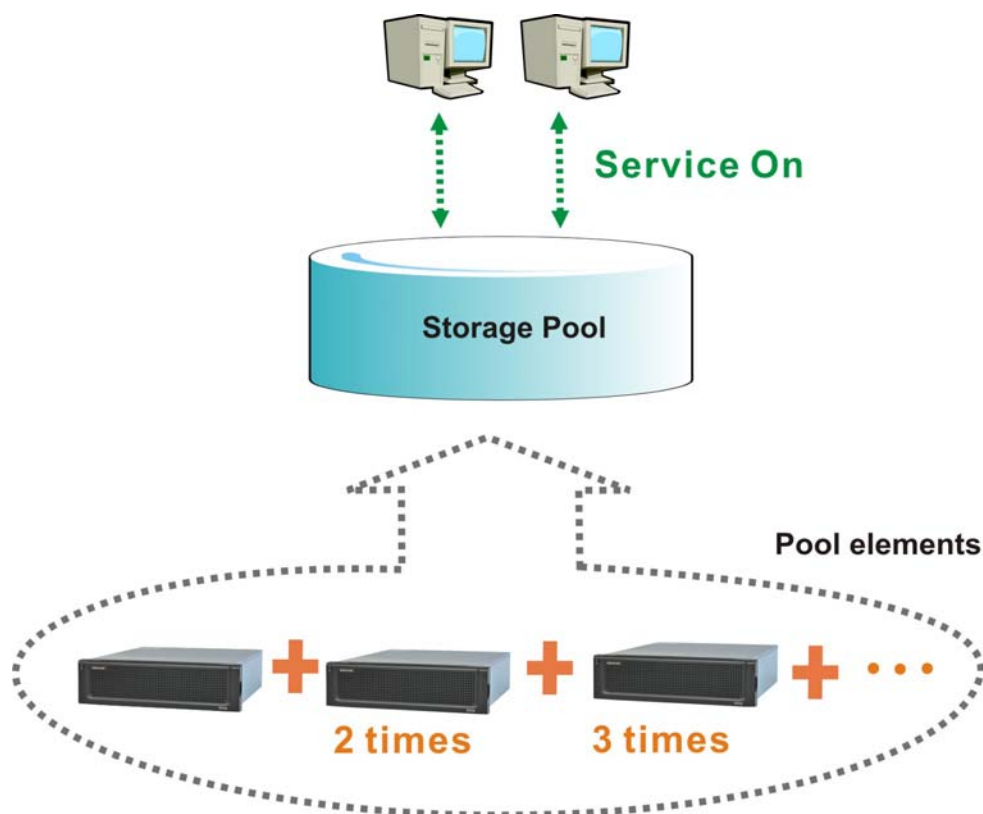
## Application Note

### ***Abstract***

This application note introduces the architecture and various storage protection features of Infortrend ESVA storage systems, and provides suggestions on using them with Microsoft SQL Server to fulfill enterprise database requirements and achieve maximized storage utilization, usage flexibility and efficiency of customer investments.

## Virtualized and Scalable Architecture of Infortrend ESVA

Deciding how much capacity should be reserved for database to fulfill current needs and future growth is a challenging issue for administrators when doing capacity planning. Reserving too much capacity will cause low storage utilization, and inaccurate allocation may inflict the pains of re-provisioning. Besides capacity allocation, performance is another challenge for database storage. Administrators have to prevent archived data from impacting application productivity. Infortrend ESVA (Enterprise Scalable Virtualized Architecture) storage systems are built upon scalable virtualized storage architecture. Resources on one or multiple physical systems can be consolidated into one virtualized storage pool. In addition to storage capacity, the I/O throughput and performance also scale up when more ESVA systems are added to the pool.



**Figure1: ESVA Scalable Architecture**

To maximize capacity utilization, ESVA provides thin-provisioning technology on its architecture. Thin provisioning allows administrators to freely create and prescribe a data volume with capacity they think fully enough to the host, even if the capacity exceeds the size of the pool. The act of prescribing fixes no or only partial (according to user configuration) amount of capacity for the host. The free capacity is shared by all



application hosts connecting to the pool. It is dynamically allocated when data writes occur.

