White Paper

Maximize Oracle Performance and Agility with Symantec and NetApp

October 2014

TABLE OF CONTENTS

LIST OF FIGURES

1 Introduction

Engineered solutions have been gaining acceptance in the data center over the past few years. These solutions include databases, replication, compression, cloud gateways, and other offerings. The goal of engineered solutions is to provide customers with a solution optimized for their needs.

Proponents of engineered solutions point out that those solutions are optimized specifically for a set task. An engineered solution form factor generally requires few tuning and configuration steps and provides a unified look and feel for managing and deploying that solution, versus integrating servers, storage, and infrastructure components. However, engineered solutions bring their own issues. They create additional organizational silos, reduce flexibility and functionality, add another layer of hardware and management, and typically have a much higher total cost of ownership.

Database appliances, a specific implementation of an engineered solution, promise optimal performance with minimal overhead for all workload types. What it cannot do, however, is run anything other than a database instance. Anything that relies on that instance, such as an application or a web server, still requires its own servers and storage to function. Additionally, database appliances are not the most cost-effective engineered solution. Consequently, database appliance customers find that they have acquired an extremely expensive piece of hardware with minimal reduction in their existing hardware footprint.

By contrast, the combination of Symantec™ and NetApp® technologies brings unparalleled performance, flexibility, and data management when compared to database appliances.

This document describes a combined Symantec Cluster File System and NetApp® storage solution and how it provides higher performance, lower cost, and more flexibility than database appliances.

1.1 About Symantec

Symantec Corporation is an information protection expert that helps people, businesses and governments seeking the freedom to unlock the opportunities technology brings – anytime, anywhere. Founded in April 1982, Symantec, a Fortune 500 company, operating one of the largest global data-intelligence networks, has provided leading security, backup and availability solutions for where vital information is stored, accessed and shared.

1.2 About NetApp

NetApp creates innovative products—storage systems and software—that help customers around the world store, manage, protect, and retain one of their most precious corporate assets: their data.

2 Benefit Analysis

2.1 Multipurpose Design

One of the biggest drawbacks of engineered solutions is evident within the term coined to define the market. Engineered solutions and others are hardware solutions engineered for a single purpose. A database appliance is designed to run large data warehouse workloads or other workloads but not both. Other solutions that focus on replication, caching, cloud gateway, or other functions are all similarly designed with a purpose-specific architecture.

The Symantec and NetApp E-Series and EF-Series configurations described in this document are designed to maximize Oracle Database performance while maintaining application deployment flexibility. The solution can run multiple versions of Oracle, not just 11*g*R2. The Symantec and NetApp storage design provides high availability and fast failover of Oracle Databases. The same system can also be configured to provide replication, backup and recovery, as well as highly available application or web services.

2.2 Design Control

Despite common database workload classifications such as Data Warehouse and Online Transaction Processing, not all workloads are the same. There are different customer characteristics in these classifications across industry verticals, amount of data, type of application, and more. With engineered solutions focused on single workloads, the ability to further fine-tune an engineered solution to the requirements of each of those workloads is limited by design.

Although the Symantec Storage Foundation brings high performance to database and other workloads out of the box, not all workloads are the same and require tuning to meet customer performance expectations. Symantec Storage Foundation includes database-acceleration technology called Oracle Disk Manager to give near-raw-volume performance to Oracle Databases. Symantec Storage Foundation also provides the full data management toolset required by the enterprise such as visibility, auditing, and capacity management; access control; and consistent file and volume management for databases and applications. Tuning parameters such as Adaptive I/O, prefetching, configurable I/O block size, stripe settings, and others enables you to optimize each file system and volume for your particular workload and provide maximum performance for your various databases.

Symantec Dynamic Multi-Pathing offers the most comprehensive set of path-optimization tools in the industry. From the simple Round-Robin to the more advanced Adaptive Minimum Queue I/O policies, Dynamic Multi-Pathing policies can be tuned to specific workload requirements. Dynamic Multi-Pathing also enables I/O to be optimally routed, fully optimizing the throughput capabilities of your NetApp E-Series and EF-Series array.

Although performance is very important, data integrity is also a key consideration. Symantec Storage Foundation and NetApp storage provide storage I/O fencing so that Oracle Databases are protected from unauthorized server access or accidental corruption.

2.3 Flexibility

Engineered solutions are limited in hardware flexibility by their design. The ability to expand processor, memory, or storage capacity is limited to a strict set of configurations. These standardized configurations likely do not meet the needs of your application, resulting in nonoptimal configurations that sacrifice performance or are overengineered for the database workload.

