Application Brief:
Using Titan for MS SQL

Abstract

Businesses rely heavily on databases for day-to-day transactions and for business decision systems. In today's information age, databases form the critical core of enterprise business processing & information systems.

Challenges facing MS SQL deployment include scaling the SQL database for both performance and size. This requires an ever-expanding quantity of storage and fast access to data, and necessitates demanding backup schedules and disaster recovery procedures. It may also mean the constant addition of database servers or changes to the infrastructure to support improved performance.

This technology brief addresses technical issues and considerations for deploying SQL database on BlueArc's Titan SiliconServer. It will detail how Titan's high performance, scalability and features such as Advanced Data Replication and Snapshots can help DBAs resolve the challenges of growing databases, backup, restoration, as well as sharing database with development and QA.

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Changing the Economics of Network Storage

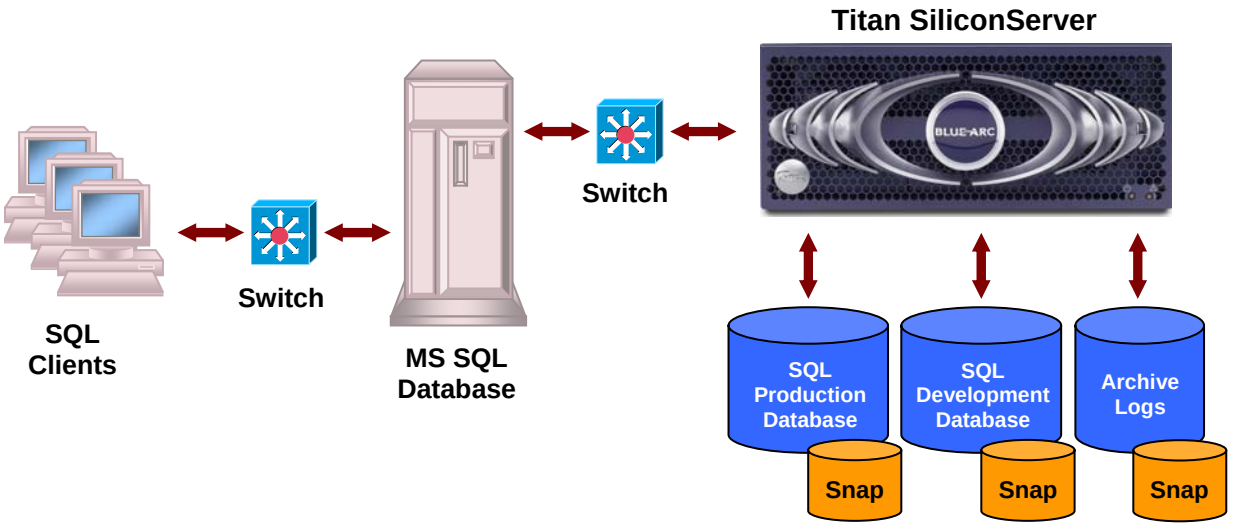
SQL Database Challenges

In today's competitive marketplace, a business' MS SQL database is their lifeblood – and therefore, a robust, scalable, manageable database infrastructure built to support it is critical. New advances in server and storage technologies provide customers with opportunities to accelerate applications and ensure reliability and anytime access to data – ideally improving the overall business value of the database.

Traditionally, MS SQL database have been hosted on locally attached storage, DAS, putting severe constraints on the growth of the SQL database server and creating complex infrastructures with isolated servers. This infrastructure also precludes the use of the storage pool by other servers and applications. Growth of the MS SQL database then stresses the local disk subsystems, resulting in the need for frequent upgrades and migration of the SQL application servers to support the scaling size and performance of the database and can result in isolated database servers. As the database grows, it becomes dramatically more difficult to reliably backup multiple servers each day; this is made even more difficult by shrinking backup windows as the database is viewed as a global information resource. Recovery and minimizing down time in the case of a disaster or corruption is another significant challenge. Yet by utilizing tape as the backup media, this restoration process can be hours or even days - hardly minimal downtime, an alternative scalable disk solution must be found.