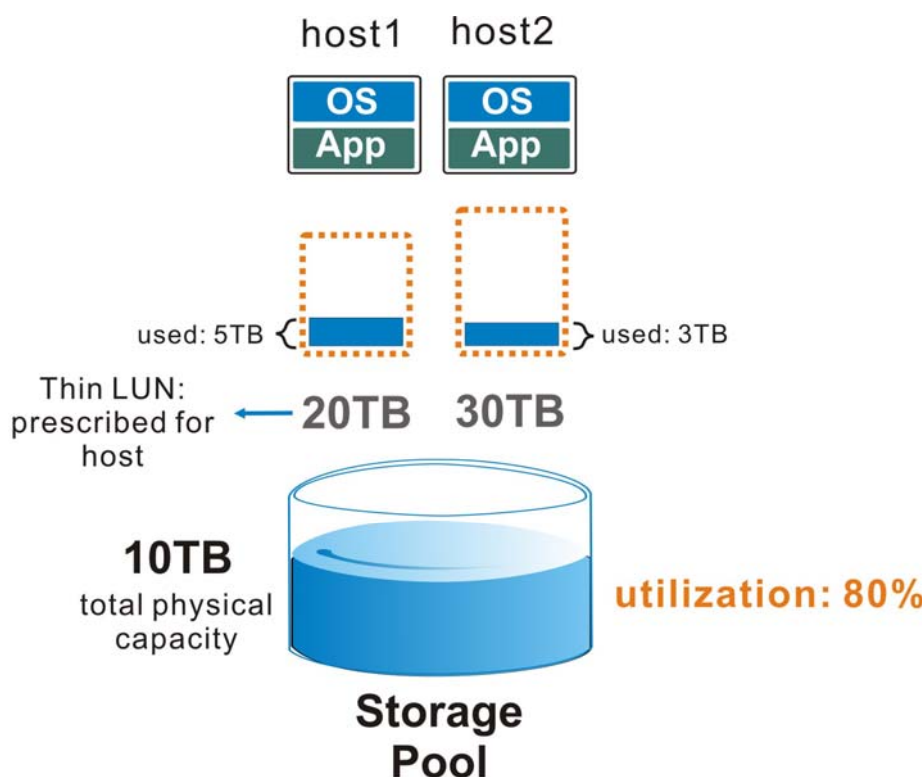


Figure 2: Thin Provisioning for Maximized Capacity Utilization

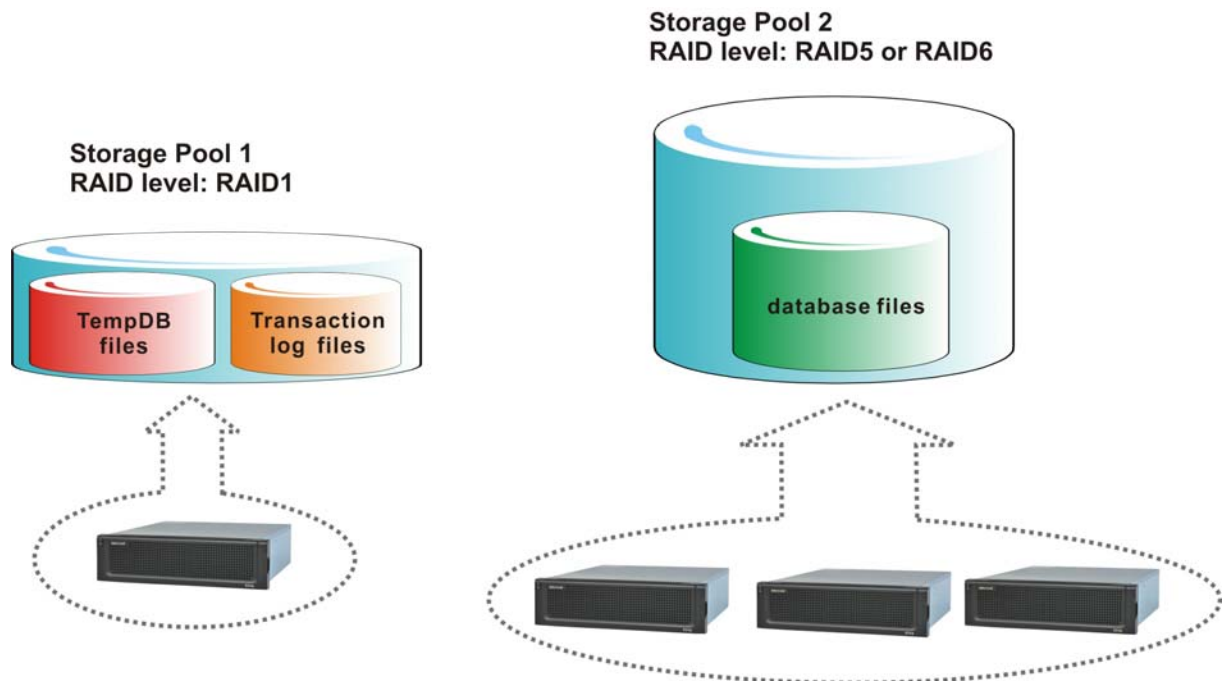
Thin provisioning eliminates the management efforts required to forecast, plan, and monitor individual data volumes. Administrators need only to keep a check on the utilization of the pool. When the pool capacity is running out, they can expand it online simply by adding more drives (through expansion enclosure or additional ESVA systems) to the pool. The storage capacity upgrade can be done with all applications running normally.

## SQL Server Configuration Considerations

Like most other databases, Microsoft SQL Server manages data by database and transaction log files. Main database files are frequently accessed with random reads and writes. As to transaction log files, they consist mostly of sequential write operations, with occasional reads of recently written transaction records. SQL Server tempDB database is read/write intensive, and is used for storing temporary tables, temporary stored procedures, and sub-queries, and for sorting aggregate operations. General guidelines should suffice for most midrange SQL database deployment.

If users would like to configure different RAID levels for different database files, they

can create two or more pools. As shown in the figure below, in the ESVA environment, users create two pools, one configured with RAID1 and the other RAID5 or RAID6. The temporary database files and transaction logs are stored in the volumes with RAID 1 protection to acquire better read/write performance and fault tolerance. As to the main database files, they are placed on the volume with RAID 5 or RAID6 protection for better capacity utilization.



**Figure 3: Using Multiple ESVA Pools for SQL Server Database Configuration**

Thanks to the scalable architecture, adding ESVA systems to a storage pool means not only capacity but also performance and data throughput scaling. To achieve excellent read/write performance as well as fault tolerance, creating one big pool for SQL Server is better than creating several separated pools. As the figure below shows, users can create one big pool with all their ESVA systems, and setup several virtual volumes to store different database files. This way of configuration enables simplified capacity management, excellent performance and necessary fault tolerant capability.