Symantec Storage Foundation provides large-scale clustering that allows enterprise customers to deploy the necessary processing and memory resources for their unique database needs. Server resources such as processor, memory, storage, and additional server nodes can be added and removed as the needs of the database and application change.

NetApp E-Series and EF-Series arrays are available in many configurations to match your required performance/cost ratio to your database workloads and applications. When you compare all NetApp storage metrics (latency, throughput, cost per IOP) to those of database appliances, you find that NetApp arrays can provide better performance at a lower cost of database appliance storage.

Symantec and NetApp enable customers to choose between Oracle single instance and Oracle Real Application Clusters (RAC). Although Symantec technologies provide fast failover (1 to 2 minutes) for Oracle single instance at a fraction of the cost of Oracle RAC, many customers choose RAC for certain applications or simply because they wish to keep utilizing RAC. Symantec benefits for RAC customers include increased performance and availability as well as unparalleled agility. Symantec customers can easily migrate their databases from single instance to RAC and back again.

2.4 Availability

Engineered solutions, including database appliances, have many availability risks. Most common is the "all-in-one" approach of an engineered solution. This design means that migrating databases requires an upgrade to a singular version of the database software. Additionally, database and application modifications may be required to take full advantage of the new engineered solution, resulting in an increased need for training and support for your application.

The most substantial risk is the modification of your backup and disaster recovery policy. Database appliances cannot run customer-facing applications. This deficiency introduces another layer of complexity in your backup procedures, leading to a higher chance of data loss or application downtime. For disaster recovery you are limited to replicating your databases from one database appliance to another similar database appliance. This limitation doubles the already expensive price of the engineered solution and increases operational complexity by inserting a closed system into your mission-critical architecture.

Symantec Storage Foundation and NetApp work together to enable your high-performance databases and applications to be highly available and protected in the case of a disaster while maintaining a standardized infrastructure and toolset for volume management, backup and recovery, and more.

Symantec Storage Foundation capability provides fast-failover technologies so that all storage resources used by the application are highly available and meet your recovery time objectives. The fast-failover capabilities of Symantec Storage Foundation can be used by both the Oracle Databases and by your applications or web services.

A volume replication option for Symantec Storage Foundation provides data availability in case of disaster. Volume Replicator supports multiple topologies, including local, campus, and global. It can synchronously replicate databases and applications within a single data center or those up to 100km away while maintaining high performance. Volume Replicator also can asynchronously replicate data to a disaster recovery site where more cost-effective options for storage and servers can be utilized to reduce the cost of recovering the application.

2.5 Cost Avoidance

Symantec and NetApp enable customers to avoid both hardware and software cost without sacrificing performance or database and application availability.

Oracle RAC for high availability requires licensing of all CPU cores for all systems in the RAC. Symantec Cluster File System High Availability eliminates the additional cost of Oracle RAC licenses and reduces the overall number of licensed CPU cores.

Symantec Cached Oracle Disk Manager (CODM) allows customers to reduce the amount of server memory allocated to the Oracle System Global Area (SGA) space while maintaining performance. Symantec analysis has shown that database performance using CODM with 800MB of SGA space equals that of the same database server configured with 4GB of SGA. You can consolidate more databases and reduce costs and infrastructure.

