Microsoft® SharePoint® Server 2010 on Dell™ Systems

Solutions for up to 10,000 users

December 2012 (revision 1.1)

Table of Contents

1 Introduction

1.1 Overview

This Microsoft® SharePoint Server 2010 solution architecture manual contains sample configurations that can be used to plan and design your SharePoint 2010 infrastructure. Configurations in this manual are intended to serve as a blueprint or example for organizations whose requirements are similar. Each organization's requirements can vary, and include items not accounted for in these configurations. For assistance in creating a configuration sized to your specific requirements, please contact your Dell representative or visit Dell.com/SharePoint for white papers and performance study papers on SharePoint Server 2010.

1.2 Hardware

Sample solutions described in this manual use the following Dell equipment:

- Dell PowerEdge™ M620
- Dell PowerEdge M820
- Dell PowerEdge™ R620
- Dell PowerEdge™ R720
- Dell PowerEdge™ M1000e
- Dell Force10™ S55
- Dell Force10™ S4810
- Dell PowerConnect™ 7048
- Dell PowerConnect™ M8024-K
- Dell FC 4/8Gbps Blade Module
- Dell EqualLogic™ PS6100X
- Dell Compellent™ Series 40 Storage Center
- Dell EqualLogic PS6110X
- Dell PowerEdge M I/O Aggregator

Click on the links to the product landing pages for additional information on each product.

1.3 Virtualization

Configurations that employ virtualization (hypervisor) software assume a platform approved through Microsoft's Server Virtualization Validation Program and deployed consistent with Microsoft's support guidelines for running Microsoft SharePoint Server 2010 on a virtualization platform. For the set of virtualized configurations in this booklet, the virtualization platforms such as Microsoft Server 2008 R2 Hyper-V, VMware vSphere 5.0, and VMware vSphere 5.1 are used.

1.4 Disclaimer

These sizing recommendations are based on sizing results obtained from Dell's SharePoint Load Generation tool. Each deployment's workload may differ in specific requirements that govern sizing and architecture. These reference architectures present a suggested distribution of SharePoint Server farm roles in either a virtualized environment and/or on physical servers. There are other combinations of distribution possible but not in the scope of this document. The configurations provided in this document provide server and storage sizing guidance and do not provide recommendations for client-side devices.

1.5 Workload Test Mix

The recommendations and sizing guidance are based on the lab testing with a specific SharePoint usage profile and a content database size. The SharePoint content database size and usage profile have a great impact on the farm performance. The reference architectures in this paper do not cover every possible combination of these two factors and are specific only to what has been mentioned here.

The workload profile used in these reference architecture validations is called out as a part of solution requirements for each configuration.

1.5.1 Collaboration Test Mix

Collaboration Test Mix	Number of tests/hr/user
Read Site Home Page	6
Read Survey	2
Read Lists	2
Read Document Library	1
Read Wiki Page	1
Read Picture Library	1
Create Wiki Page	1
Upload Document	1
Search Site	3
Respond to Survey	1
Edit Wiki Page	1
Total tests/hour/connected user	20

1.5.2 Publishing Test Mix

Publishing Test Mix	Number of tests/hr/user
Read Site Home Page	9
Read Picture Library	1
Read Survey	2
Search Site	3
Read Document Library	1
File Upload	1
Create Wiki Page	2
Edit Wiki Page	1
Total tests/hour/connected user	20

2 Rack Server configuration up to 2,500 users in SharePoint collaboration usage profile

2.1 Overview

This reference architecture is for small SharePoint Server 2010 deployments and can support up to 2,500 concurrent users in the SharePoint collaboration workload shown in section 1.5.1. This solution's server, storage and networking design is highly-available.

