Compellent Storage Center

Microsoft SQL Server on SMB

Feature Brief

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# Table of Contents

1 Preface .......................................................................................................................... 1  
1.1 Audience ................................................................................................................... 1  
1.2 Purpose....................................................................................................................... 1  
1.3 Customer Support ...................................................................................................... 1  
2 Introduction ..................................................................................................................... 2  
3 A Closer Look at SMB ................................................................................................... 3  
3.1 Performance ............................................................................................................... 3  
3.2 Flexibility ................................................................................................................... 3  
3.3 Cost .......................................................................................................................... 4  
3.4 Security ...................................................................................................................... 4  
4 Conclusion ...................................................................................................................... 5  
5 Additional Resources ..................................................................................................... 6
## Document Revisions

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>Author</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
1 Preface

1.1 Audience
The audience for this document is Architects or System Administrators who are responsible for the design, setup and/or maintenance of SQL servers and associated storage. Readers should have a working knowledge of Windows, SQL Server, and the Dell Compellent Storage Center.

1.2 Purpose
This document provides an overview of how Dell Compellent Storage Products can be used with SQL Server Databases on SMB storage.

1.3 Customer Support
Dell Compellent provides live support 1-866-EZSTORE (866.397.8673), 24 hours a day, 7 days a week, 365 days a year. For additional support, email Dell Compellent at support@compellent.com. Dell Compellent responds to emails during normal business hours.
Introduction

One of the most popular configurations today for SQL Server, either in a physical or virtual environment, is mapping storage volumes directly to a SAN. One of the keys to being a successful architect or administrator is being aware of the technologies that are available and choosing the right one for the job. Since 2008, Microsoft has done a great amount of work to make it possible to host databases on file shares. Server Message Block (SMB) has been the underlying protocol for Windows file sharing for several versions and instead of referring to it as Windows Network it is now being referred to as SMB. Version 2.1 of SMB introduced with Windows Server 2008 R2 offers many performance and resiliency enhancements. SMB Version 3.0 released with Windows Server 2012 continues to build on those enhancements.

Starting with SQL Server 2008 R2, SMB is supported for user databases and with SQL Server 2012 all databases, including system databases, can be placed on SMB shares. SMB shares are typically presented in a couple of different ways, either through a Windows File Server or through a Network Attached Storage (NAS) appliance. The Dell Compellent FS8600 NAS shares a back-end infrastructure with the Dell Compellent Storage Center SAN enabling an efficient SAN and NAS ecosystem with a virtualized pool of disk. This paper outlines some possible scenarios for hosting SQL databases on SMB shares and how leveraging Dell Compellent products and features can enhance these architectures.
3 A Closer Look at SMB

Most SQL Server professionals that are familiar with building and managing solutions on SQL Server are very familiar with using SAN storage mapped to Windows as either disk volumes. Therefore, hosting SQL Server databases on SMB is a very different storage option.Outlined below are several different possible use cases and some points to consider in terms of performance, flexibility, cost, and security.

3.1 Performance

Architecting an IT infrastructure is all about understanding the benefits and the tradeoffs. It’s important to point out from the beginning that hosting SQL Server databases on SMB with Dell Compellent Storage is likely not going to be chosen for performance. For situations where you need high performance or are extremely sensitive to end user response times you will want to use the traditional approach of connecting your SQL Server to the Dell Compellent Storage Center using the connectivity method that best fits your environment and performance requirements. However, in most organizations that have numerous SQL Server databases or systems, a number of these are typically used for less critical applications and/or in non-production environments. SQL Server databases that are candidates for SMB are those that can sacrifice some performance to gain some other important benefits. Initial test results using the SQLIO tool running on Windows Server 2012 showed approximately a 5% penalty in both throughput and latency when running on volumes using SMB over iSCSI vs. volumes directly mapped over iSCSI. Additional testing and performance data will be published on this in the future.

3.2 Flexibility

Organizations that are embracing initiatives such as consolidation, virtualization, private cloud, self-service IT, etc. require a lot of flexibility in their IT infrastructure. One of the benefits that hosting SQL Server on SMB brings is flexibility. You now have the ability to build architectures in a completely different way by combining the capabilities of SMB shares and the features of Dell Compellent Storage Center and its related tools.

By managing storage as a larger pool behind an SMB share you do not have to manage capacity at the individual volume level. This allows you to further build upon the Fluid Data Architecture in the Dell Compellent Storage Center to take storage virtualization to the next level. This is important in environments that have hundreds or thousands of SQL Server databases and want to store these on larger storage pools rather than configuring and managing volumes at the host level.

An outstanding feature of the Dell Compellent Storage Center is the ability to take Data Instant Replays which are volume level snapshots. These Replays can be taken in seconds and represent a complete picture of the volume at the time the Replay was taken. They can
also be exposed in seconds as a read/write volume and only data that is written consumes additional space. The time and space savings makes them an extremely efficient tool.

Using Replay Manager (version 6.5 or higher), you can expose Replays as an SMB share. This can allow data to be accessible in environments that previously were not directly connected to the Storage Center without any protocol configuration or volume mapping. This can give IT staff access to data that they previously did not have. For example, most organizations have development and test environments for upgrades, troubleshooting, and various other reasons. Leveraging replays, copies of production databases can be presented for testing without the space overhead of maintaining additional database copies. Replays could also be used in a development and/or test environment to provide developers and testers with their own copy of a versioned database.

SMB shares can enable failover clustering for environments where servers are not directly connected to a SAN. This could be useful in environments that take advantage of virtualization and want to be able to build clusters with minimal infrastructure. Once again, development and test environments are great candidates for this.

3.3 Cost

By providing technologies that simplify virtualization and self-service IT the cost savings of these initiatives is more fully realized. Managing storage as shares vs. individual volumes eases setup and reduces the number of items to manage. Exposing replays via SMB further reduces cost by eliminating most of the space that would be required by having multiple copies of the database stored either locally or on shared storage. The ability to use common Ethernet infrastructure instead of Fiber Channel or high-speed Ethernet can also help keep costs down.

3.4 Security

Making databases available via SMB can reduce or eliminate the need for developers and testers to have local copies of SQL Server databases. Ensuring databases remain in a secured data center, instead of being stored locally on laptops or desktops, reduces the risk of a data loss in the event a machine is lost or stolen. If personal or sensitive data is lost, it can severely damage a company’s reputation. The loss of customer data or confidential information can cost millions of dollars in damages and/or lost revenue.

For highly regulated industries, keeping data in a controlled, secure facility can aid in compliance.
4 Conclusion

Dell Compellent storage features can be used in combination with SMB to provide options that can improve flexibility, reduce cost and increase security. Environments that can leverage SMB the most are those that are using SQL Server on a larger scale and require flexibility over performance. While it is not likely that SMB will be the sole solution for the entire SQL Server environment it is a strategy that should be considered in the overall infrastructure.
5 Additional Resources

Windows Server 2012 SMB Overview

Install SQL Server with SMB fileshare as a storage option