BlueArc's Titan SiliconServer

Consolidating all your SQL databases into a centralized BlueArc Titan SiliconServer will increase performance, availability, and recoverability of your databases making it the ideal candidate for hosting MS SQL databases. The Titan's built-in snapshot feature is designed with enterprise database deployment in mind and makes the backup and restoration of SQL databases quick and painless. The SiliconServer Architecture also provides unmatched serving speeds for backend database files, satisfying performance requirements of even the most demanding enterprise database development and production environments and easily scales storage and performance for accommodating future growth.



MS SQL Database and Snapshot Data Protection

Protocol Support

Titan supports standard industry protocols such as NFSv2, NFSv3, CIFS, iSCSI, and NDMP, enabling seamless integration of true heterogeneous server environments including Windows®, UNIX®, or Linux®. Even if simply implementing a Windows environment today, the Titan provides a future proof solution for implementing other operating systems and applications as necessary.

Improved Manageability

The high throughput and capacity of Titan allows for the consolidation of multiple SQL server databases onto a single system, thus increasing availability and productivity, while reducing management overhead. Dynamic scaling of volumes, creation of test environments, and rapid duplication of datasets all help to drastically reduce the time needed to deploy new database applications. With a high performance Titan storage infrastructure, the number of database servers can also be reduced. This consolidation of storage, servers and databases results in lower management overhead, lower total cost of ownership (TCO), and provides convenient centralized backup and restoration.

Database instance backup without any performance impact

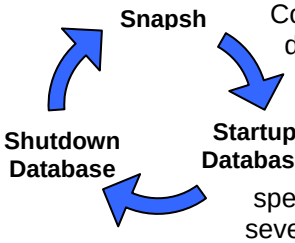
Typically database backups can take hours to days to complete, especially when backing up to tape, further stressing the database servers' performance due to increased disk I/O and the need for the data to pass through the server. Data contention between the production requests and data requested by the backup program can drastically slow down the response to the user queries.

High Performance Centralized Storage for Multiple Databases and Servers

Environments such as development, staging, QA and production require multiple instances of each database for various purposes. Titan's SiliconServer Architecture ensures that each instance and server receives the highest attainable level of performance. Additionally, Titan is a network attached storage (NAS) device, so there is no need to add high-speed local disk to each database and application server, or expensive HBA's & custom software on the servers, as one would when deploying a storage area network (SAN). This allows administrators to deploy database and applications servers on demand, as no high-speed local disk needs to be acquired. Not only can database administrators deploy many servers rapidly, but this strategy also ensures that in the event of a server's hardware failure, the same database can be mounted using a second, identical server – providing cold standby capability, without tying data to local hardware. This can significantly reduce the downtime involved in a server failure.

Instant Painless MS SQL Backup

The Titan's included snapshot capabilities shorten the backup window for the SQL database backup from a matter of hours or days down to a few seconds, virtually eliminating the need for a backup window. Restoration from snapshots is equally rapid, reducing this time down to a few minutes, instead of several hours or days needed when restoring from tape. Depending on the organization's requirements, the DBA can opt for an appropriate backup strategy for the SQL database.