2.2 Solution Requirements

Number of users	2,500
High Availability	Yes
Virtualized	No
Number of Sites	1
Not included in this solution	Active Directory and other infrastructure elements required to support SharePoint 2010 deployment
Validated usage profile & content DB size	SharePoint collaboration profile with 2TB content database

2.3 Recommended Solution

Server Configurations	Detail
2x Dell PowerEdge R620	Used for SharePoint Server 2010 web front end and application server roles: • 2 x Intel Xeon E5-2603, 1.80GHz, four-core processor • 12GB (6x 2GB DDR3) Memory • 4x 146GB, 15K SAS drives • **OS:** Windows Server 2008 R2 SP1 Enterprise Edition • SharePoint Server 2010 Standard Edition
2x Dell PowerEdge R620	Used for SharePoint Server 2010 database server roles: • 2x Intel Xeon E5-2609, 2.40GHz • 32GB (4x 8GB DDR3) Memory • 4x 146GB 15K SAS Drives • **OS:** Windows Server 2008 R2 SP1 Enterprise Edition • SQL Server 2008 R2 SP1 Standard Edition

Storage Configuration	Detail
1x PowerVault MD3220	Used for SharePoint Server 2010 content databases: 24x 300GB 15K SAS drives
Storage Controller on Dell PowerEdge R620	1x Dell SAS 6Gbps HBA

Network Configuration	Detail
2 x Dell PowerConnect 7048 Switches	Used for SharePoint farm LAN connectivity
Network Controller on Dell PowerEdge R620	4x 1GigE embedded NIC ports

2.4 Architecture Diagram
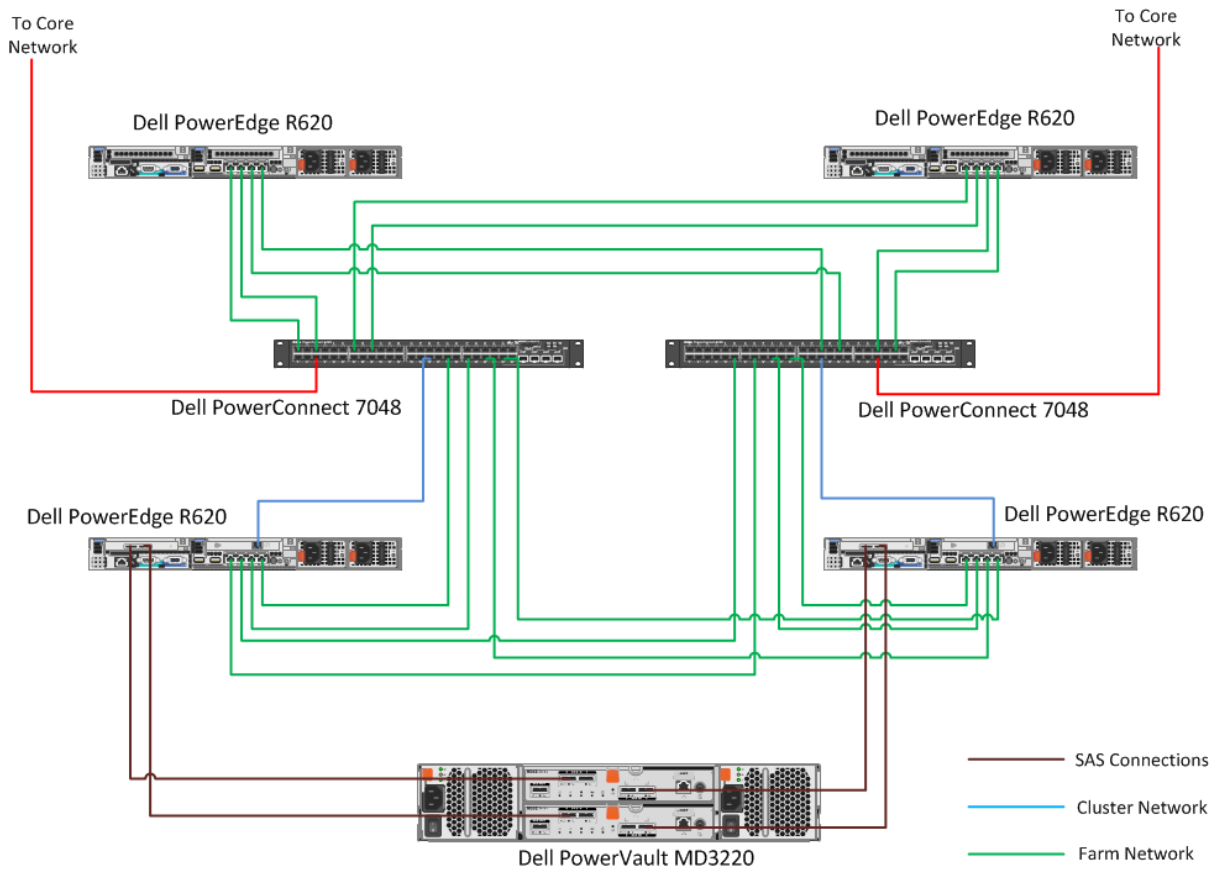
3 Virtualized Rack Server configuration up to 3,500 users in SharePoint collaboration usage profile