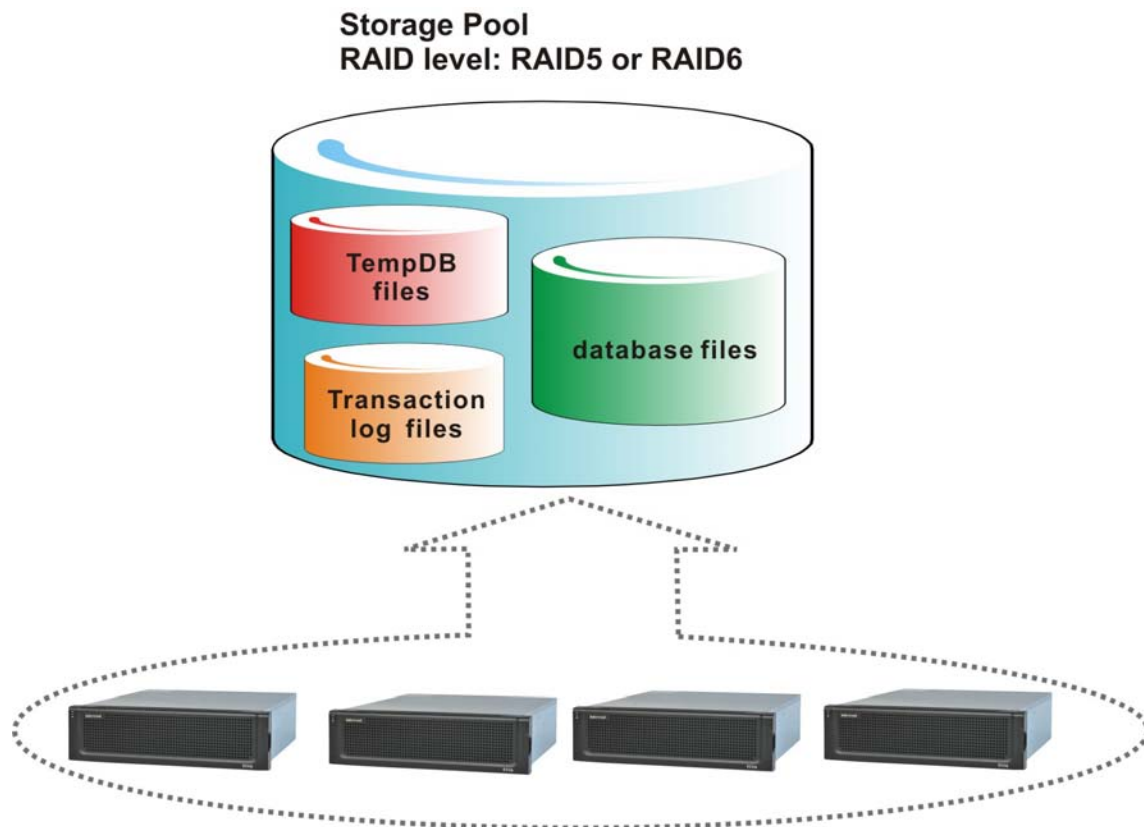
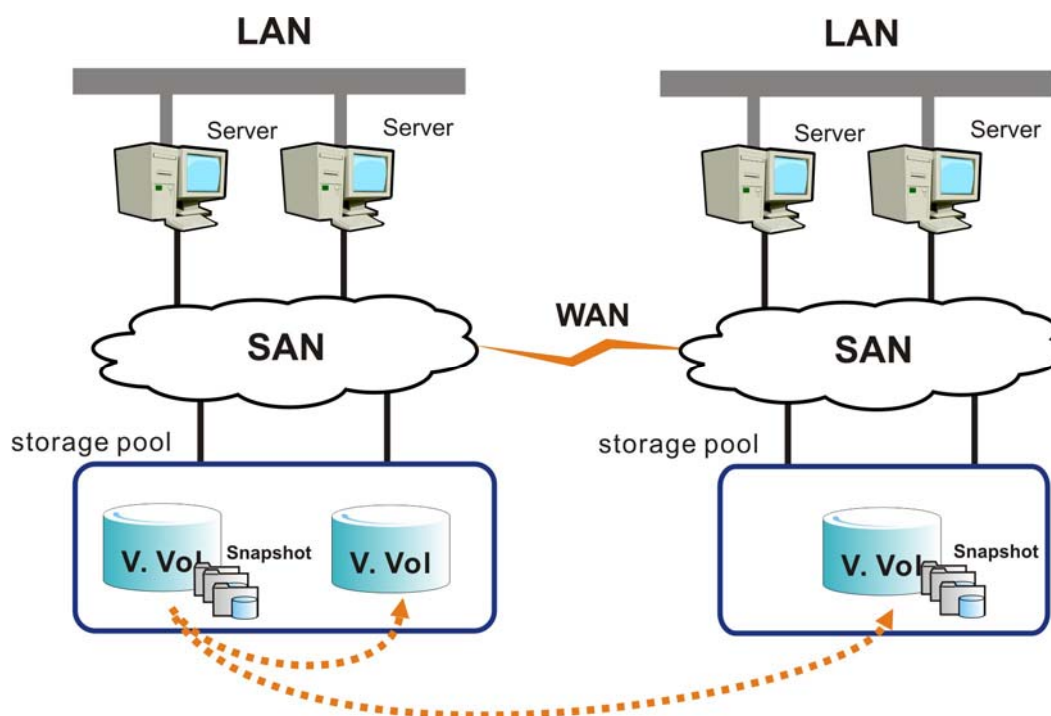