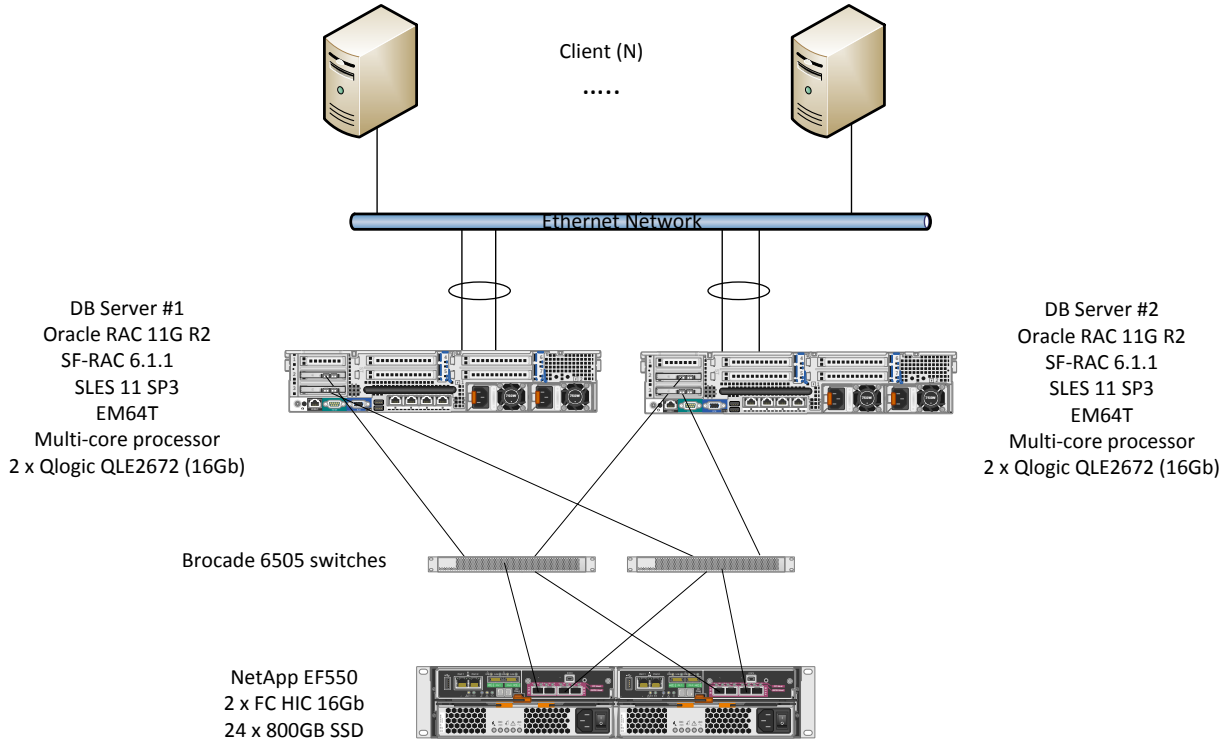
Symantec Storage Foundation offers several database protection options, including space-optimized snapshots with copy-on-write technologies. Many customers use Symantec database protection technologies to allow multiple users, such as Oracle developers or user acceptance testers to safely have access to near-real-time production data. Space-optimized snapshots give instant access to each user while only adding to storage consumption as data is changed. Symantec customers using copy-on-write technology have seen development cycle times reduced by 98% while saving as much as 50% of their storage capacity by utilizing snapshot technologies from Symantec.

3 Solution Overview

Architecting a database solution using Veritas™ Cluster File System from Symantec with NetApp E-Series or EF-Series flash arrays gives customers the ultimate choice in performance, cost, and functionality when compared with engineered offerings.

A high-level view of an example architecture shows a standard multipathed SAN deployment utilizing multiple CFS file systems with a single NetApp array as the primary storage.

Figure 1) Solution architecture*



*Refer to the Interoperability Matrix Tool (IMT) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. Also refer to the Symantec Storage Foundation HCL (hardware compatibility list), for information that indicates the various components that are known to work with a given software product.

Because our configuration has two sockets and does not employ any advanced features, we can use Oracle Standard Licensing. For a larger configuration, or to take advantage of advanced Oracle features including partitioning and transportable tablespaces, we can compare the price with Oracle Enterprise.

Refer to the Interoperability Matrix Tool (IMT) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. The NetApp IMT defines the product components and versions that can be used to construct configurations that are supported by NetApp. Specific results depend on each customer's installation in accordance with published specifications.

NetApp provides no representations or warranties regarding the accuracy, reliability or serviceability of any information or recommendations provided in this publication, or with respect to any results that may be obtained by the use of the information or observance of any recommendations provided herein. The information in this document is distributed AS IS, and the use of this information or the implementation of any recommendations or techniques herein is a customer's responsibility and depends on the customer's ability to evaluate and integrate them into the customer's operational environment. This document and the information contained herein may be used solely in connection with the NetApp products discussed in this document.

© 2014 NetApp, Inc. All rights reserved. No portions of this document may be reproduced without prior written consent of NetApp, Inc. Specifications are subject to change without notice. NetApp and the NetApp logo are trademarks or registered trademarks of NetApp, Inc. in the United States and/or other countries. Symantec, Symantec Logo, the Checkmark logo, and Veritas are trademarks of Symantec Corporation. Oracle is a registered trademark of Oracle Corporation. All other brands or products are trademarks or registered trademarks of their respective holders and should be treated as such.

www.netapp.com