3.1 Overview

This reference architecture is for virtualized SharePoint farm deployment for up to 3,500 concurrent users in the SharePoint collaboration workload shown in 1.5.1. This SharePoint solution reference architecture leverages the infrastructure design and best practices of Dell vStart 100 solutions.

3.2 Solution Requirements

Number of users	3,500
High Availability	Yes
Virtualized	Yes
Number of Sites	1
Not included in this solution	Active Directory and other infrastructure elements required to support SharePoint 2010 deployment.
Validated usage profile & content DB size	SharePoint collaboration profile with a 50GB content database

3.3 Recommended Solution

Server Configurations	Detail
3x Dell PowerEdge R720	Used as Hypervisor hosts for hosting the SharePoint Server 2010 farm roles: • 2x Dell PowerEdge R720 • 2x Intel Xeon E5-2660 2.2GHz 8 Core processors • 96GB (12x 8GB DDR3) memory • 4x 300GB 15K SAS • **OS:** Microsoft Windows Server 2008 R2 SP1 Data Center Edition
SharePoint Server 2010 Web front end role	2x Windows Server 2008 R2 SP1 Data Center Edition VMs • 4x vCPUs • 8GB memory • SharePoint Server 2010 SP1 Standard Edition
SharePoint Server 2010 Application Server role	2x Windows Server 2008 R2 SP1 Data Center Edition VMs • 4x vCPUs • 8GB memory • SharePoint Server 2010 SP1 Standard Edition
SharePoint Server 2010 Database Server role	2x Windows Server 2008 R2 SP1 Data Center Edition VMs • 4x vCPUs

	· 16GB memory
	· SQL Server 2008 R2 SP1 Standard Edition
Storage Configuration	**Detail**
2x Dell EqualLogic PS6100X	Storage for SharePoint Content and VM Store: 24x 600GB 10K SAS drives per array
RAID Controller on Dell PowerEdge R720	1x PERC H710P
Network Configuration	**Detail**
2x Dell PowerConnect 6248	Used for SharePoint Server 2010 farm LAN connectivity
2x Dell PowerConnect 6248	Used for SharePoint Server 2010 farm SAN connectivity
Network Controller on Dell PowerEdge R720	4x 1GigE embedded NIC ports 1x 1GigE Broadcom 5719 add-on quad port NIC