Figure 4: Using One ESVA Pool for SQL Server Database Configuration

## ESVA Data Protection Features

Database data are always business-critical, so data protection and disaster recovery are among the top concerns for SQL Server administrators. ESVA systems provide not only robust hardware protection designs, such as redundant components and RAID capability, but also rich data protection features. To ensure high availability and data integrity, ESVA storage systems allow users to create data copies with Snapshot, Volume Copy/Volume Mirror and Remote Replication technologies. Used with dedicated DB Flush Agent and scheduler, these features can help implement comprehensive data protection and simplify management while retaining operational flexibility in SQL Server environments.



**Figure 5: ESVA Data Protection Features**

### ***Snapshot***

As the demand for non-stop SQL Server database uptime increases, the requirements for reducing backup window and restore time are getting harsher. Snapshot is a point-in-time copy of data. It records the state of data at a specific time and can be used for quick recovery including file restore or data rollback. Since a snapshot copy only keeps the data blocks changed by new writes done to the source, it minimizes backup window and capacity consumption.

### ***Volume Copy/Volume Mirror***

Recovery with snapshot copies does not work when the data of source volume corrupt. For better data protection, ESVA provides Volume Copy/Volume Mirror function to create full copies of database volumes. The backup destination has to be of the same size as the source volume. The more data the source contains, the more time it takes to finish the copying. Volume Copy is a one-time replication of a source volume at a specific time. As to Volume Mirror, it creates a mirrored volume of the source. The volume can be split and re-synced with the source as users want. Besides data protection, these full copies can also be used to enhance operational resilience. They allow shared access to critical information among production and batch applications, such as data mining, development, and testing.

### ***Remote Replication***

Remote replication recently becomes a common practice to respond to power outages,



hardware failure, and complete site failure caused by human or natural disasters. ESVA provides Remote Replication capability for users to replicate data across storage pools, whether they are located on different enclosures, rack shelves, or even data centers. Regardless of distance and network bandwidth, users can setup remote sites to keep off-site copies of SQL Server database created by EVSA.

### ***DB Flush Agent***

Before starting to backup a database, users should flush all data, transaction logs and related records from memory to the disk array first to ensure data integrity. ESVA provides a dedicated DB Flush Agent to help SQL Server perform the flushing task.

### ***Scheduler***

Besides being operated by users manually, all the data protection features of ESVA mentioned above can be triggered by the scheduler automation mechanism ESVA provides. The mechanism allows users to create various schedules for data protection tasks, such as taking snapshots periodically, starting a copy job at a specific time or synchronizing a mirrored pair every few days. By automating these tasks, the scheduler streamlines data protection processes and makes business continuity support more easily achievable.

With ESVA, data protection can be done quickly without disrupting online service. This substantially increases data availability of SQL Server and flexibility of database maintenance. ESVA is an efficient and economic solution to fully protect data in SQL Server environments.

## **Conclusion**

ESVA storage systems are designed to offer a consolidated storage platform that simplifies storage management. The virtualization technology makes it easy to scale out capacity and performance online by adding more systems to the virtualized foundation. Featuring high reliability, availability and scalability, ESVA serves as an excellent solution to fulfill Microsoft SQL Server database storage requirements. Its comprehensive data protection features further supports business continuity by providing robust protection for the mission-critical data.