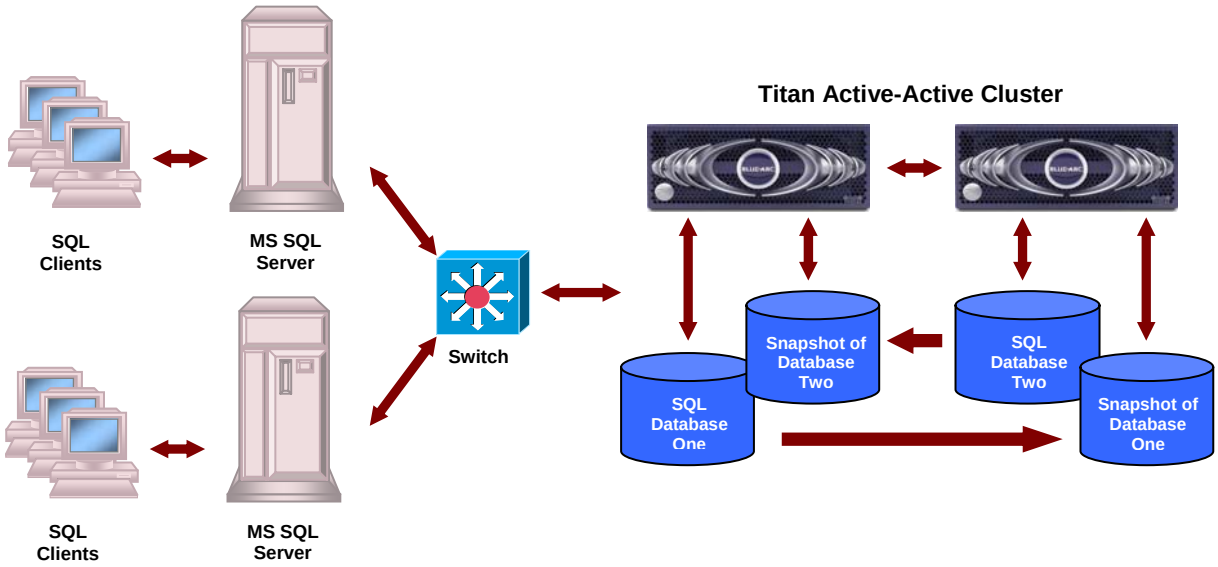
Cold backups require that the database be shut down in a consistent state while database files are sent to the backup media. During the cold backup period, the database is not available to its users and applications. Cold backups of the database can be scheduled during the maintenance window.

Typically, normal full backups can take up to several hours depending upon the speed of the backup device. Businesses, which do not have maintenance window of several hours every day, can take advantage of snapshots to complete the cold backup in a few seconds and bring back the database online without compromising their productivity and backup policy. Once the snapshot is taken, database files can be backed up to the backup device from the snapshot without effecting the database operations. Snapshot on SiliconServer only takes a few

seconds to complete, returning control back to you almost immediately for other administrative tasks. With BlueArc Multi-tiered storage capability DBA also have the choice of keeping a backup on lower cost SATA (Serial ATA) disk rather than tape. This can drastically reduce downtime in the even of an incident where recovery is necessary.

"Ready to Serve" – SQL Database Replication

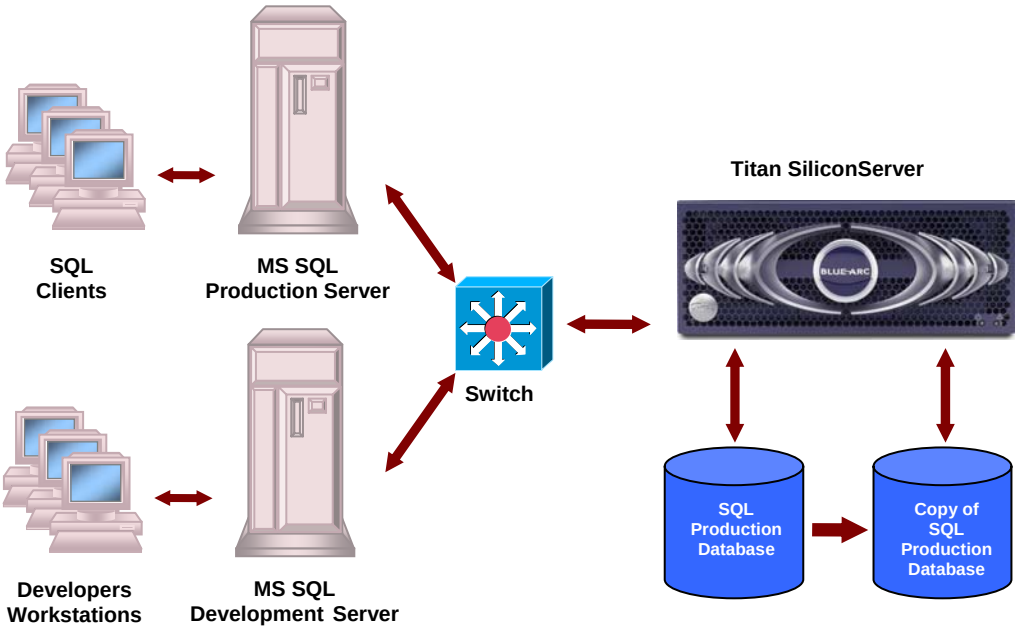
In an environment where multiple SQL servers are hosting multiple databases, BlueArc SiliconServer's can be deployed to provide high availability 'Ready-to-Serve' database infrastructure without adding any complexity to SQL configuration or incurring any additional license fees. 'Ready-to-Serve' replicated SQL database architecture is totally transparent and works with existing SQL Servers.