3.4 Architecture Diagram
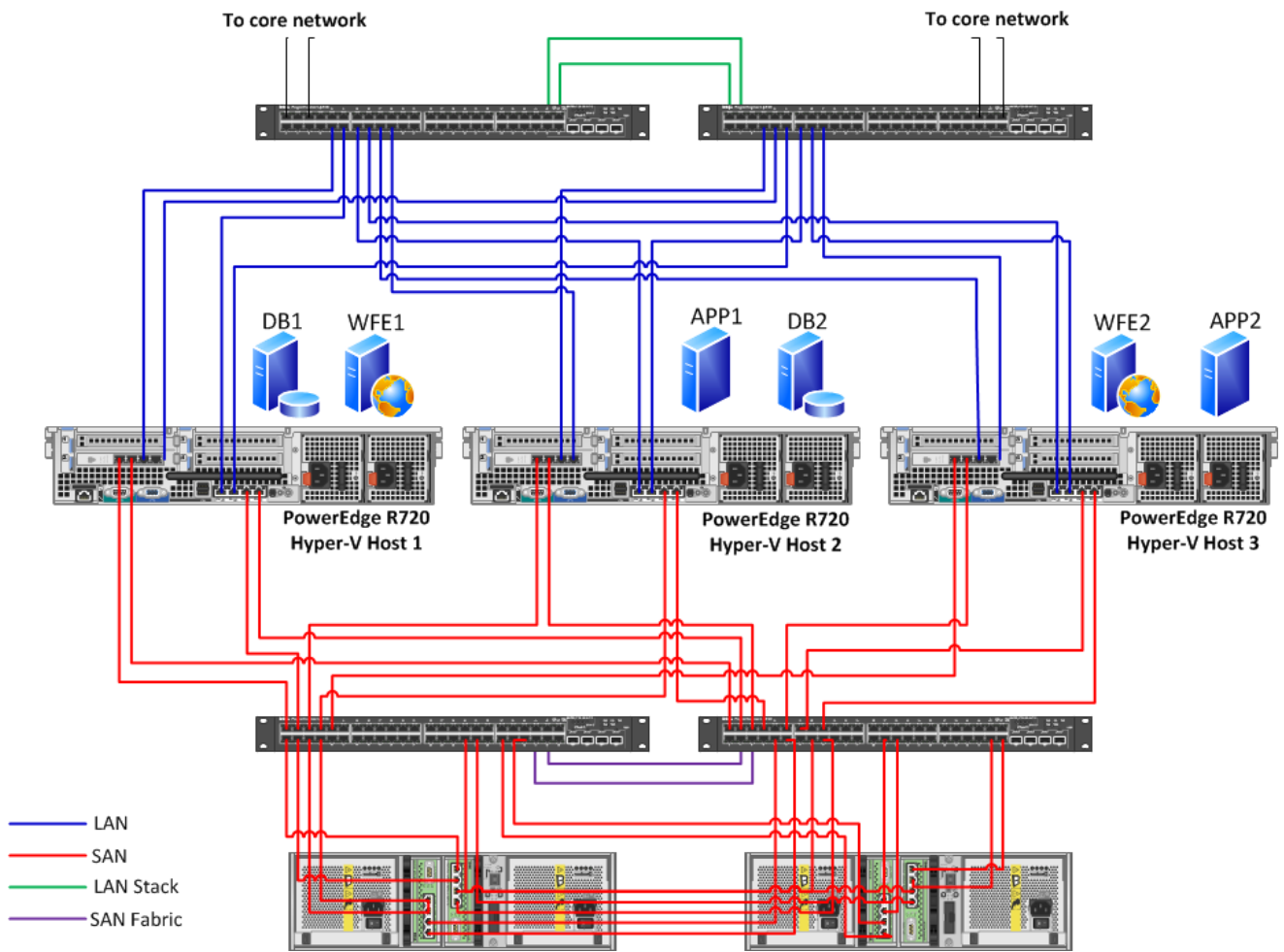
4 Converged M1000e blade configuration up to 10,000 users in SharePoint collaboration usage profile

4.1 Overview

This reference architecture is for large SharePoint farm deployments of up to 10,000 concurrent users in the SharePoint collaboration workload shown in 1.5.1. This configuration uses the converged blade configuration in Dell PowerEdge M1000e blade chassis.

4.2 Solution Requirements

Number of users	10,000
High Availability	Yes
Virtualized	No
Number of Sites	1
Not included in this solution	Active Directory and other infrastructure elements required to support SharePoint 2010 deployment.
Validated usage profile & content DB size	SharePoint collaboration profile with 2TB content DB

4.3 Recommended Solution

Server Configurations	Detail
8x Dell PowerEdge M620	Used for SharePoint Server 2010 6x Web front end and 2x application server roles: • 2x Intel Xeon E5-2609 2.4GHz four-core processors • 16GB (4x 4GB DD3) memory • 2x 300GB 15K SAS • **OS:** Windows Server 2008 R2 SP1 Enterprise Edition • SharePoint Server 2010 SP1 standard Edition
2x Dell PowerEdge M820	Used for SharePoint Server 2010 database server roles • 4x Intel Xeon E5-4607 2.2GHz six-core processors • 96GB (12x 8GB DD3) memory • 2x 300GB 15K SAS • **OS:** Windows Server 2008 R2 SP1 Enterprise Edition • SQL Server 2008 R2 SP1 standard Edition

