White Paper

EMC Infrastructure for Microsoft Private Cloud

EMC VNX5300, Replication Manager, Microsoft Hyper-V, Microsoft Exchange, SharePoint, SQL Server, System Center

- Optimize infrastructure performance
- Cloud-ready infrastructure
- Automate and simplify management and monitoring

EMC Solutions Group

Abstract

This white paper presents a solution that explores the scalability and performance for mixed application workloads on a Microsoft Hyper-V virtualized platform using an EMC® VNX5300 storage array. It also highlights the ease of management with Microsoft System Center Operations Manager integrated with EMC System Center Management Packs and EMC Storage Integrator.

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Executive summary

Business case

Today, many organizations have made a decisive move to revamp the existing storage strategy by running critical applications like Microsoft Exchange Server, SharePoint Server, and SQL Server on a virtualized infrastructure. By consolidating application servers on a virtualized platform, customers can achieve significant cost reductions and increase the environment's ability to scale.

At the same time, it is a constant critical business challenge for IT departments to maintain or improve the performance of a company's mixed Microsoft applications, while providing an easy-to-manage environment. This solution provides a simplified architecture to host different business applications, ensuring that each business line's information is separated from that of the others. It greatly simplifies the environment and reduces operational and management costs. In accordance with the best practices for Microsoft applications, this solution also showcases a comprehensive design methodology to run consolidated workloads across the EMC® VNX5300 storage platform powered by the Intel® Xeon® processor.

Solution overview

There is a growing need among customers to run multiple workloads/applications on a shared infrastructure and meet expected performance levels at lower costs as dictated by the business service-level agreement (SLA). This solution shows a mixed Microsoft workload of Exchange Server 2010, SharePoint Server 2010, SQL Server 2008 R2, and features an element of high availability (HA) in all application environments.

Furthermore, this solution architecture includes the following components to demonstrate a private cloud solution for customers who are looking for enterprise consolidation with management simplicity:

- Microsoft System Center Virtual Machine Manager (SCVMM) and System Center Operations Manager (SCOM) with EMC System Center Management Packs to manage and monitor the whole environment
- Different Microsoft application workloads running on the Hyper-V platform with VNX5300 integrated with EMC Storage Integrator (ESI) for easy storage provisioning to the platform
- Protection of application data provided by EMC Replication Manager using SnapView™ snapshots
- Brocade® FCX Series network switches delivering high performance and low latency network connectivity for both the iSCSI based IP SAN and end user access to the applications services running in virtual machines.

Key results

The solution offers the following key benefits:

- Easy-to-use and simple management features for administrators to provision and manage the infrastructure. It saves 13 steps to create CSV in a windows cluster by integrating with EMC Storage Integrator.
- Sizing guidance for Microsoft Exchange Server, SharePoint Server, and SQL Server virtual environments for mid-sized environments.

- Excellent performance results achieved during the combined workload of all Microsoft applications for:
  - 2,500 concurrent Exchange users, with a 2 GB mailbox size and 0.20 IOPS user profile.
  - 16,440 SharePoint users with 10% user concurrency on the virtualized SharePoint farm.
  - 45,000 users configured for a SQL TPC-E environment with sustained high disk utilization, considering acceptable user response time and saved storage capacity.
- Minimal performance impact during catastrophic, component-level, hardware failure.
- Robust high performance and low latency IP networking from Brocade, that is easy to configure, manage, and monitor.
- Protection of all three Microsoft applications through Replication Manager with SnapView snapshots, with minimal impact on the production environment. The VNX SnapView snapshots job was completed successfully to protect a 1 TB SharePoint farm:
  - Over 3.5 TB Exchange databases
  - Over a 500 GB SQL Server database
- A typical SQL and SharePoint content databases and Exchange database restore takes only a few minutes.
  - The restore of five Exchange databases, including log files (1.8 TB in total), took around 13 minutes. A 250 GB SQL Server database restore took less than four minutes.
  - Five SharePoint content databases (1 TB in total) restore took 7 minutes, 28 seconds.

Introduction

Purpose

The purpose of this document is to describe a validated reference architecture and provide design guidelines for a mixed Microsoft application solution, including Exchange, SQL, and SharePoint Servers, on the EMC VNX5300 storage system. Microsoft Hyper-V is used as the hypervisor platform and the hosts are connected to the storage via iSCSI, with a cost-effective connectivity infrastructure.

Scope

The scope of this paper is to describe:

- The design methodology and considerations for Microsoft applications on a Hyper-V and VNX5300 platform
- Performance testing methodology and test results
- The impact of a hardware failure on Microsoft applications
- The use of Replication Manager to manage the backup and the design considerations
- The performance impact on applications when using Replication Manager snapshots and the instant restore of the applications
- Easy storage provisioning using ESI
- How discovery and health monitoring of the storage environment is possible through SCOM and the EMC System Center Management Packs

Audience

The intended audience for the white paper is:

- Customers
- EMC partners
- Internal EMC personnel

Terminology

Table 1 provides a description of terminology used in this paper.

Table 1. Terminology

Term	Definition
Background Database Maintenance (BDM)	The process of Exchange 2010 database maintenance that involves check summing both active and passive database copies.
Building block	A building block represents the amount of disk and server resources required to support a specified number of Exchange 2010 users. The required resources depend on: • A specific user profile type • Mailbox size • Disk requirements

Term	Definition
CSV	Without CSV, a failover cluster allows a given disk (LUN) to be accessed by only one node at a time. Given this constraint, each Hyper-V virtual machine in the failover cluster requires its own set of logical units (LUNs) in order to be migrated or fail over independently of other virtual machines. In contrast, on a failover cluster that uses CSV, multiple virtual machines that are distributed across multiple cluster nodes can all access their Virtual Hard Disk (VHD) files at the same time, even if the VHD files are on a single disk (LUN) in the storage. The clustered virtual machines can all fail over independently of one another.
Database availability group (DAG)	A DAG is the base component of the HA and site resilience framework built into Microsoft Exchange Server 2010. A DAG is a group of up to 16 Mailbox servers that hosts a set of databases and provides automatic database-level recovery from failures that affect individual servers or databases.
Pass-through disk	A pass-through disk is where virtual machines have direct access to disks. It is only applicable to block devices such as iSCSI or Fabre Channel (FC).
Recovery time objective (RTO)	RTO is the period of time within which systems, applications, or functions must be recovered after an outage. This defines the amount of downtime that a business can endure.
Virtual Hard Disk (VHD)	This is a publicly available image format specification that allows encapsulation of the hard disk into an individual file for use by the operating system as a virtual disk, in all the same ways that physical hard disks are used. These virtual disks are capable of hosting native file systems (NTFS, FAT, exFAT, and UDFS) while supporting standard disk and file operations.
Volume Shadow Copy (VSS)	The Volume Shadow Copy Service in Windows Server 2008 provides an infrastructure that enables third-party storage management programs, business programs, and hardware providers to cooperate to create and manage shadow copies. VSS coordinates communication between VSS requestors (for example, backup applications), VSS writers (for example, the Exchange 2010 VSS Writer), and VSS providers (system, software, or hardware components that create the shadow copies).