"Ready to serve" – Replicated SQL Database Replication Architecture

As shown in the figure above, two BlueArc Titans are deployed, each with its independent storage. Two separate SQL database instances host their production databases on Titan one and Titan two respectively. Snapshots are created using cold backup method. After the creation of the snapshots, the snapshot database files of the first instance are copied from the snapshot directory on the first Titan to a volume on the second using Accelerated Data Copy (ADC) which allows for moving data within or between Titans. Similarly, the snapshot database files from the second instance are copied from the second Titan to a volume on the first. These snapshots can also be schedule to automatically be created using Incremental Data Replication (IDR) so that DBA have ongoing snapshots of their database instances.

In the event of database corruption, or accidental deletion of data, the database instance can be reconfigured to point to the second set of database files available from the second Titan and restarted. Up to the minute archived transaction logs will need to be applied to this copy of the database to bring it to the desired transaction level before brining it online - ensuring near zero downtime without investing in an expensive, complex synchronous software/hardware solution and the associated administrative costs. IDR feature of Titan SiliconServer can be used to replicate the database to a remote location, economically sending only the changed blocks over the network, instead of sending the large database files.



SQL Database Instances and Hosting Multiple Databases

Sharing a Production SQL Database with Development & QA

In an Enterprise environment, copies of the SQL database may be required for development and other purposes. Usually this is a lengthy time consuming process, first requiring the creation of a complete backup of the database and then restoration from this backup to the development SQL database server.

Using the BlueArc SiliconServer, this can be easily accomplished very quickly allowing IT staff to focus on other value added tasks. First a Snapshot is taken of the SQL production database on SiliconServer and then, using the Accelerated Data Copy feature of SiliconServer, which utilizes the SiliconServer's hardware data-path to provide high speed data copy, the SQL database is copied from the production volume Snapshot to the development volume very quickly. Once the database is copied to the development volume, the SQL development server can point to this copy of the database. Due to the Titan's high performance parallel architecture the copy does not impact the availability or performance of production database.

SQL implementation issues

As is the case with any NAS implementation, a stable network between the SQL Server and BlueArc SiliconServer is key to the success of NAS based SQL implementation. In order to provide maximum fault tolerance and recoverability, it is recommended that the SQL transaction log files and system database files be kept locally on the SQL Server. Other production database files, which are larger in size and generate most of disk I/O, should be stored on the Titan SiliconServer. On the Windows server the TCP/IP Window size must be set to maximum value of 64K to realize the network performance gains. Further, since SQL uses its own cache with advance cache management algorithms Opslocking on the Windows server hosting the database should be disabled, to prevent caching of writes by the OS. Please refer to Microsoft ® knowledge base for further information.

Conclusion

Challenges facing SQL deployment include the ever-growing size of the SQL database and performance scalability. In today's information age, databases form the core of enterprise business

processing & information systems, with the load on databases and their size growing exponentially. Titan SiliconServer with SQL Database offers the most scalable network storage available for SQL customers, allowing them to easily deploy data-intensive enterprise applications critical to business success. Titan speeds database operation by offloading file system workload and data backup operations into advanced Silicon-based technology, allowing a single system to manage more database services, avoiding the cost and administration problems of server proliferation – reducing management complexity and total cost of ownership.

Contact BlueArc today at 1-866-864-1040 to learn more, or visit www.bluearc.com

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