Storage Configuration	Detail
1x Dell Compellent Series 40 Storage Center	Used for SharePoint Server 2010 content databases, search index and query store: 28x 146GB, 15K, 6Gbps SAS drives
2x Brocade 5300 Fibre Channel switches	Used for Compellent Storage front end port and Dell M1000e Blade chassis connectivity
2x Dell M5424 Blade FC switches	Used for Blade server to Brocade FC top-of-rack switch connectivity
2x Qlogic QME2472 FC4 HBA	Used for Dell Blade server FC connectivity
Network Configuration	Detail
2x Dell PowerConnect 7028 switches	Used for SharePoint Server 2010 farm LAN connectivity
2x Dell PowerConnect M8024-K Blade 10GbE Switches	Used for SharePoint Server 2010 farm inter-chassis and top-of-rack (ToR) connectivity
Network Controller on Dell PowerEdge M620	2x 1GigE embedded NIC ports
Network Controller on Dell PowerEdge M820	4x 1GigE embedded NIC ports
Load Balancer Configuration	Detail
2x F5 BIG-IP 3900 LTM Hardware Load balancers	Used for load balancing SharePoint front end traffic

4.4 Architecture Diagram

Figure 1a: Front view of Blade Chassis and Compellent Series 40 Storage Array

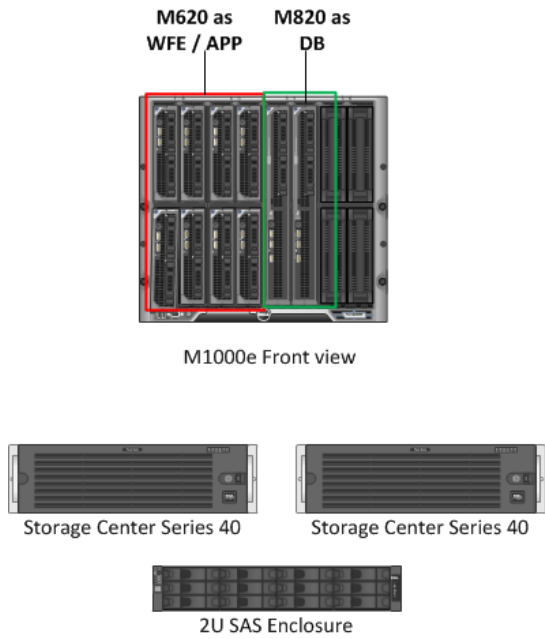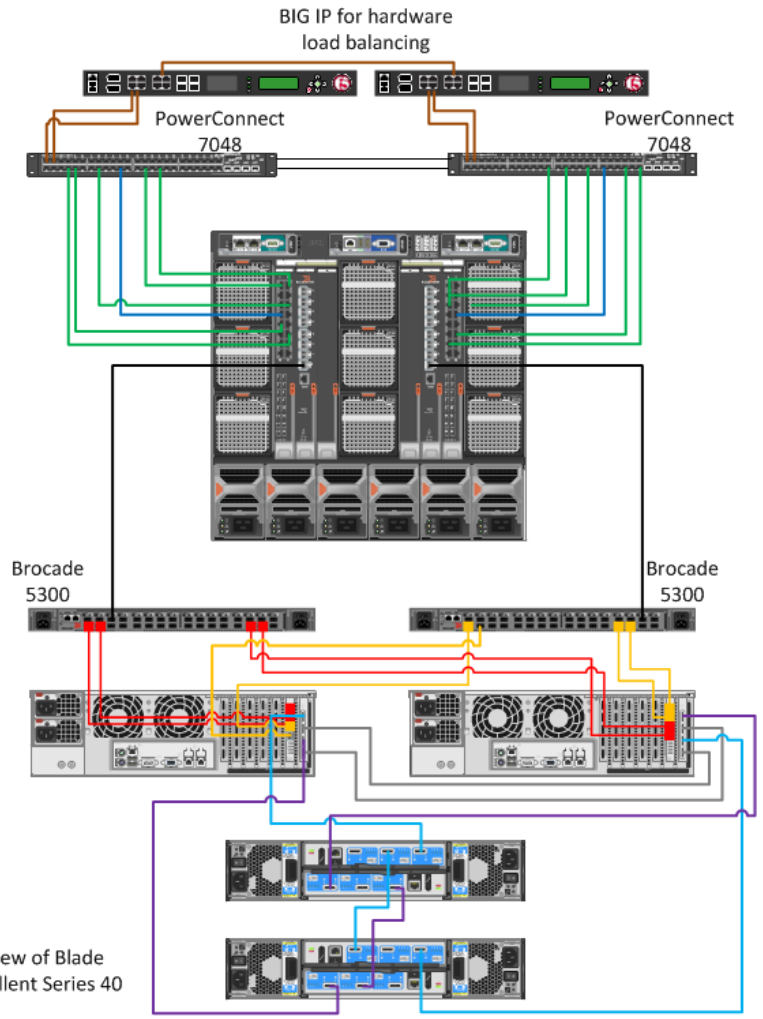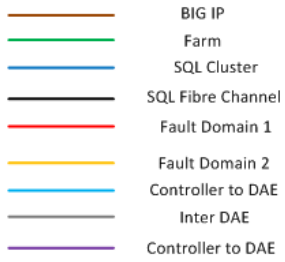Figure 1b: Rear view of Blade Chassis and Compellent Series 40 array

5 Partially virtualized, converged M1000e blade configuration up to 10,000 users in SharePoint mixed usage profile

5.1 Overview

This reference architecture is for large, partially virtualized SharePoint deployments for up to 10,000 concurrent users in the SharePoint mixed usage profile as shown in sections 1.5.1 and 1.5.2.

5.2 Solution Requirements

Number of users	10,000
High Availability	Yes
Virtualized	Partially virtualized
Number of Sites	1
Not included in this solution	Active Directory and other infrastructure elements required to support SharePoint 2010 deployment.
Validated usage profile & content DB size	SharePoint mixed (70% collaboration and 30% publishing) profile with 2TB content DB

5.3 Recommended Solution

Server Configurations	Detail
4x Dell PowerEdge M620	Used as hypervisor hosts to host SharePoint Server 2010 Farm web front end and application server roles as virtual machines: • 2x Intel Xeon E5-2620 2.4GHz six-core processors • 64GB (8x 8GB DD3) memory • 2x 146GB 15K SAS • **Hypervisor:** VMware vSphere 5.0 Update 1
SharePoint Server 2010 Web frontend role	4x Windows Server 2008 R2 SP1 Data Center Edition VMs • 8x vCPUs • 16GB memory • SharePoint Server 2010 SP1 Standard Edition
SharePoint Server 2010 Application role	2x Windows Server 2008 R2 SP1 Data Center Edition VMs • 4x vCPUs • 16GB memory • SharePoint Server 2010 SP1 Standard Edition
2x Dell PowerEdge M820	Used for SharePoint Server 2010 database server roles:

	• 2x Intel Xeon E5-4620 2.2GHz eight-core processors • 96GB (12x 8GB DD3) memory • 2x 300GB 15K SAS • **OS**: Windows Server 2008 R2 SP1 Enterprise Edition • SQL Server 2008 R2 SP1 standard Edition
Storage Configuration	**Detail**
1x Dell Compellent Series 40 Storage Center	Used for SharePoint Server 2010 content databases, search index and query store: 28x 146GB, 15K, 6Gbps SAS drives
2x Brocade 5100 Fibre Channel switches	Used for Compellent Storage front end port and Dell M1000e Blade chassis connectivity
2x Dell M5424-N Blade FC access gaetway	Used for Blade server to Brocade FC top-of-rack switch connectivity
1x Qlogic QME2572 FC8 HBA	Used for Dell Blade server FC connectivity
Network Configuration	**Detail**
2x Dell Force10 S4810 switches	Used for SharePoint Server 2010 farm top-of-rack LAN connectivity
1x Dell Force10 S55 Switch	Used for SharePoint farm infrastructure management interface connectivity
Network Controller on Dell PowerEdge M620	1x Broadcom 57810-K 10GbE dual port Blade NDC
Network Controller on Dell PowerEdge M820	2x Broadcom 57810-K 10GbE dual port Blade NDC
2x M8024-K Blade Ethernet switches	Used for blade server and top-of-rack farm connectivity
Load Balancer Configuration	**Detail**
2x F5 BIG-IP LTM virtual load balancers	Used for load balancing SharePoint front end traffic • 2x vCPUs • 4GB memory

5.4 Architecture Diagram

1x Force10 S55

M820 as database hosts

4x WFE VM

2x APP VM

2x Force10 S4810

2x M8024-K IO Modules in A1 & A2 Fabric

2x M5424-N FC Modules in B1 & B2 Fabric

M620 as virtualization hosts

Brocade 5100   Brocade 5100

Storage Center Series 40

2x 2U SAS Enclosure

Managament
LAN
FC Connectivity
Fault Domain 1
Fault Domain 2
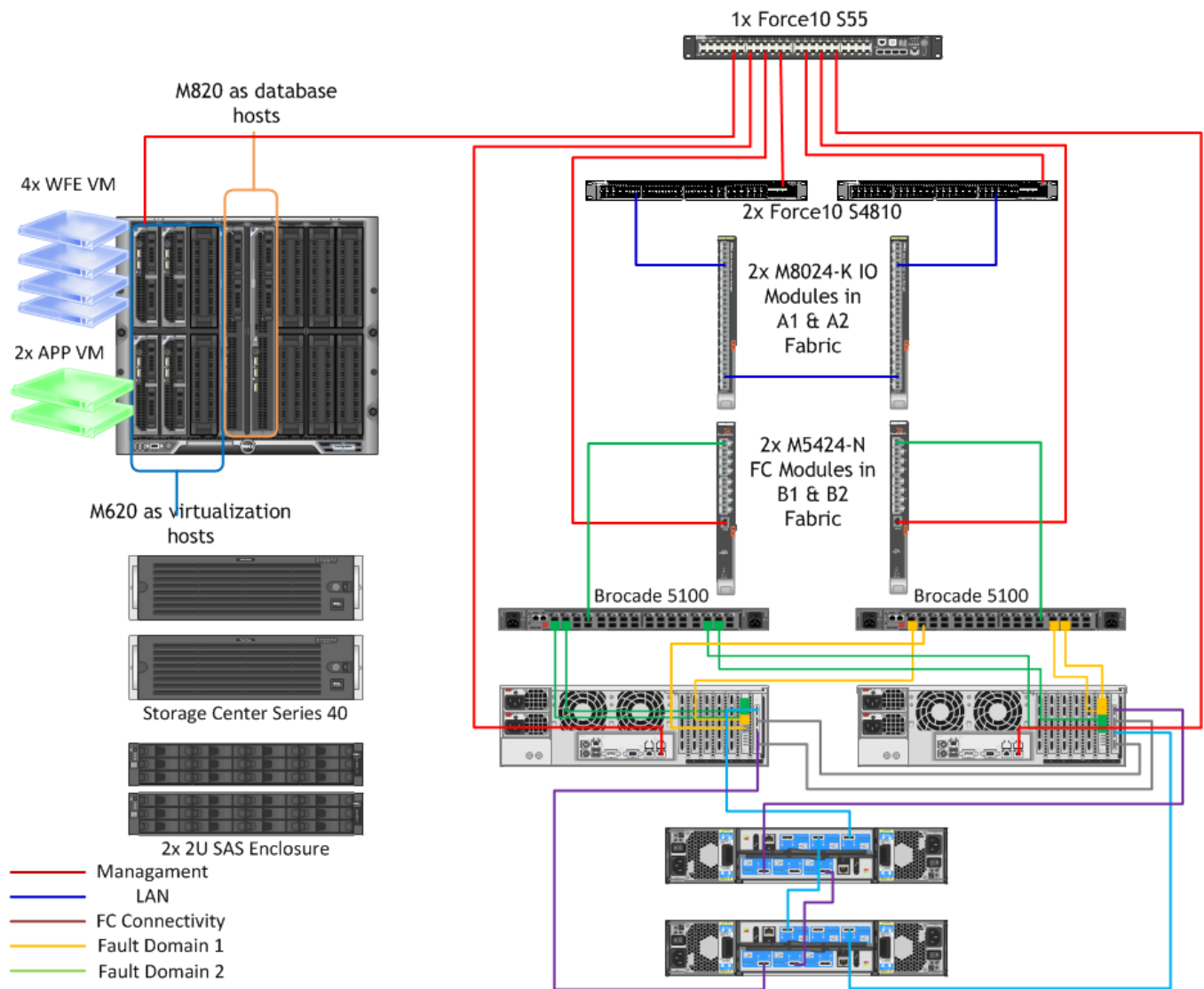
6 Dell Active Infrastructure

Dell Active Infrastructure is a family of converged infrastructure solutions that combine servers, storage, networking, and infrastructure management into an integrated and optimized system that provides general purpose virtualized resources. Active Infrastructure leverages Dell innovations, including unified management through Dell Active System Manager, converged LAN/SAN fabrics, and blade servers for a solution that can be easily deployed and operated in a unified manner. Active Infrastructure's block of storage, server, and converged networks increase efficiency in Microsoft SharePoint Server 2010 by accelerating SharePoint delivery and ensuring there is no single point of failure in the environment. On Dell Active Infrastructure, SharePoint Services ignore the individual hardware configuration of the storage, server, and networks, so the following architectures present the individual storage, specific networks, and VM configurations without hardware. Please refer to the specific Active System documentation for this information.

6.1 Dell Active System 800v with 5,000 Users

As a member of the Dell Active Infrastructure family, the Active System 800v Solution, is a converged infrastructure solution that has been designed and validated by Dell Engineering based on VMware® vSphere 5.1®. This reference architecture is for a mid-size SharePoint deployment with up to 5,000 users. It does not consume all of Active System 800v's hardware resources, therefore, this solution can be deployed with other workloads on the Active System. For more information about this specific configuration of SharePoint, see *'Microsoft SharePoint Server 2010 Implementation on Active System 800v'.*

Active System 800v includes Dell PowerEdge M1000e blade chassis with Dell PowerEdge M I/O Aggregator, Dell PowerEdge M620 blades, Dell EqualLogic Storage, Dell Force10 network switches, and VMware vSphere 5.1. The solution also includes Dell PowerEdge R620 servers as management servers. Dell Active System Manager, VMware vCenter Server, EqualLogic Virtual Storage Manager for VMware, and OpenManage™ Essentials, are included with the solution. For more details on Active System 800v please refer to the *'Specification Guide for an Active System 800 with VMware vSphere'.*

6.2 Solution Requirements

Targeted number of users	Up to 5,000
High availability	Yes
Virtualized	Yes
Number of sites	1
Not included in this solution	Active Directory and other infrastructure elements required to support SharePoint 2010 deployment.
Validated usage profile & content DB size	SharePoint collaboration profile with a 2TB content database

6.3 Recommended Solution

Server Configurations	Detail
SharePoint Server 2010 web front end role	2x Windows Server 2008 R2 SP1 Enterprise Edition VMs • 6x vCPUs • 16GB memory • SharePoint Server 2010 SP1 Standard Edition

	• 3x vNICs for SharePoint farm public (front end network), WFE-APP to SQL communication (application network), and management network
SharePoint Server 2010 application server role	2x Windows Server 2008 R2 SP1 Enterprise Edition VMs • 4x vCPUs • 8GB memory • SharePoint Server 2010 SP1 Standard Edition • 2x vNICs for WFE-APP to SQL communication (application network) and management network
SharePoint Server 2010 database server role	2x Windows Server 2008 R2 SP1 Enterprise Edition VMs in SQL Server Database mirror configuration • 6x vCPUs • 64GB memory • SQL Server 2008 R2 SP1 Standard Edition • 3x vNICs for WFE-APP to SQL communication (application network), SQL-SQL communication network (sql private network), and management network
Storage Configuration	**Detail**
Virtual machine datastore for operating system	VMFS virtual hard drive shared with Active Infrastructure
Storage for SharePoint content	2x Dell EqualLogic PS6100X 24x 900GB 10K SAS drives per array

6.4 Architecture Diagram